

ALL INDIA COORDINATED RESEARCH PROJECT ON FORAGE CROPS (Indian Council of Agricultural Research)



ANNUAL REPORT (2010-11) Part-I : Kharif-2010

Project Coordinating Unit AICRP on Forage Crops IGFRI, Jhansi – 284 003 (U.P.)

May, 2011

AICRP on Forage Crops Tech. Pub. Number 6/2010-11

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May, 2011 AICRP, Jhansi – 284 003 (U.P.)

Published by:

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Distribution:

AICRP (FC) Centres, Coordinating Unit, ICAR Officers at the Headquarters and selected distinguished forage scientists.

Group Meeting Organized at:

CSK Himachal Pradesh Krishi Vishva Vidyalaya,Palampur Dated:Sept.30 to October 2, 2010

Credits:

All the staff of AICRP (FC) Centres, PI's, Sh. O.N. Arya (Statistical Analysis), Sh. Sushil Khare (Conduct of trials and analysis), Sh. V.K. Paliwal (Computation) Sh. Dayal and Amar Singh (Xeroxing)

PREFACE

The Annual Report (2010-11), Part I – Kharif 2010 embodies the research trial results in the areas of forage crop improvement, crop production and crop protection with the view to develop and test the technologies for better quality/quantity forage production in different agro climatic situations. This report is the out come of sincere efforts made by all contributing scientists and staff at the Coordinating Unit and AICRP Centres. They have been successful in conduct of trials and activities as per the technical programme and meeting the targets fixed for Kharif 2010. The forage crops tested during the period under report, included forage cereals and legumes adaptable to a vide range of agro-ecological regions of the country. Weather data has also been recorded from all testing Centres and the same is linked to crop growth etc. The breeder seed produced under the DAC indent is also compiled and reported.

Results have been presented in the form of chapters. The results of forage crop improvement trials is given in Chapter 1, which includes multi- locations test performance of newly developed genetic material in both single and dual-purpose forage species. The findings on crop production studies are presented in Chapter-2 which includes: optimization of nitrogen levels in forage-based cropping systems, forage production potential of multi cut sorghum with forage legumes, location specific research on weed management, agronomical trial for AVT-2 entries of Pearl millet, rice bean. Chapter-3 deals with different aspects of plant protection in selected forage species, viz., sorghum, maize, pearl millet and cowpea and generation of technologies for pest management in the selected crops. Other chapters include details of in house breeding activities, weather details etc.

The contribution and sincere efforts made by each and every member of the team and their associates at the Centres deserve appreciation in achieving the objectives of this project. Their valuable contribution for our all outputs of AICRP on Forage Crops is gratefully acknowledged.

My colleagues at Project Coordinating unit, Dr. R.V. Kumar, (PS & PI Plant breeding) and Dr. S.R.Kantwa (Sr. Scientist Agronomy) and technical officers, Shri O.N. Arya and Shri S.K. Khare provided support in distribution of seed/planting material for the trials; conducting field trials at the Coordinating Unit, analysis and synthesis of data of trials conducted at all the locations. Dr. U.S. Tiwana, Professor (Agronomy), PAU, Ludhiana helped in reporting and analyzed results of agronomical trials. Forage Crop Protection trials have been conducted and coordinated by Shri K.C. Pandey, Dr. N. Hasan and Shri R.B. Bhaskar. Their contributions are thankfully acknowledged.

The efforts of Shri S.K. Khare, Shri, V.K. Paliwal and Shri, Kamlesh in computer-based work of the Report and those of Shri Dayal and Shri Amar Singh in Xeroxing and organizing this Report are sincerely acknowledged.

The administrative support and cooperation being received from Dr K.A. Singh, Director, and other colleagues at IGFRI is thankfully acknowledged.

Meeting all the targeted activities would not have been possible but for the active leadership support and encouragement received from Dr. S. Ayyappan, Secretary DARE & DG ICAR; Dr. Swapan K Datta, DDG(CS); Dr R. P. Dua, ADG (FFC). Each and every one in the Team at AICRP on Forage Crops gratefully acknowledges this support.

Dated: April 14, 2011 Place: Jhansi S. A. Faruqui Project Coordinator

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EXECUTIVE SUMMARY

The present report describes results of the coordinated trials conducted on Crop Improvement, Crop Production and Crop Protection as well as the Breeder Seed Production of the different forage crops during Kharif 2010 at different locations/centres in the country placed in five zones *viz.*, Hill zone, North-West zone, North-East zone, Central zone and South zone. Weather data are also reported to correlate the growth and yield of forage crops with weather parameters at different sites during crop period.

A. FORAGE CROP IMPROVEMENT

In Kharif 2010, nineteen breeding trials of six annual and six perennial forage species comprising 83 entries with their respective national and zonal checks were conducted at 39 Centres located in five zones. The forage species evaluated were Maize, Pearl millet, Cowpea, Rice bean, Soybean and Dinanath grass in annuals and Guinea grass, *Cenchrus ciliaris*, Bajra Napier hybrid, *Setaria ancep, Lasiurus sindicus* and *Cenchrus setigerus* in perennials. Two trials in annuals i.e. Pearl millet and Rice bean and one in perennial i.e. Guinea grass has completed its final year of evaluation and other trials are continued.

These forage trials were classified into three groups *viz.*, Initial Varietal Trial (IVT), Advanced Varietal Trial Stage-1 (AVT-1) and Advanced Varietal Trial Stage-2 (AVT-2). The summarized results of different cultivated annual and perennial forage evaluation trials are as below:

a. ANNUAL FORAGES

MAIZE

In Maize, there was only one trial i.e. IVT comprising three entries along with two national checks *viz.*, African Tall and J-1006 and one zonal check *viz.*, PMC-6. Results indicated that except for entry BAUFM-08-5-1 (2.4%) in North–East zone, none of the entries performed better than checks for green forage yield (q/ha) at zonal or national level. For dry matter yield (q/ha), entry BAUFM-08-5-1 (1.1%) exhibited superiority in North-East zone whereas rest of the entries were not able to exhibit superiority over check at zonal or national level. Similarly for fodder production potential (q/ha/day), none of the entries exhibited superiority over checks.

PEARL MILLET

IVT in forage pearl millet comprised five entries and two national checks *viz.*, Raj Bajra chari-2 and Giant Bajra and results revealed that for the character green forage yield entries NDFB-904 (10.5%) and RBB-1 (9.8%) in North-East zone proved their superiority over national check whereas in other zones as well at national level Giant Bajra performed better in comparison to other entries. For the character dry matter yield (q/ha), entries NBFB-904 (7.3%) and RBB-1 (8.5%) in North-East zone, PAC-981 (23.2%) in central zone, and

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5.5% in South zone proved their superiority over best national check. Again at national level entry PAC-981 (8.1%) ranked first for this character.

Results of AVT-2 comprising six entries and two national checks revealed that for the character green forage yield (q/ha), entries JHPM-08-1 (16.9%), AFB-3 (9.7%) and AFB-4 (9.1%) in North-West zone, entries JHPM-08-1 in North-East zone (25.7%) and Central zone (1.3%) proved their superiority over best national check. At national level too, entry JHPM-08-1 (8.4%) was found to be superior with respect to best check. Similarly for dry matter yield (q/ha), entries AFB-3 (11.6%), AFB-4 (9.8%) and JHPM-08-1 (8.1%) in North-West zone and entry JHPM-08-1 (14.2%) in North-East zone were adjudged good performer in comparison to check. Even at national level, entry JHPM-08-1 (7.5%) was ranked first. In green forage production potential (q/ha/day), entries JHPM-08-1, AFB-4 and AFB-3 exhibited their superiority and in dry matter production potential (q/ha/day), entries JHPM-08-1 (was adjudged best performer.

In AVT-2 (seed), entries NDFB-13 (44.5%) and NDFB-11 (22.7%) in North-East zone, entries NDFB-11 (30.7%), AFB-3 (21.4%) and NDFB-13 (12.1%) in Central zone proved their superiority with respect to best check for seed yield (q/ha). However in North-West zone national check RBC-2 (16.9 q/ha) and in South zone national check Giant Bajra (37.8 q/ha) ranked first in seed yield production. At national level, entry AFB-3 with seed yield of 17.7 q/ha maintained superiority followed by entry AFB-4 (17.3 q/ha).

COWPEA

In IVT with four entries along with two national checks *i.e.*, Bundel Lobia-1 and UPC-5286 and three zonal checks *i.e.*, Bundel Lobia-2, UPC-622 and UPC-9202, entry MFC-09-1 (7.3%) in Hill zone and 7.0% in South zone exhibited superiority over best national or zonal check for green forage yield (q/ha). Even at national level performance of entry MFC-09-1 (0.6%) was at par with best national check UPC-5286. For the character dry matter yield (q/ha), only one entry MFC-09-1 (0.3%) in Hill zone, Central zone (1.2%) and South zone (1.7%), exhibited superiority over best national or zonal check. At all India level entry MFC-09-1 (1.9%) was adjudged best performer with respect to national check.

In AVT-1 comprising three entries namely MFC-08-14, IC-202797 and IL-1177, entry IL-1177 excelled in performance for green forage yield (q/ha) with 10.5% superiority in North-East zone and 16.0% superiority in South zone. Entry MFC-08-14 (11.0%) exhibited superiority in South zone. On national level, entry IL-1177 (8.9%) performed better than best national check. For dry matter yield (q/ha), none of the entries performed better than respective national/zonal check in Hill, North-West and Central zone. In North-East and South zone, entry IL-1177 exhibited 5.9% superiority whereas in South zone entry MFC-08-14 exhibited 14.2% superiority. At national level too, entry IL-1177 (0.8%) adjudged as best performer.

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RICE BEAN

Results of the IVT comprising four entries along with one national check *i.e.*, Bidhan-1 revealed that for green forage yield (q/ha), entries BFRB-15 (7.3%) followed by JRB-11 (6.6%) and JRBJ-05-4 (6.4%) exhibited their superiority over check. Similarly for dry matter yield (q/ha), entries JRB-13 (6.0%), BFRB-15 (5.4%), JRB-14 (2.5%) and JRBJ-05-4 (2.3%) proved their superiority with respect to check. In green forage as well as dry matter production potential (q/ha/day), all the test entries expect JRBJ-05-4 performed better than the check.

In AVT-2 with entries JRBJ-05-2, KRB-19 and JRB-10 and one national check i.e., Bidhan-1, all the test entries exhibited their superiority with respect to check for green forage as well as dry matter yield (q/ha). For green forage yield, entries KRB-19 (20.6%), JRBJ-05-2 (8.1%) and JRB-10 (7.5%) registered their superiority over check whereas for dry matter yield (q/ha), entries KRB-19 (21.8%), JRBJ-05-2 (11.7%) and JRB-10 (10.8%) proved their superiority. For green forage and dry matter production potential (q/ha/day), entry KRB-19 ranked first followed by JRB-10 and JRBJ-05-2. For evaluation against growth parameter, entries KRB-19 (135.60 cm) ranked first followed by JRB-10 (131.80 cm) and JRBJ-05-2 (127.90 cm).

In AVT-2 for seed, all the entries exhibited superiority over national check for seed yield (q/ha). The entry JRB-10 with seed yield of 6.43 q/ha ranked first followed by entry JRBJ-05-2 (6.31 q/ha) and KRB-19 (6.22 q/ha).

SOYBEAN

In AVT-1, four entries namely JS-07-21-7, JS-07-24-13, JS-07-24-8 and JS-07-24-1 were evaluated and compared over general mean for particular character as there is no released variety. Results of the trial revealed that for green forage yield (q/ha), entries JS-07-24-13 (10.2%) and JS-07-24-8 (8.2%) and for dry matter yield (q/ha) entries JS-07-24-13 (7.6%) and JS-07-24-8 (6.0%) were adjudged good performer.

DINANATH GRASS

In Dinanath grass, an initial varietal evaluation trial comprising five entries along with two checks namely Bundel Dinanath-1 and Bundel Dinanath-2 was conducted and results clearly revealed that entry JHPP-1 (2.6 and 0.83%) exhibited superiority for green forage and dry matter yield, respectively over best national check Bundel Dinanath-2.

a. PERENNIAL FORAGES GUINEA GRASS

In Guinea grass, a total of three trials were undertaken in which one was established in 2007, second one in 2008 and third one in 2009. The trial which was established in 2007 has completed its cycle and final result is presented. This trial comprised six entries along with three national checks namely Riversdale. PGG-616 and JHGG-96-5. Results revealed that for green forage yield (q/ha), entry JHGG-07-2 (10.0%) and for dry matter yield (q/ha),

entries JHGG-07-2 (13.2%) and JHGG-07-3 (10.2%) performed their superiority over best check.

In other perennial crops, varietal trial on *Lasiurus sindicus*, *Cenchrus ciliaris*, Bajra Napier hybrid, *Cenchrus setigerus* and *Setaria ancep* is continued.

B. FORAGE CROP PRODUCTION

In forage crop production programme during 2010, total of 13 trials for coordinated and specific locations were conducted at 22 sites under AICRP on forages crops. Influence of resource conservation techniques on forage production and physico-chemical status of soil was under taken at twenty locations spread across five agro-climatic zones. In forage crop production programme major area of research included: Resource conservation techniques on forage production, nutrient management in different cropping system, forage crop production with waste water, tillage and nutrient management, location specific research for management of sodic and acidic soils with amendments, weed management and development of agronomical data on new genotypes for variety development. The summarized results of forage crop production programme during Kharif 2010 are as below:

Experiment conducted for optimization of nitrogen for maize in different forage based cropping system and its results revealed that adopting of berseem-sorghum cropping system recorded significantly higher fodder yield (601.4 q/ha) over rest of the cropping systems at Ludhiana. Sorghum fodder equivalent yield was also highest (2431 q/ha) in berseem-sorghum cropping system followed by wheat-bajra-sorghum (2321.1 q/ha) and wheat-cowpea-sorghum (2138.1 q/ha) cropping systems. The net monetary returns were also highest in the same cropping system at Ludhiana. At Pantnagar, the green fodder yield, crude protein and net returns were not influenced by different cropping systems but the highest fodder yield (611.6 q/ha) of sorghum was observed in oats-maize-sorghum cropping system. Application of increasing levels of nitrogen up to 125 % of recommended dose of N to sorghum significantly increased the green fodder, dry matter and sorghum fodder equivalent yields over lower levels of N at both the locations.

The fodder yield of multi-cut sorghum with forage legumes (Cowpea and guar) was significantly higher than sole sorghum at Ludhiana, Bikaner and Palampur (with rice bean instead of guar). At Ludhiana, the fodder yield of sorghum with forage legumes was significantly higher (265.7 to 330.2 q/ha) in the first cutting than sole crop of sorghum (238.1 q/ha). The increase in seed rate of forage legumes to 100 %, the fodder yield decreased at all the locations (except Pantnagar where, fodder yield increased with increase in seed rate of cowpea upto 100 % and rice bean up to 75 %). At Pantnagar, the highest fodder yield (343.0 q/ha) was recorded with sole sorghum than sorghum with forage crops. The net monetary returns (ranging between Rs. 34593 to 43693 /ha) in sorghum with forage legumes were significantly higher than sole sorghum (Rs 30193/ha).

At Ludhiana, a field experiment was conducted to evaluate the herbicides for the control of *Acrachne racemosa* weed in sorghum fodder and results revealed that weed was effectively controlled with all the herbicide treatments. The dry weight of weeds decreased significantly with herbicides (0.25 to 1.4 q/ha) than control (2.0 q/ha). The highest fodder yield (663.3 q/ha) was obtained with pre emergence application of atrazine 0.75 kg /ha + stomp 2.5 l/ha which was significantly higher over rest of the treatments but was at par with atrazine 1.0 kg/ha + stomp 2.5 l /ha (613.8 q/ha). The crude protein content increased with the application of herbicides (5.10 to 6.48 %) as compared to control (5.08 %).

An AVT based trial was conducted at 8 locations to findout the response of promising AVT-2 entries of pearl millet (single cut grown for fodder) with supplementation of graded doses of N. The result revealed that none of the entries surpassed the national check Giant Bajra in green fodder (340.2 q/ha), dry matter yield, CP content and CP yield. The central and western region produced higher yield of pearl millet than eastern and southern zone (except at Coimbatore). The influence of N was linear upto the highest tested rate of application (90 kg/ha).

A field trial was conducted at 3 locations for testing response of P levels to rice bean entries promoted to AVT-2 stage. The inference of location of mean data indicated that entries KRB-19 and JRBJ 05-02 were superior in GFY (by 7.4 and 24.8 %) and dry matter yield (by 5.06 and 22.8 %) over the check, respectively. Entry JRBJ 05-02 out yielded at Jorhat and Jabalpur, whereas K-1 (check) was superior at Kalyani. JRBJ 05-02 entry recorded highest GFY (368.98 q/ha) over rest of the entries. The response of P to rice bean was significantly upto 60 kg P_2O_5 /ha at Jabalpur whereas, significant response was observed upto 30 kg P_2O_5 /ha at Jorhat and Kalyani.

C. FORAGE CROP PROTECTION

Forage crop protection trials in major kharif forages included pest occurrence, evaluation of varietal resistance in improved breeding materials and pest management. The trials were conducted at Anand, Bhubaneswar, Hisar, Hyderabad, Jhansi, Ludhiana, Palampur and Rahuri.

Monitoring of diseases, insect pests and nematodes in sorghum, pearl millet, maize and cowpea revealed that at Jhansi zonate leaf spot, sooty stripes, anthracnose and grey leaf spot diseases were predominant during high humidity 80-95% and maximum temperature 35°C. At Anand Anthracnose disease was moderate (12.45%) disease intensity where as at Ludhiana grey leaf spot dominated under mean RH 90-95% and temperature. 30-33°C with 75 % disease severity. Among the insect pest shoot fly infestation was 79% at Anand. Myllocerus weevil and aphids occurred during the crop season. High population density of nematodes (550-1050/250gm soil) was recorded at Jhansi. In pearl millet leaf spot and rust were the major disease at Jhansi, Anand and Bhubaneswar. Shoot fly, stem borer and Myllocerus weevil infestation occurred during crop season at Anand, Jhansi, Hyderabad

V

and Rahuri. Five nematodes species (*Halicotylenchus, Pratylenchus, Hoplolaimus, Tylenchorhynchus & Meloidogyne*) were recorded in moderate to high population density 246-1020/250gm soil at Jhansi. In maize leaf blight disease occurred at Anand, Jhansi, Ludhiana, Palampur and Bhubaneswar in moderate intensity. Shoot borer, shoot fly and Myllocerus weevil were the insect at Jhansi and Hyderabad. Stunt nematode was found to be the dominated species with high population density (950-1056/250gm soil) Jhansi. In cowpea root rot incidence (18-28%) were recorded at Jhansi Anthracnose and mosaic diseases occurred at 50% flowering stage of the crop at Anand. At Palampur severe incidences of root rot (53%) were recorded. *Cercospora* leaf spot and Anthracnose incidences occurred at Ludhiana. Among the insect pest moderate to high infestation of aphids and jassids were recorded at Rahuri. Flea beetle infestation was severe (82.8 holes/plant) at Bhubaneswar. Higher root knot index (>3.0) of *Meloidogyne* spp. was recorded at Jhansi.

In trial on evaluation of varietal resistance in breeding trial showed that cowpea entry UPC-803 was found least infested with aphid and jassid at Rahuri. This entry also showed resistant reaction against nematodes at Jhansi. Entry UPC-804 and UPC-622 showed minimum root rot 9.4 and 12.4% respectively. AVT entry IC-202797 showed resistant against aphids at Jhansi. In pearl millet IVT entry RBB-1 and AFB-5 showed resistant to leaf spot disease at Bhubaneswar, entry NDFB-914 was found resistant to shoot fly at Anand. In AVT entries AFB-3 and AFB-4 showed resistance to leaf spot diseases at Jhansi. Entries RBC-2 and JHPM-08-1 were found resistant to stem borer at Hyderabad and moderately resistant to nematode at Jhansi. In soybean, AVT entries were found resistant to yellow mosaic virus at Hisar and Jhansi. Entry JH-07-24-8 was found resistant to leaf blight and entry JRBJ-10 was found resistant to yellow mosaic virus at Jhansi. In were found resistant to yellow mosaic virus at Jhansi. In maize, IVT entry APFM-08-1 showed minimum leaf blight incidences at Bhubaneswar, Jhansi and Palampur. Entry MFM-09-2 was found least infested with shoot borer and shoot fly at Hyderabad.

In trial on integrated disease management in fodder maize revealed that all the treatments provided superior control of leaf blight at Ludhiana and Palampur. However, T-4 (Seed Treatment with vita vex @ 2gm per kg + Mancozeb spray @ 0.25%) provided maximum diseases control (47%) at both the centre. This treatment also provided maximum fodder yield.

In trial on management of cowpea sucking pest and yellow mosaic in seed crop T-7 (seed treatment with Imidacloprid @ 5gm/kg followed by foliar spray of Imidacloprid @ 0.3ml/l provided maximum pest and disease control (>50%) at Anand, Palampur and Rahuri. In trial on management of shoot fly in forage sorghum, the application of Imidacloprid as foliar spray @ 0.3ml/l at 10 days after sowing provided maximum reduction (>50%) of shoot fly infestation and increase in GFY and DMY at Hyderabad.

VI

In trial on management of root rot disease in cowpea the result revealed that seed treatment with *Trichoderma viridae* @ 5gm/kg seed + FYM @ 2 t/ha provided minimum disease incidences (10.80%) and maximum GFY (271.25k/ha) and DMY (65.61 k/ha). This treatment also provided maximum net monetary return (Rs. 15700/ha/yr) over the control.

D. BREEDER SEED PRODUCTION

In Kharif 2010, the indent for breeder seed production was received from DAC, Gol for 19 varieties in five major forage crops *viz.*, Maize, Cowpea, Pearl Millet, Sorghum and Teosinte (BSP-1). The allocation of total quantity of Breeder seed (106.92q) was made to nine breeder seed producing centres of the different SAUs/ICAR institutes. Among quantity indented the maximum was for Maize i.e. 63.22 q (59.13%) followed by Sorghum (23.00q-21.51%) and in other forage crop i.e. Teosinte (10.00q-9.35%), Cowpea (9.20q-8.60%) and Pearl millet (1.50q-1.40%), it was less than 10 percent which shows that among several forage crops, seed of only these two crops was demanded in substantial quantity.

The final breeder seed production report (BSP-IV) received from different producing centres indicated that except for Teosinte, breeder seed production in all other crops was higher than the indented quantity. As compared to indent in Maize (63.22q), the actual production was 92.68q, in Sorghum against indent of 23.00q, production was 28.62q, in Cowpea, against indent of 9.20q, production was 16.10q and in Pear millet against indent of 1.50q actual production was 8.50q. The over all breeder seed production was 42.07 percent higher as evident from seed production of 151.90q against the indent for 106.92q.

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ALL INDIA CCOORDINATED RESEARCH PROJECT ON FORAGE CROPS ZONES & COORDINATED CENTERS & TESTING LOCATIONS

Zone		Coordin	nated Centers			Testing Location (Coordinating Centers)					
	SI. No.	Location	Establishment Year	State	SI. No.	Location	State				
I. Hill States = 03 Locations = 2+2 = 4	1. 2.	Palampur, CSK, HPKV Srinagar, SKUAT	1970 2010	Himachal Pradesh Jammu & Kashmir	1. 2.	Rajouri, SKUAT (Jammu) Almora, VPKAS*	Jammu & Kashmir Uttarakhand				
II. North West States = 05 Locations = 4+5 = 9	3. 4. 5. 6.	Ludhiana, PAU Hisar, CCS HAU Pantnagar, GBPUAT Bikaner, SKRAU	1989 1970 1995 1995	Punjab Haryana Uttarakhand Rajasthan	3. 4. 5. 6. 7.	Avikanagar, IGFRI-RRS* Jodhpur, CAZRI-RRS* Jalore, RAU-RRS Udaipur MPUAT Meerut, SVBPUA&T	Rajasthan Rajasthan Rajasthan Rajasthan Uttar Pradesh				
III. North East States = 8 Locations = 6+2= 8	7. 8. 9. 10. 11. 12.	Faizabad, NDUAT Ranchi, BAU Kalyani, BCKV Bhubaneswar,OUAT Jorhat, AAU Imphal, CAU	1982 1970 1972 1987 1970 2010	Uttar Pradesh Jharkhand West Bengal Orissa Assam Manipur	8. 9.	Umiam (Barapani), ICAR Res. Complex for NEH Region* Pusa, RAU	Meghalaya Bihar				

Zone		Coordin	nated Centers			Testing Location (Coordina	ting Center)
	SI. No.	Location	Establishme nt Year	State	SI. No	Location	State
IV. Central	13.	Anand, AAU	1970	Gujarat	10.	Kanpur, CSAU&T	Uttar Pradesh
States = 5	14.	Jabalpur, JNKVV	1970	Madhya Pradesh	11.	Jhansi, IGFRI*	Uttar Pradesh
Locations = $5+5=10$	15.	Rahuri, MPKV	1971	Maharashtra	12.	Dhari & Jamnagar, GAU	Gujrat
	16.	Urulikanchan, BAIF	1982	Maharashtra	13.	Akola, PRDKVV	Maharashtra
	17.	Raipur, IGKV	2010	Chhattisgarh	14.	Dapoli & Palighar, KKV	Maharashtra
V. South	18.	Mandya, UAS (B)	1986	Karnataka	15.	Dharwad, IGFRI-RRS*	Karnataka
States =5	19.	Coimbatore, TNAU	1976	Tamil Nadu	16.	Raichur, UAS (D)	Karnataka
Locations = $4+3 = 7$	20.	Vellayani, KAU	1971	Kerala	17.	Pondicherry, PJLNCA & RI, Karaikal	Pondicherry
	21.	Hyderabad, ANGRAU	1970	Andhra Pradesh			

Summary: Zone = 5, States = 26, Coordinating Centres = 21, Testing Locations = 17

*ICAR Institute

AICRP ON FORAGE CROPS: ENTRIES DECODE FOR KHARIF 2010 Forage Breeding Trials

Contributor	Entry name	Code name	Contributor	Entry name	Code name
1. IVT Maize			2. IVT Pearl Millet	-	
NC	J-1006	IVTM-1	Faizabad 1	NDFB-904	IVTPM-1
Mandya	MFM-09-2	IVTM-2	Faizabad 2	NDFB-914	IVTPM-2
Hyderabad	APFM-08-1	IVTM-3	Bikaner	RBB-1	IVTPM-3
NC	African Tall	IVTM-4	NC	RBC-2	IVTPM-4
ZC	PMC-6	IVTM-5	NC	Giant Bajra	IVTPM-5
Ranchi	BAUFM-08-5-1	IVTM-6	Anand	AFB-5	IVTPM-6
			Advanta	PAC-981	IVTPM-7
3. AVT Pearl Mille	et-2		4. AVT Pearl Mille	t-2 (Seed)	
NC	RBC-2	AVTPM-1	NC	RBC-2	AVTPMS-1
Faizabad	NDFB-11	AVTPM-2	Faizabad	NDFB-11	AVTPMS-2
Faizabad	NDFB-13	AVTPM-3	Faizabad	NDFB-13	AVTPMS-3
Anand	AFB-3	AVTPM-4	Anand	AFB-3	AVTPMS-4
Anand	AFB-4	AVTPM-5	Anand	AFB-4	AVTPMS-5
Jhansi	JHPM-08-1	AVTPM-6	Jhansi	JHPM-08-1	AVTPMS-6
NC	Giant Bajra	AVTPM-7	NC	Giant Bajra	AVTPMS-7
5. IVT Cowpea			6. AVT Cowpea-1		
Pantanagar 1	UPC-803	IVTC-1	ZC	Bundel Lobia-2	AVTC-1
Pantnagar 2	UPC-804	IVTC-2	ZC	UPC-622	AVTC-2
NC	Bundel Lobia-1	IVTC-3	ZC	UPC-9202	AVTC-3
NC	UPC-5286	IVTC-4	Mandya	MFC-08-14	AVTC-4
Hyderabad	APFC-10-1	IVTC-5	NBPGR	IC-202797	AVTC-5
Mandya	MFC-09-1	IVTC-6	NC	Bundel Lobia-1	AVTC-7
ZC	Bundel Lobia-2	IVTC-7	NC	UPC-5286	AVTC-8
ZC	UPC-622	IVTC-8		* AVTC-6	Not in the trial
ZC	UPC-9202	IVTC-9	Jhansi	IL-1177	AVTC-9
7. IVT Ricebean			8. AVT Ricebean-2	2	1
NC	K-1 (Bidhan-1)	IVTR-1	Jabalpur	JRBJ-05-2	AVTR-1
Jorhat 1	JRB-13	IVTR-2	Kalyani	KRB-19	AVTR-2
Jorhat 2	JRB-14	IVTR-3	NC	K-1 (Bidhan-1)	AVTR-3
Bhubneshwar	BFRB-15	IVTR-4	Jorhat	JRB-10	AVTR-4
Jabalpur	JRBJ -05-4	IVTR-5			
9. AVT Ricebean-	2 (Seed)		10. AVT Soybean-	1	
Jabalpur	JRBJ-05-2	AVIRS-1	Jabalpur	JS07-21-7	AVIS-1
Kalyani	KRB-19	AVTRS-2	Jabalpur	JS07-24-13	AVIS-2
NC	K-1 (Bidhan-1)	AVIRS-3	Jabalpur	JS07-24-8	AVIS-3
Jorhat	JRB-10	AVIRS-4	Jabalpur	JS07-24-1	AVIS-4
44. V/TOO 0007				04.0	
14. VIGG-2007	11100 07 4	00.07.4	19. VI Dinanath-2		
Jhansi	JHGG-07-1	GG-07-1	Jhansi	JHPP-1	VID-10-1
Jnansi	JHGG-07-2	66-07-2	Jnansi-4	BUN-11 Dundal Discussibut	VID-10-2
Jnansi	JHGG-07-3	GG-07-3	NC	Bundel Dinanath-1	VID-10-3
	JHGG-96-5		INC Donobi 1	Bundel Dinanath-2	VID-10-4
	PGG-702	66-07-5		BDN-15	VID-10-5
	PGG-/10		Ranchi 2	BDN-5	VID-10-6
	PGG-129		Ranchi 3	DUN-3	VID-10-7
	FGG-010	99-07-9	1		

AICRP ON FORAGE CROPS: ENTRIES DECODE FOR KHARIF 2010 Forage Agronomy Trials

AST-13 Pea	rl Millet (AVT-2		AST-14 Rice		
S.No.	Code Name	Entry Name	S.No.	Code Name	Entry Name
1	V1	JHPM-08-1	1	V1	JRB-10
2	V2	Raj Bajra Chari-2 (NC)	2	V2	Bidhan-1
3	V3	Giant Bajra (NC)	3	V3	KRB-19
4	V4	NDFB-13	4	V4	JRPJ-05-02
5	V5	NDFB-11			
6	V6	AFB-4			
7	V7	AFB-3			

CHAPTER-1 FORAGE CROP IMPROVEMENT

1. IVTM: INITIAL VARIETAL TRIAL IN FORAGE MAIZE

(Table Reference: 1.1 to 1.9)

Results of the initial varietal trial in forage maize comprising three entries along with two national checks *viz.*, African Tall and J-1006 and one zonal check *i.e.*, PMC-6 reported from 22 centres of five zones indicated that except for entry BAUFM-08-5-1 (2.4%) in North–East zone, none of the entries performed better than checks for green forage yield (q/ha) at zonal or national level. For dry matter yield (q/ha), entry BAUFM-08-5-1 (1.1%) exhibited superiority in North-East zone whereas rest of the entries were not able to exhibit superiority over check at zonal or national level.

Similarly for fodder production potential (q/ha/day), none of the entries exhibited superiority over checks. National checks African Tall and J-1006 maintained their superiority for green forage yield and dry matter yield at zonal and national level. For the character plant height (cm), national checks maintained their superiority. In quality parameters like crude protein yield (q/ha) and crude protein (%), African Tall ranked first. For the character leafiness (L/S ratio) again African Tall exhibited superiority. For other quality attributes entry BAUFM-08-5-1 ranked first for ADF (%), African Tall for NDF (%), PMC-6 for IVDMD (%) and APFM-08-1 for DDM (q/ha).

1

AICRP on Forage Crops

				•			•							Cont			
	Hill Zone									North West Zone							
Entries	Sri- nagar	Ra- jouri	Palam- pur	Aver- age	Rank	Superi- ority%	Ludhi- ana	Hisar	Pant- nagar	Udai- pur	Jalour	Aver- age	Rank	Superi- ority%			
MFM-09-2	300.5	156.1	398.2	284.9	4		270.8	240.3	421.7	236.1	447.7	323.3	6				
APFM-08-1	330.7	180.6	456.2	322.5	2		302.1	372.2	316.7	425.3	451.3	373.5	3				
BAUFM-08-5-1	287.3	156.3	444.4	296.0	5		244.8	284.7	450.0	336.8	422.0	347.7	5				
African Tall (NC)	309.8	239.6	499.2	349.5	1		281.3	358.3	415.0	373.3	417.7	369.1	4				
J-1006 (NC)	241.5	170.1	504.1	305.2	3		350.7	393.1	420.0	392.9	441.3	399.6	2				
PMC-6 (ZC)							329.9	381.9	316.7	557.3	513.7	419.9	1				
Mean	294.0	180.5	460.4	311.6			296.6	338.4	390.0	387.0	449.0	372.2					
CD at 5%	4.1	19.5	47.1				2.2	37.2	39.6	23.8	23.4						
CV%	1.1	7.0	6.6				5.8	7.3	5.6	4.1	2.9						

Table1.1: IVTM- Initial Varietal Trial in Forage Maize: Green Forage Yield (q/ha)

				•			•		,							Cont
			North	East Zo	ne			Central Zone								
Entries	Ranchi	Faiza- bad	Bhub- neshwar	Jorhat	Aver- age	Rank	Superi- ority%	Anand	Jhansi	Jabal- pur	Ra- huri	Uruli- kanchan	Dhari	Aver- age	Rank	Superi- ority%
MFM-09-2	361.9	180.6	320.8	166.8	257.5	5		358.0	377.6	372.3	526.8	569.8	47.8	375.4	5	
APFM-08-1	453.0	116.4	308.3	176.4	263.5	4		433.0	408.7	455.5	520.6	772.0	49.8	439.9	3	
BAUFM-08-5-1	525.9	212.0	364.6	237.0	334.9	1	2.4	399.0	350.7	436.8	591.1	686.2	51.6	419.2	4	
African Tall (NC)	609.3	163.5	352.1	175.9	325.2	2		475.0	459.2	528.3	551.3	821.0	47.5	480.4	2	
J-1006 (NC)	489.5	186.3	312.7	229.7	304.6	3		475.0	497.7	517.9	646.2	821.0	33.7	498.6	1	
PMC-6 (ZC)																
Mean	487.9	171.8	331.7	197.2	297.1			428.0	418.8	462.2	567.2	734.0	46.1	442.7		
CD at 5%	98.9	38.9	41.0	5.5				31.1	38.9	51.3	54.1	63.2	7.9			
CV%	13.9	14.8	4.0	11.4				4.7	6.0	15.7	6.2	13.8	11.2			

Table1.1: IVTM- Initial Varietal Trial in Forage Maize: Green Forage Yield (q/ha)

					dia					
Entries	Hyderabad	Coimbatore	Vellayani	Mandya	Average	Rank	Superiority%	Average	Rank	Superiority%
MFM-09-2	254.0	583.3	411.3	461.3	427.5	4		339.3	5	
APFM-08-1	236.0	524.3	338.8	452.5	387.9	5		367.3	4	
BAUFM-08-5-1	299.0	510.4	377.5	650.5	459.4	3		378.1	3	
African Tall (NC)	306.0	576.4	397.5	731.1	502.8	1		413.1	1	
J-1006 (NC)	261.0	645.8	327.5	646.6	470.2	2		409.3	2	
PMC-6 (ZC)										
Mean	271.2	568.0	370.5	588.4	449.5			383.6		
CD at 5%	NS	69.2	39.0	93.1						
CV%	13.0	7.9	6.8	10.3						

Table1.1: IVTM- Initial Varietal Trial in Forage Maize: Green Forage Yield (q/ha)

				-	-			-					Cont	
			Hill 2	Zone			North West Zone							
Entries	Srinagar	Rajouri	Palam- pur	Average	Rank	Superi- ority%	Ludhi- ana	Hisar	Pant- nagar	Udai- pur	Average	Rank	Superi- ority%	
MFM-09-2	65.8	32.4	73.4	57.2	3		66.4	44.4	94.2	22.5	56.9	6		
APFM-08-1	73.4	39.7	68.7	60.6	2		77.0	66.8	70.3	45.2	64.8	4		
BAUFM-08-5-1	58.9	33.2	69.9	54.0	5		58.8	47.1	103.8	57.0	66.7	3		
African Tall (NC)	67.9	50.8	74.4	64.4	1		70.3	51.8	93.6	39.7	63.9	5		
J-1006 (NC)	52.5	36.4	81.5	56.8	4		92.9	66.8	96.1	41.7	74.4	1		
PMC-6 (ZC)							86.7	59.2	74.9	57.7	69.6	2		
Mean	63.7	38.5	73.6	58.6			75.4	56.0	88.8	44.0	66.0			
CD at 5%	2.9	5.1	NS				1.0	7.7	11.9	4.9				
CV%	3.0	8.7	17.0				10.2	9.1	7.4	7.4				

Table1.2: IVTM- Initial Varietal Trial in Forage Maize: Dry Matter Yield (q/ha)

				•					• •							Cont
			North E	East Zor	ne			Central Zone								
Entries	Ranchi	Faiza- bad	Bhub- neshwar	Jorhat	Aver- age	Rank	Superi- ority%	Anand	Jhansi	Jabal- pur	Ra- huri	Uruli- kanchan	Dhari	Aver- age	Rank	Superi- ority%
MFM-09-2	70.2	46.3	70.3	31.1	54.5	5		59.8	88.4	87.3	107.5	99.9	7.8	75.1	5	
APFM-08-1	91.7	33.2	63.3	34.7	55.7	4		75.3	89.4	108.1	109.3	127.8	7.9	86.3	3	
BAUFM-08-5-1	110.5	46.5	84.0	55.5	74.1	1	1.1	58.2	88.5	104.0	110.2	111.3	9.4	80.3	4	
African Tall (NC)	153.9	29.4	72.3	37.7	73.3	2		75.1	118.5	126.8	92.6	145.7	7.9	94.4	2	
J-1006 (NC)	93.2	55.8	63.9	56.6	67.4	3		77.4	107.1	128.9	147.3	134.6	6.2	100.3	1	
PMC-6 (ZC)																
Mean	103.9	42.2	70.8	43.1	65.0			69.2	98.4	111.0	113.4	123.9	7.8	87.3		
CD at 5%	21.0	11.3	7.3	2.8				5.0	21.5	12.4	11.1	18.6	1.6			
CV%	13.1	17.5	3.3	12.7				4.7	14.2	15.7	6.4	14.8	13.2			

Table1.2: IVTM- Initial Varietal Trial in Forage Maize: Dry Matter Yield (q/ha)

				All India						
Entries	Hyderabad	Coimbatore	Vellayani	Mandya*	Average	Rank	Superiority%	Average	Rank	Superiority%
MFM-09-2	63.2	81.6	80.7	89.9	75.2	4		64.7	5	
APFM-08-1	57.4	76.7	66.4	77.4	66.8	5		69.1	4	
BAUFM-08-5-1	71.4	70.4	74.0	219.7	71.9	2		71.1	3	
African Tall (NC)	58.8	76.7	78.0	267.5	71.2	1		76.1	2	
J-1006 (NC)	60.7	101.5	64.2	154.1	75.5	3		78.3	1	
PMC-6 (ZC)										
Mean	62.3	81.4	72.7	161.7	72.1			72.0		
CD at 5%	NS	11.0	7.7	58.7						
CV%	18.0	8.8	6.9	28.3						

Table1.2: IVTM- Initial Varietal Trial in Forage Maize: Dry Matter Yield (q/ha)

*Not included in zonal and all India average due to CV \geq 20

											Cont
Entries	Udaipur	Anand	Rahuri	Faizabad	Mandya	Hyderabad	Palampur	Jorhat	Urulikanchan	Ludhiana	Vellayani
MFM-09-2	4.03	8.33	10.54	2.54	10.61	3.62	6.75	3.55	10.96	4.92	7.09
APFM-08-1	7.33	9.21	9.64	1.79	9.96	3.38	7.28	3.75	13.79	5.49	5.84
BAUFM-08-5-1	5.45	7.82	10.75	3.07	10.01	4.27	7.11	3.60	11.63	3.95	6.51
African Tall (NC)	4.89	7.66	8.23	2.59	10.91	4.37	8.26	2.67	12.07	5.02	6.86
J-1006 (NC)	5.92	9.50	11.14	2.74	11.09	3.72	8.01	3.51	13.46	5.75	5.65
PMC-6 (ZC)	9.44									5.41	
Mean	6.18	8.50	10.06	2.55	10.52	3.87	7.48	3.42	12.38	5.09	6.39

Table1.3: IVTM- Initial Varietal Trial in Forage Maize: Green Forage Yield (q/ha/day)

Table1.3: IVTM- Initial Varietal Trial in Forage Maize: Green Forage Yield (q/ha/day)

Entries	Jhansi	Coimbatore	Dhari	Jabalpur	Ranchi	Rajouri	Hisar	Bhubneshwar	Pantnagar	Srinagar	Average	Rank
MFM-09-2	6.19	12.15	0.72	4.40	8.00	2.15	3.94	5.73	8.43	3.87	6.12	3
APFM-08-1	6.70	10.49	0.72	5.60	8.72	2.51	6.10	5.32	4.40	4.29	6.30	2
BAUFM-08-5-1	5.75	8.51	0.75	5.50	9.98	2.17	4.67	5.98	6.29	3.72	6.07	4
African Tall (NC)	7.53	9.61	0.67	6.60	9.37	3.33	5.87	5.68	6.10	4.00	6.30	2
J-1006 (NC)	8.16	12.19	0.51	6.60	9.61	2.36	6.44	5.21	6.97	3.08	6.74	1
PMC-6 (ZC)							6.26		4.67			
Mean	6.87	10.59	0.67	5.74	9.14	2.50	5.55	5.58	6.14	3.79	6.33	

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r	-			-				Cont
Entries	Udaipur	Anand	Rahuri	Fiazabad	Hyderabad	Jorhat	Urulikanchan	Ludhiana
MFM-09-2	0.37	1.39	2.15	0.65	0.90	0.66	1.92	4.92
APFM-08-1	0.77	1.60	2.02	0.51	0.82	0.73	2.28	5.49
BAUFM-08-5-1	0.91	1.14	2.00	0.67	1.02	0.84	1.89	3.95
African Tall (NC)	0.51	1.21	1.38	0.47	0.84	0.57	2.14	5.02
J-1006 (NC)	0.67	1.55	2.54	0.82	0.87	0.86	2.21	5.75
PMC-6 (ZC)	0.97							5.41
Mean	0.70	1.38	2.02	0.62	0.89	0.73	2.09	5.09

Table1.4: IVTM- Initial Varietal Trial in Forage Maize: Dry Matter Yield (q/ha/day)

Table1.4: IVTM- Initial Varietal Trial in Forage Maize: Dry Matter Yield (q/ha/day)

Entries	Jhansi	Coimbatore	Jabalpur	Ranchi	Hisar	Bhubneshwar	Pantnagar	Average	Rank
MFM-09-2	1.45	1.70	1.00	1.61	0.73	1.25	1.57	1.48	4
APFM-08-1	1.47	1.53	1.30	1.78	1.10	1.09	0.98	1.56	2
BAUFM-08-5-1	1.45	1.17	1.30	2.09	0.77	1.38	1.45	1.47	5
African Tall (NC)	1.94	1.28	1.50	2.44	0.85	1.17	1.38	1.51	3
J-1006 (NC)	1.76	1.92	1.60	1.86	1.10	1.07	1.59	1.74	1
PMC-6 (ZC)					0.97		1.09		
Mean	1.61	1.52	1.34	1.96	0.92	1.19	1.34	1.56	

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								Cont
Entries	Anand	Rahuri	Faizabad	Mandya	Hyderabad	Palampur	Jorhat	Urulikanchan
MFM-09-2	3.3	9.9	3.3	12.5	3.9	7.2	2.9	10.4
APFM-08-1	4.2	8.9	2.1	10.0	3.8	6.1	3.5	12.9
BAUFM-08-5-1	3.2	9.8	3.8	33.2	5.3	5.9	6.0	8.7
African Tall (NC)	4.2	7.7	2.0	36.1	4.4	7.0	4.0	14.5
J-1006 (NC)	4.3	11.8	4.2	21.9	3.2	8.0	5.3	11.0
PMC-6 (ZC)								
Mean	3.8	9.6	3.1	22.7	4.1	6.9	4.3	11.5

Table1.5: IVTM- Initial Varietal Trial in Forage Maize: Crude Protien Yield (q/ha)

Table1.5: IVTM- Initial Varietal Trial in Forage Maize: Crude Protien Yield (q/ha)

Entries	Ludhiana	Coimbatore	Jabalpur	Ranchi	Hisar	Bhubneshwar	Average	Rank
MFM-09-2	1.7	8.2	6.6	5.5	4.8	5.4	6.1	5
APFM-08-1	1.6	8.4	8.5	6.0	7.7	4.6	6.3	4
BAUFM-08-5-1	1.4	6.8	8.3	8.2	4.8	6.6	8.0	2
African Tall (NC)	1.5	8.6	10.6	12.8	5.7	5.5	8.9	1
J-1006 (NC)	2.3	10.6	10.4	6.5	6.1	5.5	7.9	3
PMC-6 (ZC)	2.1				6.9			
Mean	1.8	8.5	8.9	7.8	6.0	5.5	7.5	

								Cont
Entries	Anand	Rahuri	Faizabad	Mandya	Hyderabad	Palampur	Jorhat	Urulikanchan
MFM-09-2	5.4	9.2	7.2	13.9	6.1	9.8	9.5	10.3
APFM-08-1	5.6	8.2	6.2	12.9	6.6	9.0	10.2	10.1
BAUFM-08-5-1	5.5	8.9	8.1	15.1	7.5	8.5	11.0	7.9
African Tall (NC)	5.6	8.3	6.8	13.5	7.5	9.4	10.8	10.0
J-1006 (NC)	5.5	8.0	7.5	14.2	5.3	9.8	9.4	8.2
PMC-6 (ZC)								
Mean	5.5	8.5	7.1	13.9	6.6	9.3	10.2	9.3

Table1.6: IVTM- Initial Varietal Trial in Forage Maize: Crude Protien (%)

Table1.6: IVTM- Initial Varietal Trial in Forage Maize: Crude Protien (%)

Entries	Ludhiana	Ciombatore	Ranchi	Hisar	Bhubneshwar	Jabalpur	Average	Rank
MFM-09-2	9.0	10.1	7.9	10.7	7.7	7.7	8.9	2
APFM-08-1	7.3	11.0	6.6	11.5	7.3	8.1	8.6	4
BAUFM-08-5-1	8.0	9.6	7.4	10.3	7.8	8.0	8.8	3
African Tall (NC)	7.3	11.4	8.3	10.9	7.6	8.3	9.0	1
J-1006 (NC)	8.6	10.5	7.0	9.2	8.5	8.2	8.6	4
PMC-6 (ZC)	8.5			11.7				
Mean	8.1	10.5	7.4	10.7	7.8	8.1	8.8	

											Cont
Entries	Udaipur	Anand	Faizabad	Mandya	Hyderabad	Palampur	Jorhat	Urulikanchan	Ludhiana	Vellayani	Jhansi
MFM-09-2	191.3	199.8	127.5	199.0	150.0	194.5	168.9	221.2	160.0	182.5	232.2
APFM-08-1	201.3	200.3	98.2	169.2	171.0	163.7	147.5	243.8	185.0	158.8	233.8
BAUFM-08-5-1	200.0	219.2	132.2	203.8	176.0	211.2	195.7	250.4	186.3	206.3	242.8
African Tall (NC)	256.3	218.0	105.8	194.2	131.0	172.5	204.1	306.3	180.0	231.3	254.8
J-1006 (NC)	221.3	223.8	130.2	219.8	183.0	178.7	188.7	252.1	185.0	188.8	224.4
PMC-6 (ZC)	237.5								213.8		
Mean	218.0	212.2	118.8	197.2	162.2	184.1	181.0	254.8	185.0	193.5	237.6

Table1.7: IVTM- Initial Varietal Trial in Forage Maize: Plant Height (cm)

Table1.7: IVTM- Initial Varietal Trial in Forage Maize: Plant Height (cm)

Entries	Coimbatore	Dhari	Rahuri	Jabalpur	Ranchi	Rajouri	Jalour	Hisar	Bhubneshwar	Pantnagar	Srinagar	Average	Rank
MFM-09-2	216.3	76.8	209.0	161.1	170.5	204.0	176.7	151.4	194.6	185.7	258.0	183.2	5
APFM-08-1	263.0	71.4	235.0	194.1	210.8	213.6	198.3	153.7	177.2	195.3	228.0	187.0	4
BAUFM-08-5-1	279.8	66.8	243.0	194.6	218.6	202.9	213.0	173.9	208.5	194.0	239.0	202.6	3
African Tall (NC)	292.0	79.5	212.0	217.8	219.9	212.9	195.3	165.2	201.3	204.3	255.0	205.0	1
J-1006 (NC)	272.3	76.8	235.0	192.9	223.1	250.0	215.3	164.9	187.2	211.3	241.0	203.0	2
PMC-6 (ZC)							236.0	182.8		178.0			
Mean	264.7	74.3	226.8	192.1	208.6	216.7	205.8	165.3	193.8	194.8	244.2	196.9	

											Cont
Entries	Udaipur	Faizabad	Mandya	Hyderabad	Palampur	Jorhat	Urulikanchan	Ludhiana	Vellayani	Jhansi	Coimbatore
MFM-09-2	0.44	0.68	0.35	0.28	0.59	0.51	0.78	0.40	0.43	0.32	0.35
APFM-08-1	0.48	0.57	0.51	0.28	0.51	0.82	0.89	0.50	0.40	0.36	0.35
BAUFM-08-5-1	0.51	0.65	0.47	0.29	0.56	0.73	0.80	0.40	0.59	0.33	0.32
African Tall (NC)	0.35	0.61	0.32	0.36	0.46	0.78	0.86	0.40	0.66	0.32	0.32
J-1006 (NC)	0.50	0.70	0.46	0.29	0.52	0.74	0.90	0.80	0.44	0.35	0.35
PMC-6 (ZC)	0.43							0.30			
Mean	0.45	0.64	0.42	0.30	0.53	0.72	0.85	0.47	0.50	0.34	0.34

Table1.8: IVTM- Initial Varietal Trial in Forage Maize: Leaf Stem Ratio

Table1.8: IVTM- Initial Varietal Trial in Forage Maize: Leaf Stem Ratio

Entries	Dhari	Rahuri	Jabalpur	Ranchi	Rajouri	Hisar	Bhubneshwar	Pantnagar	Srinagar	Average	Rank
MFM-09-2	0.94	0.43	0.53	0.56	0.40	0.22	1.00	0.18	0.43	0.49	4
APFM-08-1	0.84	0.42	0.55	0.59	0.42	0.28	0.81	0.33	0.35	0.51	3
BAUFM-08-5-1	0.88	0.40	0.51	0.72	0.31	0.42	0.98	0.24	0.40	0.53	3
African Tall (NC)	1.11	0.35	0.65	0.57	0.40	0.40	1.04	0.29	0.45	0.54	1
J-1006 (NC)	0.88	0.35	0.67	0.51	0.29	0.35	0.89	0.25	0.40	0.53	2
PMC-6 (ZC)						0.30		0.24			
Mean	0.93	0.39	0.58	0.59	0.36	0.33	0.94	0.26	0.41	0.52	

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		IVDMI	D (%)		DDM (q/ha)		ADF (%)	NDF (%)	
Entries	Hisar	Ludhiana	Average	Rank	Hisar	Rank	Ludhiana	Rank	Ludhiana	Rank
MFM-09-2	57.8	61.4	59.6	2	25.7	5	33.0	1	55.4	2
APFM-08-1	57.2	59.0	58.1	3	38.2	1	34.6	4	54.6	3
BAUFM-08-5-1	52.8	60.2	56.5	5	24.9	6	33.0	1	55.2	5
African Tall (NC)	55.6	59.4	57.5	4	28.8	4	34.9	5	54.0	1
J-1006 (NC)	55.6	60.6	58.1	3	37.2	2	33.6	3	55.0	4
PMC-6 (ZC)	61.6	60.8	61.2	1	36.5	3	33.5	2	55.0	4
Mean	56.8	60.2	58.5		31.9		33.8		54.9	

Table1.9: IVTM: Initial Varietal Trial in Forage Maize: IVDMD (%), DDM (q/ha), ADF (%) & NDF (%)

2. IVTPM: INITIAL VARIETAL TRIAL IN FORAGE PEARL MILLET

(Table Reference: 2.1 to 2.9)

An initial varietal trial in forage pearl millet comprising five entries and two national checks *viz.*, Raj Bajra chari-2 and Giant Bajra was conducted at 18 locations distributed in four zones of the country. Results obtained from different centres revealed that for the character green forage yield entries NDFB-904 (10.5%) and RBB-1 (9.8%) in North-East zone and entry PAC-981 (0.7%) in North-West zone and at par to national check in Central zone proved their superiority over national check whereas in other zones as well at national level Giant Bajra performed better in comparison to other entries.

For the character dry matter yield (q/ha), entries NBFB-904 (7.3%) and RBB-1 (8.5%) in North-East zone, PAC-981 (23.2%) central zone, and 5.5% in South zone proved their superiority over best national check. Again at national level entry PAC-981 (8.1%) ranked first for this character. In green forage production potential (q/ha/day), Giant Bajra ranked first whereas entry RBB-1 ranked first for the character dry matter yield (q/ha/day), In growth parameter, national check Giant Bajra (203.90 cm) maintained superiority.

In quality parameters like crude protein yield (q/ha), national check Giant Bajra adjudged best whereas for crude protein (%), entry NDFB-914 (9.6%) and RBB-1 (9.5%) was good performer. For the character leafiness (L/S ratio), entry PAC-981 (0.61) recorded their superiority over national check Giant Bajra (0.56). For other quality parameters, entry AFB-5 (37.0%) for ADF, entry RBB-1 (59.6%) for NDF and IVDMD (39.5%) and AFB-5 (31.6 q/ha) for DDM proved their superiority over best national check.

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					•			•	,				Cont
			No	orth Wes	st Zone			North East Zone					
Entries	Ludhiana	Hisar	Bikaner	Jalour	Average	Rank	Superiority%	Faizabad	Pusa	Bhubneshwar	Average	Rank	Superiority%
NDFB-904	518.5	604.2	557.1	488.3	542.0	3		456.6	312.3	268.7	345.9	1	10.5
NDFB-914	476.9	586.8	516.1	551.0	532.7	4		410.0	263.6	277.0	316.9	3	1.2
RBB-1	550.9	569.4	494.4	476.1	522.7	5		426.5	341.8	262.5	343.6	2	9.8
AFB-5	506.9	555.6	518.5	472.0	513.3	6		269.6	237.7	247.9	251.7	7	
PAC-981	652.8	920.1	550.0	588.5	677.9	1	0.7	168.1	254.8	344.1	255.7	6	
RBC-2 (NC)	495.4	479.2	470.5	408.3	463.4	7		339.7	297.4	302.0	313.0	4	
Gaint Bajra (NC)	675.9	822.9	661.9	531.3	673.0	2		247.5	289.3	312.9	283.2	5	
Mean	553.9	648.3	538.4	502.2	560.7			331.1	285.3	287.9	301.4		
CD at 5%	1.9	59.4	101.4	52.7				92.9	32.4	29.9			
CV %	2.6	6.1	10.6	5.9				15.8	10.2	3.4			

Table-2.1: IVTPM- Initial Varietal Trial in Forage Pearl Millet: Green Forage Yield (q/ha)

			-	•		•	. ,			Cont			
	Central Zone												
Entries	Anand	Jabalpur	Rahuri	Urulikanchan	Jhansi	Jamnagar	Dhari*	Average	Rank	Superiority%			
NDFB-904	623.0	490.8	445.1	743.4	376.4	129.0	58.6	468.0	3				
NDFB-914	605.0	336.9	367.5	718.8	506.4	150.7	74.9	447.6	4				
RBB-1	574.0	401.4	311.9	661.7	506.1	191.0	64.4	441.0	5				
AFB-5	617.0	318.2	377.3	661.7	479.4	114.3	82.5	428.0	6				
PAC-981	889.0	370.2	621.5	702.5	587.0	139.0	72.9	551.5	1				
RBC-2 (NC)	599.0	303.6	261.3	604.5	310.9	106.3	54.2	364.3	7				
Gaint Bajra (NC)	864.0	287.0	620.7	784.2	573.0	178.7	99.9	551.3	2				
Mean	681.6	358.3	429.3	696.7	477.0	144.1	72.5	464.5					
CD at 5%	66.4	41.6	62.9	60.8	116.6	17.2	30.6						
CV %	5.5	14.2	8.2	9.0	13.7	6.7	23.9						

Table-2.1: IVTPM- Initial Varietal Trial in Forage Pearl Millet: Green Forage Yield (q/ha)

*Not included in zonal and all India average due to CV≥20

				All India						
Entries	Hyderabad	Dharwad	Coimbatore	Mandya	Average	Rank	Superiority%	Average	Rank	Superiority%
NDFB-904	195.0	189.8	402.8	203.4	247.8	7		412.0	3	
NDFB-914	273.0	199.1	384.3	295.9	288.1	3		407.0	4	
RBB-1	278.0	166.7	370.4	288.8	276.0	5		404.2	5	
AFB-5	185.0	208.3	393.5	338.2	281.3	4		382.4	6	
PAC-981	246.0	203.7	412.0	497.2	339.7	2		479.2	2	
RBC-2 (NC)	153.0	226.9	384.3	262.7	256.7	6		353.2	7	
Gaint Bajra (NC)	176.0	213.0	555.6	513.7	364.6	1		488.7	1	
Mean	215.1	201.1	414.7	342.8	293.4			318.1		
CD at 5%	38.9	NS	71.9	37.4						
CV %	10.0	16.5	9.8	6.1						

Table-2.1: IVTPM- Initial Varietal Trial in Forage Pearl Millet: Green Forage Yield (q/ha)

												Cont		
			North	West Zon	е		North East Zone							
Entries	Ludhiana	Hisar	Bikaner	Average	Rank	Superiority%	Faizabad	Pusa	Bhubneshwar	Average	Rank	Superiority%		
NDFB-904	116.6	113.5	82.3	104.1	3		102.5	68.6	56.8	76.0	2	7.3		
NDFB-914	102.5	98.2	94.2	98.3	5		89.9	58.9	62.6	70.5	4			
RBB-1	123.9	89.7	86.3	100.0	4		91.1	78.4	60.9	76.8	1	8.5		
AFB-5	111.5	80.6	90.7	94.3	6		71.1	52.9	52.6	58.9	6			
PAC-981	153.4	144.9	106.1	134.8	2		39.2	55.9	77.3	57.5	7			
RBC-2 (NC)	106.5	86.5	75.2	89.4	7		76.8	65.3	70.4	70.8	3			
Gaint Bajra (NC)	162.2	123.5	129.0	138.2	1		62.9	67.6	69.2	66.6	5			
Mean	125.2	105.3	94.8	108.4			76.2	63.9	64.3	68.1				
CD at 5%	1.2	14.2	31.4				23.6	8.7	6.4					
CV %	7.2	9.0	18.6				17.5	8.4	3.3					

Table-2.2 IVTPM: Initial Varietal Trial in Forage Pearl Millet (New): Dry Matter Yield (q/ha)
										Cont
					Central	Zone				
Entries	Anand	Jabalpur	Rahuri	Urulikanchan	Jhansi	Jamnagar	Dhari*	Average	Rank	Superiority%
NDFB-904	77.9	114.4	75.9	145.8	63.3	38.7	12.9	86.0	4	
NDFB-914	84.7	74.8	61.2	143.9	92.2	42.0	16.4	83.1	6	
RBB-1	97.0	93.6	43.7	137.7	111.8	59.0	14.3	90.5	3	
AFB-5	92.5	72.8	64.9	147.9	88.5	32.7	17.8	83.2	5	
PAC-981	208.9	85.2	124.3	141.4	145.5	87.7	15.7	132.2	1	23.2
RBC-2 (NC)	104.8	68.6	37.1	115.6	59.1	35.0	12.3	70.0	7	
Gaint Bajra (NC)	134.8	66.5	124.1	188.0	113.9	16.3	20.3	107.3	2	
Mean	114.4	82.3	75.9	145.8	96.3	44.5	15.7	93.2		
CD at 5%	10.2	9.7	11.1	10.1	32.6	8.5	7.7			
CV %	5.0	14.4	8.2	14.4	19.0	10.8	28.5			

Table-2.2 IVTPM: Initial Varietal Trial in Forage Pearl Millet (New): Dry Matter Yield (q/ha)

*Not included in zonal and all India average due to CV \geq 20

			Sout	h Zone					All Ir	ndia
Entries	Hyderabad	Dharwad	Coimbatore	Mandya	Average	Rank	Superiority%	Average	Rank	Superiority%
NDFB-904	45.4	38.6	74.4	39.1	49.4	7		78.4	5	
NDFB-914	61.9	42.1	75.4	81.7	65.3	3		79.1	4	
RBB-1	69.6	35.6	70.5	68.4	61.0	4		82.3	3	
AFB-5	41.6	47.6	77.4	68.3	58.7	5		74.6	6	
PAC-981	88.4	45.7	71.0	150.3	88.9	1	5.5	107.8	1	8.1
RBC-2 (NC)	39.8	50.2	65.7	60.8	54.1	6		69.8	7	
Gaint Bajra (NC)	58.7	44.9	93.4	140.2	84.3	2		99.7	2	
Mean	57.9	43.5	75.4	87.0	66.0			76.5		
CD at 5%	15.3	NS	12.5	9.6						
CV %	14.0	17.6	9.3	6.2						

Table-2.2: IVTPM: Initial Varietal Trial in Forage Pearl Millet (New): Dry Matter Yield (q/ha)

Entries	Jabal-	Bika-	Fiaza-	Man-	Uruli-	Ludhi-	Jam-	An-	Coimba-	Dha-	Ra-	Hiasr	Bhub-	Jhansi	Pusa	Hydera-	Aver-	Rank
	pur	ner	bad	dya	kanchan	ana	nagar	and	tore	ri	huri		neshwar			bad	age	
NDFB-904	6.13	9.13	7.13	4.45	15.49	8.94	1.87	13.84	8.95	0.89	8.90	9.90	3.89	7.62	4.95	4.32	7.28	3
NDFB-914	4.15	8.46	6.12	6.67	14.67	8.22	2.19	13.15	8.73	1.22	7.50	9.62	4.20	11.13	4.24	6.07	7.27	4
RBB-1	5.01	8.11	6.46	6.68	12.73	9.84	2.77	13.67	8.82	1.01	6.37	9.33	4.30	11.28	5.33	6.18	7.37	2
AFB-5	4.02	8.50	3.85	7.52	12.73	8.74	1.65	13.41	8.74	1.81	7.40	9.11	4.13	10.65	3.82	4.12	6.89	5
PAC-981	4.46	6.96	2.24	8.90	8.08	10.53	2.02	10.84	7.63	1.09	8.63	15.08	5.55	7.81	4.10	5.46	6.84	6
RBC-2 (NC)	3.70	7.71	5.00	5.98	11.85	7.99	1.54	13.61	8.54	0.87	5.23	7.86	4.87	6.82	4.71	3.40	6.23	7
Gaint Bajra (NC)	3.54	8.38	3.64	9.96	12.07	12.07	2.59	13.94	10.10	2.81	9.70	13.49	4.97	8.64	4.59	3.91	7.78	1
Mean	4.43	8.18	4.92	7.17	12.52	9.48	2.09	13.21	8.79	1.39	7.68	10.63	4.56	9.14	4.53	4.78	7.09	

Table-2.3: IVTPM: Initial Varietal trial in Forage Pearl Millet: Green Forage Yield (q/ha/day)

Table-2.4: IVTPM: Initial Varietal Trial in Forage Pearl Millet (New): Dry Matter Yield (q/ha/day)

Entries	Jabalpur	Bikaner	Fiazabad	Hydera	Uruli-	Ludhi-	Anand	Coimba-	Hisar	Bhub-	Jhansi	Pusa	Average	Rank
				-bad	kanchan	ana		tore		neshwar				
NDFB-904	1.43	1.35	1.60	1.01	3.04	2.01	1.73	1.65	1.86	0.82	1.28	1.08	1.57	5
NDFB-914	0.93	1.54	1.34	1.38	2.94	1.77	1.84	1.71	1.61	0.95	2.03	0.95	1.58	4
RBB-1	1.17	1.42	1.36	1.55	2.65	2.21	2.31	1.68	1.47	1.00	2.49	1.23	1.71	1
AFB-5	0.92	1.49	1.01	0.92	2.84	1.92	2.01	1.72	1.32	0.88	1.96	0.85	1.49	6
PAC-981	1.02	1.34	0.52	1.97	1.63	2.47	2.55	1.31	2.37	1.25	1.93	0.90	1.61	3
RBC-2 (NC)	0.83	1.23	1.13	0.88	2.27	1.72	2.38	1.46	1.42	1.14	1.29	1.04	1.40	7
Gaint Bajra (NC)	0.82	1.63	0.92	1.31	2.89	2.90	2.17	1.70	2.02	1.10	1.71	1.07	1.69	2
Mean	1.02	1.43	1.13	1.29	2.61	2.14	2.14	1.60	1.72	1.02	1.81	1.02	1.58	

Entries	Jaba-	Fiaza-	Man-	Hydera-	Uruli-	Ludhi-	Anand	Coimba-	Rahuri	Hisar	Bhub-	Aver-	Rank
	lpur	bad	dya	bad	kanchan	ana		tore			neshwar	age	
NDFB-904	9.1	9.2	5.9	2.7	14.1	7.9	5.8	5.8	6.2	13.4	4.0	7.6	5
NDFB-914	5.8	7.7	11.7	4.1	13.7	7.6	7.5	10.4	4.7	12.5	4.9	8.2	3
RBB-1	7.2	8.1	9.2	4.9	13.9	8.7	7.0	10.0	3.5	11.2	4.7	8.0	4
AFB-5	5.6	5.8	9.4	2.4	14.1	7.8	6.2	12.0	5.1	10.1	4.2	7.5	6
PAC-981	6.6	3.2	17.8	4.2	14.0	10.7	10.9	8.5	10.3	17.4	6.0	10.0	2
RBC-2 (NC)	5.4	6.2	7.4	2.4	10.8	8.3	6.5	8.8	2.8	9.7	5.1	6.7	7
Gaint Bajra (NC)	4.7	4.7	19.3	3.1	17.0	12.2	8.5	11.7	10.5	16.2	5.5	10.3	1
Mean	6.3	6.4	11.5	3.4	13.9	9.0	7.5	9.6	6.2	12.9	4.9	8.3	

Table-2.5: IVTPM: Initial Varietal Trial in Forage Pearl Millet (New): Crude Protien Yield (q/ha)

Table-2.6: IVTPM: Initial Varietal Trial in Forage Pearl Millet: Crude Protien (%)

Entries	Jabal-	Fiaza-	Mandya	Hydera-	Uruli-	Ludhi-	Anand	Coimba-	Rahuri	Hisar	Bhub-	Average	Rank
	pur	bad		bad	kanchan	ana		tore			neshwar		
NDFB-904	8.1	8.9	15.0	6.1	9.6	6.8	7.4	7.8	8.2	11.8	7.1	8.8	5
NDFB-914	7.8	8.6	14.4	6.6	9.5	7.4	8.9	13.8	7.7	12.7	7.9	9.6	1
RBB-1	7.9	8.9	13.4	7.0	10.1	7.0	7.2	14.3	8.0	12.5	7.8	9.5	2
AFB-5	7.8	8.2	13.8	5.7	9.5	7.0	6.7	15.6	7.9	12.5	8.0	9.3	3
PAC-981	8.0	8.1	11.9	4.8	9.8	7.0	5.0	11.9	8.3	12.0	7.7	8.6	6
RBC-2 (NC)	8.0	8.1	12.2	6.1	9.4	7.8	6.2	13.4	7.6	11.2	7.3	8.8	5
Gaint Bajra (NC)	7.6	7.5	13.8	5.2	9.1	7.5	6.3	12.7	8.5	13.1	8.0	9.0	4
Mean	7.9	8.3	13.5	5.9	9.6	7.2	6.8	12.8	8.0	12.3	7.7	9.1	

	Jabal-	Bika-	Ja-	Fiaza-	Man-	Hydera-	Uruli-	Ludhi-	Jam-	Anand	Dhari	Ra-	Hisar	Bhub-	Jhansi	Aver-	Rank
Entries	pur	ner	lour	bad	dya	bad	kanchan	ana	nagar			huri		neshwar		age	
NDFB-904	209.2	236.5	222.3	212.5	136.8	163.0	238.6	213.0	127.0	210.0	82.9	200.0	242.8	189.5	220.4	193.6	3
NDFB-914	198.6	241.9	213.0	198.2	127.5	168.3	206.3	210.0	122.0	206.0	97.7	192.0	247.7	200.2	226.3	190.4	6
RBB-1	203.7	239.9	225.8	215.6	145.4	145.0	208.3	203.0	138.0	209.7	87.9	191.0	223.5	184.6	242.5	190.9	5
AFB-5	201.6	240.9	193.2	194.7	125.9	162.3	218.3	190.0	133.0	204.2	115.5	220.0	231.8	171.5	240.5	189.6	7
PAC-981	208.4	248.4	94.7	185.6	183.4	206.7	305.3	215.0	83.0	220.3	102.1	261.0	197.1	227.6	244.3	198.9	2
RBC-2 (NC)	171.9	237.7	216.3	190.4	157.4	155.0	220.4	223.0	130.0	221.3	110.3	195.0	219.9	207.8	233.3	192.6	4
Gaint Bajra (NC)	192.3	247.3	107.2	188.5	190.5	170.8	279.9	220.0	97.0	215.0	145.1	275.0	255.2	220.4	254.3	203.9	1
Mean	198.0	241.8	181.8	197.9	152.4	167.3	239.6	210.6	118.6	212.4	105.9	219.1	231.1	200.2	237.4	194.3	

Table-2.7 IVTPM: Initial Varietal Trial in Forage Pearl Millet: Plant Height (cm)

Table-2.8: IVTPM: Initial Varietal Trial in Forage Pearl Millet: Leaf Stem Ratio

Entries	Jabalpur	Bika-	Fiaza-	Man-	Hydera-	Uruli-	Ludhi-	Jam-	Dha-	Ra-	Hisar	Bhub-	Jhansi	Pusa	Aver-	Rank
	-	ner	bad	dya	bad	kanchan	ana	nagar	ri	huri		neshwar			age	
NDFB-904	0.65	0.24	0.72	0.16	0.23	0.62	0.30	0.96	0.39	0.24	0.25	0.87	0.45	0.91	0.50	4
NDFB-914	0.52	0.24	0.68	0.21	0.23	0.56	0.40	0.92	0.36	0.25	0.21	0.91	0.36	0.77	0.47	5
RBB-1	0.60	0.23	0.69	0.15	0.25	0.57	0.60	1.13	0.32	0.35	0.23	0.84	0.28	0.97	0.52	3
AFB-5	0.51	0.23	0.59	0.20	0.26	0.70	0.40	1.53	0.37	0.22	0.27	0.79	0.34	0.80	0.52	3
PAC-981	0.59	0.30	0.57	0.27	0.20	0.54	0.60	2.12	0.34	0.32	0.42	1.04	0.33	0.85	0.61	1
RBC-2 (NC)	0.53	0.29	0.63	0.16	0.22	0.65	0.30	1.03	0.41	0.29	0.28	0.95	0.30	0.93	0.50	4
Gaint Bajra (NC)	0.46	0.26	0.64	0.23	0.15	0.49	0.40	1.81	0.37	0.30	0.52	1.01	0.32	0.86	0.56	2
Mean	0.55	0.26	0.65	0.20	0.22	0.59	0.43	1.36	0.37	0.28	0.31	0.92	0.34	0.87	0.52	

	ADF	(%)	NDF	(%)		IVDM	D (%)		DDM	(q/ha)
Entries	Ludhiana	Rank	Ludhiana	Rank	Ludhiana	Hisar	Average	Rank	Hisar	Rank
NDFB-904	40.7	6	62.4	4	54.8	40.4	47.6	6	45.8	5
NDFB-914	37.6	3	60.0	2	55.4	40.5	48.0	7	39.8	4
RBB-1	38.9	5	59.6	1	35.0	44.0	39.5	1	39.5	3
AFB-5	37.0	1	60.0	2	55.0	34.2	44.6	2	31.6	1
PAC-981	41.5	7	60.0	2	55.0	38.0	46.5	3	55.1	7
RBC-2 (NC)	37.1	2	60.0	2	55.8	38.4	47.1	5	33.2	2
Gaint Bajra (NC)	38.4	4	60.4	3	55.2	38.6	46.9	4	47.7	6
Mean	38.7		60.3		52.3	39.2	45.7		41.8	

Table-2.9: IVTPM: Initial Varietal Trial in Forage Pearl Millet: ADF (%), NDF (%), IVDMD (%) & DDM (q/ha)

3. AVTPM – 2: SECOND ADVANCED VARIETAL TRIAL IN FORAGE PEARL MILLET

(Table Reference: 3.1 to 3.11)

An advanced varietal trial in forage pearl millet comprising six entries and two national checks *viz.*, Raj Bajra chari-2 and Giant Bajra was conducted at 17 locations distributed in four zones of the country. Results of the trial obtained from different centres revealed that for the character green forage yield (q/ha), entries JHPM-08-1 (16.9%), AFB-3 (9.7%) and AFB-4 (9.1%) in North-West zone, entries JHPM-08-1 in North-East zone (25.7%) and Central zone (1.3%) proved their superiority over best national check. At national level too, entry JHPM-08-1 (8.4%) was found to be superior with respect to best check.

Similarly for dry matter yield (q/ha), entries AFB-3 (11.6%), AFB-4 (9.8%) and JHPM-08-1 (8.1%) in North-West zone and entry JHPM-08-1 (14.2%) in North-East zone were adjudged good perfarmer in comparison to check. Even at national level, entry JHPM-08-1 (7.5%) was ranked first. The performance of entries JHPM-08-1, AFB-3 and AFB-4 are better than the check. In green forage production potential (q/ha/day), entries JHPM-08-1, AFB-4 and AFB-3 exhibited their superiority and in dry matter production potential (q/ha/day), entries JHPM-08-1 was adjudged best performer. For the character plant height, entry NDFB-13 (203.10 cm) ranked first.

In quality parameters like crude protein yield (q/ha), entry JHPM-08-1 ranked first but for crude protein (%) national check Raj Bajra chari-2 maintained superiority. In other quality parameters like leaf stem ratio, entry AFB-3, NDFB-11 and JHPM-08-1, for NDF (%), entry AFB-3 and JHPM-08-1, for ADF (%), entries AFB-3 and JHPM-08-1, for IVDMD (%), entry NDFB-13 and for DDM (q/ha) entries AFB-3 and JHPM-08-1 proved their superiority over check.

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						-			-				Cont
			North	h West Zo	one					North East 2	Zone		
Entries	Ludhi-	Hisar	Bikaner	Jalour	Aver-	Rank	Superi-	Faiza-	Ranchi	Bhub-	Aver-	Rank	Superi-
	ana				age		ority%	bad		neshwar	age		ority%
NDFB-11	387.5	194.4	213.5	448.2	310.9	7		368.9	281.3	266.8	305.7	4	
NDFB-13	448.6	383.3	268.1	514.3	403.6	5		383.6	270.9	299.1	317.9	3	
AFB-3	547.2	636.1	357.0	541.3	520.4	2	9.7	234.4	295.2	252.2	260.6	6	
AFB-4	538.9	527.8	433.6	570.6	517.7	3	9.1	229.5	263.9	238.6	244.0	7	
JHPM-08-1	548.6	636.1	306.1	728.0	554.7	1	16.9	236.9	659.9	338.6	411.8	1	25.7
RBC-2 (NC)	483.3	316.7	205.0	464.8	367.5	6		333.7	253.6	282.4	289.9	5	
Gaint Bajra (NC)	434.7	594.4	338.5	529.6	474.3	4		237.3	427.2	317.8	327.4	2	
Mean	484.1	469.8	303.1	542.4	449.9			289.2	350.3	285.1	308.2		
CD at 5%	4.6	58.4	50.9	38.1				54.1	70.4	25.4			
CV%	4.5	6.9	9.4	3.9				10.5	11.3	2.9			

Table-3.1: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: Green Forage Yield (q/ha)

				_			-		Cont
				Cent	ral Zone				
Entries	Anand	Jamnagar	Jabalpur	Rahuri	Urulikanchan	Jhansi	Average	Rank	Superiority%
NDFB-11	426.0	142.0	345.6	363.4	563.6	227.7	344.7	7	
NDFB-13	494.0	194.3	396.6	451.2	494.2	223.2	375.6	5	
AFB-3	514.0	198.0	429.3	414.5	682.0	259.1	416.2	4	
AFB-4	633.0	198.7	420.5	416.5	735.1	238.1	440.3	3	
JHPM-08-1	852.0	178.0	486.1	534.9	698.4	323.5	512.2	1	1.3
RBC-2 (NC)	418.0	151.0	383.0	322.6	600.4	202.2	346.2	6	
Gaint Bajra (NC)	805.0	135.0	474.7	575.8	726.9	316.2	505.6	2	
Mean	591.7	171.0	419.4	439.8	642.9	255.7	420.1		
CD at 5%	61.7	17.2	40.4	56.0	28.3	77.1			
CV%	5.9	5.7	11.7	7.2	13.7	16.6			

Table-3.1: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: Green Forage Yield (q/ha)

			So	outh Zone					All In	dia
Entries	Hyderabad	Dharwad	Coimbatore	Mandya	Average	Rank	Superiority%	Average	Rank	Superiority%
NDFB-11	203.0	202.8	372.2	160.1	234.5	6		315.0	6	
NDFB-13	144.0	200.0	411.1	220.1	243.8	3		306.1	7	
AFB-3	186.0	266.7	436.1	366.0	313.7	7		357.4	5	
AFB-4	200.0	277.8	605.5	288.8	343.0	4		396.0	4	
JHPM-08-1	194.0	283.3	599.9	273.3	337.6	5		399.7	3	
RBC-2 (NC)	172.0	338.9	555.5	319.8	346.6	1		465.5	1	8.4
Gaint Bajra (NC)	178.0	183.3	708.3	312.6	345.6	2		429.1	2	
Mean	182.4	250.4	526.9	277.2	309.3			381.3		
CD at 5%	NS	55.3	54.3	31.6						
CV%	15.0	12.4	5.8	6.4						

Table-3.1: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: Green Forage Yield (q/ha)

									-		-	Cont
		1	North W	est Zon	е				North East	Zone		
Entries	Ludhi-	Hisar	Bika-	Aver-	Rank	Superi-	Faiza-	Ranchi	Bhub-	Aver-	Rank	Superi-
	ana		ner	age		ority%	bad		neshwar	age		ority%
NDFB-11	85.3	32.4	35.2	51.0	7		86.6	66.6	60.7	71.3	5	
NDFB-13	100.9	60.0	42.1	67.7	5		92.1	76.3	65.2	77.9	3	
AFB-3	131.3	112.3	55.5	99.7	1	11.6	52.3	72.9	61.1	62.1	6	
AFB-4	126.6	86.2	81.5	98.1	2	9.8	51.5	67.0	54.2	57.6	7	
JHPM-08-1	131.7	97.4	60.3	96.5	3	8.1	46.2	181.1	76.3	101.2	1	14.2
RBC-2 (NC)	111.2	53.7	34.3	66.4	6		82.9	77.9	60.6	73.8	4	
Gaint Bajra (NC)	97.8	85.1	85.0	89.3	4		42.5	150.5	72.9	88.6	2	
Mean	112.1	75.3	56.3	81.2			64.9	98.9	64.4	76.1		
CD at 5%	1.2	8.2	17.2				15.0	22.0	4.5			
CV%	5.1	6.0	17.2				13.1	12.5	2.3			

 Table-3.2: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: Dry Matter Yield (q/ha)

				-		•			Cont
				С	entral Zone				
Entries	Anand	Jamnagar	Jabalpur	Rahuri	Urulikanchan	Jhansi	Average	Rank	Superiority%
NDFB-11	68.6	38.0	77.0	58.5	111.5	40.8	65.7	7	
NDFB-13	69.2	54.0	90.5	78.2	98.6	38.1	71.4	5	
AFB-3	86.4	57.0	98.9	65.0	136.3	46.5	81.7	4	
AFB-4	107.0	58.7	96.8	63.3	133.2	44.2	83.9	3	
JHPM-08-1	112.4	39.7	113.4	115.9	144.4	80.4	101.0	2	
RBC-2 (NC)	68.1	52.0	88.4	55.5	116.5	35.5	69.3	6	
Gaint Bajra (NC)	131.3	30.0	109.3	118.2	151.2	76.2	102.7	1	
Mean	91.9	47.1	96.3	79.2	127.4	51.7	82.3		
CD at 5%	9.8	4.9	9.2	9.3	15.9	17.1			
CV%	6.0	5.8	11.5	6.6	14.8	18.6			

 Table-3.2: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: Dry Matter Yield (q/ha)

			Soι	uth Zone					All Ir	ndia
Entries	Hyderabad	Dharwad	Coimbtore	Mandya	Average	Rank	Superiority%	Average	Rank	Superiority%
NDFB-11	34.0	46.0	61.1	46.5	46.9	7		59.3	7	
NDFB-13	42.0	69.1	73.6	77.0	65.4	5		70.4	5	
AFB-3	47.0	76.1	96.5	66.5	71.5	2		78.8	3	
AFB-4	45.0	67.3	98.6	67.9	69.7	3		78.1	4	
JHPM-08-1	61.0	85.5	93.1	91.7	82.8	1		95.7	1	7.5
RBC-2 (NC)	54.0	48.3	61.6	32.7	49.2	6		64.6	6	
Gaint Bajra (NC)	55.0	41.8	111.1	66.5	68.6	4		89.0	2	
Mean	48.3	62.0	85.1	64.1	64.9			76.6		
CD at 5%	14.7	10.7	9.0	13.1						
CV%	17.0	9.7	6.0	11.4						

Table-3.2: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: Dry Matter Yield (q/ha)

Entries	Hydera-	Jabal-	Ran-	Ra-	Bika-	Faiza-	Uruli-	Ludhi-	Jam-	Anand	Coimba-	Hi-	Bhub-	Man-	Jhansi	Aver-	Rank
	bad	pur	chi	huri	ner	bad	kanchan	ana	nagar		tore	sar	neshwar	dya		age	
NDFB-11	3.21	4.21	5.82	7.57	3.50	5.59	11.27	7.05	2.06	10.14	9.34	3.19	4.04	4.78	4.70	5.76	7
NDFB-13	4.13	5.02	5.69	9.60	4.39	5.90	9.69	8.01	2.82	12.35	10.14	6.28	4.67	7.85	4.31	6.72	5
AFB-3	4.44	5.05	6.13	8.29	5.85	3.35	13.92	9.95	2.87	11.17	12.62	10.43	3.67	6.11	4.80	7.24	3
AFB-4	4.32	5.06	4.80	8.50	7.11	3.19	15.32	9.29	2.88	13.19	13.33	8.56	3.46	5.81	4.66	7.30	2
JHPM-08-1	3.83	6.07	10.88	7.87	3.88	3.34	11.84	9.46	2.58	13.97	12.35	10.43	5.46	5.75	5.65	7.56	1
RBC-2 (NC)	4.50	4.78	5.39	7.01	3.36	4.91	12.51	8.79	2.19	10.20	8.27	5.19	4.09	3.59	4.00	5.92	6
Gaint Bajra (NC)	3.95	5.78	6.57	8.34	4.28	3.12	12.76	7.01	1.96	13.20	15.07	9.74	5.21	5.65	5.80	7.23	4
Mean	4.05	5.14	6.47	8.17	4.62	4.20	12.47	8.51	2.48	12.03	11.59	7.69	4.37	5.65	4.85	6.82	

Table-3.3: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: Green Forage Yield (q/ha/day)

Table-3.4: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: Dry Matter Yield (q/ha/day)

Entries	Hydera-	Jabal-	Ranchi	Rahuri	Bika-	Faiza-	Uruli-	Ludhi-	Anand	Coimba-	Hisar	Man-	Bhub-	Jhansi	Aver-	Rank
	bad	pur			ner	bad	kanchan	ana		tore		dya	neshwar		age	
NDFB-11	0.62	0.93	1.38	1.22	0.58	1.31	2.23	1.55	1.63	1.39	0.53	4.78	0.92	0.83	1.42	7
NDFB-13	0.76	1.14	1.60	1.66	0.69	1.42	1.93	1.80	1.73	1.71	0.98	7.85	1.02	0.73	1.79	4
AFB-3	0.86	1.16	1.51	1.30	0.91	0.75	2.78	2.39	1.88	2.01	1.84	6.11	0.91	0.87	1.81	3
AFB-4	0.81	1.16	1.22	1.29	1.34	0.71	2.78	2.18	2.23	2.19	1.41	5.81	0.79	0.88	1.77	5
JHPM-08-1	1.11	1.41	2.98	1.70	0.76	0.65	2.45	2.27	1.84	2.07	1.60	5.75	1.23	1.40	1.94	1
RBC-2 (NC)	0.98	1.10	1.66	1.21	0.56	1.22	2.43	2.02	1.66	1.37	0.88	3.59	0.88	0.70	1.45	6
Gaint Bajra (NC)	1.00	1.33	2.32	1.71	1.08	0.57	2.65	1.58	2.15	2.36	1.40	5.65	1.19	1.22	1.87	2
Mean	0.88	1.18	1.81	1.44	0.85	0.95	2.46	1.97	1.87	1.87	1.23	5.65	0.99	0.95	1.72	

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Entries	Hydera-	Jabal-	Ranchi	Rahuri	Faiza-	Uruli-	Ludhi-	Anand	Coimba-	Hisar	Man-	Bhub-	Aver-	Rank
	bad	pur			bad	kanchan	ana		tore		dya	neshwar	age	
NDFB-11	2.1	5.5	4.4	4.9	7.5	12.3	6.0	4.6	7.8	4.0	5.8	4.3	5.8	7
NDFB-13	2.7	6.9	5.7	5.9	8.2	10.0	6.7	4.2	10.3	7.0	9.1	4.8	6.8	5
AFB-3	2.2	7.5	5.7	5.4	4.3	14.7	8.4	4.6	13.5	13.5	8.2	4.3	7.7	3
AFB-4	2.0	7.4	5.6	4.8	3.8	14.4	7.4	7.6	11.2	10.6	8.4	4.1	7.3	4
JHPM-08-1	2.7	8.9	15.9	8.8	3.6	13.7	8.3	7.3	11.7	12.2	11.5	5.9	9.2	1
RBC-2 (NC)	3.3	6.2	6.1	4.4	7.3	12.1	8.1	4.8	7.1	6.7	4.9	4.5	6.3	6
Gaint Bajra (NC)	2.6	8.5	11.9	9.0	3.1	14.7	5.7	9.7	17.5	9.9	8.8	5.6	8.9	2
Mean	2.5	7.3	7.9	6.2	5.4	13.1	7.2	6.1	11.3	9.1	8.1	4.8	7.4	

Table-3.5: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: Crude Protien Yield (q/ha)

Table-3.6: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: Crude Protien (%)

Entries	Hydera-	Jabal-	Rahuri	Ranchi	Faiza-	Uruli-	Ludhi-	Anand	Coimba-	Hisar	Man-	Bhub-	Aver-	Rank
	bad	pur			bad	kanchan	ana		tore		dya	neshwar	age	
NDFB-11	6.1	7.2	8.3	6.6	8.7	11.0	7.0	6.7	12.7	12.5	12.5	7.1	8.9	2
NDFB-13	6.6	7.6	7.6	7.4	8.9	10.0	6.6	6.0	14.0	11.6	11.9	7.4	8.8	3
AFB-3	4.6	7.6	8.3	7.9	8.2	10.7	6.4	5.3	14.0	12.0	12.5	7.0	8.7	4
AFB-4	4.6	7.7	7.6	8.3	7.3	10.8	5.8	7.1	11.4	12.3	12.5	7.6	8.6	5
JHPM-08-1	4.4	7.9	7.6	8.8	7.8	9.5	6.3	6.5	12.7	12.5	12.5	7.8	8.7	4
RBC-2 (NC)	6.1	7.1	7.9	7.9	8.8	10.5	7.3	7.1	11.7	12.5	15.0	7.3	9.1	1
Gaint Bajra (NC)	4.8	7.9	7.6	7.9	7.2	9.8	5.8	7.4	15.8	11.6	13.1	7.7	8.9	2
Mean	5.3	7.6	7.8	7.8	8.1	10.3	6.5	6.6	13.2	12.1	12.9	7.4	8.8	

Entries	Hydera-	Jabal-	Ra-	Ra-	Ja-	Faiza-	Uruli-	Ludhi-	Jam-	Ana-	Coimba-	Hi-	Man-	Bhub-	Bika-	Jhan-	Aver-	Rank
	bad	pur	nchi	huri	lour	bad	kanchan	ana	nagar	nd	tore	sar	dya	neshwar	ner	si	age	
NDFB-11	121.2	184.9	205.3	223.0	190.8	232.5	243.2	221.7	147.0	211.6	215.1	190.1	167.1	194.6	192.1	211.8	197.0	6
NDFB-13	141.5	199.5	212.9	235.0	196.7	235.4	221.9	195.0	153.0	223.7	236.0	216.7	153.4	204.3	211.3	213.8	203.1	1
AFB-3	144.0	212.6	206.8	213.0	194.5	190.3	225.8	206.0	148.0	224.4	229.0	219.4	165.4	187.6	235.9	211.1	200.9	4
AFB-4	136.7	208.2	205.7	216.0	194.2	195.6	219.8	200.0	147.0	217.0	216.7	225.1	152.5	183.5	204.1	209.5	195.7	7
JHPM-08-1	173.0	221.7	191.0	255.0	191.7	210.2	238.3	178.3	82.0	214.3	206.5	206.9	172.7	225.6	218.9	235.6	201.4	3
RBC-2 (NC)	132.7	196.0	206.9	224.0	226.7	225.6	229.9	160.0	162.0	229.5	230.8	225.8	162.3	198.7	207.1	212.3	201.9	2
Gaint Bajra (NC)	142.0	217.8	182.1	278.0	140.0	201.5	247.8	200.0	83.0	214.6	223.9	226.3	179.0	210.4	206.9	233.4	199.2	5
Mean	141.6	205.8	201.5	234.9	190.7	213.0	232.4	194.4	131.7	219.3	222.6	215.8	164.6	200.7	210.9	218.2	199.9	

Table-3.7: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: Plant Height (cm)

Table-3.8: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: Leaf Stem Ratio

Entries		Jabal-	Ra-	Ranchi	Faiza-	Uruli-	Ludhi-	Jam-	Anand	Coimba-	Hisar	Bhub-	Man-	Bika-	Jhansi	Aver-	Rank
	Hydera-bad	pur	huri		bad	kanchan	ana	nagar		tore		neshwar	dya	ner		age	
NDFB-11	0.24	0.49	0.29	0.31	0.70	0.60	0.33	1.12	0.65	0.28	0.20	0.87	0.16	0.24	0.37	0.46	2
NDFB-13	0.22	0.52	0.26	0.48	0.75	0.50	0.42	0.95	0.77	0.26	0.27	0.94	0.16	0.26	0.40	0.48	6
AFB-3	0.25	0.58	0.30	0.31	0.60	0.65	0.38	1.35	0.63	0.23	0.40	0.81	0.24	0.32	0.44	0.50	1
AFB-4	0.23	0.56	0.33	0.45	0.62	0.72	0.33	0.89	0.50	0.24	0.27	0.75	0.23	0.27	0.44	0.46	4
JHPM-08-1	0.19	0.68	0.34	0.53	0.68	0.53	0.42	1.06	0.61	0.25	0.40	1.04	0.16	0.33	0.34	0.50	3
RBC-2 (NC)	0.21	0.49	0.22	0.31	0.73	0.50	0.38	1.04	0.45	0.23	0.23	0.90	0.18	0.26	0.40	0.44	7
Gaint Bajra (NC)	0.19	0.65	0.34	0.53	0.65	0.64	0.53	1.18	0.72	0.23	0.40	0.99	0.19	0.25	0.35	0.52	5
Mean	0.22	0.57	0.30	0.42	0.68	0.59	0.40	1.08	0.62	0.25	0.31	0.90	0.19	0.28	0.39	0.48	

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Entries	Ranchi	Rahuri	Ludhiana	Average	Rank
NDFB-11	62.4	52.3	60.0	58.2	3
NDFB-13	63.8	53.8	60.8	59.5	5
AFB-3	62.6	48.7	60.0	57.1	1
AFB-4	64.2	50.5	61.8	58.8	4
JHPM-08-1	61.8	49.5	61.0	57.4	2
RBC-2 (NC)	60.6	51.3	60.4	57.4	2
Gaint Bajra (NC)	62.4	52.3	61.6	58.8	4
Mean	62.5	51.2	60.8	58.2	

Table-3.9: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: NDF (%)

Table-3.10: AVTPM-2: Second Adva	ice Varietal Trial in	Forage Pearl Millet:	ADF (%)
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Entries	Ranchi	Rahuri	Ludhiana	Average	Rank
NDFB-11	46.4	52.3	39.8	46.2	3
NDFB-13	47.6	53.8	40.0	47.1	7
AFB-3	45.2	48.7	40.8	44.9	1
AFB-4	47.4	50.5	41.6	46.5	5
JHPM-08-1	46.8	49.5	41.0	45.8	2
RBC-2 (NC)	48.2	51.3	39.6	46.4	4
Gaint Bajra (NC)	47.2	52.3	41.4	47.0	6
Mean	47.0	51.2	40.6	46.3	

			IVDN		DDM	(q/ha)		
Entries	Ranchi	Rahuri	Ludhiana	Hisar	Average	Rank	Hisar	Rank
NDFB-11	65.0	52.3	55.0	56.6	57.2	2	18.4	7
NDFB-13	68.4	53.8	54.6	55.4	58.1	1	33.2	5
AFB-3	67.8	48.7	54.2	49.2	55.0	5	55.2	1
AFB-4	63.4	50.5	53.0	43.1	52.5	7	37.1	4
JHPM-08-1	67.6	49.5	54.0	48.0	54.8	6	46.8	2
RBC-2 (NC)	64.2	51.3	55.2	50.8	55.4	3	27.3	6
Gaint Bajra (NC)	65.4	52.3	53.4	50.0	55.3	4	42.6	3
Mean	66.0	51.2	54.2	50.4	55.5		37.2	

Table-3.11: AVTPM-2: Second Advance Varietal Trial in Forage Pearl Millet: IVDMD (%) & DDM (q/ha)

4. AVTPM – 2 (Seed): ADVANCED VARIETAL TRIAL IN FORAGE PEARL MILLET FOR SEED

(Table Reference: 4)

Results for the advanced varietal trial in forage pearl millet for seed with five entries namely NDFB-11, NDFB-13, AFB-3, AFB-4 and JHPM-08-1 along with two national checks *i.e.*, Raj Bajra Chari-2 and Giant Bajra conducted at 14 locations distributed in four zones of the country revealed that for seed yield (q/ha), entries NDFB-13 (44.5%) and NDFB-11 (22.7%) in North-East zone, entries NDFB-11 (30.7%), AFB-3 (21.4%) and NDFB-13 (12.1%) in Central zone proved their superiority with respect to best check.

However in North-West zone national check RBC-2 (16.9 q/ha) and in South zone national check Giant Bajra (37.8 q/ha) ranked first in seed yield production. At national level, entry AFB-3 with seed yield of (17.7 q/ha) maintained superiority followed by entry AFB-4 (17.3 q/ha).

					U				Cont
			Ν	lorth West Z	one			North East	st Zone
Entries	Ludhiana	Hisar	Bikaner	Jalour	Average	Rank	Superiority%	Faizabad	Rank
NDFB-11	7.8	18.3	7.8	7.2	10.3	6		13.5	2
NDFB-13	6.6	22.5	11.1	7.7	12.0	5		15.9	1
AFB-3	12.4	19.4	13.3	10.4	13.9	3		9.4	4
AFB-4	11.3	22.5	17.9	13.0	16.2	2		8.6	5
JHPM-08-1	29.1	14.2	1.4	3.8	12.1	4		6.5	6
RBC-2 (NC)	27.5	18.1	8.3	13.8	16.9	1		11.0	3
Gaint Bajra (NC)	7.1	13.6	11.6	3.9	9.1	7		8.6	5
Mean	14.5	18.4	10.2	8.6	12.9			10.5	
CD at 5%	2.4	3.5	3.1	1.4				2.2	
CV%	13.1	10.5	17.1	8.9				12.0	

Table-4: AVTPMS-2 (Seed): Second Advanced Varietal Trial in Forage Pearl Millet: Seed yield (q/ha)

	,				U			,	Cont
					Central Zone				
Entries	Anand	Jamnagar	Jabalpur	Rahuri	Ururikanchan	Jhansi	Average	Rank	Superiority%
NDFB-11	14.9	6.8	22.5	6.3	31.4	27.9	18.3	1	30.7
NDFB-13	12.8	8.3	21.7	6.2	21.7	23.8	15.7	3	12.1
AFB-3	14.1	7.0	20.7	6.8	31.0	22.6	17.0	2	21.4
AFB-4	13.0	6.9	21.0	5.3	24.1	14.6	14.2	4	1.4
JHPM-08-1	8.4	5.5	11.6	8.9	24.7	21.9	13.5	7	
RBC-2 (NC)	13.1	5.5	16.2	2.5	30.1	16.9	14.0	5	
Gaint Bajra (NC)	8.4	4.4	15.0	9.5	17.5	28.5	13.9	6	
Mean	12.1	6.4	18.4	6.5	25.8	22.3	15.2		
CD at 5%	3.7	0.9	3.0	1.0	0.8	7.7			
CV%	11.4	7.8	19.7	9.0	19.1	19.3			

Table-4: AVTPMS-2 (Seed): Second Advanced Varietal Trial in Forage Pearl Millet: Seed yield (q/ha)

		S	outh Zone				All In	dia	
Entries	Dharwad	Coimbatore	Mandya	Average	Rank	Superiority%	Average	Rank	Superiority%
NDFB-11	1.9	12.4	45.6	20.0	6		16.0	5	
NDFB-13	2.2	14.6	55.4	24.0	5		16.5	4	
AFB-3	2.8	13.1	65.2	27.0	4		17.7	1	2.9
AFB-4	2.8	13.7	66.9	27.8	3		17.3	2	0.6
JHPM-08-1	2.6	8.5	76.3	29.1	2		16.0	5	
RBC-2 (NC)	2.4	9.7	37.9	16.6	7		15.2	6	
Gaint Bajra (NC)	5.3	16.0	92.0	37.8	1		17.2	3	
Mean	2.8	12.6	62.7	26.0			16.6		
CD at 5%	0.3	1.6	8.7						
CV%	5.9	7.0	7.8						

Table-4: AVTPMS-2 (Seed): Second Advanced Varietal Trial in Forage Pearl Millet: Seed yield (q/ha)

5. IVTC: INITIAL VARIETAL TRIAL IN FORAGE COWPEA

(Table Reference: 5.1 to 5.10)

An initial varietal trial in forage cowpea comprising four entries along with two national checks *i.e.*, Bundel Lobia-1 and UPC-5286 and three zonal checks *i.e.*, Bundel Lobia-2, UPC-622 and UPC-9202 was conducted at 25 locations over five zones in the country. Results of the trial revealed that for the character green forage yield (q/ha), entries MFC-09-1 (7.3%) and UPC-803 (1%) in Hill zone, entry UPC-803 (1.8%) and entry MFC-09-1 (7.0%) in South zone exhibited superiority over best national or zonal check. None of the entries exhibited superiority in North-East and Central zone. Even at national level performance of entry MFC-09-1 (0.6%) was at par with best national check UPC-5286. For the character dry matter yield (q/ha), only one entry MFC-09-1 (0.3%) in Hill zone, Central zone (1.2%) and South zone (1.7%), exhibited superiority over best national or zonal check. None of the entries in North-West and North-East zone exhibited superiority over best respective check. Even at all India level entry MFC-09-1 (1.9%) was adjudged best performer with respect to national check.

In green forage production potential (q/ha/day), national check Bundel Lobia-1 maintained superiority whereas same check was adjudged best for dry matter production potential (q/ha/day) also. For evaluation against growth parameter, entry UPC-804 (147.1cm) ranked first. In quality parameters, national check UPC-5286 maintained superiority both for crude protein yield (q/ha) and crude protein (%). Performance of other test entries for crude protein (%) was at par with national check UPC-5286. For leafiness, again national check UPC-5286 was adjudged best performer. For the character NDF and ADF (%), national check Bundel Lobia-1 maintained superiority whereas for IVDMD (%), entry UPC-803 and for DDM (q/ha), national check Bundel Lobia-1 ranked first.

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				0	•	5						Cont
			Hill Zo	ne				No	rth West Z	Zone		
Entries	Rajuri	Almora	Average	Rank	Superiority%	Ludhiana	Hisar	Pantnagar	Bikaner	Average	Rank	Superiority%
UPC-803	53.7	400.0	226.8	2	1.0	435.2	592.6	172.9	347.6	387.1	1	1.8
UPC-804	68.1	264.8	166.5	6		266.2	472.2	155.4	252.4	286.6	7	
MFC-09-1	98.5	383.4	241.0	1	7.3	368.1	601.8	77.9	355.0	350.7	4	
APFC-10-1	93.9	351.9	222.9	4		310.2	537.1	87.5	399.1	333.5	6	
Bundel Lobia-1 (NC)	76.1	179.6	127.9	7		375.0	574.0	112.5	378.2	359.9	3	
UPC-5286 (NC)	113.8	335.2	224.5	3		416.7	611.1	127.1	366.3	380.3	2	
Bundel Lobia-2 (ZC)						335.7	564.9	79.2	390.1	342.5	5	
UPC-622 (ZC)	87.2	286.1	186.7	5								
UPC-9202 (ZC)												
Mean	84.5	314.5	199.5			358.2	564.8	116.1	355.5	348.6		
CD at 5%	6.9	89.3				3.0	60.9	17.2	NS			
CV%	6.6	16.0				6.6	6.0	8.3	15.5			

			-		-		-			Cont
					North E	ast Zone				
Entries	Faizabad	Ranchi	Kalyani	Bhubneshwar	Jorhat	Pusa	Shilong	Average	Rank	Superiority%
UPC-803	307.8	437.4	278.7	339.6	246.1	271.4	144.1	289.3	2	
UPC-804	253.9	416.6	252.3	316.7	223.0	259.2	284.1	286.5	3	
MFC-09-1	341.5	381.9	277.3	250.0	206.4	227.4	295.1	282.8	5	
APFC-10-1	235.3	416.6	224.1	291.7	186.5	234.2	190.2	254.1	7	
Bundel Lobia-1 (NC)	248.3	374.9	254.7	285.4	237.1	243.7	203.5	263.9	6	
UPC-5286 (NC)	223.0	416.6	266.7	372.9	206.4	238.3	256.5	282.9	4	
Bundel Lobia-2 (ZC)										
UPC-622 (ZC)	277.0	618.0	280.1	241.7	211.4	238.7	222.2	298.4	1	
UPC-9202 (ZC)										
Mean	269.6	437.4	262.0	299.7	216.7	244.7	228.0	279.7		
CD at 5%	63.7	75.2	16.5	28.9	8.1	29.2	45.5			
CV%	13.3	9.7	4.4	3.1	11.7	8.3	3.4			

			-	-	-		-		Cont
					Central Zor	ne			
Entries	Anand	Jhansi	Jabalpur	Rahuri	Urulikanchan	Kanpur	Average	Rank	Superiority%
UPC-803	284.0	361.1	176.8	254.5	513.8	476.8	344.5	6	
UPC-804	278.0	365.5	249.6	277.6	458.3	379.6	334.8	7	
MFC-09-1	303.0	347.2	149.7	360.4	527.7	555.6	373.9	3	
APFC-10-1	323.0	347.2	135.2	269.5	486.1	509.3	345.0	5	
Bundel Lobia-1 (NC)	338.0	347.2	124.8	289.9	513.8	569.4	363.9	4	
UPC-5286 (NC)	305.0	338.0	172.6	360.9	587.9	532.4	382.8	1	
Bundel Lobia-2 (ZC)									
UPC-622 (ZC)									
UPC-9202 (ZC)	308.0	361.1	214.2	370.6	569.4	444.4	378.0	2	
Mean	305.6	352.5	174.7	311.9	522.4	495.4	360.4		
CD at 5%	NS	6.6	22.2	31.1	33.1	114.0			
CV%	7.7	12.5	15.6	5.6	8.4	7.7			

				So	uth Zon	е					All Ind	lia
Entries	Coimba-	Vela-	Man-	Hydera-	Dhar-	Pondi-	Aver-	Rank	Superi-	Aver-	Rank	Superi-
	tore	yani	dya	bad	wad	cherry*	age		ority%	age		ority%
UPC-803	162.0	322.3	90.4	74.1	226.9	89.5	175.1	6		290.4	3	
UPC-804	125.0	207.3	163.4	88.0	250.0	60.2	166.7	7		263.6	6	
MFC-09-1	171.3	350.0	182.5	88.0	319.4	132.0	222.2	1	7.0	300.8	1	0.6
APFC-10-1	194.4	325.0	113.4	78.8	222.2	119.6	186.8	3		273.4	5	
Bundel Lobia-1 (NC)	138.9	299.3	150.9	78.8	240.7	130.6	181.7	5		276.5	4	
UPC-5286 (NC)	143.5	319.0	149.0	83.4	236.1	111.0	186.2	4		299.1	2	
Bundel Lobia-2 (ZC)												
UPC-622 (ZC)												
UPC-9202 (ZC)	199.1	274.7	175.4	88.0	300.9	122.2	207.6	2				
Mean	162.0	299.7	146.4	82.7	256.6	109.3	189.5			286.0		
CD at 5%	22.0	58.4	19.1	NS	57.4	NS						
CV%	7.6	11.0	7.3	9.2	12.6	35.2						

*Not included in zonal and all India average due to CV≥20

				•			• •	-				Cont
			Hill Zo	ne				No	rth West	Zone		
Entries	Rajuri	Almora	Average	Rank	Superiority%	Ludhiana	Hisar	Pantnagar	Bikaner	Average	Rank	Superiority%
UPC-803	6.3	62.7	34.5	4		90.9	86.9	29.0	50.8	64.4	2	
UPC-804	8.6	43.4	26.0	6		54.5	72.4	26.9	48.3	50.5	6	
MFC-09-1	13.5	58.3	35.9	1	0.3	77.3	83.7	12.6	46.5	55.0	5	
APFC-10-1	13.3	57.7	35.5	3		60.5	84.2	14.2	76.2	58.8	4	
Bundel Lobia-1 (NC)	10.8	29.1	20.0	7		82.5	97.6	17.6	65.4	65.8	1	
UPC-5286 (NC)	16.5	55.1	35.8	2		81.2	81.7	21.0	63.9	61.9	3	
Bundel Lobia-2 (ZC)						67.1	73.5	13.3	65.9	55.0	5	
UPC-622 (ZC)	12.3	45.4	28.8	5								
UPC-9202 (ZC)												
Mean	11.6	50.3	30.9			73.4	82.9	19.2	59.6	58.8		
CD at 5%	1.0	14.1				1.5	7.8	2.9	19.4			
CV%	4.9	16.2				16.1	5.2	8.6	18.3			

			-				-			Cont
					North Ea	ast Zone				
Entries	Faizabad	Ranchi	Kalyani	Bhubneshwar	Jorhat	Pusa	Shilong	Average	Rank	Superiority%
UPC-803	69.7	69.1	44.7	79.7	42.8	59.6	42.9	58.4	2	
UPC-804	57.8	58.9	37.0	69.3	39.5	55.9	82.1	57.2	3	
MFC-09-1	77.9	54.4	45.9	57.4	40.3	50.2	67.7	56.3	4	
APFC-10-1	68.5	61.9	33.2	67.4	35.7	48.7	43.2	51.2	7	
Bundel Lobia-1 (NC)	59.7	67.6	38.3	67.8	45.8	53.5	38.9	53.1	6	
UPC-5286 (NC)	56.5	57.1	44.2	85.4	37.7	51.2	47.2	54.2	5	
Bundel Lobia-2 (ZC)										
UPC-622 (ZC)	57.2	98.2	42.0	55.1	39.5	60.6	63.1	59.4	1	
UPC-9202 (ZC)										
Mean	63.9	66.7	40.8	68.9	40.2	54.2	55.0	55.7		
CD at 5%	15.8	14.2	0.6	6.5	3.2	4.3	4.4			
CV%	13.9	11.9	3.9	3.0	11.0	7.6	5.0			

			•	•	•	· · /			Cont
					Central Zo	one			
Entries	Anand	Jhansi	Jabalpur	Rahuri	Urulikanchan	Kanpur	Average	Rank	Superiority%
UPC-803	41.2	47.3	32.0	47.2	79.5	118.1	60.9	4	
UPC-804	39.7	49.3	45.9	52.3	60.0	94.4	56.9	6	
MFC-09-1	44.9	43.4	26.8	63.9	69.0	149.0	66.2	1	1.2
APFC-10-1	41.0	45.4	23.7	35.0	67.3	99.0	51.9	7	
Bundel Lobia-1 (NC)	42.2	46.3	22.4	38.2	70.6	172.6	65.4	2	
UPC-5286 (NC)	47.2	44.9	31.2	64.6	81.4	120.8	65.0	3	
Bundel Lobia-2 (ZC)									
UPC-622 (ZC)									
UPC-9202 (ZC)	44.6	48.8	39.5	65.6	85.2	78.2	60.3	5	
Mean	43.0	46.5	31.6	52.4	73.3	118.9	60.9		
CD at 5%	NS	6.6	3.1	5.3	8.1	51.4			
CV%	7.8	3.9	15.5	5.5	12.3	7.1			

				Sc	outh Zor	ne					All Indi	ia
Entries	Coimba-	Vela-	Man-	Hydera-	Dhar-	Pondi-	Aver-	Rank	Superi-	Aver-	Rank	Superi-
	tore	yani	dya	bad	wad	cherry*	age		ority%	age		ority%
UPC-803	18.9	63.2	15.8	18.5	49.1	12.3	33.1	7		52.7	2	0.2
UPC-804	16.1	40.6	45.4	17.9	47.3	22.1	33.5	5		48.5	5	
MFC-09-1	22.9	68.6	26.9	19.6	66.2	20.8	40.8	1	1.7	53.6	1	1.9
APFC-10-1	22.6	63.7	12.8	21.5	51.1	35.1	34.3	4		47.8	6	
Bundel Lobia-1 (NC)	19.4	58.7	17.7	20.4	49.8	22.0	33.2	6		51.4	4	
UPC-5286 (NC)	19.3	62.5	22.8	19.3	49.7	24.4	34.7	3		52.6	3	
Bundel Lobia-2 (ZC)												
UPC-622 (ZC)												
UPC-9202 (ZC)	25.0	53.8	43.3	18.3	60.2	21.6	40.1	2				
Mean	20.6	58.7	26.4	19.4	53.3	22.6	35.7			51.3		
CD at 5%	2.4	11.5	5.4	NS	4.8	NS						
CV%	6.7	10.9	11.5	18.0	12.8	33.2						

*Not included in zonal and all India average due to CV≥20

			_		_		-			Cont
Entries	Kalyani	Jabalpur	Ranchi	Bikaner	Faizabad	Hyderabad	Mandya	Jorhat	Urulikanchan	Rahuri
UPC-803	3.44	2.45	6.14	4.40	4.22	1.43	1.43	4.03	7.79	3.80
UPC-804	3.41	3.61	6.55	3.20	3.34	1.69	2.92	3.65	7.77	4.55
MFC-09-1	3.42	2.05	5.05	4.49	4.88	1.69	2.70	3.38	7.23	5.22
APFC-10-1	4.07	1.82	6.58	5.05	3.14	1.51	2.25	3.05	9.00	5.08
Bundel Lobia-1 (NC)	4.11	1.70	6.00	4.79	3.45	1.51	3.19	3.88	9.02	5.68
UPC-5286 (NC)	3.29	2.53	5.60	4.64	3.05	1.60	2.31	3.38	8.28	5.31
Bundel Lobia-2 (ZC)				4.94			3.11			
UPC-622 (ZC)	3.79		8.12		4.01			3.46		
UPC-9202 (ZC)		3.06				1.69			8.25	5.29
Mean	3.65	2.46	6.29	4.50	3.73	1.59	2.56	3.55	8.19	4.99

Table-5.3: IVTC: Initial Varietal Trial in Forage Cowpea: Green Forage Yield (q/ha/day)

Entries	Ludhiana	Rajouri	Jhansi	Vellayani	Kanpur	Anand	Coimbatore	Hisar	Bhubneshwar	Pusa	Pondicherry	Average	Rank
UPC-803	5.72	0.77	5.33	5.10	8.08	3.84	2.95	9.71	4.78	4.68	0.21	4.30	4
UPC-804	3.70	0.97	5.17	3.30	6.33	6.78	2.23	7.47	4.52	4.47	0.36	4.09	5
MFC-09-1	5.11	1.41	5.03	5.60	9.26	4.09	3.11	9.87	3.91	4.05	0.35	4.38	3
APFC-10-1	4.19	1.34	5.03	5.20	8.35	5.57	3.60	8.80	4.42	4.25	0.61	4.42	2
Bundel Lobia-1 (NC)	5.00	1.09	4.95	4.70	10.35	5.54	2.53	9.41	4.20	4.26	0.40	4.56	1
UPC-5286 (NC)	5.56	1.63	4.80	5.10	9.02	4.12	2.52	10.02	5.40	4.25	0.39	4.42	2
Bundel Lobia-2 (ZC)	4.54							9.26					
UPC-622 (ZC)		1.25		4.40					3.90	4.88			
UPC-9202 (ZC)			5.23		7.66	4.16	3.62				0.35		
Mean	4.83	1.21	5.08	4.77	8.44	4.87	2.94	9.22	4.45	4.41	0.38	4.39	

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											Cont
Entries	Kalyani	Jabalpur	Ranchi	Bikaner	Faizabad	Hyderabad	Jorhat	Urulikanchan	Rajouri	Ludhiana	Coimbatore
UPC-803	0.55	0.44	0.97	0.64	0.95	0.36	0.70	1.21	0.70	1.20	0.34
UPC-804	0.50	0.66	0.93	0.61	0.76	0.34	0.64	1.02	0.86	0.76	0.29
MFC-09-1	0.57	0.60	0.72	0.59	1.11	0.38	0.66	0.95	0.93	1.07	0.42
APFC-10-1	0.60	0.32	0.98	0.96	0.91	0.41	0.58	1.25	0.66	0.82	0.42
Bundel Lobia-1 (NC)	0.62	0.29	1.08	0.83	0.83	0.39	0.74	1.24	0.75	1.10	0.35
UPC-5286 (NC)	0.55	0.45	0.77	0.81	0.77	0.37	0.61	1.15	0.95	1.08	0.34
Bundel Lobia-2 (ZC)				0.83		0.35				0.91	
UPC-622 (ZC)	0.57		1.30		0.83		0.64				
UPC-9202 (ZC)		0.56						1.23	0.94		0.45
Mean	0.57	0.47	0.96	0.75	0.88	0.37	0.65	1.15	0.83	0.99	0.37

Table-5.4: IVTC: Initial Varietal Trial in Forage Cowpea: Dry Matter Yield (q/ha/day)

Entries	Jhansi	Kanpur	Anand	Hisar	Bhubneshwar	Rahuri	Pusa	Average	Rank
UPC-803	0.70	2.00	0.56	1.42	1.12	0.70	1.03	0.87	3
UPC-804	0.73	1.57	0.97	1.19	0.99	0.86	0.96	0.81	5
MFC-09-1	0.63	2.48	0.61	1.37	0.90	0.93	0.89	0.88	2
APFC-10-1	0.67	1.62	0.71	1.38	1.02	0.66	0.89	0.83	4
Bundel Lobia-1 (NC)	0.67	3.14	0.69	1.60	1.00	0.75	0.94	0.95	1
UPC-5286 (NC)	0.63	2.05	0.64	1.34	1.24	0.95	0.91	0.87	3
Bundel Lobia-2 (ZC)				1.20					
UPC-622 (ZC)					0.89	0.94	1.04		
UPC-9202 (ZC)	0.73	1.35	0.66						
Mean	0.68	2.03	0.69	1.36	1.02	0.83	0.95	0.86	

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Entries	Jabal-	Ranchi	Faiza-	Hydera-	Man-	Jor-	Uruli-	Ra-	Ludhi-	Anand	Coimba-	Hisar	Bhub-	Pondi-	Aver-	Rank
	pur		bad	bad	dya	hat	kanchan	huri	ana		tore		neshwar	cherry*	age	
UPC-803	3.9	8.8	12.8	2.6	3.6	5.9	13.6	6.4	1.3	4.9	3.3	14.1	11.4	2.2	6.8	4
UPC-804	5.8	7.7	9.5	3.4	10.1	4.2	10.2	7.5	1.5	4.6	3.1	12.2	9.0	9.0	7.0	
MFC-09-1	3.3	6.9	13.3	2.2	6.9	5.0	11.1	9.1	1.4	5.9	4.9	13.6	7.9	7.9	7.1	2
APFC-10-1	2.9	7.0	12.6	2.7	2.9	4.4	11.0	4.9	1.1	5.2	4.4	13.6	8.9	8.9	6.5	5
Bundel Lobia-1 (NC)	2.7	8.0	10.6	2.5	4.0	5.7	11.5	5.5	1.5	4.8	3.6	16.2	9.3	9.3	6.8	4
UPC-5286 (NC)	3.7	7.0	9.7	2.7	5.5	4.8	13.7	9.7	1.4	6.7	3.2	13.2	12.4	12.4	7.6	1
Bundel Lobia-2 (ZC)					10.9				0.9			11.5				
UPC-622 (ZC)		13.3	9.4			4.9							7.2	7.2		
UPC-9202 (ZC)	5.0			2.8			13.6	9.7		5.3	4.5					
Mean	3.9	8.4	11.1	2.7	6.3	5.0	12.1	7.6	1.3	5.3	3.9	13.5	9.4	8.1	7.0	

Table-5.5: IVTC: Initial Varital Trial in Forage Cowpea: Crude Protien Yield (q/ha)

Table-5.6: IVTC: Initial Varietal Trial in Forage Cowpea: Crude Protien (%)

Entries	Ranchi	Faiza-	Hydera-	Man-	Jor-	Uruli-	Ra-	Ludhi-	Coimba-	Hi-	Bhub-	Anand	Jabal-	Pondi-	Aver-	Rank
		bad	bad	dya	hat	kanchan	huri	ana	tore	sar	neshwar		pur	cherry	age	
UPC-803	12.7	18.4	14.0	22.8	13.9	17.1	13.6	15.1	17.5	16.2	14.3	11.9	12.6	17.5	15.5	1
UPC-804	13.1	16.5	18.8	22.2	10.8	17.0	14.3	14.9	19.0	16.9	12.9	11.7	12.7	16.6	15.5	1
MFC-09-1	12.7	17.1	11.4	25.6	12.5	16.0	14.3	15.4	21.3	16.2	13.7	13.2	12.3	15.7	15.5	1
APFC-10-1	11.4	18.4	12.3	22.5	12.6	16.4	14.1	13.2	19.7	16.2	13.2	12.7	12.5	22.4	15.5	1
Bundel Lobia-1 (NC)	11.8	17.8	12.3	23.1	12.7	16.2	14.4	16.3	18.6	16.6	13.7	11.3	12.2	14.8	15.1	2
UPC-5286 (NC)	12.3	17.2	14.0	24.4	12.9	16.8	15.0	15.6	16.6	16.2	14.5	13.3	12.3	16.7	15.5	1
Bundel Lobia-2 (ZC)				24.4				15.2		15.8						
UPC-622 (ZC)	13.6	16.5			12.7						13.1					
UPC-9202 (ZC)			15.3			16.0	14.8		18.0			12.0	12.7	17.0		
Mean	12.5	17.4	14.0	23.6	12.6	16.5	14.4	15.1	18.7	16.3	13.6	12.3	12.5	17.2	15.5	

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Entries	Kalyani	Jabalpur	Ranchi	Bikaner	Rajouri	Faizabad	Hyderabad	Mandya	Jorhat	Urulikanchan
UPC-803	88.8	124.8	72.7	97.4	59.0	310.5	25.0	34.4	158.8	195.2
UPC-804	118.5	149.4	93.4	205.9	62.9	270.6	35.0	41.3	190.3	242.1
MFC-09-1	93.0	91.8	80.7	139.0	66.0	160.6	31.0	45.3	182.3	174.1
APFC-10-1	88.7	105.3	82.8	138.3	96.7	157.5	24.0	36.3	195.0	201.1
Bundel Lobia-1 (NC)	94.5	75.6	79.7	110.7	93.0	180.5	25.0	39.5	183.1	200.7
UPC-5286 (NC)	90.4	113.3	83.4	147.3	83.6	350.2	29.0	36.5	182.8	186.0
Bundel Lobia-2 (ZC)				181.0				44.2		
UPC-622 (ZC)	101.1		83.9		68.2	196.2			159.9	
UPC-9202 (ZC)		125.0					45.0			202.1
Mean	96.4	112.2	82.4	145.7	75.6	232.3	30.6	39.6	178.9	200.2

Table-5.7: IVTC: Initial Varietal Trial in Forage Cowpea: Plant Height (cm)

Table-5.7: IVTC: Initial Varietal Trial in Forage Cowpea: Plant Height (cm)

Entries	Rahuri	Ludhi-	Coimba-	Jhansi	Vella-	Kanpur	Anand	Bhub-	Pant-	Hisar	Shi-	Pondi-	Aver-	Rank
		ana	tore		yani			neshwar	nagar		long	cherry*	age	
UPC-803	140.0	138.7	67.0	201.9	73.7	165.0	118.6	207.9	77.7	161.6	107.7	42.4	125.1	4
UPC-804	164.0	204.0	76.0	163.7	68.7	156.9	100.0	200.6	101.0	167.0	278.0	44.7	147.1	1
MFC-09-1	138.0	177.7	81.0	162.5	72.3	183.1	118.3	181.6	44.0	154.8	247.0	55.1	125.0	5
APFC-10-1	98.0	171.3	77.0	189.4	65.0	160.8	112.4	197.3	51.0	140.1	165.7	47.9	121.6	6
Bundel Lobia-1 (NC)	136.0	200.0	77.0	184.0	64.3	184.9	114.0	189.4	106.0	226.8	176.8	45.6	130.5	3
UPC-5286 (NC)	193.0	146.7	74.7	171.5	77.3	177.5	117.3	224.5	138.3	149.0	148.1	44.8	139.1	2
Bundel Lobia-2 (ZC)		197.3							43.7	159.2				
UPC-622 (ZC)					65.7			175.4			204.1			
UPC-9202 (ZC)	236.0		89.7	216.2		183.2	111.2					50.1		
Mean	157.9	176.5	77.5	184.2	69.6	173.1	113.1	196.7	80.2	165.5	189.6	47.2	132.3	

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			_							Cont
Entries	Kalyani	Jabalpur	Ranchi	Bikaner	Rajouri	Faizabad	Hyderabad	Mandya	Jorhat	Urulikanchan
UPC-803	0.85	0.57	0.60	1.03	0.89	0.82	0.67	0.58	0.47	0.84
UPC-804	0.83	0.72	0.61	1.04	0.81	0.63	0.55	0.38	0.49	0.66
MFC-09-1	1.08	0.56	0.40	1.07	1.06	0.80	0.63	0.67	0.53	0.87
APFC-10-1	1.39	0.52	0.50	0.84	0.95	0.70	0.19	0.75	0.78	0.77
Bundel Lobia-1 (NC)	1.15	0.43	0.54	1.03	0.76	0.61	0.39	0.67	0.55	1.02
UPC-5286 (NC)	0.99	0.65	0.61	1.04	0.80	0.64	0.74	0.80	0.69	0.70
Bundel Lobia-2 (ZC)				0.93		0.70		0.35		
UPC-622 (ZC)	0.88		0.74		0.89				0.50	
UPC-9202 (ZC)		0.67					0.57			0.94
Mean	1.02	0.59	0.57	1.00	0.88	0.70	0.53	0.60	0.57	0.83

Table-5.8: IVTC: Initial Varietal Trial in Forage Cowpea: Leaf Stem Ratio

Table-5.8: IVTC: Initial Varietal Trial in Forage Cowpea: Leaf Stem Ratio

Entries	Rahuri	Ludhiana	Coimbatore	Jhansi	Vellayani	Kanpur	Bhubneshwar	Hisar	Pusa	Pondicherry*	Average	Rank
UPC-803	0.70	0.63	0.77	0.40	0.69	0.45	1.07	0.60	1.01	1.20	0.74	2
UPC-804	0.50	0.70	0.79	0.39	0.81	0.38	1.01	0.60	0.91	1.35	0.71	4
MFC-09-1	0.60	0.68	0.76	0.40	0.80	0.44	0.81	0.40	0.89	1.37	0.74	2
APFC-10-1	0.53	0.65	0.68	0.42	0.72	0.42	0.91	0.50	0.98	1.17	0.72	3
Bundel Lobia-1 (NC)	0.50	0.65	0.66	0.37	0.74	0.45	0.85	0.40	0.86	1.46	0.70	5
UPC-5286 (NC)	0.60	0.65	0.93	0.43	0.70	0.43	1.18	0.40	0.93	1.15	0.75	1
Bundel Lobia-2 (ZC)	0.50	0.43						0.50				
UPC-622 (ZC)					0.80		0.84		0.96			
UPC-9202 (ZC)			0.86	0.44		0.49				1.21		
Mean	0.56	0.63	0.78	0.41	0.75	0.44	0.95	0.49	0.93		0.70	

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	ADF	(%)	NDF	(%)
Entries	Ludhiana	Rank	Ludhiana	Rank
UPC-803	28.2	4	42.8	3
UPC-804	28.8	5	43.1	5
MFC-09-1	28.0	3	43.0	4
APFC-10-1	29.6	6	43.8	7
Bundel Lobia-1 (NC)	27.4	1	41.2	1
UPC-5286 (NC)	27.7	2	41.6	2
Bundel Lobia-2 (ZC)	28.2	4	43.2	6
UPC-622 (ZC)				
UPC-9202 (ZC)				
Mean	28.3		42.7	

Table-5.9: IVTC: Initial Varietal Trial in Forage Cowpea: ADF (%) & NDF (%)

		IVDI	MD (%)		DDI	/I (q/ha)
Entries	Ludhiana	Hisar	Average	Rank	Hisar	Rank
UPC-803	62.8	58.6	60.7	1	50.9	2
UPC-804	62.2	53.2	57.7	5	38.5	6
MFC-09-1	62.6	53.4	58.0	4	44.7	4
APFC-10-1	61.4	58.4	59.9	2	49.2	3
Bundel Lobia-1 (NC)	63.0	54.0	58.5	3	52.7	1
UPC-5286 (NC)	62.8	47.8	55.3	6	39.1	5
Bundel Lobia-2 (ZC)	62.2	47.2	54.7	7	34.7	7
UPC-622 (ZC)						
UPC-9202 (ZC)						
Mean	62.4	53.2	57.8		44.3	

Table-5.10: IVTC: Initial Varietal Trial in Forage Cowpea: IVDMD (%) & DDM (q/ha)

6. AVTC-1: FIRST ADVANCED VARIETAL TRIAL IN FORAGE COWPEA

(Table Reference: 6.1 to 6.11)

In forage Cowpea, three entries namely MFC-08-14, IC-202797 and IL-1177 along with two national checks *viz.*, UPC-5286 and Bundel Lobia-1 and three zonal checks *viz.*, UPC-9202, UPC-622 and Bundel Lobia-2 were evaluated in first advanced varietal trial conducted at 24 centres distributed in five zones of the country. Results reported from different centres clearly revealed that entry IL-1177 excelled in performance for green forage yield (q/ha) in North-West zone with 0.7% superiority, 10.5% superiority in North-East zone and 16.0% superiority in South zone. Entry MFC-08-14 (11.0%) too exhibited superiority in South zone. Con national level, entry IL-1177 (8.9%) performed better than best national check. For dry matter yield (q/ha), none of the entries performed better than respective national/zonal check in Hill, North-West and Central zone. In North-East and South zone entry IL-1177 exhibited 5.9% superiority whereas in South zone entry MFC-08-14 exhibited 14.2% superiority. At national level too, entry IL-1177 (0.8%) recorded best performer in comparison to national check.

In fodder production potential, entry IL-1177 ranked first both for green forage as well as dry matter yield potential (q/ha/day). For evaluation against growth parameters entry IL-1177 (146.5cm) ranked first for plant height (cm). In quality parameter, entry MFC-08-14 ranked first both for crude protein yield (q/ha) and crude protein (%). For leafiness character, entry IC-202797 ranked first followed by IL-1177. For ADF and IVDMD (%) entries MFC-08-14 and IC-202797 adjudged best performer. For NDF (%) and DDM (q/ha), national check performed better than the test entries.

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					-	•		•	. ,			Cont
			Hill Zon	е				No	orth West	Zone		
Entries	Rajouri	Almora	Average	Rank	Superiority%	Ludhiana	Hisar	Pantnagar	Bikaner	Average	Rank	Superiority%
MFC-08-14	145.6	322.9	234.3	3		236.5	495.8	119.4	234.7	271.6	5	
IC-202797	28.8	274.3	151.5	5		188.5	404.2	131.9		241.5	6	
IL-1177						297.9	479.2	122.2		299.8	1	0.7
UPC-5286 (NC)	173.3	347.2	260.3	2		299.0	493.7	127.7	238.9	289.8	3	
Bundel Lobia-1 (NC)	53.7	319.4	186.5	4		287.5	525.0	122.2	255.6	297.6	2	
UPC-9202 (ZC-C, Z)												
UPC-622 (ZC-NE, HL)	165.6	364.5	265.0	1								
Bundel Lobia-2 (ZC-NW)						280.2	514.6	114.7	219.0	282.1	4	
Mean	113 4	325 7	219.5			264.9	485 4	123.0	237 0	277 6		
CD at 5%	10.1	58.0	210.0			1.9	42.3	21.4	NS	2		
CV%	5.8	10.0				3.9	5.7	9.6	17.1			

Table-6.1: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Green Forage Yield (q/ha)

				•		•	. ,		Cont
				Nort	h East Zo	ne			
Entries	Faizabad	Ranchi	Kalyani	Bhubneshwar	Jorhat	Pusa	Average	Rank	Superiority%
MFC-08-14	329.3	260.5	202.7	276.1	172.2	236.2	246.2	5	
IC-202797	285.8	104.2		242.8		243.4	219.0	6	
IL-1177		302.2		314.7		289.3	302.1	1	10.5
UPC-5286 (NC)	230.0	268.3	262.7	339.7	259.0	251.6	268.6	3	
Bundel Lobia-1 (NC)	238.4	291.8	263.9	311.0	228.5	271.2	267.5	4	
UPC-9202 (ZC-C, Z)									
UPC-622 (ZC-NE, HL)	266.8	281.3	242.1	363.7	226.9	258.7	273.3	2	
Bundel Lobia-2 (ZC-NW)									
Mean	270.0	251.4	242.9	308.0	221.7	258.4	258.7		
CD at 5%	47.3	59.0	14.1	29.2	3.9	21.3			
CV%	11.4	15.6	5.0	3.1	9.7	9.3			

Table-6.1: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Green Forage Yield (q/ha)

									Cont
					Central Zone				
Entries	Anand	Jhansi	Jabalpur	Rahuri	Urulikanchan**	Kanpur	Average	Rank	Superiority%
MFC-08-14	277.0	308.3	171.7	272.8	341.6	510.4	313.6	4	
IC-202797	192.0		149.9	121.0	108.3		142.8	6	
IL-1177	288.0	354.9			370.8		337.9	2	
UPC-5286 (NC)	273.0	329.2	222.7	300.3	395.8	404.2	320.9	3	
Bundel Lobia-1 (NC)	206.0	322.9	131.1	281.8	358.3	450.0	291.7	5	
UPC-9202 (ZC-C, Z)	247.0	316.7	169.6	349.9	433.3	608.3	354.1	1	
UPC-622 (ZC-NE, HL)									
Bundel Lobia-2 (ZC-NW)									
Mean	247.2	326.4	169.0	265.2	334.7	493.2	305.9		
CD at 5%	17.5	4.7	16.1	24.9	19.5	71.3			
CV%	4.7	9.5	13.4	6.1	8.9	7.0			

Table-6.1: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Green Forage Yield (q/ha)

**At Urulikanchan statistical analysis considered exclusive of yield figure of AVTC-5

	South Zone										All Ind	ia
Entries	Coimba-	Vella-	Man-	Dhar-	Hydera-	Pandu-	Aver-	Rank	Superi-	Aver-	Rank	Superi-
	tore	yani	dya	wad	bad	cherry*	age		ority%	age		ority%
MFC-08-14	164.6	306.3	185.2	183.3	108.3	163.5	189.5	2	11.0	254.8	3	
IC-202797	143.7	248.8		102.1			164.9	4		185.6	4	
IL-1177	208.3	268.8		116.7			197.9	1	16.0	284.4	1	8.9
UPC-5286 (NC)	179.2	235.0	171.3	143.8	61.6	107.2	158.2	6		261.2	2	
Bundel Lobia-1 (NC)	191.7	242.5	161.8	129.2	73.3	101.5	159.7	5		248.6	5	
UPC-9202 (ZC-C, Z)	208.3	230.0	172.8	177.1	65.0	124.1	170.6	3				
UPC-622 (ZC-NE, HL)												
Bundel Lobia-2 (ZC-NW)												
Mean	182.6	255.2	172.8	142.0	77.1	124.1	165.9			250.7		
CD at 5%	17.7	32.2	8.6	30.7	17.3	NS						
CV%	6.4	8.4	3.1	14.4	16.0	52.1						

Table-6.1: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Green Forage Yield (q/ha)

*Not included in zonal and all India average due to CV≥20

					• .	-						Cont
			Hill Zor	ne				Nor	th West Z	one		
Entries	Rajouri	Almora	Average	Rank	Superiority%	Ludhiana	Hisar	Pantnagar	Bikaner	Average	Rank	Superiority%
MFC-08-14	20.1	50.6	35.4	3		49.7	69.4	19.7	38.5	44.3	5	
IC-202797	4.5	43.0	23.7	5		36.8	60.6	24.5		40.6	6	
IL-1177						61.0	61.1	21.4		47.8	4	
UPC-5286 (NC)	23.8	54.5	39.1	2		59.8	75.3	21.6	39.5	49.1	3	
Bundel Lobia-1 (NC)	8.0	50.1	29.0	4		63.3	86.7	20.9	49.2	55.0	1	
UPC-9202 (ZC-C, Z)												
UPC-622 (ZC-NE, HL)	22.5	57.2	39.8	1								
Bundel Lobia-2 (ZC-NW)						57.4	83.6	20.1	41.7	50.7	2	
Mean	15.8	51.1	33.4			54.7	72.8	21.4	42.2	47.8		
CD at 5%	1.8	9.1				1.5	7.6	3.5	NS			
CV%	7.6	10.0				13.0	6.8	9.1	17.2			

Table-6.2: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Dry Matter Yield (q/ha)

				•	•	•		•••	Cont
				North E	ast Zon	e			
Entries	Faizabad	Ranchi	Kalyani	Bhubneshwar	Jorhat	Pusa	Average	Rank	Superiority%
MFC-08-14	74.0	44.4	32.6	65.0	31.1	53.1	50.0	4	
IC-202797	63.4	14.6		54.9		54.7	46.9	6	
IL-1177		35.3		74.2		61.6	57.0	1	5.9
UPC-5286 (NC)	50.9	45.2	40.1	80.0	50.7	56.2	53.8	2	
Bundel Lobia-1 (NC)	49.1	37.3	31.8	73.8	42.0	58.3	48.7	5	
UPC-9202 (ZC-C, Z)									
UPC-622 (ZC-NE, HL)	59.2	35.7	36.0	86.7	41.3	54.7	52.3	3	
Bundel Lobia-2 (ZC-NW)									
Mean	59.3	35.4	35.1	72.4	41.3	56.4	50.0		
CD at 5%	9.2	9.7	2.2	7.0	2.4	7.9			
CV%	10.0	18.2	4.9	3.2	13.9	8.7			

Table-6.2: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Dry Matter Yield (q/ha)

								-	Cont
					Central Zone	e			
Entries	Anand	Jhansi	Jabalpur	Rahuri	Urulikanchan**	Kanpur	Average	Rank	Superiority%
MFC-08-14	41.5	71.2	32.2	50.9	52.0	103.3	58.5	4	
IC-202797	28.6		27.0	15.5	18.9		22.5	6	
IL-1177	45.5	81.3			56.8		61.2	3	
UPC-5286 (NC)	43.4	76.6	43.7	57.4	61.0	82.3	60.7	2	
Bundel Lobia-1 (NC)	29.3	77.9	23.9	41.9	45.9	84.2	50.5	5	
UPC-9202 (ZC-C, Z)	35.9	76.0	32.2	70.0	70.3	130.6	69.2	1	
UPC-622 (ZC-NE, HL)									
Bundel Lobia-2 (ZC-NW)									
Mean	37.4	76.6	31.8	47.1	50.8	100.1	57.3		
CD at 5%	2.6	2.8	3.0	4.2	6.4	29.7			
CV%	4.6	2.4	13.2	5.2	15.5	6.4			

Table-6.2: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Dry Matter Yield (q/ha)

**At Urulikanchan statistical analysis considered exclusive of yield figure of AVTC-5

					South Zon	е					All Indi	a
Entries	Coimba-	Vella-	Man-	Dhar-	Pandu-	Hydera-	Aver-	Rank	Superi-	Aver-	Rank	Superi-
	tore	yani	dya	wad	cherry*	bad*	age		ority%	age		ority%
MFC-08-14	20.5	60.1	48.5	41.0	27.8	26.7	42.5	1	14.2	48.6	3	
IC-202797	21.8	48.8		21.0			30.5	5		33.7	5	
IL-1177	26.3	52.7		24.0			34.3	3		50.1	1	0.8
UPC-5286 (NC)	22.9	46.1	32.2	30.9	22.1	15.2	33.0	4		49.7	2	
Bundel Lobia-1 (NC)	25.9	47.5	47.9	27.6	25.3	22.9	37.2	2		46.5	4	
UPC-9202 (ZC-C, Z)	25.5	45.1	27.9	33.6	25.7	16.7	33.0	4				
UPC-622 (ZC-NE, HL)												
Bundel Lobia-2 (ZC-NW)												
Mean	23.8	50.1	39.1	29.7	25.2	20.4	35.7			47.5		
CD at 5%	2.3	6.3	6.6	7.0	NS	6.4						
CV%	6.3	8.3	10.6	15.5	28.4	22.0						

Table-6.2: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Dry Matter Yield (q/ha)

*Not included in zonal and all India average due to CV≥20

											Cont
Entries	Kanpur	Anand	Coimbatore	Jabalpur	Rajouri	Bikaner	Ranchi	Faizabad	Kalyani	Hyderabad	Mandya
MFC-08-14	8.23	3.74	2.74	2.41	2.08	2.97	3.80	4.70	2.67	2.08	2.64
IC-202797		3.15	2.61	2.05	0.41		2.56	3.97			
IL-1177		3.95	3.42				4.37				
UPC-5286 (NC)	7.35	3.69	2.76	3.27	2.48	3.02	3.79	3.03	2.99	1.19	2.92
Bundel Lobia-1 (NC)	7.26	2.94	3.55	1.87	0.77	3.24	5.16	3.26	4.26	1.41	3.20
UPC-9202 (ZC-C, Z)	10.31	3.34	3.47	2.42						1.25	2.81
UPC-622 (ZC-NE, HL)					2.37		4.21	3.50	3.19		
Bundel Lobia-2 (ZC-NW)						2.77					
Mean	8.29	3.47	3.09	2.40	1.62	3.00	3.98	3.69	3.28	1.48	2.89

Table-6.3: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Green Forage Yield (q/ha/day)

Table-6.3: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Green Forage Yield (q/ha/day)

Entries	Rahuri	Urulikanchan	Vellayani	Jorhat	Ludhiana	Jhansi	Hisar	Bhubneshwar	Pusa	Pondicherry*	Average	Rank
MFC-08-14	4.01	5.02	4.90	2.77	3.20	4.38	8.13	4.18	4.10	0.48	3.94	3
IC-202797	2.42	2.08	4.00		2.55		6.63	3.97	4.30		3.13	4
IL-1177		5.57	4.40		3.92	5.34	7.86	4.56	4.90		4.83	1
UPC-5286 (NC)	4.42	6.40	3.80	4.17	3.82	4.76	8.09	4.78	4.50	0.37	4.06	2
Bundel Lobia-1 (NC)	5.42	2.08	3.90	3.68	3.78	4.70	8.61	5.02	4.70	0.44	3.94	3
UPC-9202 (ZC-C, Z)	5.07	6.57	3.70			4.86				0.54		
UPC-622 (ZC-NE, HL)				3.66				5.27	4.5			
Bundel Lobia-2 (ZC-NW)					3.79		8.44					
Mean	4.27	4.62	4.12	3.57	3.51	4.81	7.96	4.63	4.50	0.46	3.96	

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					-							Cont
Entries	Kanpur	Anand	Coimba-	Jabal-	Bika-	Ranchi	Faiza-	Kal-	Hydera-	Rahuri	Uruli-	Ludhi-
			tore	pur	ner		bad	yani	bad		kanchan	ana
MFC-08-14	1.67	0.56	0.34	0.45	0.49	0.65	1.05	0.43	0.51	0.75	0.76	0.67
IC-202797		0.47	0.40	0.36		0.36	0.88			0.31	0.36	0.50
IL-1177		0.62	0.43			0.51					0.97	0.80
UPC-5286 (NC)	1.50	0.59	0.35	0.64	0.50	0.64	0.67	0.46	0.29	0.84	0.86	0.79
Bundel Lobia-1 (NC)	1.36	0.42	0.48	0.34	0.62	0.66	0.67	0.51	0.44	0.81	0.82	0.81
UPC-9202 (ZC-C, Z)	2.21	0.49	0.43	0.46					0.32	1.01	1.06	
UPC-622 (ZC-NE, HL)						0.53	0.78	0.50				
Bundel Lobia-2 (ZC-NW)					0.53							0.78
Mean	1.69	0.53	0.41	0.45	0.54	0.56	0.81	0.48	0.39	0.74	0.81	0.73

Table-6.4: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Dry Matter Yield (q/ha/day)

Table-6.4: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Dry Matter Yield (q/ha/day)

Entries	Jhansi	Jorhat	Hisar	Bhubneshwar	Pusa	Average	Rank
MFC-08-14	1.00	0.50	1.14	0.98	0.93	0.76	3
IC-202797			0.99	0.86	0.98	0.59	4
IL-1177	1.32		1.00	1.08	1.06	0.87	1
UPC-5286 (NC)	1.10	0.81	1.23	1.13	1.00	0.79	2
Bundel Lobia-1 (NC)	1.12	0.67	1.42	1.19	1.01	0.79	2
UPC-9202 (ZC-C, Z)	1.16						
UPC-622 (ZC-NE, HL)		0.66		1.26	0.96		
Bundel Lobia-2 (ZC-NW)			1.37				
Mean	1.14	0.66	1.19	1.08	0.99	0.77	

Entries	Anand	Coimbat	Jabal-	Ranchi	Faiza-	Kal-	Hydera	Man-	Ra-	Uruli-	Jor-	Ludhi-	Hisar	Bhub-	Pondi-	Aver-	Rank
		-ore	pur		bad	yani	-bad	dya	huri	kanchan	hat	ana		neshwar	cherry*	age	
MFC-08-14	4.9	4.0	4.0	5.4	13.7	1.7	3.7	13.9	7.1	8.6	3.8	0.6	12.2	9.3	4.1	6.6	1
IC-202797	3.5	3.1	3.4	1.9	10.3				2.2	3.1		0.6	9.7	7.4		4.5	5
IL-1177	5.1	3.5		4.0						9.3		0.9	9.4	10.2		6.0	3
UPC-5286 (NC)	5.3	3.1	5.5	6.1	8.9	2.7	2.2	8.8	8.0	9.5	6.1	0.8	12.0	10.8	3.7	6.4	2
Bundel Lobia-1 (NC)	3.2	3.5	2.8	4.9	8.2	1.8	2.7	10.9	5.9	7.8	4.8	0.9	13.5	10.8	3.9	5.8	4
UPC-9202 (ZC-C, Z)	4.6	5.4	3.9				1.7	6.8	10.1	11.8					4.5		
UPC-622 (ZC-NE, HL)				4.5	10.2	2.1					4.9			11.9			
Bundel Lobia-2 (ZC-NW)												0.7	12.8				
Mean	4.4	3.7	3.9	4.5	10.3	2.1	2.6	10.1	6.7	8.4	4.9	0.7	11.6	10.1	4.1	6.0	

Table-6.5: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Crude Protien Yield (q/ha)

Table-6.6: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Crude Protien (%)

Entries	Ana-	Coimba-	Jabal-	Ran-	Faiza-	Kal-	Hydera-	Man-	Ra-	Uruli-	Jor-	Ludhi-	Hi-	Bhub-	Pant-	Pondi-	Aver-	Ra-
	nd	tore	pur	chi	bad	yani	bad	dya	huri	kanchan	hat	ana	sar	neshwar	nagar	cherry*	age	nk
MFC-08-14	11.8	19.7	12.7	12.3	18.6	14.5	14.0	28.8	14.0	16.7	12.4	14.1	17.5	14.3	19.3	14.9	16.0	1
IC-202797	12.1	14.0	12.5	12.7	16.2				14.4	16.6		13.7	16.0	13.4	20.1		14.7	4
IL-1177	11.1	13.1		11.4						16.4		16.2	15.3	13.7	18.4		14.5	5
UPC-5286 (NC)	12.1	13.6	12.8	13.6	17.5	15.9	14.1	27.5	13.9	15.6	12.0	13.9	16.0	13.5	20.1	17.0	15.5	2
Bundel Lobia-1 (NC)	11.2	13.6	12.2	13.1	16.8	16.3	12.1	22.5	14.0	17.0	11.5	16.7	15.5	14.7	21.0	15.3	15.2	3
UPC-9202 (ZC-C, Z)	12.9	21.0	12.7				10.1	24.4	14.4	16.8						17.5		
UPC-622 (ZC-NE, HL)				12.7	17.3	15.6					12.1			13.7				
Bundel Lobia-2 (ZC-NW)												14.1	15.3		21.0			
Mean	11.9	15.8	12.6	12.6	17.3	15.5	12.6	25.8	14.1	16.5	12.0	14.8	15.9	13.9	20.0	16.2	15.4	

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												Cont
Entries	Kanpur	Anand	Coimbatore	Jabalpur	Rajouri	Bikaner	Ranchi	Faizabad	Kalyani	Hyderabad	Mandya	Urulikanchan
MFC-08-14	201.0	117.0	103.3	169.7	88.0	64.0	78.2	210.6	105.5	42.0	42.5	196.9
IC-202797		121.8	109.8	134.4	87.3		76.2	205.8				112.8
IL-1177		98.7	119.3				75.2					225.9
UPC-5286 (NC)	197.5	125.0	121.0	186.4	100.3	79.4	71.1	270.5	98.5	55.0	41.6	209.4
Bundel Lobia-1 (NC)	188.5	95.0	127.3	113.5	67.3	92.0	74.0	195.7	87.3	45.0	39.0	220.7
UPC-9202 (ZC-C, Z)	175.5	114.4	127.8	168.9						63.0	54.1	170.0
UPC-622 (ZC-NE, HL)					122.3		74.9	170.5	108.6			
Bundel Lobia-2 (ZC-NW)						115.6						
Mean	190.6	112.0	118.0	154.6	93.0	87.8	74.9	210.6	100.0	51.3	44.3	189.3

Table-6.7: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Plant Height (cm)

Table-6.7: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Plant Height (cm)

Entries	Jorhat	Ludhiana	Jhansi	Vellayani	Bhubneshwar	Pantnagar	Hisar	Pondicherry*	Average	Rank
MFC-08-14	135.5	149.7	185.3	78.3	191.3	90.3	170.8	57.2	127.4	5
IC-202797		180.0		58.5	180.4	106.7	193.4		130.6	4
IL-1177		156.3	249.2	67.8	210.8	61.7	200.5		146.5	1
UPC-5286 (NC)	158.7	236.7	174.8	72.5	224.6	75.0	182.2	53.1	141.1	2
Bundel Lobia-1 (NC)	180.3	230.3	241.0	75.8	200.4	61.7	181.4	56.4	132.4	3
UPC-9202 (ZC-C, Z)			188.0	71.3				62.4		
UPC-622 (ZC-NE, HL)	140.0				230.9					
Bundel Lobia-2 (ZC-NW)		205.0				91.7	188.4			
Mean	153.6	193.0	207.7	70.7	206.4	81.2	186.1	57.3	132.9	

												Cont
Entries	Kanpur	Coimbatore	Jabalpur	Rajouri	Bikaner	Ranchi	Faizabad	Kalyani	Hyderabad	Mandya	Rahuri	Urulikanchan
MFC-08-14	0.36	0.79	0.55	0.84	1.10	0.69	0.85	0.82	0.64	0.52	0.60	1.01
IC-202797		1.20	0.52	0.89		0.83	0.75				0.77	1.08
IL-1177		0.66				0.77						0.91
UPC-5286 (NC)	0.38	0.73	0.63	0.92	1.00	0.53	0.63	0.61	0.61	0.65	0.56	1.16
Bundel Lobia-1 (NC)	0.39	0.77	0.43	0.92	1.00	0.56	0.68	0.77	0.35	0.40	0.65	0.89
UPC-9202 (ZC-C, Z)	0.39	0.83	0.52						0.52	0.53	0.74	0.88
UPC-622 (ZC-NE, HL)				0.85		0.46	0.62	0.72				
Bundel Lobia-2 (ZC-NW)					1.00							
Mean	0.38	0.83	0.53	0.88	1.03	0.64	0.71	0.73	0.53	0.53	0.66	0.99

Table-6.8: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Leaf Stem Ratio

Table-6.8: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: Leaf Stem Ratio

Entries	Jorhat	Ludhiana	Jhansi	Vellayani	Bhubneshwar	Pantnagar	Hisar	Pusa	Pondicherry*	Average	Rank
MFC-08-14	0.73	0.53	0.45	0.77	0.97	0.71	0.49	0.97	1.25	0.72	3
IC-202797		0.63		0.66	0.89	0.63	0.51	0.97		0.79	1
IL-1177		0.63	0.45	0.79	1.07	0.62	0.56	0.89		0.74	2
UPC-5286 (NC)	0.64	0.60	0.42	0.77	1.14	0.63	0.43	0.98	1.41	0.70	4
Bundel Lobia-1 (NC)	0.66	0.50	0.37	0.75	1.01	0.68	0.43	0.93	1.09	0.66	5
UPC-9202 (ZC-C, Z)			0.31	0.75					1.03		
UPC-622 (ZC-NE, HL)	0.67				1.23			1.01			
Bundel Lobia-2 (ZC-NW)		0.63				0.60	0.40				
Mean	0.68	0.59	0.40	0.75	1.05	0.65	0.47	0.96	1.20	0.70	

Entries	Ranchi	Ludhiana	Rahuri	Pantnagar	Average	Rank
MFC-08-14	54.6	44.0	62.7	54.0	53.8	5
IC-202797	52.8	45.2	60.5	58.0	54.1	3
IL-1177	56.6	43.0		58.6	52.7	2
UPC-5286 (NC)	54.4	44.8	55.2	55.6	52.5	1
Bundel Lobia-1 (NC)	55.2	43.6	63.7	54.2	54.2	4
UPC-9202 (ZC-C, Z)			60.9			
UPC-622 (ZC-NE, HL)	54.8					
Bundel Lobia-2 (ZC-NW)		44.4		59.2		
Mean	54.7	44.2	60.6	56.6	54.0	

Table-6.9: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: NDF (%)

Table-6.10: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: AD	- (%))
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Entries	Ranchi	Ludhiana	Hisar	Pantnagar	Average	Rank
MFC-08-14	50.8	31.5	50.2	49.4	45.5	1
IC-202797	46.6	33.0	47.7	50.6	44.5	2
IL-1177	48.2	30.4		48.8	42.5	5
UPC-5286 (NC)	47.4	33.6	49.0	47.2	44.3	3
Bundel Lobia-1 (NC)	48.2	30.0	46.6	48.4	43.3	4
UPC-9202 (ZC-C, Z)			48.4			
UPC-622 (ZC-NE, HL)	48.2					
Bundel Lobia-2 (ZC-NW)		32.2		49.8		
Mean	48.2	31.8	48.4	49.0	44.4	

				IVDMD (%)			DDM	(q/ha)
Entries	Ranchi	Ludhiana	Hisar	Rahuri	Pantnagar	Average	Rank	Hisar	Rank
MFC-08-14	63.2	60.4	55.2	55.4	63.2	59.5	1	38.3	4
IC-202797	57.0	59.2	59.6	54.5	65.0	59.1	2	36.1	5
IL-1177	58.2	62.2	51.2		62.6	58.6	4	31.3	6
UPC-5286 (NC)	59.2	59.2	54.4	51.7	61.4	57.2	5	40.9	3
Bundel Lobia-1 (NC)	55.0	61.6	60.0	53.2	64.0	58.8	3	52.0	1
UPC-9202 (ZC-C, Z)				54.6					
UPC-622 (ZC-NE, HL)	62.0								
Bundel Lobia-2 (ZC-NW)		60.0	53.8		64.2			45.0	2
Mean	59.1	60.4	55.7	53.9	63.4	58.5		40.6	

Table-6.11: AVTC-1: First Advanced Varietal Trial in Forage Cowpea: IVDMD (%) & DDM (q/ha)

7. IVTRB: INITIAL VARIETAL TRIAL IN FORAGE RICE BEAN

(Table Reference: 7.1 to 7.8)

An initial varietal trial in forage rice bean comprising four entries namely JRB-13, JRB-14, BFRB-15 and JRBJ-05-4 along with one national check *i.e.*, Bidhan-1 was conducted at 8 different locations across the country. Results obtained from different centres indicated that for green forage yield (q/ha), entries BFRB-15 (7.3%) followed by JRB-11 (6.6%) and JRBJ-05-4 (6.4%) exhibited their superiority over check.

Similarly for dry matter yield (q/ha) entries JRB-13 (6.0%), BFRB-15 (5.4%), JRB-14 (2.5%) and JRBJ-05-4 (2.3%) proved their superiority with respect to check. In green forage production potential (q/ha/day), all the test entries performed better than the check. For dry matter production potential (q/ha/day), all the entries expect JRBJ-05-4 proved their superiority over check. Similar was the case with growth parameter where entry JRB-13 (150.10 cm) ranked first and other entries also performed better than the national check Bidhan-1.

Coming to the quality aspects, entry JRB-13 (9.8 q/ha) ranked first for crude protein yield followed by JRB-14 (9.4 q/ha) and BFRB-15 (9.2 q/ha). For the character crude protein (%), all the entries except BFRB-15 performed better than check. For the character Leaf/Stem ratio, entries BFRB-15 (0.85) and JRBJ-05-4 (0.83) adjudged good performer with respect to Bidhan-1 (0.80).

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Entries	Kalyani	Ranchi	Bhubneshwar	Jorhat	Pusa	Vellayani	Jabalpur	Shilong	Average	Rank	Superiority%
JRB-13	262.5	430.5	220.9	278.3	263.3	280.0	407.0	237.4	297.5	2	6.6
JRB-14	207.1	312.5	287.6	265.2	258.3	270.0	414.3	219.5	279.3	4	0.1
BFRB-15	271.7	465.2	336.6	232.4	290.2	248.7	377.8	173.5	299.5	1	7.3
JRBJ-05-4	257.9	444.4	208.4	242.9	279.5	256.2	466.1	220.2	297.0	3	6.4
K-1 (Bidhan-1) (NC)	221.2	402.7	255.3	223.8	247.6	262.5	405.9	213.1	279.0	5	
Mean	244.1	411.1	261.8	248.5	267.8	263.5	414.2	212.7	290.5		
CD at 5%	15.5	69.2	26.5	4.3	17.8	19.7	35.0	15.3			
CV%	5.0	9.6	3.4	8.0	10.7	4.9	12.1	4.5			

 Table-7.1: IVT (Rice bean): Initial Varietal Trial in Rice bean: Green Forage Yield (q/ha)

Table-7.2: IVT (Ric	ce bean): Initial V	arietal Trial in Rice	e bean: Dry Matter	[·] Yield (q/ha)
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Entries	Kalyani	Ranchi	Bhubneshwar	Jorhat	Pusa	Vellayani	Jabalpur	Shilong	Average	Rank	Superiority%
JRB-13	44.7	81.9	47.0	55.1	56.6	54.9	79.1	54.5	59.2	1	6.0
JRB-14	30.7	64.9	68.6	53.5	55.3	52.9	80.1	51.8	57.2	3	2.5
BFRB-15	46.6	80.2	75.9	41.6	62.9	48.8	72.8	41.8	58.8	2	5.4
JRBJ-05-4	45.9	73.4	43.0	47.5	58.1	50.2	86.4	52.1	57.1	4	2.3
K-1 (Bidhan-1) (NC)	41.5	84.4	53.0	41.8	54.5	51.5	81.1	38.7	55.8	5	
Mean	41.9	77.0	57.5	47.9	57.5	51.7	79.9	47.8	57.6		
CD at 5%	2.8	14.6	5.5	2.2	6.4	3.9	7.0	2.6			
CV%	5.3	10.7	3.2	9.4	9.8	4.9	12.4	5.4			

Entries	Kalyani	Jorhat	Vellayani	Ranchi	Jabalpur	Bhubneshwar	Pusa	Average	Rank
JRB-13	2.41	3.97	4.51	4.35	4.19	2.19	3.13	3.54	1
JRB-14	2.20	3.78	4.35	3.66	4.27	2.69	3.11	3.44	4
BFRB-15	2.43	3.32	4.01	4.70	3.81	3.12	3.41	3.54	2
JRBJ-05-4	2.30	3.47	4.13	4.49	4.90	2.00	3.29	3.51	3
K-1 (Bidhan-1) (NC)	1.98	3.19	4.23	4.21	4.31	2.48	3.02	3.35	5
Mean	2.26	3.55	4.25	4.28	4.30	2.50	3.19	3.47	

Table-7.3: IVT (Rice bean): Initial Varietal Trial in Rice bean: Green Forage Yield (q/ha/day)

Table-7.4: IVT (Rice bean): Initial Varietal Trial in Rice bean: Dry Matter Yield (q/ha/day)

Entries	Kalyani	Jorhat	Ranchi	Jabalpur	Bhubneshwar	Pusa	Average	Rank
JRB-13	0.41	0.78	0.83	0.81	0.47	0.67	0.66	1
JRB-14	0.33	0.76	0.76	0.82	0.64	0.67	0.66	1
BFRB-15	0.42	0.59	0.81	0.73	0.70	0.74	0.67	2
JRBJ-05-4	0.41	0.67	0.74	0.90	0.41	0.68	0.64	4
K-1 (Bidhan-1) (NC)	0.37	0.59	0.88	0.86	0.51	0.66	0.65	3
Mean	0.39	0.68	0.80	0.82	0.55	0.68	0.65	

Entries	Jorhat	Ranchi	Jabalpur	Bhubneshwar	Average	Rank
JRB-13	8.8	11.5	11.0	7.9	9.8	1
JRB-14	8.4	8.8	11.0	9.6	9.4	2
BFRB-15	5.2	10.9	9.9	10.6	9.2	3
JRBJ-05-4	5.5	10.0	12.0	6.8	8.6	5
K-1 (Bidhan-1) (NC)	4.9	11.1	11.4	8.3	8.9	4
Mean	6.5	10.4	11.1	8.6	9.2	

Table-7.5: IVT (Rice bean): Initial Varietal Trial in Rice bean: Crude Protien Yield (q/ha)

Table-7.6: IVT (Rice bean): Initial Varietal Trial in Rice bean: Crude Protien (%)

Entries	Jorhat	Ranchi	Jabalpur	Bhubneshwar	Average	Rank
JRB-13	16.0	14.0	14.0	16.8	15.2	1
JRB-14	15.8	13.6	14.1	14.0	14.4	2
BFRB-15	12.7	13.6	13.8	14.0	13.5	5
JRBJ-05-4	11.7	13.6	14.1	15.7	13.8	3
K-1 (Bidhan-1) (NC)	11.7	13.1	14.2	15.6	13.7	4
Mean	13.6	13.6	14.0	15.2	14.1	

Entries	Kalyani	Jorhat	Vellayani	Ranchi	Jabalpur	Bhubneshwar	Shilong	Average	Rank
JRB-13	116.7	178.9	160.0	82.0	194.2	152.4	166.8	150.1	1
JRB-14	96.5	172.9	172.5	84.7	197.5	163.2	147.6	147.8	2
BFRB-15	117.5	134.0	150.0	83.5	166.9	174.6	103.9	132.9	4
J RBJ-05-4	107.8	163.4	145.0	89.6	215.4	148.9	158.6	147.0	3
K-1 (Bidhan-1) (NC)	104.6	147.1	156.3	79.5	201.4	158.7	81.4	132.7	5
Mean	108.6	159.3	156.8	83.9	195.1	159.6	131.7	142.1	

Table-7.7: IVT (Rice bean): Initial Varietal Trial in Rice bean: Plant Height (cm)

Entries	Kalyani	Jorhat	Vellayani	Ranchi	Jabalpur	Bhubneshwar	Pusa	Average	Rank
JRB-13	1.09	0.71	0.92	0.58	0.54	0.84	0.98	0.81	5
JRB-14	1.09	0.75	0.84	0.40	0.61	1.08	0.88	0.81	3
BFRB-15	1.20	0.55	0.90	0.56	0.57	1.13	1.02	0.85	1
JRBJ-05-4	1.40	0.61	0.83	0.55	0.65	0.80	0.98	0.83	2
K-1 (Bidhan-1) (NC)	1.19	0.56	0.89	0.50	0.60	0.97	0.91	0.80	4
Mean	1.19	0.64	0.88	0.52	0.59	0.96	0.95	0.82	

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8. AVTRB – 2: SECOND ADVANCED VARIETAL TRIAL IN FORAGE RICE BEAN

(Table Reference: 8.1 to 8.9)

In forage rice bean, three entries namely JRBJ-05-2, KRB-19 and JRB-10 which were promoted from AVTRB-1 were evaluated against one national check i.e., Bidhan-1 at eight locations across the country. Results of the trial received from different locations clearly indicated that all the test entries exhibited their superiority with respect to check for green forage as well as dry matter yield (q/ha). For green forage yield, entries KRB-19 (20.6%), JRBJ-05-2 (8.1%) and JRB-10 (7.5%) registered their superiority over check whereas for dry matter yield (q/ha), entries KRB-19 (21.8%), JRBJ-05-2 (11.7%) and JRB-10 (10.8%) proved their superiority.

In the fodder production potential i.e., green forage and dry matter yield (q/ha/day) entry KRB-19 ranked first followed by JRB-10 and JRBJ-05-2. For evaluation against growth parameter, entries KRB-19 (135.60 cm) ranked first followed by JRB-10 (131.80 cm) and JRBJ-05-2 (127.90 cm).

In quality parameters, entry KRB-19 (8.6 q/ha) ranked first followed by JRB-10 (7.6 q/ha) and JRBJ-05-2 (7.3 q/ha) for crude protein yield (q/ha) whereas for crude protein (%) too, KRB-19 ranked first but followed by JRBJ-05-2 and JRB-10. For the character leaf stem ratio, all the entries surpassed their performance over check. Entry KRB-19 ranked first for the character ADF (%) and IVDMD (%) whereas entry JRB-10 ranked first for NDF (%). In general, performances of all the entries against the national check were superior for production potential as well as growth parameter and quality aspects.

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Entries	Kalyani	Ranchi	Bhubneshwar	Jorhat	Pusa	Vellayani	Imphal	Jabalpur	Average	Rank	Superiority%
JRBJ-05-2	224.5	343.9	213.6	245.5	294.3	254.0	104.2	446.5	265.8	2	8.1
KRB-19	320.9	400.1	304.8	275.9	237.8	315.0	120.0	397.6	296.5	1	20.6
JRB-10	236.7	375.1	252.2	297.2	229.2	262.0	110.0	352.9	264.4	3	7.5
K-1 (Bidhan-1) (NC)	245.2	354.3	203.2	245.8	241.9	217.0	100.8	358.1	245.8	4	
Mean	256.8	368.4	243.4	266.1	250.8	262.0	108.8	388.8	268.1		
CD at 5%	8.3	39.5	22.5	5.5	21.7	34.4	9.9	31.9			
CV%	2.9	7.8	6.7	12.3	9.3	9.4	6.6	13.0			

Table-8.1: AVT-2 (Rice bean): Second Advanced Varietal Trial in Rice bean: Green Forage Yield (q/ha)

Table-8.2: AVT-2 (F	Rice bean	: Second Advanced	Varietal Trial in	Rice bean: Dr	y Matter	Yield (q/ha)
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Entries	Kalyani	Ranchi	Bhubneshwar	Jorhat	Pusa	Vellayani	Imphal	Jabalpur	Average	Rank	Superiority%
JRBJ-05-2	39.0	58.5	46.0	40.2	61.2	49.8	23.9	87.4	50.7	2	11.7
KRB-19	57.9	54.2	67.5	48.0	50.9	61.8	26.0	75.9	55.3	1	21.8
JRB-10	37.8	65.9	53.9	54.7	50.2	51.4	23.9	66.6	50.5	3	10.8
K-1 (Bidhan-1) (NC)	38.0	56.7	41.8	40.8	52.3	42.5	22.2	68.7	45.4	4	
Mean	43.2	58.8	52.3	45.9	53.7	51.4	24.0	74.7	50.5		
CD at 5%	1.6	8.1	4.5	2.6	7.9	6.7	NS	6.2			
CV%	3.3	10.0	6.2	13.7	8.9	9.5	11.8	13.0			

Entries	Vellayani	Kalyani	Jorhat	Ranchi	Jabalpur	Imphal	Bhubneshwar	Pusa	Average	Rank
JRBJ-05-2	4.09	2.00	3.50	3.44	4.70	2.08	1.96	3.50	3.16	3
KRB-19	5.08	2.87	3.94	4.00	4.09	2.26	2.93	2.90	3.51	1
JRB-10	4.22	2.17	4.24	3.95	3.67	2.06	2.50	2.80	3.20	2
K-1 (Bidhan-1) (NC)	3.50	2.19	3.51	3.54	3.69	1.93	1.90	2.90	2.90	4
Mean	4.22	2.31	3.80	3.73	4.04	2.08	2.32	3.03	3.19	

Table-8.3: AVT-2 (Rice bean): Second Advanced Varietal Trial in Rice bean: Green Forage Yield (q/ha/day)

Table-8.4: AVT-2 (Ricebean): Second Advanced Varietal Trial in Rice bean: Dry Matter Yield (q/ha/day)

Entries	Kalyani	Jorhat	Ranchi	Jabalpur	Bhubneshwar	Pusa	Average	Rank
JRBJ-05-2	0.35	0.57	0.59	0.92	0.42	0.73	0.60	3
KRB-19	0.52	0.68	0.54	0.78	0.65	0.63	0.63	1
JRB-10	0.35	0.78	0.69	0.69	0.53	0.62	0.61	2
K-1 (Bidhan-1) (NC)	0.34	0.58	0.57	0.70	0.39	0.63	0.54	4
Mean	0.39	0.65	0.60	0.77	0.50	0.65	0.59	

Entries	Kalyani	Jorhat	Jabalpur	Ranchi	Imphal	Bhubneshwar	Average	Rank
JRBJ-05-2	8.1	4.8	12.2	8.4	3.4	6.9	7.3	3
KRB-19	11.5	7.6	10.6	7.3	3.7	11.2	8.6	1
JRB-10	6.1	9.3	9.2	9.8	3.2	7.9	7.6	2
K-1 (Bidhan-1) (NC)	7.0	5.1	9.7	8.2	3.4	5.8	6.5	4
Mean	8.2	6.7	10.4	8.4	3.4	7.9	7.5	

Table-8.5: AVT-2 (Rice bean): Second Advanced Varietal Trial in Rice bean: Crude Protien Yield (q/ha)

Table-8.6: AVT-2 (Rice bea	 Second Advanced V 	arietal Trial in Rice	bean: Crude Protien	(%)
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Entries	Kalyani	Jorhat	Jabalpur	Ranchi	Imphal	Bhubneshwar	Average	Rank
JRBJ-05-2	20.8	12.1	14.1	14.4	14.1	15.1	15.1	2
KRB-19	19.8	16.0	14.0	13.6	14.3	16.6	15.7	1
JRB-10	16.2	17.1	14.0	14.9	13.4	14.6	15.0	3
K-1 (Bidhan-1) (NC)	18.4	12.7	14.1	14.4	15.3	13.8	14.8	4
Mean	18.8	14.5	14.1	14.3	14.3	15.0	15.2	

Entries	Kalyani	Jorhat	Jabalpur	Ranchi	Imphal	Bhubneshwar	Average	Rank
JRBJ-05-2	110.6	147.2	187.3	84.6	75.1	162.4	127.9	3
KRB-19	126.7	153.3	190.2	88.5	80.5	174.5	135.6	1
JRB-10	106.1	162.3	178.3	86.6	88.5	169.2	131.8	2
K-1 (Bidhan-1) (NC)	116.1	133.8	172.9	85.6	76.3	154.5	123.2	4
Mean	114.9	149.2	182.2	86.3	80.1	165.1	129.6	

Table-8.7: AVT-2 (Rice bean): Second Advanced Varietal Trial in Rice bean: Plant Height (cm)

Table-8.8: AVT-2 (Rice bean): Second Advanced Varietal Trial in Rice bean: Leaf stem ratio

Entries	Kalyani	Jorhat	Jabalpur	Ranchi	Imphal	Bhubneshwar	Pusa	Average	Rank
JRBJ-05-2	1.26	0.68	0.72	0.43	2.95	0.97	0.93	1.13	1
KRB-19	1.16	0.71	0.64	0.54	1.96	1.28	0.98	1.04	3
JRB-10	1.00	0.82	0.53	0.46	2.43	1.14	0.94	1.05	2
K-1 (Bidhan-1) (NC)	0.93	0.65	0.60	0.40	2.57	1.03	0.89	1.01	4
Mean	1.09	0.72	0.62	0.46	2.48	1.11	0.94	1.06	

	ADF (%)		NDF (%)		IVDMD (%)		
Entries	Ranchi	Rank	Ranchi	Rank	Ranchi	Rank	
JRBJ-05-2	47.6	4	63.6	4	55.8	4	
KRB-19	45.8	1	58.4	3	51.8	1	
JRB-10	46.4	3	53.4	1	52.8	2	
K-1 (Bidhan-1) (NC)	46.2	2	58.2	2	54.6	3	
Mean	46.5		58.4		53.8		

Table-8.9: AVT-2 (Rice bean): Second Advanced Varietal Trial in Rice bean: ADF (%), NDF (%) & IVDMD (%)

9. AVTRB – 2 (Seed): ADVANCED VARIETAL TRIAL IN FORAGE RICE BEAN FOR SEED

(Table Reference: 9)

Results of the advanced varietal trial in forage rice bean for seed yield with entries namely JRBJ-05-2, KRB-19 and JRB-10 along with check Bidhan-1 conducted on five locations revealed that all the entries exhibited superiority over national check for seed yield (q/ha).

The entry JRB-10 with seed yield of 6.43 q/ha ranked first followed by entry JRBJ-05-2 (6.31 q/ha) and KRB-19 (6.22 q/ha). National checks Bidhan-1 with seed yield of 5.77 q/ha ranked fourth and its seed yield production was less than all test entries.

Entries	Kalyani	Bhubneshwar	Jorhat	Pusa	Vellayani	Average	Rank	Superiority%
JRBJ-05-2	7.85	3.59	14.70	2.73	2.67	6.31	2	9.4
KRB-19	9.83	4.15	11.20	2.48	3.46	6.22	3	7.8
JRB-10	8.33	3.18	15.40	2.41	2.83	6.43	1	11.4
K-1 (Bidhan-1) (NC)	7.12	3.25	13.60	2.51	2.35	5.77	4	
Mean	8.28	3.54	13.73	2.53	2.83	6.18		
CD at 5%	0.36	0.31	0.97	0.29	0.22			
CV%	3.80	7.27	9.60	5.10	2.60			

Table-9: AVT-2 (Rice bean) (Seed): Second Advanced Varietal Trial in Rice bean: Seed Yield (q/ha)

10. AVT SOYBEAN – 1: FIRST ADVANCED VARIETAL TRIAL IN FORAGE SOYBEAN

(Table Reference: 10.1 to 10.10)

In forage soybean, four entries namely JS-07-21-7, JS-07-24-13, JS-07-24-8 and JS-07-24-1 were evaluated at seven locations across the country in first advanced varietal trial. As there is no established check for forage soybean, performance of entries is compared over general mean for particular character. Results of the trial revealed that for green forage yield (q/ha), entries JS-07-24-13 (10.2%) and JS-07-24-8 (8.2%) exhibited their superiority over general mean.

Similar was the case for dry matter yield (q/ha) where JS-07-24-13 (7.6%) and JS-07-24-8 (6.0%) with superiority were adjudged good performer. In the fodder production potential i.e., green forage and dry matter yield (q/ha/day), entries JS-07-24-13 and JS-07-24-8 maintained their superiority among the test entries. Even for evaluation against growth parameter i.e., plant height, these two entries maintained their performance.

In quality parameters like crude protein yield (q/ha) and crude protein (%), again entries JS-07-24-13 and JS-07-24-8 adjudged best performer among test entries. For the character leafiness (L/S ratio), entry JS-07-24-8 ranked first followed by entry JS-07-21-7. For the parameter ADF (%), entry JS-07-21-7, for NDF (%), entry JS-07-24-13, IVDMD (%), entry JS-07-24-13 and for DDM (q/ha), entry JS-07-24-13 ranked first.

Entries	Rahuri	Jhansi	Imphal	Jabalpur	Ranchi	Hisar	Pusa	Average	Rank	Superiority%
JS07-21-7	74.5	89.7	120.8	364.3	93.8	49.2	127.6	131.4	4	
JS07-24-13	144.6	123.7	153.4	339.3	200.1	91.7	143.4	170.9	1	10.2
JS07-24-8	108.5	116.5	149.6	377.8	200.1	85.0	139.3	168.1	2	8.2
JS07-24-1	65.9	105.7	122.8	339.3	214.7	53.3	152.4	150.6	3	
Mean	98.4	108.9	136.7	355.2	177.2	69.8	140.7	155.3		
CD at 5%	18.8	4.6	19.8	29.6	23.9	6.7	13.2			
CV%	13.8	15.2	10.5	13.2	9.8	6.8	8.3			

Table-10.1: AVT-1 (Soy): First Advanced Varietal Trial in Forage Soybean: Green Forage Yield (q/ha)

Table-10.2: AVT-1 (Soy): First Advanced Varietal Trial in Forage Soybean: Dry Matter Yield (q/ha)

Entries	Rahuri	Jhansi	Imphal	Jabalpur	Ranchi	Hisar	Pusa	Average	Rank	Superiority%
JS07-21-7	16.1	21.2	29.7	70.7	18.7	10.1	25.0	27.4	4	
JS07-24-13	29.0	26.6	35.1	63.1	38.8	15.6	28.1	33.8	1	7.6
JS07-24-8	21.7	23.1	35.1	73.9	36.3	15.7	27.4	33.3	2	6.0
JS07-24-1	15.0	21.6	30.6	64.5	46.0	10.0	30.2	31.1	3	
Mean	20.5	23.1	32.6	68.1	35.0	12.9	27.7	31.4		
CD at 5%	3.8	2.1	4.3	5.8	5.9	1.7	3.4			
CV%	13.5	5.9	9.5	13.4	12.4	9.4	7.7			

Entries	Rahuri	Jhansi	Imphal	Jabalpur	Ranchi	Hisar	Average	Rank
JS07-21-7	1.62	2.10	2.99	5.05	2.18	0.81	2.46	4
JS07-24-13	3.36	2.87	3.67	4.84	4.17	1.50	3.40	1
JS07-24-8	2.52	2.76	3.65	5.39	4.08	1.39	3.30	2
JS07-24-1	1.65	2.54	2.87	4.64	4.37	0.87	2.82	3
Mean	2.29	2.57	3.30	4.98	3.70	1.14	3.00	

Table-10.3: AVT-1 (Soy): First Advanced Varietal Trial in Forage Soybean: Green Forage Yield (q/ha/day)

Table-10.4: AVT-1 (Soy): First Advanced Varietal Trial in Forage Soybean: Dry Matter Yield (q/ha/day)

Entries	Rahuri	Jhansi	Jabalpur	Ranchi	Hisar	Average	Rank
JS07-21-7	0.35	0.50	0.98	0.04	0.17	0.41	3
JS07-24-13	0.67	0.61	0.90	0.08	0.26	0.50	1
JS07-24-8	0.51	0.55	1.05	0.07	0.26	0.49	2
JS07-24-1	0.38	0.52	0.88	0.09	0.16	0.41	3
Mean	0.48	0.55	0.95	0.07	0.21	0.45	

Entries	Rahuri	Imphal	Jabalpur	Ranchi	Hisar	Average	Rank
JS07-21-7	2.0	5.5	9.5	2.5	1.6	4.2	4
JS07-24-13	3.9	7.1	8.4	5.4	2.5	5.5	1
JS07-24-8	2.6	6.6	9.8	4.6	3.0	5.3	2
JS07-24-1	1.8	5.8	8.4	5.6	1.6	4.6	3
Mean	2.6	6.2	9.0	4.5	2.2	4.9	

Table-10.5: AVT-1 (Soy): First Advanced Varietal Trial in Forage Soybean: Crude Protien Yield (q/ha)

Table-10.6: AVT-1 (Soy): First Advanced Varietal Trial in Forage Soybean: Crude Protien (%)

Entries	Rahuri	Imphal	Jabalpur	Ranchi	Hisar	Average	Rank
JS07-21-7	12.5	18.4	13.6	13.1	16.0	14.7	3
JS07-24-13	13.6	20.2	13.3	14.0	16.0	15.4	1
JS07-24-8	12.1	18.8	13.4	12.7	19.0	15.2	2
JS07-24-1	11.7	18.9	13.1	12.3	16.2	14.4	4
Mean	12.5	19.1	13.4	13.0	16.8	14.9	

Entries	Jhansi	Imphal	Jabalpur	Ranchi	Hisar	Average	Rank
JS07-21-7	52.2	83.9	89.2	81.3	57.7	72.9	3
JS07-24-13	51.0	88.4	73.8	82.0	49.1	68.9	4
JS07-24-8	62.0	86.0	101.4	86.1	57.7	78.6	1
JS07-24-1	65.8	84.6	86.8	91.0	50.6	75.8	2
Mean	57.8	85.7	87.8	85.1	53.8	74.0	

Table-10.7: AVT-1 (Soy): First Advanced Varietal Trial in Forage Soybean: Plant Height (cm)

Table-10.8: AVT-1 (Soy): First Advanced Varietal Trial in Forage Soybean: Leaf Stem Ratio

Entries	Jhansi	Imphal	Jabalpur	Ranchi	Hisar	Pusa	Average	Rank	
JS07-21-7	0.70	1.58	0.60	0.86	0.90	0.73	0.90	2	
JS07-24-13	0.72	1.60	0.53	0.74	1.04	0.73	0.89	3	
JS07-24-8	0.67	2.00	0.66	0.66	0.88	0.78	0.94	1	
JS07-24-1	0.65	1.87	0.53	0.66	0.87	0.76	0.89	3	
Mean	0.69	1.76	0.58	0.73	0.92	0.75	0.91		
		ADF	(%)		NDF (%)				
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Entries	Rahuri	Ranchi	Average	Rank	Rahuri	Ranchi	Average	Rank	
JS07-21-7	42.3	43.8	43.0	1	51.2	58.4	54.8	4	
JS07-24-13	43.9	44.2	44.1	2	50.6	54.2	52.4	1	
JS07-24-8	44.1	45.6	44.9	3	52.1	55.0	53.6	2	
JS07-24-1	43.5	44.8	44.1	2	52.3	56.4	54.4	3	
Mean	43.4	44.6	44.0		51.5	56.0	53.8		

Table-10.9: AVT-1 (Soy): First Advanced Varietal Trial in Forage Soybean: ADF (%) & NDF (%)

Table-10.10: AVT-1 (Soy): First Advanced Varietal Trial in Forage Soybean: IVDMD (%) & DDM (q/ha)

				DDM	(q/ha)		
Entries	Rahuri	Ranchi	Hisar	Average	Rank	Hisar	Rank
JS07-21-7	52.5	54.8	58.2	55.2	2	5.9	3
JS07-24-13	50.3	61.8	54.4	55.5	1	8.5	1
JS07-24-8	51.4	59.8	52.8	54.7	3	8.3	2
JS07-24-1	52.3	56.0	52.8	53.7	4	5.3	4
Mean	51.6	58.1	54.6	54.8		7.0	

11. IVT SEWAN-2010 (1st year) : INITIAL VARIETAL TRIAL IN SEWAN (PERENNIAL)

(Table Reference: 11.1 to 11.3)

An initial varietal trial in sewan comprising seven entries was established in Kharif-2010 at 5 centres of North-West zone. Crop being perennial in nature, entries are coded as from IVTS-1 to IVTS-7. This is being the first year of evaluation and data has been reported from four centres. Results obtained clearly revealed that entry IVTS-4 didn't germinate/poorly germinate at all the centres, hence data of this entry has not been reported. For the character green forage yield (q/ha), entry IVTS-2 ranked first followed by IVTS-3 and IVTS-6 whereas for dry matter yield, entry IVTS-2 ranked first followed by entry IVTS-7 and IVTS-1. In fodder production potential entries IVTS-2 and IVTS-1 exhibited their superiority both for green forage and dry matter yield (q/ha/day). Even for evaluation against growth parameter *i.e.*, plant height and quality character leafiness, entries IVTS-2 and IVTS-1 recorded their superiority with respect to other entries under evaluation.

		G	Freen forag	e Yield (q/ha	a)		Dry Matter Yield (q/ha)				
Entries	Jaisalmer	Bikaner	Jalore	Jodhpur*	Average	Rank	Jaisalmer	Bikaner	Jodhpur*	Average	Rank
IVTS-1	21.6	31.0	140.6	12.0	64.4	4	5.8	13.8	5.2	9.8	3
IVTS-2	18.5	54.3	185.9	28.6	86.3	1	5.0	22.1	10.2	13.6	1
IVTS-3	18.7	22.7	167.8	27.0	69.7	2	5.4	9.4	9.7	7.4	6
IVTS-5	12.5	28.3	134.2	10.7	58.3	6	3.3	11.9	4.7	7.6	4
IVTS-6	23.2	18.4	158.9	22.2	66.8	3	6.3	8.6	9.1	7.5	5
IVTS-7	14.7	36.2	139.7	28.8	63.5	5	4.1	16.7	9.9	10.4	2
Mean	18.2	31.8	154.5	21.6	68.2		5.0	13.8	8.1	9.4	
CD at 5%	1.8	8.7	36.0	29.8			0.6	4.7	9.4		
CV%	5.6	15.1	15.3	76.0			6.6	18.8	63.8		

 Table-11.1: IVT Sewan-2010 (1st year): Initial Varietal Trial in Sewan Grass (Perennial): Green Forage Yield (q/ha) &

 Dry Matter Yield (q/ha)

*Not included in zonal and all India average due to CV≥20

		Green Fo	rage Yield (d	q/ha/day)		Dry Matter Yield (q/ha)					
Entries	Jaisalmer	Bikaner	Jodhpur*	Average	Rank	Jaisalmer	Bikaner	Jodhpur*	Average	Rank	
IVTS-1	0.24	0.22	0.09	0.23	2	0.06	0.10	0.04	0.08	2	
IVTS-2	0.21	0.39	0.23	0.30	1	0.06	0.16	0.08	0.11	1	
IVTS-3	0.22	0.16	0.22	0.19	4	0.06	0.07	0.08	0.07	3	
IVTS-5	0.12	0.20	0.08	0.16	5	0.03	0.09	0.04	0.06	4	
IVTS-6	0.24	0.13	0.18	0.19	4	0.07	0.06	0.07	0.07	3	
IVTS-7	0.15	0.26	0.23	0.21	3	0.04	0.12	0.08	0.08	2	
Mean	0.20	0.23	0.17	0.21		0.05	0.10	0.07	0.08		

 Table-11.2: IVT Sewan-2010 (1st year): Initial Varietal Trial in Sewan Grass (Perennial): Green Forage Yield

 (q/ha/day) & Dry Matter Yield (q/ha/day)

			Plant Heig	ht (cm)			Le	eaf stem ratio	
Entries	Jaisalmer	Bikaner	Jalore	Jodhpur*	Average	Rank	Jodhpur*	Jaisalmer	Rank
IVTS-1	67.1	19.7	89.7	95.9	58.8	2	2.77	2.18	2
IVTS-2	65.7	12.7	100.0	93.9	59.5	1	2.30	3.15	1
IVTS-3	65.8	14.3	95.3	83.1	58.5	4	2.15	1.95	4
IVTS-5	50.5	15.0	75.0	82.5	46.8	6	3.03	2.15	3
IVTS-6	71.7	12.7	91.7	83.3	58.7	3	2.22	1.67	5
IVTS-7	52.5	14.7	88.0	85.9	51.7	5	2.04	1.39	6
Mean	62.2	14.9	89.9	87.4	55.7		2.42	2.08	

Table-11.3: IVT Sewan-2010 (1st year): Initial Varietal Trial in Sewan Grass (Perennial): Plant Height (cm) & Leaf Stem Ratio

12. VTGG-2009 (2nd year): VARIETAL TRIAL IN GUINEA GRASS (PERENNIAL)

(Table Reference: 12.1 to 12.9)

In Guinea grass, a varietal evaluation trial comprising four entries and three checks namely Riversdale, PGG-616 and JHGG-96-5 was established in Kharif-2009. Crop being perennial in nature, entries are in coded form as from GG-09-1 to GG-09-7. Decoding will be done on completion of the trial. Results obtained from 11 centres reveals that for green forage yield (q/ha) entry GG-09-1 ranked first followed by entries GG-09-4 and GG-09-5. Similarly for dry matter yield (q/ha), entry GG-09-1 ranked first followed by entries GG-09-4 and GG-09-4 and GG-09-2. With respect to fodder production potential, entry GG-09-1 ranked first both for green forage as well as dry matter production potential (q/ha/day). In terms of growth parameter, entry GG-09-5 (118.8 cm) ranked first followed by GG-09-7(116.9 cm) and GG-09-6(113.3 cm).

For evaluation against quality parameter, entry GG-09-1, GG-09-4 and GG-09-2 performed better for crude protein yield (q/ha) whereas for crude protein (%), entries GG-09-7, GG-09-6 and GG-09-3 exhibited their superiority over other entries. In leafiness character, entry GG-09-4 ranked first and GG-09-1 and GG-09-2 were recorded good performer. For NDF and ADF (%), entries GG-09-3, GG-09-2 and GG-09-4 exhibited their superiority with respect to other entries.

Entries	Faiza-	Bhub-	Uruli-	Mandya	Coimba-	Dhar-	Anand	Ranchi	Hydera-	Vella-	Aver-	Rank	Superi-
	bad	neshwar	kanchan		tore	wad			bad	yani	age		ority%
GG-09-1	547.8	318.8	1155.6	1051.8	3824.9	163.9	1967.0	587.5	712.2	993.3	1132.3	1	
GG-09-2	433.3	401.4	1374.8	566.2	1924.9	116.7	1496.0	520.8	522.7	660.0	801.7	4	
GG-09-3	651.7	300.5	1249.5	507.6	1690.2	112.5	1140.0	445.8	318.6	500.0	691.6	5	
GG-09-4	481.7	366.9	1276.3	954.9	3594.3	159.7	1846.0	454.2	683.1	870.0	1068.7	2	
GG-09-5	550.7	321.1	1274.5	620.2	2263.8	133.3	1522.0	487.5	479.0	480.0	813.2	3	
GG-09-6	728.3	392.4	1010.2	434.0	2008.3	133.3	917.0	475.0	474.8	476.7	705.0	7	
GG-09-7	573.9	315.3	923.8	523.2	1475.5	111.1	1058.0	404.2		636.7	669.1	6	
Mean	566.8	345.2	1180.7	665.4	2397.4	132.9	1420.9	482.1	531.7	659.5	838.3		
CD at 5%	146.9	24.8	102.1	70.3	116.0	18.7	217.0	88.9	109.5	91.8			
CV%	14.6	4.5	13.6	5.9	3.7	7.9	8.6	10.4	13.7	7.8			

 Table-12.1: VTGG-2009 (2nd Years): Varietal Trial in Guinea Grass (Perennial): Green Forage Yield (q/ha)

Entries	Faiza-	Bhub-	Uruli-	Mandya	Coimba-	Dhar-	Anand	Ranchi	Hydera-	Vella-	Aver-	Rank	Superi-
	bad	neshwar	kanchan		tore	wad			bad	yani	age		ority%
GG-09-1	117.5	79.5	273.9	141.2	621.2	33.0	433.3	175.3	138.9	177.4	219.1	1	
GG-09-2	83.8	93.1	366.5	76.3	319.3	25.0	342.0	177.5	111.3	117.9	171.3	3	
GG-09-3	143.3	71.6	343.7	69.0	279.6	24.9	273.1	130.8	64.7	89.3	149.0	6	
GG-09-4	119.3	82.9	291.8	130.6	598.8	35.8	437.8	124.0	132.5	155.4	210.9	2	
GG-09-5	120.1	80.3	344.7	80.3	363.2	28.2	345.6	152.0	97.2	85.7	169.7	4	
GG-09-6	160.3	87.3	272.9	60.6	322.5	28.0	245.0	185.2	105.4	85.1	155.2	5	
GG-09-7	127.2	73.6	233.2	61.7	240.7	23.9	263.3	103.8		115.2	138.1	7	
Mean	124.5	81.2	303.8	88.5	392.2	28.4	334.3	149.8	108.3	118.0	172.9		
CD at 5%	16.6	12.9	48.6	12.4	31.1	4.7	51.5	45.7	21.9	17.6			
CV%	8.5	8.9	16.8	7.9	4.5	9.3	8.7	16.0	13.4	8.4			

 Table-12.2: VTGG-2009 (2nd Years): Varietal Trial in Guinea Grass (Perennial): Dry Matter Yield (q/ha)

Entries	Anand	Ranchi	Faizabad	Hyderabad	Average	Rank
GG-09-1	5.49	1.61	1.99	5.94	3.76	1
GG-09-2	4.18	1.43	1.57	4.36	2.89	4
GG-09-3	3.18	1.22	2.37	2.66	2.36	6
GG-09-4	5.10	1.24	1.75	5.69	3.45	2
GG-09-5	4.25	1.34	2.00	4.00	2.90	3
GG-09-6	2.56	1.30	2.64	3.96	2.62	5
GG-09-7	2.96	1.11	2.09		2.05	7
Mean	3.96	1.32	2.06	4.44	2.94	

Table-12.3: VTGG-2009 (2nd Years): Varietal Trial in Guinea Grass (Perennial): Green Forage Yield (q/ha/day)

Table-12.4: VTGG-2009 (2nd Years): Varietal Trial in Guinea Grass (Perennial): Dry Matter Yield (q/ha/day)

Entries	Anand	Ranchi	Faizabad	Hyderabad	Average	Rank
GG-09-1	1.21	0.48	0.43	1.16	0.82	1
GG-09-2	0.96	0.49	0.30	0.93	0.67	3
GG-09-3	0.76	0.36	0.52	0.54	0.55	5
GG-09-4	1.22	0.34	0.43	1.10	0.77	2
GG-09-5	0.97	0.42	0.44	0.81	0.66	4
GG-09-6	0.68	0.51	0.58	0.88	0.66	4
GG-09-7	0.74	0.28	0.56		0.53	6
Mean	0.93	0.41	0.47	0.90	0.68	

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Entries	Anand	Ranchi	Faizabad	Mandya	Hyderabad	Urulikanchan	Bhubneshwar	Average	Rank
GG-09-1	35.1	14.6	7.6	13.3	8.6	20.9	7.4	15.4	1
GG-09-2	24.5	16.3	4.4	7.2	7.9	26.7	8.1	13.6	3
GG-09-3	21.4	10.9	9.8	6.5	4.9	25.0	8.0	12.3	6
GG-09-4	36.2	9.2	6.0	13.1	9.0	21.5	7.5	14.6	2
GG-09-5	26.0	12.0	9.0	7.5	6.8	24.1	7.4	13.3	4
GG-09-6	19.4	14.6	12.2	6.1	7.8	20.2	7.4	12.5	5
GG-09-7	22.8	9.1	7.9	6.2		17.3	6.5	11.6	7
Mean	26.5	12.4	8.1	8.5	7.5	22.2	7.5	13.2	

 Table-12.5: VTGG-2009 (2nd Years): Varietal Trial in Guinea Grass (Perennial): Crude Protien Yield (q/ha)

Table-12.6: VTGG-2009 (2 nd Years	: Varietal Trial in Guinea Grass	(Perennial): Crude Protien (%)
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Entries	Anand	Ranchi	Faizabad	Mandya	Hyderabad	Urulikanchan	Average	Rank
GG-09-1	8.4	8.3	6.5	9.4	6.2	7.6	7.7	4
GG-09-2	7.3	9.2	5.2	9.4	7.1	7.3	7.6	5
GG-09-3	8.1	8.3	6.8	9.4	7.6	7.3	7.9	3
GG-09-4	8.2	7.4	5.0	10.0	6.8	7.3	7.5	6
GG-09-5	7.6	7.9	7.5	9.4	7.0	7.0	7.7	4
GG-09-6	8.0	7.9	7.6	10.0	7.4	7.4	8.0	2
GG-09-7	9.1	8.8	6.2	10.0		7.4	8.3	1
Mean	8.1	8.2	6.4	9.6	7.0	7.3	7.8	

Entries	Vellayani	Anand	Ranchi	Faizabad	Mandya	Urulikanchan	Average	Rank
GG-09-1	128.3	137.4	71.9	138.7	117.2	62.1	109.3	6
GG-09-2	105.0	131.4	77.0	125.2	89.3	133.9	110.3	5
GG-09-3	96.7	138.7	75.2	157.5	88.6	108.6	110.9	4
GG-09-4	125.0	135.0	75.5	135.6	69.7	66.6	101.2	7
GG-09-5	133.3	138.0	76.9	158.7	97.7	108.5	118.8	1
GG-09-6	86.7	140.1	77.9	152.6	82.8	139.4	113.3	3
GG-09-7	120.0	146.0	69.7	159.8	84.0	122.2	116.9	2
Mean	113.6	138.1	74.9	146.9	89.9	105.9	111.5	

 Table-12.7: VTGG-2009 (2nd Years): Varietal Trial in Guinea Grass (Perennial): Plant Height (cm)

Table-12 8. VTGG-2009	(2 nd Years)	• Varietal '	Trial in Guine	a Grass	(Perennial)	I eaf Sten	Ratio
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Entries	Vellayani	Ranchi	Faizabad	Mandya	Urulikanchan	Average	Rank
GG-09-1	1.20	1.54	1.18	0.44	0.82	1.04	2
GG-09-2	0.72	0.58	1.15	0.49	0.59	0.71	7
GG-09-3	0.70	1.52	1.30	0.77	0.76	1.01	3
GG-09-4	0.96	1.62	1.25	0.73	0.77	1.07	1
GG-09-5	0.74	1.13	1.48	0.84	0.73	0.98	4
GG-09-6	0.70	0.40	1.32	0.63	0.72	0.75	6
GG-09-7	0.80	1.33	1.25	0.58	0.65	0.92	5
Mean	0.83	1.16	1.28	0.64	0.72	0.93	

	NDF (%)	ADF ('	%)
Entries	Ranchi	Rank	Ranchi	Rank
GG-09-1	66.8	4	51.4	4
GG-09-2	65.2	2	52.3	5
GG-09-3	64.8	1	49.4	2
GG-09-4	67.2	5	48.2	1
GG-09-5	69.4	7	53.4	6
GG-09-6	67.8	6	54.2	7
GG-09-7	65.6	3	50.4	3
Mean	66.7		51.3	

Table-12.9: VTGG-2009 (2nd Years): Varietal Trial in Guinea Grass (Perennial): NDF (%) & ADF (%)

13. VTGG-2008 (3rd year): VARIETAL TRIAL IN GUINEA GRASS (PERENNIAL)

(Table Reference: 13.1 to 13.9)

In Guinea grass, a varietal trial comprising seven entries and three checks namely Riversdale, JHGG-96-5 and PGG-616 was established in Kharif-2008 at twelve centers. This is being the third year and data have been reported from eight centres. Crop being perennial in nature, entries are in coded form as GG-08-1 to GG-08-10. Decoding of the entries will be done after completion of the trial. Results obtained clearly indicates that for green forage yield (q/ha), entry GG-08-4 ranked first followed by GG-08-2 and GG-08-1. Similarly in dry matter yield (q/ha), entries GG-08-4, GG-08-10 and GG-08-1 proved their superiority over other entries. In fodder production potential, entry GG-08-4 ranked first followed by GG-08-1 proved their superiority over other entries. In fodder production potential, entry GG-08-4 ranked first followed by GG-08-4 ranked first followed by GG-08-4 ranked first followed by GG-08-1 proved their superiority over other entries. In fodder production potential, entry GG-08-4 ranked first followed by GG-08-1 proved their superiority over other entries. In fodder production potential, entry GG-08-4 ranked first followed by GG-08-1 and GG-08-5 both for green forage as well as dry matter production potential (q/ha/day). In growth parameter, entry GG-08-10 ranked first followed by entries GG-08-9 and GG-08-4 for plant height (cm).

In quality parameters entry GG-08-4 ranked first for crude protein yield (q/ha) whereas entries GG-08-2 and GG-08-3 were adjudged best performer for crude protein (%). For leafiness, entries GG-08-1, GG-08-4 and GG-08-3 exhibited their superiority over rest of the entries. For the quality parameter NDF and ADF (%), entry GG-08-1 ranked first whereas entries GG-08-3, GG-08-4 and GG-08-8 was also good performer.

Entries	Faizabad	Vellayani	Dharwad	Mandya	Urulikanchan	Ranchi	Bhubneshwar	Anand	Average	Rank	Superiority%
GG-08 -1	670.0	960.0	119.4	656.7	1090.8	418.8	326.8	1458.0	712.6	3	
GG-08 -2		866.7	123.6	972.1	1264.5			356.0	716.6	2	
GG-08 -3	434.7	903.3	118.1	841.6	1291.2	334.4	353.7	1221.0	687.3	4	
GG-08 -4	716.7	938.3	174.3	1172.7	1173.1	328.1	401.0	2203.0	888.4	1	
GG-08 -5	615.6	901.7	125.0	760.7	1020.8	303.1	364.1	1249.0	667.5	6	
GG-08 -6	361.7	905.0	130.6	488.6	1120.7	368.8	395.4	928.0	587.4	8	
GG-08 -7	300.0	858.3	136.1	456.5	1165.5	356.3	318.2	971.0	570.2	10	
GG-08 -8	543.9	868.3	177.8	517.8	1071.7	271.9	401.3	905.0	594.7	7	
GG-08 -9	531.1	910.0	136.1		1167.4	250.0	310.1	780.0	583.5	9	
GG-08 -10		162.5		1198.8			666.0	675.8	5		
Rank	521.7	901.3	140.4	733.3	1156.5	328.9	358.8	1073.7	651.8		
CD at 5%	134.9	63.5	31.6	78.1	126.1	65.8	19.0	116.0			
CV%	14.8	4.1	13.1	6.4	8.4	13.6	3.5	9.6			

Table-13.1: VTGG-2008 (3rd Year): Varietal Trial in Guinea Grass (Perennial): Green Forage Yield (q/ha)

Entries	Faizabad	Vellayani	Dharwad	Mandya	Urulikanchan	Ranchi	Bhubneshwar	Anand	Average	Rank	Superiority%
GG-08 -1	141.8	187.3	24.2	100.9	306.0	126.5	78.2	382.8	168.5	3	
GG-08 -2		168.0	26.6	148.8	336.7			97.3	155.5	5	
GG-08 -3	84.7	178.0	26.2	121.1	362.4	96.0	82.3	305.7	157.1	4	
GG-08 -4	135.8	182.7	39.4	168.4	324.0	98.3	91.8	548.7	198.6	1	
GG-08 -5	132.2	176.7	26.6	111.2	281.6	92.7	78.0	302.2	150.2	6	
GG-08 -6	83.0	178.0	27.4	79.3	317.8	104.5	85.5	244.6	140.0	7	
GG-08 -7	67.8	170.0	29.2	68.9	325.0	102.9	78.4	245.1	135.9	9	
GG-08 -8	113.0	170.3	38.2	69.6	295.5	92.7	87.6	239.1	138.3	8	
GG-08 -9	100.3	178.7	30.4	78.7	316.9	67.6	75.7	188.5	129.6	10	
GG-08 -10		35.2		337.8			181.1	184.7	2		
Rank	107.3	176.6	30.3	105.2	320.4	97.7	82.2	273.5	149.2		
CD at 5%	19.2	11.7	8.4	16.1	33.9	22.5	8.4	29.6			
CV%	10.5	6.8	16.1	8.9	8.5	15.6	5.8	7.6			

 Table-13.2: VTGG-2008 (3rd Year): Varietal Trial in Guinea Grass (Perennial): Dry Matter Yield (q/ha)

Entries	Ranchi	Faizabad	Anand	Average	Rank
GG-08 -1	1.15	2.44	4.06	2.55	2
GG-08 -2			0.99		
GG-08 -3	0.92	1.58	3.40	1.97	4
GG-08 -4	0.90	2.61	6.14	3.22	1
GG-08 -5	0.83	2.23	3.48	2.18	3
GG-08 -6	1.01	1.30	2.58	1.63	7
GG-08 -7	0.98	1.09	2.70	1.59	8
GG-08 -8	0.74	1.98	2.52	1.75	6
GG-08 -9	0.68	1.93	2.17	1.59	8
GG-08 -10			1.86	1.86	5
Mean	0.90	1.90	2.99	1.93	

 Table-13.3: VTGG-2008 (3rd Year): Varietal Trial in Guinea Grass (Perennial): Green Forage Yield (q/ha/day)

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Entries	Ranchi	Faizabad	Anand	Average	Rank
GG-08 -1	0.35	0.52	1.07	0.65	2
GG-08 -2			0.27		
GG-08 -3	0.26	0.31	0.85	0.47	5
GG-08 -4	0.27	0.49	1.53	0.76	1
GG-08 -5	0.25	0.48	0.84	0.52	3
GG-08 -6	0.29	0.30	0.68	0.42	7
GG-08 -7	0.28	0.25	0.68	0.40	8
GG-08 -8	0.25	0.41	0.67	0.44	6
GG-08 -9	0.19	0.36	0.53	0.36	9
GG-08 -10		0.50	0.50	4	
Mean	0.27	0.39	0.76	0.47	

 Table-13.4: VTGG-2008 (3rd Year): Varietal Trial in Guinea Grass (Perennial): Dry Matter Yield (q/ha/day)

Entries	Vellayani	Ranchi	Faizabad	Anand	Mandya	Urulikanchan	Average	Rank
GG-08 -1	108.3	65.0	155.6	151.1	84.8	119.3	114.0	6
GG-08 -2	105.0			152.8	45.4	153.2	114.1	5
GG-08 -3	131.7	65.8	145.8	152.7	68.6	121.0	114.3	4
GG-08 -4	131.7	68.0	158.7	149.2	89.4	117.4	119.1	3
GG-08 -5	115.0	65.3	148.5	144.9	54.2	133.2	110.2	9
GG-08 -6	131.7	67.3	120.7	136.9	64.7	151.2	112.1	8
GG-08 -7	145.0	64.3	132.8	124.4	61.7	147.8	112.7	7
GG-08 -8	118.3	66.3	148.6	137.5	65.1	124.8	110.1	10
GG-08 -9	131.7	54.9	153.5	154.2	68.4	153.2	119.3	2
GG-08 -10				154.3		153.5	153.9	1
Mean	124.3	64.6	145.5	145.8	66.9	137.5	114.1	

 Table-13.5: VTGG-2008 (3rd Year): Varietal Trial in Guinea Grass (Perennial): Plant Height (cm)

Entries	Vellayani	Ranchi	Faizabad	Mandya	Urulikanchan	Average	Rank
GG-08 -1	1.01	1.64	1.35	0.51	0.65	1.03	1
GG-08 -2	0.87			0.54	0.65	0.69	8
GG-08 -3	0.97	1.33	1.20	0.68	0.70	0.98	3
GG-08 -4	0.99	1.20	1.38	0.71	0.69	0.99	2
GG-08 -5	0.80	0.79	1.28	0.54	0.82	0.85	4
GG-08 -6	0.80	1.17	1.02	0.44	0.81	0.85	4
GG-08 -7	0.76	0.88	1.00	0.75	0.70	0.82	5
GG-08 -8	0.72	0.34	1.15	0.58	0.76	0.71	7
GG-08 -9	0.84	0.63	1.26	0.51	0.66	0.78	6
GG-08 -10				0.69	0.69	8	
Mean	0.86	1.00	1.21	0.58	0.71	0.87	

 Table-13.6: VTGG-2008 (3rd Year): Varietal Trial in Guinea Grass (Perennial): Leaf Stem Ratio

Entries	Ranchi	Faizabad	Anand	Mandya	Urulikanchan	Bhubneshwar	Average	Rank
GG-08 -1	10.0	8.2	33.6	10.0	23.0	7.3	15.3	4
GG-08 -2			7.9	13.9	24.4		15.4	3
GG-08 -3	8.0	6.4	26.9	12.0	24.9	7.5	14.3	5
GG-08 -4	8.6	8.8	44.4	17.9	23.6	10.0	18.9	1
GG-08 -5	8.1	6.6	23.8	11.8	19.6	7.9	13.0	6
GG-08 -6	9.6	4.1	17.6	9.0	22.3	15.1	12.9	7
GG-08 -7	9.0	3.6	19.2	5.7	22.9	7.3	11.3	9
GG-08 -8	7.3	6.6	18.4	8.9	20.8	8.1	11.7	8
GG-08 -9	5.9	6.3	15.0	6.8	23.0	7.4	10.8	10
GG-08 -10		12.2		23.8		18.0	2	
Mean	8.3	6.3	21.9	10.7	22.8	8.8	13.1	

Table-13.7: VTGG-2008 (3rd Year): Varietal Trial in Guinea Grass (Perennial): Crude Protien Yield (q/ha)

Entries	Ranchi	Faizabad	Anand	Mandya	Urulikanchan	Average	Rank
GG-08 -1	7.9	5.8	8.4	10.0	7.5	7.9	4
GG-08 -2			8.4	9.4	7.2	8.3	1
GG-08 -3	8.1	7.6	9.0	10.0	6.9	8.3	1
GG-08 -4	8.8	6.5	8.1	10.6	7.2	8.2	2
GG-08 -5	8.8	5.0	7.6	10.6	7.1	7.8	5
GG-08 -6	9.2	4.9	7.5	11.3	7.0	8.0	3
GG-08 -7	8.8	5.3	8.3	8.1	7.1	7.5	6
GG-08 -8	7.9	5.8	7.8	12.5	7.1	8.2	2
GG-08 -9	8.8	6.3	8.6	8.8	7.3	7.9	4
GG-08 -10			7.2		7.0	7.1	7
Mean	8.5	5.9	8.1	10.1	7.1	8.0	

Table-13.8: VTGG-2008 (3rd Year): Varietal Trial in Guinea Grass (Perennial): Crude Protien (%)

	NDF	· (%)	ADF	- (%)
Entries	Ranchi	Rank	Ranchi	Rank
GG-08 -1	64.4	1	46.4	1
GG-08 -2				
GG-08 -3	66.2	5	48.6	2
GG-08 -4	65.2	3	48.7	3
GG-08 -5	65.4	4	49.5	4
GG-08 -6	68.2	7	52.3	8
GG-08 -7	66.8	6	51.4	7
GG-08 -8	64.8	2	50.0	6
GG-08 -9	68.2	7	49.8	5
GG-08 -10				
Mean	66.2		49.6	

Table-13.9: VTGG-2008 (3rd Year): Varietal Trial in Guinea Grass (Perennial): NDF (%) & ADF (%)

14. VTGG-2007 (4th year): VARIETAL TRIAL IN GUINEA GRASS (PERENNIAL)

(Table Reference: 14.1 to 14.11)

In Guinea grass, a varietal evaluation trial comprising six entries along with three national checks namely Riversdale. PGG-616 and JHGG-96-5 were established in Kharif-2007. This is being the fourth and final year of evaluation hence all the entries are decoded and results obtained from 11 centres are presented. Results clearly revealed that for green forage yield (q/ha), entries JHGG-07-2 (10.0%), JHGG-07-1 (2.9%) and JHGG-07-3 (2.3%) exhibited their superiority over national check JHGG-96-5. Similarly for dry matter yield (q/ha), entry JHGG-07-2 (13.2%) ranked first followed by JHGG-07-3 (10.2%) and JHGG-07-1 (5.2%). For evaluation against fodder production potential, entry PGG-702 ranked first for green forage yield (q/ha/day) whereas entries JHGG-07-2, PGG-702 and JHGG-07-3 performed superiority over check for dry matter yield (q/ha/day). In growth performance, entry JHGG-07-3(104.8 cm) ranked first followed by PGG-729 (103.0 cm) and JHGG-07-2 (102.1 cm) for plant height (cm).

In quality parameters, entry JHGG-07-1 ranked first followed by JHGG-07-3 and PGG-710 for crude protein yield (q/ha) whereas entry JHGG-07-2 ranked first for crude protein (%). In leafiness character, entry PGG-710 ranked first for quality parameters, NDF and ADF (%), entries JHGG-07-1 and JHGG-07-2 exhibited their superiority. For IVDMD (%), check Riversdale maintained superiority. After compiling the data over the years (2008-2010), results reveal that for the character green forage yield (q/ha) none of the entries perform better than national check JHGG-96-5 whereas for dry matter yield entry JHGG-07-3 ranked first with 1.9% superiority followed by JHGG-07-2 with 0.8% superiority over best national check JHGG-96-5.

Entries	Hydera-	Vella-	Coimba-	Ranchi	Mandya	Bhub-	Ra-	Jhansi	Bika-	Anand	Dhar-	Aver-	Rank	Superi-
	bad	yani	tore			neshwar	huri		ner		wad	age		ority%
JHGG-07-1	241.1	925.0	949.7	495.8	1036.7	1345.9	324.6	223.6	773.9	1225.0	205.6	704.3	2	2.9
JHGG-07-2		896.7	914.7	533.3	803.1	1288.0	281.2	308.3	798.5	1580.0	129.2	753.3	1	10.0
JHGG-07-3	262.5	1016.7	916.9	512.5	773.7	1191.5	333.0	281.9	749.8	1471.0	191.7	700.1	3	2.3
PGG-702	302.3	948.3	914.1	550.0	504.2	1174.0	225.0	178.3		1263.0	216.7	627.6	7	
PGG-710		988.3	1018.6	541.7	468.2	1036.7	201.8	168.9		1214.0	251.4	654.4	6	
PGG-729	230.6	920.0	967.0	550.0	472.1	1246.0	205.7	205.0		1235.0	130.6	616.2	8	
Riversdale (NC)	312.8	1021.7	903.9	616.7	915.1	1040.0	256.1	212.5	437.8	1435.0	183.3	666.8	5	
PGG-616 (NC)		893.3	944.7	516.7	503.1	1031.8	208.9	112.2	307.8	1212.0	180.6	591.1	9	
JHGG-96-5 (NC)	229.5	1078.7	945.2	629.2	778.4	1108.8	237.7	304.2		1297.0	237.5	684.6	4	
Mean	263.1	965.4	941.6	549.5	695.0	1162.5	252.7	221.7	613.6	1325.8	191.8	653.0		
CD at 5%	16.4	84.7	42.8	68.9	86.7	79.2	57.5	55.0	176.6	104.4	52.7			
CV%	4.1	5.1	2.6	7.2	7.2	3.9	13.1	14.3	18.7	4.6	15.9			

Table-14.1: VTGG-2007 (4th year): Varietal Trail in Guinea Grass (Perennial): Green Forage Yield (q/ha)

Entries	Hydera-	Vella-	Coimba-	Ranchi	Mandya	Bhub-	Rahuri	Jhansi	Bika-	Anand	Dhar-	Aver-	Rank	Superi-
	bad	yani	tore			neshwar			ner		wad	age		ority%
JHGG-07-1	50.7	165.2	151.6	129.1	146.4	290.8	82.5	46.6	296.8	306.0	41.4	155.2	3	5.2
JHGG-07-2		161.0	148.6	141.6	97.8	288.7	75.4	62.3	278.9	387.9	27.8	167.0	1	13.2
JHGG-07-3	65.7	181.5	154.5	135.9	97.5	289.1	89.6	60.6	280.3	390.4	42.5	162.5	2	10.2
PGG-702	69.5	169.3	161.7	150.7	60.6	277.8	64.4	33.4		343.9	45.7	137.7	7	
PGG-710		176.5	175.8	149.8	62.6	266.7	60.5	32.2		311.7	53.3	143.2	6	
PGG-729	50.2	164.3	168.9	137.3	58.2	281.3	60.9	39.2		318.2	28.2	130.7	9	
Riversdale (NC)	71.8	180.9	152.9	158.9	119.4	243.2	67.6	42.7	173.6	354.8	39.3	145.9	5	
PGG-616 (NC)		159.5	157.3	149.7	72.0	253.3	44.3	22.8	127.2	294.9	40.4	132.1	8	
JHGG-96-5 (NC)	52.1	192.5	161.6	167.8	98.6	280.8	56.8	62.9		347.7	53.8	147.5	4	
Mean	60.0	172.3	159.2	146.7	90.3	274.6	66.9	44.7	231.3	339.5	41.4	147.9		
CD at 5%	5.8	14.7	7.9	28.8	13.5	16.6	16.0	14.6	58.0	27.2	14.8			
CV%	6.4	4.9	2.9	11.3	8.7	3.5	13.8	18.9	16.3	4.6	20.6			

Table-14.2: VTGG-2007 (4th year): Varietal Trail in Guinea Grass (Perennial): Dry Matter Yield (q/ha)

Entries	Anand	Ranchi	Bikaner	Hyderabad	Average	Rank
JHGG-07-1	3.44	1.36	1.71	2.44	2.24	7
JHGG-07-2	4.44	1.46	1.76		2.55	3
JHGG-07-3	4.13	1.40	1.66	2.68	2.47	5
PGG-702	3.55	1.51		3.11	2.72	1
PGG-710	3.41	1.48			2.45	6
PGG-729	3.47	1.51		2.42	2.47	5
Riversdale (NC)	4.03	1.69	0.97	3.23	2.48	4
PGG-616 (NC)	3.40	1.42	0.68		1.83	8
JHGG-96-5 (NC)	3.64	1.72		2.35	2.57	2
Mean	3.72	1.51	1.36	2.71	2.32	

 Table-14.3: VTGG-2007 (4th year): Varietal Trail in Guinea Grass (Perennial): Green Forage Yield (q/ha/day)

Table-14.4: VTGG-2007	(4 th year)	: Varietal	Trail in	Guinea Gras	s (Perennia	l): Dr	y Matter	Yield	(q/ha/da	iy)
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Entries	Anand	Ranchi	Bikaner	Hyderabad	Average	Rank
JHGG-07-1	0.86	0.35	0.66	0.52	0.60	6
JHGG-07-2	1.09	0.39	0.62		0.70	1
JHGG-07-3	1.10	0.37	0.62	0.67	0.69	2
PGG-702	0.97	0.41		0.73	0.70	1
PGG-710	0.88	0.41			0.65	4
PGG-729	0.89	0.38		0.54	0.60	6
Riversdale (NC)	1.00	0.44	0.28	0.75	0.62	5
PGG-616 (NC)	0.83	0.41	0.51		0.58	7
JHGG-96-5 (NC)	0.98	0.46		0.55	0.66	3
Mean	0.96	0.40	0.54	0.63	0.63	

Entries	Anand	Ranchi	Hyderabad	Mandya	Rahuri	Bhubneshwar	Avearge	Rank
JHGG-07-1	29.6	10.7	3.2	16.5	6.5	29.0	15.9	8
JHGG-07-2	44.4	13.6		9.7	6.6	28.1	20.5	1
JHGG-07-3	46.1	11.9	4.8	10.4	7.8	27.4	18.1	2
PGG-702	41.0	12.5	4.9	5.7	5.4	26.8	16.0	7
PGG-710	36.1	13.1		6.3	4.8	26.2	17.3	3
PGG-729	36.2	10.2	4.4	4.4	4.5	28.9	14.8	9
Riversdale (NC)	40.4	12.5	5.5	11.9	5.6	25.7	16.9	5
PGG-616 (NC)	31.4	11.1		9.5	3.1	25.4	16.1	6
JHGG-96-5 (NC)	42.5	16.2	4.2	8.0	5.2	26.6	17.1	4
Mean	38.6	12.4	4.5	9.1	5.5	27.1	16.2	

Table-14.5: VTGG-2007 (4th year): Varietal Trail in Guinea Grass (Perennial): Crude Protien Yield (q/ha)

Table-14.6: VTGG-2007	(4 th)	/ear): Va	rietal	Trail in	Guinea	Grass	(Perennial): Crude	Protien	(%))
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Entries	Anand	Ranchi	Hyderabad	Mandya	Rahuri	Average	Rank
JHGG-07-1	8.4	8.3	6.5	11.3	7.9	8.5	5
JHGG-07-2	8.8	9.6		10.0	8.8	9.3	1
JHGG-07-3	7.6	8.8	7.3	10.6	8.8	8.6	4
PGG-702	9.0	8.3	7.0	9.4	8.3	8.4	6
PGG-710	8.6	8.8		10.0	7.9	8.8	3
PGG-729	8.4	7.4	8.4	7.5	7.4	7.8	7
Riversdale (NC)	8.9	7.9	7.5	10.0	8.3	8.5	5
PGG-616 (NC)	8.4	7.8		13.1	7.0	9.1	2
JHGG-96-5 (NC)	9.0	9.6	8.1	8.1	9.2	8.8	3
Mean	8.6	8.5	7.5	10.0	8.2	8.5	

Entries	Vellayani	Anand	Bikaner	Mandya	Rahuri	Average	Rank
JHGG-07-1	100.0	149.8	87.5	71.7	60.3	93.9	7
JHGG-07-2	128.3	148.2	105.8	61.3	66.9	102.1	3
JHGG-07-3	133.3	146.9	100.3	70.1	73.2	104.8	1
PGG-702	103.3	145.4		53.2	70.8	93.2	9
PGG-710	115.0	152.1		66.0	66.7	100.0	4
PGG-729	116.7	150.8		72.5	72.1	103.0	2
Riversdale (NC)	90.0	161.4	83.7	50.4	82.0	93.5	8
PGG-616 (NC)	123.3	145.9	75.6	66.9	67.1	95.8	6
JHGG-96-5 (NC)	120.0	142.9		51.5	69.4	95.9	5
Mean	114.4	149.3	90.6	62.6	69.8	97.3	

Table-14.7: VTGG-2007 (4th year): Varietal Trail in Guinea Grass (Perennial): Plant Height (cm)

Table-14.8: VTGG-2007	(4 th	year):	Varietal	Trail in	Guinea	Grass	(Perennial): Leaf	Stem	Ratio
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Entries	Vellayani	Bikaner	Mandya	Rahuri	Average	Rank
JHGG-07-1	0.79	0.50	0.58	1.11	0.75	8
JHGG-07-2	0.84	0.70	0.44	0.90	0.72	9
JHGG-07-3	0.79	0.60	0.42	1.35	0.79	7
PGG-702	0.74		0.48	1.35	0.86	5
PGG-710	0.68		0.51	1.67	0.95	1
PGG-729	0.70		0.53	1.50	0.91	3
Riversdale (NC)	0.76	0.80	0.51	1.50	0.89	4
PGG-616 (NC)	0.78	0.70	0.48	1.27	0.81	6
JHGG-96-5 (NC)	0.81		0.45	1.50	0.92	2
Mean	0.77	0.66	0.49	1.35	0.82	

		NDF (%)				ADF	(%)		IVDMD (%)			
Entries	Rahuri	Ranchi	Average	Rank	Rahuri	Ranchi	Average	Rank	Rahuri	Ranchi	Average	Rank
JHGG-07-1	67.8	66.2	67.0	1	54.5	50.2	52.4	3	54.6	52.8	53.7	9
JHGG-07-2	67.0	69.4	68.2	2	55.2	48.4	51.8	1	57.2	56.2	56.7	5
JHGG-07-3	69.2	70.2	69.7	6	55.1	49.1	52.1	2	56.4	57.4	56.9	4
PGG-702	67.8	69.4	68.6	3	58.9	52.3	55.6	8	55.8	58.6	57.2	3
PGG-710	74.6	70.0	72.3	8	53.9	54.4	54.2	6	54.6	53.4	54.0	8
PGG-729	72.4	67.4	69.9	7	59.5	49.2	54.4	7	60.2	52.4	56.3	6
Riversdale (NC)	70.8	68.2	69.5	5	58.5	47.3	52.9	4	60.6	60.2	60.4	1
PGG-616 (NC)	75.2	70.4	72.8	9	59.0	54.4	56.7	9	56.2	59.2	57.7	2
JHGG-96-5 (NC)	69.4	68.8	69.1	4	56.3	51.2	53.8	5	56.8	54.8	55.8	7
Mean	70.5	68.9	69.7		56.8	50.7	53.7		56.9	56.1	56.5	

Table-14.9: VTGG-2007 (4th year): Varietal Trail in Guinea Grass (Perennial): NDF (%), ADF (%) & IVDMD (%)

Entries	2008	2009	2010	Mean	Rank	Superiority%
JHGG-07-1	712.2	632.2	704.3	682.9	5	
JHGG-07-2	683.2	700.6	753.3	712.4	2	
JHGG-07-3	768.8	652.3	700.1	707.1	3	
PGG-702	730.0	609.4	627.6	655.7	8	
PGG-710	661.0	671.4	654.4	662.3	6	
PGG-729	694.6	629.4	616.2	646.7	7	
Riversdale (NC)	776.7	620.5	666.8	688.0	4	
PGG-616 (NC)	699.8	577.4	591.1	622.8	9	
JHGG-96-5 (NC)	790.0	676.1	684.6	716.9	1	
Mean	724.0	641.0	666.5	677.2		

Table-14.10: VTGG-2007 (4th year): Varietal trail in Guinea Grass (Perennial): Green Forage Yield (q/ha) over three years

Table-14.11: VTGG-2007 (4	th year)	: Varietal Trai	I in Guinea Grass	(Perennial): Dr	y Matter Yield (q/ha) over three	years
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Entries	2008	2009	2010	Mean	Rank	Superiority%
JHGG-07-1	163.0	133.8	155.2	150.7	5	
JHGG-07-2	158.2	154.9	167.0	160.0	2	0.8
JHGG-07-3	182.5	140.0	162.5	161.7	1	1.9
PGG-702	174.3	130.7	137.7	147.6	7	
PGG-710	160.5	144.2	143.2	149.3	6	
PGG-729	173.5	133.6	130.7	145.9	8	
Riversdale (NC)	180.4	131.3	145.9	152.5	4	
PGG-616 (NC)	168.5	124.2	132.1	141.6	9	
JHGG-96-5 (NC)	184.5	144.2	147.5	158.7	3	
Mean	171.7	137.4	146.9	152.0		

15. VTCC-2008 (3rd year): VARIETAL TRIAL IN *Cenchrus ciliaris* (PERENNIAL)

(Table Reference: 15.1 to 15.5)

In *Cenchrus ciliaris*, a varietal evaluation trial comprising four entries and two national checks namely CAZRI-75 and IGFRI-3108 was established in Kharif-2008. As the crop is perennial in nature, all the entries are in coded form *i.e.*, CC-08-1 to CC-08-6. Decoding of the entries will be done after completion of the trial. This is the third year of evaluation and only four centres have provided the data. Based on the results obtained from testing locations in fodder production, entry CC-08-4 ranked first followed by CC-08-5 and CC-08-6 for green forage yield (q/ha). For dry matter yield (q/ha), entry CC-08-4 ranked first followed by CC-08-5 and CC-08-5 and CC-08-5 performed better both for green forage and dry matter production potential in comparison to other entries.

For evaluation against plant height (cm), entry CC-08-3 ranked first. In quality parameters, entries CC-08-5 followed by CC-08-4 and CC-08-6 for crude protein yield (q/ha) and entries CC-08-4, CC-08-6, CC-08-2 and CC-08-3 for crude protein (%) performed better than other entries. In leafiness character entry CC-08-2 ranked first followed by entries CC-08-4 and CC-08-5. For the character NDF and ADF (%), entries CC-08-6, CC-08-2 and CC-08-5 exhibited their superiority over rest of the entries.

			Gree	n Forage	Yield (q/ha)			Dry Matter Yield (q/ha)					
Entries	Jodhpur	Jalour	Jhansi	Rahuri	Average	Rank	Superiority%	Jodhpur	Jhansi	Rahuri	Average	Rank	Superiority%
CC-08 -1	145.0	298.5	126.2	87.4	164.3	5		35.9	30.4	16.4	27.6	6	
CC-08 -2	144.3	272.1	135.3	78.3	157.5	6		34.9	33.9	18.2	29.0	5	
CC-08 -3	201.6	264.8	118.6	92.7	169.4	4		41.2	31.6	20.8	31.2	3	
CC-08 -4		326.6	241.3	102.8	223.6	1			61.8	22.2	42.0	1	
CC-08 -5	188.1	288.6	147.9	113.4	184.5	2		36.6	36.4	32.4	35.1	2	
CC-08 -6	175.0	280.9	124.9	108.2	172.3	3		35.6	33.2	22.7	30.5	4	
Mean	170.8	288.6	149.0	97.1	176.4			36.8	37.9	22.1	32.3		
CD at 5%	56.5	NS	14.3	NS				13.9	5.2	7.1			
CV%	17.6	12.0	6.4	20.7				20.0	9.2	21.2			

Table-15.1: VTCC-2008 (3rd year): Varietal Trail in *Cenchrus ciliaris* (Perennial): Green Forage Yield & Dry Matter Yield (q/ha)

	ord.			. .							
Table-15.2: VTCC-2008 ((3 ^{°°} yea	ar): Varietal	Trail in (Cenchrus	ciliaris (Pe	rennial): G	Green Forag	e Yield & Dry	y Matter	Yield (q/ha/day)

	Green Forage Y	ield (q/ha/day)	Dry Matter Yiel	d (q/ha/day)
Entries	Jodhpur	Rank	Jodhpur	Rank
CC-08 -1	1.75	4	0.43	3
CC-08 -2	1.74	5	0.42	4
CC-08 -3	2.43	1	0.50	1
CC-08 -4				
CC-08 -5	2.27	2	0.44	2
CC-08 -6	2.11	3	0.43	3
Mean	2.06		0.44	

	Crude	e Protien Yield (q/ha)	Crude	Protien (%)
Entries	Rahuri	Rank	Rahuri	Rank
CC-08 -1	1.0	5	6.1	3
CC-08 -2	1.2	4	6.6	2
CC-08 -3	1.4	3	6.6	2
CC-08 -4	1.6	2	7.0	1
CC-08 -5	2.0	1	6.1	3
CC-08 -6	1.6	2	7.0	1
Mean	1.4		6.6	

 Table-15.3: VTCC-2008 (3rd year): Varietal Trail in Cenchrus ciliaris (Perennial): Crude

 Protien Yield (q/ha) & Crude Protien (%)

			Plant He	eight (cm)			Leaf Stem Ratio			
Entries	Jhansi	Jalour	Rahuri	Jodhpur	Average	Rank	Rahuri	Jodhpur	Average	Rank
CC-08 -1	93.4	133.8	36.2	95.4	89.7	3	1.22	1.84	1.53	2
CC-08 -2	88.7	118.8	37.3	100.3	86.3	6	0.82	2.65	1.74	1
CC-08 -3	87.2	128.8	40.7	107.4	91.0	1	0.67	1.51	1.09	4
CC-08 -4	87.3	130.0	48.7	82.6	87.2	4	1.00	2.46	1.73	1
CC-08 -5	85.7	118.1	41.0	96.4	85.3	6	1.22	2.23	1.73	1
CC-08 -6	94.3	117.5	42.7	105.4	90.0	2	0.82	1.80	1.31	3
Mean	89.4	124.5	41.1	97.9	88.2		0.96	2.08	1.52	

Table-15.4: VTCC-2008 (3rd year): Varietal Trail in *Cenchrus ciliaris* (Perennial): Plant Height (cm) & Leaf Stem Ratio

Table-15 5. VTCC-2008 ((3 rd vear)	· Varietal Trail in	Cenchrus ciliaris	(Perennial) · NDF	(%) & ADF (%)	(۵
Table=13.3. ¥100=2000	J year		Ochichi us chians			U)

	NDF	- (%)	ADF	(%)
Entries	Rahuri	Rank	Rahuri	Rank
CC-08 -1	74.2	6	54.6	3
CC-08 -2	70.0	2	54.1	2
CC-08 -3	71.4	3	54.6	3
CC-08 -4	72.0	5	56.7	4
CC-08 -5	71.6	4	51.7	1
CC-08 -6	68.4	1	54.1	2
Mean	71.3		54.3	

16. VT BXN Hyb. -2008 (3rd year): VARIETAL TRIAL IN BAJRA X NAPIER HYBRID (PERENNIAL)

(Table Reference: 16.1 to 16.10)

In Bajra x Napier Hybrid, a varietal evaluation trial comprising nine entries and three checks namely CO-3, PBN-233 and NB-21 was initiated during Kharif-2008. Crop being perennial in nature entries were coded as NB-08-1 to NB-08-12. Decoding of entries will be made available after completion of the trial. Results obtained from 16 centres clearly revealed that for green forage as well as dry matter yield (q/ha), entry NB-08-7 ranked first followed by NB-08-2 and NB-08-11. In fodder production potential, entry NB-08-11 ranked first followed by NB-08-2 and NB-08-6 both for green forage and dry matter production potential (q/ha/day). In terms of growth parameter, entries NB-08-3, NB-08-4 and NB-08-5 exhibited their superiority over rest of the entries.

In quality parameters, entry NB-08-6 ranked first for crude protein yield (q/ha) whereas entries NB-08-6 and NB-08-7 were equally well for crude protein (%). In leafiness character, entries NB-08-10 and NB-08-12 performed better whereas for NDF and ADF (%), entries NB-08-12 and NB-08-7 ranked first, respectively.

Entries	Vellayani	Rahuri	Mandya	Hyderabad	Coimbatore	Palampur	Faizabad	Dharwad	Almora	Ludhiana
NB-08 -1	1283.3	641.7	1018.1	819.1	2355.5	105.1	555.6	133.3	457.8	2476.1
NB-08 -2	1226.7	1226.5	1056.5	694.2	2244.4	227.4	508.8	151.4	184.9	3285.6
NB-08 -3	1173.3	651.8	1068.5	694.2	3085.4	143.6	641.7	133.3	415.8	2219.5
NB-08 -4	1236.7	1109.1	1408.6	749.7	1833.3	297.7	481.5	170.8	420.8	2727.7
NB-08 -5	1133.3	637.0	997.0	655.3	2413.8	120.3	576.0	163.9	401.1	2535.8
NB-08 -6	1213.3	870.6	1136.0	749.7	1623.6	100.3	610.6	205.5	488.1	3119.7
NB-08 -7	1520.0	1003.0	1276.6	1041.3	2236.0	221.4	381.5	98.2	744.7	2774.8
NB-08 -8	1270.0	955.5	1108.1	827.4	1395.8	120.3	627.8	195.8	295.2	2711.9
NB-08 -9	1126.7	1042.5	1164.1	677.5	2227.7	118.8	806.5	140.3		2436.4
NB-08 -10	1240.0	866.7	1263.9	771.9	1334.7	145.2	923.6	123.6	390.0	2861.3
NB-08 -11	1300.0	744.0	1578.1	1124.6	1301.3	173.3	772.2	168.1	479.2	2912.1
NB-08 -12				788.6	1506.9	212.9	700.0	126.4	322.8	2715.6
Mean	1247.6	886.2	1188.7	799.5	1963.2	165.5	632.1	150.9	418.2	2731.4
CD at 5%	115.8	235.8	132.6	172.1	206.2	48.0	180.2	33.5	68.8	7.7
CV%	5.5	15.8	6.6	12.7	6.2	16.6	16.8	13.1	10.0	4.2

Table-16.1: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): Green Forage Yield (q/ha)
Entries	Ranchi	Urulikanchan	Bhubneshwar	Anand	Jabalpur	Pantnagar	Average	Rank	Superiority%
NB-08 -1	700.0	1397.6	1011.7	221.0	312.0	856.8	896.5	11	
NB-08 -2	754.2	1717.3	966.8	689.0	315.0	2082.2	1083.2	2	
NB-08 -3	633.3	1700.7	1008.9	305.0	283.0	2128.8	1017.9	6	
NB-08 -4	675.0	1788.9	1046.3	371.0	371.0	1929.8	1038.6	5	
NB-08 -5	679.2	1782.8	1004.6	691.0	279.0	1437.8	969.2	9	
NB-08 -6	570.8	1587.7	998.1	874.0		965.3	1007.6	7	
NB-08 -7	716.7	1744.5	1011.3	358.0	339.0	2612.8	1130.0	1	
NB-08 -8	695.8	1466.7	1021.1	618.0	314.0	1041.2	916.5	10	
NB-08 -9	691.7	1628.4	1043.5	481.0	341.0	1999.2	1061.7	4	
NB-08 -10	550.0	1477.8	1009.4	490.0		1184.8	975.5	8	
NB-08 -11	733.3	1699.4	1014.9	641.0	311.0	2142.0	1068.4	3	
NB-08 -12	600.0	1355.6		446.0	237.0		819.3	12	
Mean	666.7	1612.3	1012.4	515.4	310.2	1671.0	998.2		
CD at 5%	97.4	80.8	110.5	112.2	30.4	341.1			
CV%	8.6	9.5	6.5	12.9	12.1	11.9			

Table-16.1: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): Green Forage Yield (q/ha)

Entries	Vellayani	Rahuri	Mandya	Hyderabad	Coimbatore	Palampur	Faizabad	Dharwad	Almora	Ludhiana
NB-08 -1	291.6	128.3	197.9	303.6	376.2	17.8	123.3	38.7	80.4	433.1
NB-08 -2	278.8	239.4	203.5	260.1	385.1	39.9	114.2	51.1	34.2	678.6
NB-08 -3	266.7	134.0	203.4	219.5	522.0	24.4	161.5	48.1	83.3	379.2
NB-08 -4	281.7	230.7	284.1	311.0	313.8	49.1	114.3	56.7	89.3	516.3
NB-08 -5	257.6	135.4	188.9	235.3	452.5	19.8	103.3	55.3	89.8	455.6
NB-08 -6	275.7	174.8	207.8	315.5	296.2	19.6	127.4	71.1	90.3	628.2
NB-08 -7	343.8	206.8	235.4	430.9	391.8	40.0	66.8	33.5	150.5	526.2
NB-08 -8	288.7	179.2	200.9	251.5	264.7	22.3	148.9	66.8	68.4	501.5
NB-08 -9	270.5	221.0	227.3	260.1	406.9	17.3	180.6	44.8		426.2
NB-08 -10	281.8	194.5	220.4	312.1	224.6	26.4	197.2	41.1	72.2	565.0
NB-08 -11	295.4	146.6	297.7	360.4	241.0	27.8	186.1	58.1	88.7	568.0
NB-08 -12				299.1	266.1	34.4	138.8	42.0	61.7	502.5
Mean	284.8	181.0	224.3	296.6	345.1	28.2	138.5	50.6	82.6	515.0
CD at 5%	30.7	43.8	38.5	78.3	41.4	9.3	17.6	12.8	12.6	NS
CV%	6.3	15.5	10.1	15.6	7.1	19.1	9.5	15.0	9.0	15.4

Table-16.2: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): Dry Matter Yield (q/ha) Cont....

Entries	Ranchi	Urulikanchan	Bhubneshwar	Anand	Jabalpur	Pantnagar	Average	Rank	Superiority%
NB-08 -1	204.1	293.3	249.8	49.0	61.2	184.7	189.6	11	
NB-08 -2	227.3	354.1	234.1	154.0	61.3	446.3	235.1	2	
NB-08 -3	190.1	358.0	249.0	61.0	55.2	477.4	214.5	7	
NB-08 -4	190.6	330.3	239.0	83.1	73.4	471.6	227.2	4	
NB-08 -5	219.1	387.7	238.5	162.9	54.3	310.1	210.4	9	
NB-08 -6	166.9	318.2	226.4	207.1		243.9	224.6	6	
NB-08 -7	213.2	335.2	239.7	75.2	66.8	525.5	242.6	1	
NB-08 -8	196.2	321.6	241.8	145.7	61.5	212.2	198.2	10	
NB-08 -9	196.8	312.1	227.9	104.0	66.9	423.5	225.7	5	
NB-08 -10	154.2	296.7	229.3	102.2		266.8	212.3	8	
NB-08 -11	228.2	307.2	242.7	132.4	60.6	483.8	232.8	3	
NB-08 -12	173.7	262.9		99.9	45.8		175.2	12	
Mean	196.7	323.1	238.0	114.7	60.7	367.8	215.5		
CD at 5%	26.2	31.0	35.9	26.1	6.0	70.2			
CV%	8.0	11.1	8.8	13.4	12.0	11.2			

Table-16.2: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): Dry Matter Yield (q/ha)

Entries	Anand	Ranchi	Faizabad	Hyderabad	Ludhiana	Average	Rank
NB-08 -1	0.62	1.92	2.02	5.46	15.48	5.10	10
NB-08 -2	1.92	2.07	1.85	4.63	20.28	6.15	2
NB-08 -3	0.85	1.74	2.33	4.63	13.87	4.68	11
NB-08 -4	1.03	1.85	1.75	5.00	16.63	5.25	8
NB-08 -5	1.92	1.86	2.09	4.37	15.65	5.18	9
NB-08 -6	2.43	1.56	2.22	5.00	19.14	6.07	3
NB-08 -7	1.00	1.96	1.39	6.94	17.13	5.68	5
NB-08 -8	1.72	1.91	2.28	5.52	16.44	5.57	6
NB-08 -9	1.34	1.89	2.93	4.52	15.23	5.18	9
NB-08 -10	1.36	1.51	3.36	5.15	17.55	5.79	4
NB-08 -11	1.79	2.01	2.81	7.50	18.20	6.46	1
NB-08 -12	1.24	1.64	2.54	5.26	16.97	5.53	7
Mean	1.44	1.83	2.30	5.33	16.88	5.55	

Table-16.3: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): Green Forage Yield (q/ha/day)

Entries	Anand	Ranchi	Faizabad	Hyderabad	Ludhiana	Average	Rank
NB-08 -1	0.14	0.56	0.45	2.02	2.71	1.18	8
NB-08 -2	0.43	0.62	0.42	1.73	4.19	1.48	3
NB-08 -3	0.17	0.52	0.59	1.46	2.37	1.02	10
NB-08 -4	0.23	0.52	0.42	2.07	3.15	1.28	6
NB-08 -5	0.45	0.60	0.37	1.57	2.81	1.16	9
NB-08 -6	0.58	0.46	0.46	2.10	3.85	1.49	2
NB-08 -7	0.21	0.58	0.24	2.87	3.25	1.43	4
NB-08 -8	0.41	0.54	0.54	1.68	3.04	1.24	7
NB-08 -9	0.29	0.54	0.66	1.73	2.66	1.18	8
NB-08 -10	0.28	0.42	0.72	2.08	3.47	1.39	5
NB-08 -11	0.37	0.63	0.68	2.40	3.55	1.53	1
NB-08 -12	0.28	0.48	0.50	1.99	3.14	1.28	6
Mean	0.32	0.54	0.50	1.98	3.18	1.30	

 Table-16.4: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): Dry Matter Yield (q/ha/day)

Entries	Anand	Jabalpur	Ranchi	Faizabad	Hyderabad	Mandya	Rahuri	Palampur	Urulikanchan	Ludhiana	Bhubneshwar	Average	Rank
NB-08 -1	4.4	4.9	16.1	7.5	19.2	16.1	9.6	1.6	24.8	33.8	19.2	14.3	11
NB-08 -2	11.1	4.9	16.9	6.4	19.7	15.3	21.0	3.3	30.7	55.0	18.8	18.5	2
NB-08 -3	4.6	4.1	15.8	9.4	13.5	12.8	12.3	1.9	31.7	28.8	21.4	14.2	12
NB-08 -4	7.0	6.0	17.5	6.3	21.1	21.4	20.2	4.7	26.8	39.8	18.5	17.2	6
NB-08 -5	11.7	4.1	17.2	5.8	12.3	14.3	11.9	2.0	32.3	37.4	19.0	15.3	9
NB-08 -6	16.8		14.6	7.6	24.5	16.9	16.1	1.9	27.7	47.7	20.4	19.4	1
NB-08 -7	6.8	5.3	19.6	3.6	26.4	25.1	18.1	3.7	30.0	41.6	20.5	18.2	4
NB-08 -8	12.5	4.8	18.9	7.9	15.7	18.8	14.1	2.0	26.4	38.6	19.1	16.2	7
NB-08 -9	9.5	5.2	16.3	11.2	15.9	18.4	18.4	1.4	27.0	35.8	18.4	16.1	8
NB-08 -10	8.9		14.2	13.6	17.5	16.6	17.0	2.2	25.6	49.7	18.6	18.4	3
NB-08 -11	11.3	4.7	20.0	11.7	22.1	26.0	11.5	2.5	26.2	44.3	18.0	18.0	5
NB-08 -12	7.7	3.2	13.7	7.8	20.3			3.2	22.4	40.2		14.8	10
											19.3	16.6	
Mean	9.4	4.7	16.7	8.2	19.0	18.3	15.5	2.5	27.6	41.1			

Table-16.5: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): Crude Protien Yield (q/ha)

Entries	Anand	Rahuri	Ranchi	Faizabad	Hyderabad	Mandya	Palampur	Urulikanchan	Ludhiana	Jabalpur	Pantnagar	Average	Rank
NB-08 -1	8.5	7.4	7.9	6.1	6.8	8.1	8.8	8.5	7.8	8.1	10.5	8.0	5
NB-08 -2	7.7	8.8	7.4	5.6	8.1	7.5	8.2	8.7	8.1	8.1	8.8	7.9	6
NB-08 -3	8.1	9.2	8.3	5.8	6.6	6.3	7.9	8.9	7.6	7.4	11.4	7.9	6
NB-08 -4	8.3	8.8	9.2	5.5	7.4	7.5	9.6	8.1	7.7	8.2	10.5	8.3	2
NB-08 -5	9.1	8.8	7.9	5.6	5.7	7.5	10.2	8.4	8.2	7.5	10.5	8.1	4
NB-08 -6	8.4	9.2	8.8	6.0	8.3	8.1	9.6	8.7	7.6		9.6	8.4	1
NB-08 -7	9.1	8.8	9.2	5.4	6.6	10.6	9.3	9.0	7.9	8.0	8.8	8.4	1
NB-08 -8	8.4	7.9	9.6	5.3	6.6	9.4	8.8	8.2	7.7	7.9	8.8	8.0	5
NB-08 -9	9.2	8.3	8.3	6.2	6.6	8.1	7.9	8.6	8.4	7.8	9.6	8.1	4
NB-08 -10	9.4	8.8	9.2	6.9	6.1	7.5	8.5	8.6	8.8		8.8	8.2	3
NB-08 -11	8.6	7.9	8.8	6.3	6.6	8.7	9.0	8.5	7.8	7.3	9.6	8.1	4
NB-08 -12	8.3		7.9	5.6	7.4		9.3	8.5	8.0	7.0		7.8	7
Mean	8.6	8.5	8.5	5.9	6.9	8.1	8.9	8.5	8.0	7.7	9.7	8.1	

Table-16.6: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): Crude Protien (%)

Entries	Vellayani	Anand	Jabalpur	Ranchi	Faizabad	Mandya	Palampur	Ludhiana	Urulikanchan	Rahuri	Pantnagar	Average	Rank
NB-08 -1	171.7	114.0	82.8	82.3	155.3	58.9	109.0	128.3	84.0	100.1	219.7	118.7	5
NB-08 -2	123.3	121.5	82.5	83.0	142.5	38.9	119.0	143.3	85.6	112.9	188.0	112.8	8
NB-08 -3	180.0	116.2	73.8	84.5	153.4	48.0	133.6	136.7	91.0	99.9	205.3	120.2	4
NB-08 -4	158.3	124.5	111.0	80.4	125.2	89.1	112.6	155.0	88.7	112.3	220.3	125.2	1
NB-08 -5	168.3	132.6	71.9	81.0	135.8	58.0	106.3	141.7	121.3	110.8	214.7	122.0	2
NB-08 -6	106.7	133.7		83.0	153.4	38.5	90.0	158.3	98.7	103.3	242.7	120.8	3
NB-08 -7	111.7	109.6	103.8	83.5	105.6	40.5	114.0	145.0	83.7	106.4	192.3	108.7	12
NB-08 -8	135.0	124.3	85.5	85.2	155.7	40.8	113.0	120.0	90.7	104.9	169.0	111.3	10
NB-08 -9	105.0	128.9	90.1	92.9	159.5	66.3	106.6	136.0	95.4	113.6	192.0	116.9	6
NB-08 -10	145.0	107.3		80.7	165.2	40.1	99.6	120.0	65.2	88.6	204.3	111.6	9
NB-08 -11	141.7	121.8	91.6	87.2	151.4	46.6	109.0	128.0	85.1	112.1	208.0	116.6	7
NB-08 -12		118.3	82.9	86.2	135.8		114.6	145.0	81.1			109.1	11
Mean	140.6	121.1	87.6	84.2	144.9	51.4	110.6	138.1	89.2	105.9	205.1	116.2	

Table-16.7: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): Plant Height (cm)

Entries	Vellayani	Jabalpur	Ranchi	Faizabad	Mandya	Palampur	Ludhiana	Urulikanchan	Rahuri	Pantnagar	Average	Rank
NB-08 -1	0.82	0.82	1.68	0.95	0.48	1.87	0.82	1.14	1.22	0.68	1.05	8
NB-08 -2	0.91	0.81	2.78	0.81	0.52	1.87	1.22	1.41	1.22	0.79	1.23	3
NB-08 -3	0.87	0.79	2.12	0.89	0.86	1.62	1.00	1.07	1.40	0.64	1.13	7
NB-08 -4	0.84	0.97	2.42	0.80	0.87	1.36	1.22	1.35	1.31	0.82	1.20	4
NB-08 -5	0.75	0.87	1.45	0.78	0.69	1.53	1.11	1.27	1.31	0.59	1.04	9
NB-08 -6	1.04		1.82	0.87	0.64	1.65	1.22	1.26	1.61	0.61	1.19	5
NB-08 -7	0.98	0.94	1.77	0.98	0.64	1.96	1.11	1.17	1.31	0.57	1.14	6
NB-08 -8	0.98	0.83	2.75	1.00	0.47	1.93	0.90	0.99	1.45	0.64	1.19	5
NB-08 -9	0.95	0.89	2.08	1.10	0.76	1.31	1.22	1.24	1.14	0.70	1.14	6
NB-08 -10	1.02		3.29	1.15	0.49	1.60	0.82	1.24	1.73	0.79	1.35	1
NB-08 -11	0.89	0.87	1.76	0.92	0.89	1.89	1.00	1.18	1.86	0.68	1.19	5
NB-08 -12		0.86	2.17	0.75		1.74	1.22	1.20			1.32	2
Mean	0.91	0.87	2.17	0.92	0.66	1.69	1.07	1.21	1.41	0.68	1.16	

Table-16.8: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): Leaf Stem Ratio

Entries	Ranchi	Palampur	Ludhiana	Rahuri	Pantnagar	Average	Rank
NB-08 -1	43.4	50.4	37.6	56.9	52.6	48.2	4
NB-08 -2	42.6	54.6	37.0	57.7	54.0	49.2	12
NB-08 -3	44.4	52.0	37.8	56.4	52.6	48.6	2
NB-08 -4	41.8	51.4	38.0	56.2	51.8	47.8	6
NB-08 -5	42.4	52.6	36.4	57.0	52.2	48.1	5
NB-08 -6	44.2	52.2	37.6	58.7	50.0	48.5	10
NB-08 -7	40.4	48.0	38.0	45.2	51.8	44.7	11
NB-08 -8	45.6	49.8	37.6	41.2	52.6	45.4	9
NB-08 -9	43.6	51.4	37.2	54.5	50.2	47.4	8
NB-08 -10	41.2	50.4	36.6	47.9	49.8	45.2	3
NB-08 -11	43.0	51.8	37.8	55.2	52.6	48.1	7
NB-08 -12	41.4	52.6	37.2			43.7	1
Mean	42.8	51.4	37.4	53.4	51.8	47.4	

Table-16.9: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): ADF (%)

Entries	Ranchi	Palampur	Ludhiana	Rahuri	Pantnagar	Average	Rank
NB-08 -1	61.6	74.0	56.8	73.6	74.0	68.0	9
NB-08 -2	60.2	73.6	55.4	66.8	72.6	65.7	4
NB-08 -3	58.6	70.2	57.2	68.4	72.0	65.3	3
NB-08 -4	59.8	74.0	56.6	66.0	73.4	66.0	5
NB-08 -5	60.6	73.6	55.6	72.0	74.4	67.2	8
NB-08 -6	57.8	72.4	57.2	73.0	74.6	67.0	7
NB-08 -7	61.0	69.4	56.0	69.4	70.6	65.3	3
NB-08 -8	59.4	68.4	56.8	69.4	68.6	64.5	2
NB-08 -9	57.6	70.6	55.8	74.4	71.6	66.0	5
NB-08 -10	58.8	72.6	55.4	73.0	72.0	66.4	6
NB-08 -11	60.2	74.6	57.2	71.2	71.8	67.0	7
NB-08 -12	59.4	74.2	56.2			63.3	1
Mean	59.6	72.3	56.4	70.7	72.3	66.2	

Table-16.9: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): NDF (%)

Entries	Ludhiana	Rahuri	Palampur	Average	Rank
NB-08 -1	56.0	58.6	54.6	56.4	2
NB-08 -2	56.7	60.0	51.8	56.2	3
NB-08 -3	55.7	60.4	52.6	56.2	3
NB-08 -4	56.3	58.4	51.8	55.5	5
NB-08 -5	57.0	58.6	52.2	55.9	4
NB-08 -6	55.8	54.8	54.0	54.9	8
NB-08 -7	56.9	61.2	52.2	56.8	1
NB-08 -8	56.4	55.4	53.2	55.0	7
NB-08 -9	57.6	56.2	50.2	54.7	9
NB-08 -10	57.1	56.4	51.8	55.1	6
NB-08 -11	56.5	59.4	52.4	56.1	3
NB-08 -12	57.1		52.0	54.6	10
Mean	56.6	58.1	52.4	55.7	

 Table-16.10: VT BXN Hyb. -2008 (3rd year): Varietal trial in Bazra X Napier Hybrid (Perennial): IVDMD (%)

17. VT Setaria – 2008 (3rd year): VARIETAL TRIAL IN *Setaria ancep* (PERENNIAL)

(Table Reference: 17.1 to 17.4)

In Kharif-2008, a varietal trial in *Setaria ancep* grass comprising five entries and one check viz. S-92 was initiated at four centres in Himalayan hill region. Contributor of the entries and check is CSHPKV, Palampur centre. This year data has been reported from three centres i.e., Almora, Palampur and Kullu. Results of the trial obtained from different centres clearly revealed that for green forage as well as dry matter yield (q/ha) entry S-18, S-20 and S-21 exhibited their superiority over check S-92. For green forage yield (q/ha), entry S-18(21.0 %) ranked first followed by S-20(19.1 %) and S-21(5.2 %). Similarly for dry matter yield (q/ha), entry S-18(9.3 %) ranked first followed by S-20(6.1 %) and S-21(2.7 %). Even for growth parameter i.e. plant height (cm), these three entries exhibited superiority over check S-92.

For evaluation against quality parameter, entry S-20 ranked first followed by S-21, PSS-1 and S-18 for crude protein yield (q/ha) and entry S-18 ranked first followed by S-20 and S-21 for crude protein (%). For the character NDF (%), entry S-20, ADF (%), Check S-92 and IVDMD (%) entry S-18 was found best performer. Performance of the entry S-25 have not been reported by any centre.

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	Green Forage Yield (q/ha)						Dry Matter Yield (q/ha)					
Entries	Almora	Palampur	Kullu	Average	Rank	Superiority%	Almora	Palampur	Kullu	Average	Rank	Superiority%
S-18	643.5	354.0	855.8	617.8	1		70.3	63.4	172.7	102.1	1	
S-20	687.4	397.6	739.4	608.1	2		74.4	76.9	146.0	99.1	2	
S-21	587.2	404.2	619.8	537.1	3		63.4	100.7	123.5	95.9	3	
PSS-1	671.7	366.6	276.1	438.1	5		69.4	81.0	50.6	67.0	5	
S-25												
S-92 (NC)	480.9	260.7	790.4	510.7	4		60.6	51.3	168.4	93.4	4	
Filler	669.5						63.8					
Mean	623.4	356.6	656.3	545.4			67.0	74.7	132.2	91.3		
CD at 5%	82.7	88.6	68.3				14.8	17.5	14.3			
CV%	9.0	16.1	6.8				15.0	16.4	6.7			

Table-17.1: VT Setaria-2008 (3rd year): Varietal Trial in *Setaria ancep* (Perennial): Green Forage Yield & Dry Matter Yield (q/ha)

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	Crude Proteir	rYield (q/ha)	Crude Protien (%)		
Entries	Palampur	Rank	Palampur	Rank	
S-18	6.7	3	10.5	1	
S-20	7.9	1	10.3	2	
S-21	7.3	2	9.8	3	
PSS-1	7.3	2	9.0	5	
S-25					
S-92 (NC)	4.7	4	9.2	4	
Filler					
Mean	6.8		9.8		

 Table-17.2: VT Setaria-2008 (3rd year): Varietal Trial in Setaria ancep (Perennial): Crude Protien Yield

 (q/ha) & Crude Protien (%)

Table-17.3: VT Setaria-2008 (3rd year): Varietal Trial in Setaria ancep (Perennial): Plant Height (cm)

Entries	Palampur	Kullu	Average	Rank
S-18	83.5	89.8	86.7	2
S-20	83.7	87.7	85.7	3
S-21	100.7	78.5	89.6	1
PSS-1	101.5	45.6	73.6	5
S-25				
S-92 (NC)	77.0	87.7	82.4	4
Mean	89.3	77.9		

	NDF (%)		ADF	(%)	IVDM	D (%)
Entries	Palmpur	Rank	Palmpur	Rank	Palmpur	Rank
S-18	68.4	4	50.0	3	54.2	1
S-20	67.2	1	51.2	4	53.8	2
S-21	68.0	3	53.4	5	50.6	3
PSS-1	68.6	5	49.8	2	48.4	4
S-25						
S-92 (NC)	67.6	2	48.6	1	50.6	3
Mean	68.0		50.6		51.5	

 Table-17.4: VT Setaria-2008 (3rd year): Varietal Trial in Setaria ancep (Perennial): NDF (%), ADF (%)

 & IVDMD (%)

18. VT *Cenchrus setigerus* (1st year): VARIETAL TRIAL IN *Cenchrus setigerus* GRASS (PERENNIAL)

(Table Reference: 18.1 to 18.8)

In *Cenchrus setigerus*, a varietal evaluation trial comprising seven entries and check namely CAZRI-76 was conducted at 12 locations distributed in four zones of the country. Crop being perennial in nature, entries are in coded form as from VTCS-10-1 to VTCS-10-8. Decoding of entries will be done after completion of the trial. This is being the first year, the data has been received from eight centres only. In terms of fodder yield, results clearly revealed that entries VTCS-10-6, VTCS-10-7 and VTCS-10-4 exhibited their superiority for green forage as well as dry matter yield (q/ha) with respect to other entries.

With respect to fodder production potential, entries VTCS-10-6, VTCS-10-7 and VTCS-10-5 performed better than other entries both for green forage and dry matter production potential (q/ha/day). For evaluation against growth parameter i.e., plant height (cm), entry VTCS-10-5 ranked first followed by VTCS-10-1. For evaluation against quality parameters, entries VTCS-10 – 5 and VTCS-10-6 maintained their superiority for crude protein yield (q/ha) and ADF (%). For crude protein (%), entry VTCS-10-5 ranked first whereas for NDF (%), entry VTCS -10-3 ranked first followed by VTCS-10-1.

Entries	Jalore	Pali(CAZRI)	Bikaner	Dhari	Anand	Coimbatore	Jodhpur (CAZRI)*	Rahuri*	Average	Rank	Superiority%
VTCS-10-1	233.7	163.0	15.3	16.5	319.0	430.5	23.1	143.0	196.3	5	
VTCS-10-2	195.0	178.9	30.6	24.3	227.0	383.3	28.0	158.0	173.2	7	
VTCS-10-3	228.0	141.2	50.8	20.6	299.0	369.4	34.9	138.9	184.8	6	
VTCS-10-4	154.7	153.6	24.8	15.2	328.0	538.9	18.7	200.8	202.5	3	
VTCS-10-5	235.3	163.8	40.3	15.0	353.0	405.5	33.8	147.9	202.2	4	
VTCS-10-6	221.1	173.0	23.7	12.1	410.0	436.1	23.7	144.2	212.7	1	
VTCS-10-7	221.2	180.9	25.6	14.4	391.0	422.2	19.2	154.6	209.2	2	
VTCS-10-8	227.5	135.5	19.8	9.6	302.0	280.5	39.7	85.2	162.5	8	
Mean	214.6	161.2	28.9	16.0	328.6	408.3	27.6	146.6	192.9		
CD at 5%	30.1	29.4	9.7	3.5	42.2	63.1	21.4	102.1			
CV%	7.8	10.4	19.1	12.4	7.3	8.8	44.3	39.8			

Table-18.1: VT Cenchrus setigerus (1st year): Varietal Trial in Cenchrus setigerus (Perennial): Green forage Yield (q/ha)

Entries	Pali(CAZRI)	Bikaner	Dhari	Anand	Coimbatore	Jodhpur(CAZRI)*	Rahuri*	Average	Rank	Superiority%
VTCS-10-1	34.9	5.3	7.5	86.1	72.1	5.4	35.0	41.2	6	
VTCS-10-2	38.0	12.2	10.7	56.4	63.6	6.9	34.6	36.2	7	
VTCS-10-3	31.4	17.5	7.8	85.2	64.7	8.2	29.4	41.3	5	
VTCS-10-4	33.3	8.8	6.1	94.4	83.6	5.3	49.4	45.2	3	
VTCS-10-5	34.7	14.9	6.1	97.3	65.7	7.5	43.2	43.7	4	
VTCS-10-6	37.1	9.8	5.1	107.1	71.5	5.5	38.6	46.1	2	
VTCS-10-7	41.1	9.6	6.3	112.1	76.6	4.9	39.7	49.1	1	
VTCS-10-8	30.7	7.3	4.4	79.9	46.1	9.2	26.8	33.7	8	
Mean	35.2	10.7	6.8	89.8	68.0	6.6	37.1	42.1		
CD at 5%	9.5	4.9	1.8	10.9	12.7	4.9	26.8			
CV%	15.5	26.2	15.0	6.9	10.6	42.2	41.2			

 Table-18.2: VT Cenchrus setigerus (1st year): Varietal Trial in Cenchrus setigerus (Perennial): Dry Matter Yield (q/ha)

*not included in zonal and all India average due to CV≥30

Entries	Dhari	Bikaner	Anand	Pali	Jodhpur	Average	Rank
VTCS-10-1	0.29	0.11	2.36	4.28	0.28	1.46	4
VTCS-10-2	0.40	0.22	1.68	4.63	0.31	1.45	5
VTCS-10-3	0.34	0.36	2.21	3.76	0.43	1.42	6
VTCS-10-4	0.25	0.18	2.43	4.20	0.21	1.45	5
VTCS-10-5	0.28	0.29	2.61	4.31	0.41	1.58	3
VTCS-10-6	0.19	0.17	3.04	4.49	0.26	1.63	1
VTCS-10-7	0.22	0.18	2.90	4.50	0.21	1.60	2
VTCS-10-8	0.14	0.14	2.24	3.13	0.48	1.23	7
Mean	0.26	0.21	2.43	4.16	0.32	1.48	

Table-18.3: VT Cenchrus setigerus (1st year): Varietal Trial in Cenchrus setigerus (Perennial): Green Forage Yield (q/ha/day)

Table-18.4: VT Cenchrus setigerus (1st year): Varietal Trial in Cenchrus setigerus (Perennial): Dry Matter Yield (q/ha/day)

Entries	Bikaner	Anand	Jodhpur	Average	Rank
VTCS-10-1	0.04	0.64	0.07	0.25	5
VTCS-10-2	0.09	0.42	0.08	0.20	6
VTCS-10-3	0.12	0.63	0.10	0.28	3
VTCS-10-4	0.06	0.70	0.06	0.27	4
VTCS-10-5	0.11	0.72	0.09	0.31	2
VTCS-10-6	0.07	0.79	0.06	0.31	2
VTCS-10-7	0.07	0.83	0.05	0.32	1
VTCS-10-8	0.05	0.59	0.11	0.25	5
Mean	0.08	0.67	0.08	0.27	

Entries	Dhari	Bikaner	Jalour	Rahuri	Anand	Pali	Jodhpur	Average	Rank
VTCS-10-1	59.7	22.3	110.9	68.1	115.0	142.3	57.4	82.2	2
VTCS-10-2	51.0	25.7	101.6	61.2	96.5	149.3	55.2	77.2	6
VTCS-10-3	55.9	35.3	102.7	56.3	102.2	147.3	53.3	79.0	5
VTCS-10-4	58.5	29.0	99.2	96.1	109.2	1743	60.0	75.3	7
VTCS-10-5	50.2	30.3	108.4	58.9	112.8	164.0	61.4	83.7	1
VTCS-10-6	47.9	25.3	108.1	57.5	111.2	151.3	52.8	79.2	4
VTCS-10-7	52.2	24.3	107.4	74.3	114.0	139.6	51.1	80.4	3
VTCS-10-8	39.8	27.3	97.8	44.3	111.6	150.6	50.6	74.6	8
Mean	51.9	27.4	104.5	64.6	109.1	149.2	55.2	80.3	

Table-18.5: VT Cenchrus setigerus (1st year): Varietal Trial in Cenchrus setigerus (Perennial): Plant Height (cm)

 Table-18.6: VT Cenchrus setigerus (1st year): Varietal Trial in Cenchrus setigerus (Perennial): Leaf Stem Ratio

Entries	Dhari	Rahuri	Pali	Jodhpur*	Average	Rank
VTCS-10-1	0.51	1.08	1.23	3.80	0.94	4
VTCS-10-2	0.27	1.00	0.90	6.50	0.72	8
VTCS-10-3	0.52	1.17	1.00	4.30	0.90	5
VTCS-10-4	0.44	0.92	1.70	5.80	1.02	3
VTCS-10-5	0.40	1.17	1.06	5.00	0.88	7
VTCS-10-6	0.36	1.04	1.26	3.30	0.89	6
VTCS-10-7	0.57	1.27	1.26	4.80	1.03	2
VTCS-10-8	0.59	0.96	1.73	3.30	1.09	1
Mean	0.46	1.08	1.27	4.60	0.93	

		Crude Pro	tein Yield			Crude Pro	otien (%)	
Entries	Rahuri	Anand	Average	Rank	Rahuri	Anand	Average	Rank
VTCS-10-1	2.3	4.9	3.6	6	6.6	7.1	6.8	5
VTCS-10-2	2.4	2.9	2.7	8	7.0	5.9	6.5	6
VTCS-10-3	2.3	4.5	3.4	7	7.9	6.0	6.9	4
VTCS-10-4	3.2	5.4	4.3	4	6.6	6.4	6.5	6
VTCS-10-5	3.0	7.3	5.2	1	7.0	8.5	7.7	1
VTCS-10-6	2.9	6.7	4.8	2	7.4	6.8	7.1	3
VTCS-10-7	2.6	6.2	4.4	3	6.6	6.2	6.4	7
VTCS-10-8	1.9	5.6	3.7	5	7.0	8.0	7.5	2
Mean	2.6	5.4	4.0		7.0	6.9	6.9	

Table-18.7: VT *Cenchrus setigerus* (1st year): Varietal Trial in *Cenchrus setigerus* (Perennial): Crude Protien Yield (q/ha) & Crude Protien (%)

Table-18.8 VT Cenchrus setigerus	(1 st year): Varietal Trial in Cene	<i>chrus setigerus (</i> Perennial): N	NDF (%) & ADF (%)
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	NDF (%	b)	ADF (%)	
Entries	Rahuri	Rank	Rahuri	Rank
VTCS-10-1	69.4	2	53.6	5
VTCS-10-2	71.2	6	52.8	4
VTCS-10-3	68.8	1	52.6	3
VTCS-10-4	70.8	5	53.6	5
VTCS-10-5	72.4	8	50.2	1
VTCS-10-6	71.6	7	51.6	2
VTCS-10-7	70.6	4	52.8	4
VTCS-10-8	69.8	3	57.6	6
Mean	70.6		53.1	

19. VT DINANATH GRASS: VARIETAL TRIAL IN DINANATH GRASS

(Table Reference: 19.1 to 19.5)

In Dinanath grass, a varietal evaluation trial comprising five entries along with two checks namely Bundel Dinanath-1 and Bundel Dinanath-2 was conducted at four locations across the country. In terms of fodder yield, results clearly revealed that for green forage yield (q/ha), entry JHPP-1 (2.6%) exhibited superiority over best national check Bundel Dinanath-2. Similarly, for dry matter yield (q/ha), entry JHPP-1 (0.83%) was adjudged best performer in comparison to other entries. With respect to fodder production potential, entry JHPP-1 ranked first for green forage yield (q/ha/day) whereas for dry matter yield (q/ha/day), check Bundel Dinanath-2 adjudged best performer. Entry JHPP-1 (101.90 cm) ranked first for evaluation against plant height (cm).

For evaluation against quality parameters, Bundel Dinanath-2 for crude protein yield (q/ha) and entry BDN-15 for crude protein (%) ranked first. For leafiness character entry BDN-11 ranked first. For the quality parameter NDF (%), entry BDN-15 whereas for ADF (%), entry BDN-5 was recorded best performer with respect to other entries.

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	Green ForageYield (q/ha)						Dry Ma	atterYield	(q/ha)				
Entries	Ranchi	Jorhat	Kalyani	Pusa	Average	Rank	Superiority%	Ranchi	Jorhat	Kalyani	Average	Rank	Superiority%
JHPP-1	371.7	369.6	430.0	293.4	366.2	1	2.6	90.6	86.8	77.4	84.9	1	0.8
BDN-11	218.8	198.9	480.0	351.7	312.4	4		50.0	41.3	89.8	60.4	6	
BDN-15	253.6	366.7	438.3	289.6	337.1	5		50.5	77.6	78.9	69.0	4	
BDN-5	316.1	252.4	476.6	323.7	342.2	3		72.2	55.0	90.6	72.6	3	
BDN-3	250.1	175.6	503.3	309.8	309.7	6		52.9	39.5	91.6	61.3	5	
Bundal Dinanath-1 (NC)	274.4	98.2	476.1	249.1	274.5	7		72.4	21.0	80.9	58.1	7	
Bundel Dinanath-2 (NC)	361.2	367.9	425.5	273.5	357.0	2		100.1	78.4	74.0	84.2	2	
Mean	292.3	261.3	461.4	298.7	328.4			69.8	57.1	83.3	70.1		
CD at 5%	55.1	10.1	23.7	32.0				15.0	4.4	4.4			
CV%	10.6	13.4	3.5	11.6				12.1	12.6	3.6			

Table-19.1: Varietal Trial in Dinanath Grass: Green Forage Yield (q/ha) & Dry Matter Yield (q/ha)

	Green Forage Yeild (q/ha/day)				Dry Matter Yeild (q/ha/day)					
Entries	Jorhat	Kalyani	Ranchi	Average	Rank	Jorhat	Kalyani	Ranchi	Average	Rank
JHPP-1	3.00	4.78	5.47	4.42	1	0.70	0.86	1.33	0.96	2
BDN-11	1.61	5.33	3.27	3.40	6	0.33	0.99	0.75	0.69	6
BDN-15	2.98	4.87	3.57	3.81	4	0.63	0.88	0.71	0.74	4
BDN-5	2.05	5.30	4.52	3.96	3	0.44	1.01	1.03	0.83	3
BDN-3	1.42	5.59	3.47	3.49	5	0.32	1.02	0.73	0.69	6
Bundal Dinanath-1 (NC)	0.79	5.29	4.10	3.39	7	0.17	0.90	1.08	0.72	5
Bundel Dinanath-2 (NC)	2.99	4.73	5.47	4.40	2	0.63	0.82	1.52	0.99	1
Mean	2.12	5.13	4.27	3.84		0.46	0.93	1.02	0.80	

Table-19.2: Varietal Trial in Dinanath Grass: Green Forage Yield (q/ha/day) & Dry Matter Yield (q/ha/day)

Note- At Jorhat entry VDT-10-3 poorly germination.

	Crude ProteinYeild (q/ha)				Crude Protien (%)			
Entries	Ranchi	Jorhat	Average	Rank	Ranchi	Jorhat	Average	Rank
JHPP-1	7.5	7.6	7.6	2	8.3	8.8	8.6	5
BDN-11	3.7	4.2	4.0	6	7.4	9.6	8.5	6
BDN-15	4.4	8.1	6.3	3	8.8	10.2	9.5	1
BDN-5	6.0	4.5	5.3	4	8.3	8.3	8.3	7
BDN-3	4.6	3.6	4.1	5	8.8	8.9	8.8	4
Bundal Dinanath-1 (NC)	5.4	2.3	3.9	7	7.4	10.4	8.9	3
Bundel Dinanath-2 (NC)	7.9	8.6	8.3	1	7.9	10.8	9.3	2
Mean	5.7	5.6	5.6		8.1	9.6	8.9	

Table-19.3: Varietal Trial in Dinanath Grass: Crude Protien Yield (q/ha) & Crude Protien (%)

	Plant Hei	ght (cm)	Leaf Ste	m Ratio
Entries	Jorhat	Rank	Jorhat	Rank
JHPP-1	101.9	1	0.49	4
BDN-11	52.1	7	0.62	1
BDN-15	66.1	5	0.60	2
BDN-5	70.3	3	0.45	5
BDN-3	57.5	6	0.42	6
Bundal Dinanath-1 (NC)	69.9	4	0.41	7
Bundel Dinanath-2 (NC)	85.6	2	0.59	3
Mean	71.9		0.51	

Table-19.4: Varietal Trial in Dinanath Grass: Plant Height (cm) & Leaf Stem Ratio

Table-19.5: Varietal Trial in Dinanath Grass: NDF (%) & ADF (%)

	NDF	(%)	ADF (%)		
Entries	Ranchi	Rank	Ranchi	Rank	
JHPP-1	65.4	4	50.4	5	
BDN-11	63.8	3	51.2	7	
BDN-15	61.8	1	49.2	3	
BDN-5	67.0	7	48.4	1	
BDN-3	63.4	2	49.8	4	
Bundal Dinanath-1 (NC)	65.8	5	48.6	2	
Bundel Dinanath-2 (NC)	66.2	6	50.8	6	
Mean	64.8		49.8		

CHAPTER-2

FORAGE CROP PRODUCTION

The forage crop production programme was executed at 22 locations in five zones identified under this project. In total 13 experiments were conducted, out of which 8 in net work and 5 in location specific mode were undertaken with the aim to generate region specific forage production technology. The main emphasis of natural resource management under forage crops was to increase system productivity and resource use optimization in forage based system. The salient research achievement have been discussed in this chapter for the forage crop production programme during kharif 2010.

A. COORDINATED TRIALS

AST-1: Influence of resource conservation techniques on forage production and physio-chemical status of soil

AST-1.1: Effect of vegetative barrier and improved forage species on conservation of degraded grassland (Rainfed conditions) (Location: Hill Zone – Palampur and Rajouri)

AST-1.2 (a): Effect of different tillage practices on productivity of forage crop in the prevalent crop sequence (Irrigated conditions)

(Location: North West Zone - Ludhiana, Hisar and Pantnagar)

AST-1.2 (b): Conservation of rangelands by incorporating grass species in alleys of improved variety of Khejari (Prosopis cineraria) (Rainfed condition)

(Location: North West Zone - Bikaner and Jalore)

AST-1.3: Effect of planting methods and forage crop combinations on fodder productivity through moisture conservation

(Location: Central Zone - Rahuri, Jabalpur, Anand and Urulikanchan)

AST-1.4: Effect of moisture conservation practices on productivity of perennial grasses

(Location: North East Zone – Jorhat, Faizabad, Ranchi, Bhubaneswar and Kalyani)

AST-1.5 (a): Intensive forage production through silvipasture system under rainfed ecosystem

(Location: South Zone – Hyderabad, coimbatore and Mandya)

AST-1.5 (b) : Cassava based sustainable alley farming system for rainfed areas of the humid tropics

(Location: South Zone - Vellayani)

This experiment (AST-1) was initiated in kharif 2009 (Initial soil studies) and executed in kharif 2010 at 20 locations to study the effect of resource conservation technologies (RCT) on forage yield, physico-chemical properties of soil and economics of the system. Since, the experimental plan was executed in kharif 2010, hence, data of complete sequence/ system would be reported in Rabi 2011.

AST-2: Optimization of nitrogen for maize in different forage based cropping systems This experiment was allotted to Shillong and Imphal but could not conduct the trial.

AST-3: Optimization of nitrogen for sorghum in different cropping systems (Locations: Ludhiana and Pantnagar)

The experiment was conducted to find out the nitrogen requirement of sorghum in different cropping systems. This was the first year of the experiment and data has been reported in Tables 3 (a) to 3(e).

At Ludhiana, the significantly higher fodder yield (601.4 q/ha) of sorghum was recorded in berseem-sorghum system over rest of the cropping systems. The fodder yield of sorghum was lowest in wheat-bajra-sorghum and oats-bajra-sorghum cropping systems. Sorghum fodder equivalent yield was also highest (2431 q/ha) in berseem-sorghum cropping system followed by wheat-bajra-sorghum (2320.1 q/ha) and wheat-cowpea-sorghum (2138.1 q/ha) cropping systems. The net monetary returns were also highest in berseem-sorghum cropping system closely followed by wheat-cowpea-sorghum and oats-cowpea-sorghum cropping systems. In berseem-sorghum system the nitrogen uptake was highest (168.1 q/ha) as compared to other cropping systems. Application of increasing levels of nitrogen up to 125 % recommended dose to sorghum significantly increased the green fodder, dry matter and crude protein yields, sorghum fodder equivalent yield and net monetary returns as compared to lower levels.

At Pantnagar, the fodder yield of sorghum was not influenced by cropping systems but the highest fodder yield (611.6 q/ha) of sorghum was observed in oats-maize-sorghum cropping system closely followed by wheat-sorghum system. The crude protein yield and net monetary returns were also not influenced significantly by cropping systems. The nitrogen uptake was highest in oats-maize-sorghum system (185.5 q/ha) but was at par with rest of the treatments. Application of 125 % of recommended dose of nitrogen to sorghum significantly recorded the highest green fodder, dry matter and crude protein yields (642.2, 167.1 and 13.21 q/ha, respectively), net monetary returns (Rs. 25823/ha at par with 100 % RD of N), benefit cost ratio (2.02) and nitrogen uptake (211.4 kg/ha) over rest of the treatments.

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Treatment	Green fodder yield (q/ha)	Dry matter yield (q/ha)	Crude protein yield (q/ha)	Sorghum fodder equivalent yield (q/ha)
A. Cropping systems				
Wheat – fallow – sorghum	531.5	136.4	8.67	1689.5
Wheat – cowpea - sorghum	544.4	140.2	9.23	2138.1
Wheat – bajra - sorghum	507.6	130.8	8.02	2320.1
Berseem - sorghum	601.4	153.4	10.51	2431.1
Oat – cowpea - sorghum	553.5	141.7	9.39	1625.0
Oat - bajra - sorghum	521.5	134.2	8.34	1817.4
SEm <u>+</u>	12.4	4.44	0.19	49.1
CD at 5%	39.2	14.0	0.59	154.7
B. Nitrogen level (kg/ha)				
50%	416.2	107.4	5.81	1877.6
75%	526.4	135.4	8.33	1987.9
100%	592.6	151.8	10.52	2053.3
125%	637.9	163.4	11.44	2095.2
SEm <u>+</u>	6.9	2.35	0.12	33.1
CD at 5%	19.2	6.52	0.33	91.6
C. Interaction Cropping system X Nitrogen level				
SEm <u>+</u>	17.0	5.57	0.29	81.0
CD at 5%	47.0	15.4	0.80	224.3

Table-3 (a): Yield of sorghum as influenced by nitrogen levels and crop sequences at Ludhiana

Treatment	Plant height (cm)	Tillers/m row length	Crude protein (%)	Nitrogen content (%)	Nitrogen uptake (kg/ha)
A. Cropping systems					
Wheat – fallow – sorghum	147.3	20.8	6.23	1.00	138.7
Wheat – cowpea - sorghum	150.4	20.7	6.45	1.03	147.6
Wheat – bajra - sorghum	145.5	19.8	6.01	0.96	128.3
Berseem - sorghum	155.7	21.0	6.78	1.09	168.1
Oat – cowpea - sorghum	152.3	20.7	6.56	1.05	150.3
Oat - bajra - sorghum	145.9	20.1	6.12	0.98	133.4
SEm <u>+</u>	3.7	0.3			4.0
CD at 5%	11.6	0.9			12.6
B. Nitrogen level (kg/ha)					
50%	131.7	18.0	5.39	0.86	92.6
75%	145.0	19.7	6.12	0.98	133.3
100%	157.0	21.0	6.93	1.11	168.3
125%	166.3	21.7	7.00	1.12	183.0
SEm <u>+</u>	2.3	0.2			2.5
CD at 5%	6.4	0.6			7.0
C. Interaction Cropping system X Nitrogen level					
SEm <u>+</u>	5.6	0.5			6.2
CD at 5%	15.6	1.4			17.2

Table 3(b): Growth, nitrogen content and nitrogen uptake of sorghum as influenced by nitrogen levels and crop sequences at Ludhiana

AICRP on Forage Crops

Treatment	Cost of cultivation (Rs./ha)	Gross monetary return (Rs./ha)	Net monetary return (Rs./ha)	Benefit cost ratio
A. Cropping systems				
Wheat – fallow – sorghum	22240	67581	45342	2.03
Wheat – cowpea - sorghum	32305	85524	53219	1.64
Wheat – bajra - sorghum	31598	92806	61209	1.94
Berseem - sorghum	31064	97242	66178	2.12
Oat – cowpea - sorghum	30908	64998	34091	1.09
Oat - bajra - sorghum	30230	72694	42493	1.40
SEm <u>+</u>				
CD at 5%				
B. Nitrogen level (kg/ha)				
50%	29139	75104	45966	1.58
75%	29526	79517	49992	1.70
100%	29913	82132	52220	1.75
125%	30300	81976	53510	1.78
SEm <u>+</u>				
CD at 5%				
C. Interaction Cropping system X Nitrogen level				
SEm <u>+</u>				
CD at 5%				
CV%				

Table 3(c): Economics of sorghum as influenced by nitrogen levels and crop sequences at Ludhiana

Treatment	Green fodder yield (q/ha)	Dry matter yield (q/ha)	Crude protein yield (q/ha)	Plant height (cm)	Plant population / m row length
A. Cropping systems					
Sorghum – Wheat	605.1	157.3	11.46	348.5	11.3
Sorghum – Wheat – Maize	585.8	152.3	11.09	342.2	11.9
Sorghum – Wheat – Cowpea	597.6	155.4	11.27	347.6	11.3
Sorghum – Berseem	592.7	154.1	11.19	346.9	10.1
Sorghum – Oat – Maize	611.6	159.0	11.59	340.0	12.3
Sorghum – Oat – Cowpea	577.8	150.2	10.99	344.4	10.4
SEm <u>+</u>	11.4	3.0	0.23	4.9	0.7
CD at 5%	NS	NS	NS	NS	NS
B. Nitrogen level (kg/ha)					
50%	530.2	137.9	8.68	313.3	11.1
75%	588.9	153.1	10.87	341.1	11.3
100%	618.3	160.8	12.30	353.9	10.6
125%	642.9	167.1	13.21	371.4	11.9
SEm <u>+</u>	8.4	2.2	0.15	3.2	0.4
CD at 5%	24.0	6.3	0.43	9.2	NS
C. Interaction Cropping system X Nitrogen level					
SEm <u>+</u>					
CD at 5%	NS	NS	NS	NS	NS

Table-3 (d): Yield and growth of sorghum as influenced by nitrogen levels and crop sequences at Pantnagar

AICRP on Forage Crops

Treatment	Leaf stem ratio	Gross monetary return (Rs./ha)	Net monetary return (Rs./ha)	Benefit cost ratio	Nitrogen uptake (kg/ha)
A. Cropping systems					
Sorghum – Wheat	0.32	36305	23930	1.93	183.2
Sorghum – Wheat – Maize	0.33	35150	22775	1.83	177.5
Sorghum – Wheat – Cowpea	0.34	35855	23480	1.90	180.0
Sorghum – Berseem	0.32	35560	23185	1.87	179.0
Sorghum – Oat – Maize	0.34	36395	24340	1.97	185.5
Sorghum – Oat – Cowpea	0.34	34650	22290	1.80	175.8
SEm <u>+</u>	0.01	685.7	683.3	0.06	3.7
CD at 5%	NS	NS	NS	NS	NS
B. Nitrogen level (kg/ha)					
50%	0.27	31813	19813	1.65	138.8
75%	0.30	35337	23100	1.89	173.9
100%	0.39	37097	24397	1.97	196.9
125%	0.37	38573	25823	2.02	211.4
SEm <u>+</u>	0.016	503.1	503.5	0.04	2.4
CD at 5%	0.030	1442.9	1444.2	0.12	6.9
C. Interaction Cropping system X Nitrogen level					
SEm <u>+</u>					
CD at 5%	NS	NS	NS	NS	NS

Table-3 (e): Economics, nitrogen uptake and leaf stem ratio of sorghum as influenced by nitrogen levels and crop sequences at Pantnagar

AICRP on Forage Crops

AST-4: Forage production potential of multicut sorghum with forage legumes under varying seed rates of intercrop

(Locations: Ludhiana, Bikaner, Pantnagar and Palampur)

Different seed rates of forage legumes (cowpea, guar/rice-bean) were tested in sorghum to get higher fodder of good quality. The data of first year has been reported in Tables 4(a) to 4(h).

At Ludhiana, the fodder yield of sorghum with forage legumes (cowpea and guar) was significantly higher (265.7 to 330.2 q/ha) in the first cutting than the sole crop of sorghum (238.1 q/ha). In the first cutting, the fodder yield increased with increase in seed rate of forage legumes up to 75 %. Further increase in seed rate of forage legumes to 100 %, the fodder yield decreased. In second cutting, the fodder yield was highest in sorghum + 50 % cowpea (301.5 q/ha) followed by pure sorghum (296.2 q/ha) and decreased with increase in seed rate of legumes. The total yield of both the cuttings was not influenced significantly by forage legumes but was higher than pure sorghum (534.3 q/ha). The crude protein and IVDMD contents were higher in sorghum + guar than sorghum + cowpea. The crude protein was higher in first cutting than second cutting, the crude protein content ranged between 8.75 to 11.38 % and IVDMD ranged between 54.6 to 57.0 %. The lowest crude protein content (7.70 %) and IVDMD content (54.4 %) were observed in pure sorghum.

At Bikaner, the fodder yield of sorghum with forage legumes (cowpea and guar) was significantly higher (231.08 q/ha) than sole sorghum and the magnitude of increase was 25.2 %. The forage intercrops such as cowpea and guar were statistically at par. The fodder yield increased with increase in seed rate up to 75 % and decreased significantly with further increase in seed rate to 100 % (226.94 q/ha). In the first cutting, crude protein yield of sorghum with forage legumes was significantly higher (7.20 q/ha) over sorghum pure by a margin of 57.2 %. The crude protein yield of sorghum + guar was significantly higher (7.76 q/ha) over sorghum + cowpea. With increase in seed rate of forage legumes, the crude protein yield increased up to 75 % and decreased with increase in seed rate to 100%. In second cutting, the crude protein content was not influenced by seed rates of legumes and between legume crops.

At Pantnagar, the highest fodder yield (343.0 q/ha) was recorded with sole sorghum than sorghum with forage legumes (cowpea and rice-bean). The fodder yield increased with increase in seed rate of cowpea up to 100 % and of rice bean up to 75 %. The net monetary return was significantly higher with sole sorghum (Rs. 8060/ha) over rest of the treatments except sorghum + 100 % cowpea.
At Palampur, the fodder yield of sorghum with forage legumes (cowpea and ricebean) was significantly higher (403.0 to 524.0 q/ha) than the sole crop of sorghum (377.0 q/ha), cowpea (129.0 q/ha) and rice-bean (156.0 q/ha). The fodder yield increased with increase in seed rate of forage legumes up to 75 %. Further increase in seed rate of forage legumes to 100 %, the fodder yield decreased significantly. Whereas, the crude protein content of fodder increased with increase in seed rate of legumes to 100 % (15.9 % with cowpea and 16.0 % with rice-bean). In pure rice-bean the crude protein content was 19.5 % as compared to 17.9 % in pure cowpea. The net monetary returns (ranging between Rs. 34593 to 43693/ha) in sorghum with forage legumes were significantly higher than sorghum + 25 % rice-bean, sole sorghum (Rs. 30193/ha), sole cowpea (Rs. 4210/ha) and sole ricebean (Rs. 6910 q/ha). The land equivalent ratio was highest with sorghum + 75 % cowpea or rice-bean.

Treatment	Green fodder yield (q/ha)		(q/ha)	Dry matter yield (q/ha)			Plant hei	ght (cm)	Tillers/ len	/m row ath	Leaf stem ratio	
	1 st cut	2 nd cut	Total	1 st cut	2 nd cut	Total	1 st cut	2 nd cut	1 st cut	2 nd cut	1 st cut	2 nd cut
Sorghum + 25 %	272.1	291.5	563.6	47.6	67.0	113.6	143.6	191.8	16.0	10.0	0.75	1.50
cowpea												
Sorghum + 50 %	265.7	301.5	567.2	44.9	70.2	115.1	144.5	186.5	16.6	11.0	0.79	1.50
cowpea	004.0	004.0	500 4	40.0	05.0		1 1 0 0	100.0		0.0	0.07	1.10
Sorghum + 75 % cowpea	284.6	284.8	569.4	49.8	65.6	115.4	148.6	188.8	15.5	9.2	0.67	1.46
Sorghum + 100 %	280.3	286.8	567.1	49.1	66.8	115.9	149.7	185.9	16.2	11.0	0.72	1.50
cowpea												
Sorghum + 25 %	292.4	281.5	573.9	49.7	65.6	115.3	149.2	187.9	15.0	9.5	0.67	1.38
guar												
Sorghum + 50 %	305.7	266.8	567.5	55.0	61.4	116.4	151.0	186.0	15.5	10.2	0.72	1.38
guar												4
Sorghum + 75 %	330.2	250.1	580.3	54.4	58.3	112.7	152.7	182.5	14.8	8.5	0.62	1.27
guar	247.0	250.4	500.0	57.0	F7 F	4447	450.0	101 5	45 4	0.0	0.07	1.00
Sorgnum + 100 %	317.9	250.1	0.800	57.2	57.5	114.7	152.0	181.5	15.1	9.0	0.67	1.22
guar												
Sorghum pure	238.1	296.2	534.3	42.9	66.2	108.1	139.0	189.7	16.3	11.5	0.72	1.42
SEm <u>+</u>	10.26	11.64	21.83	1.70	2.46	4.03	7.95	9.44	0.76	0.45		
C D 5 %	30.7	34.9	NS	5.09	7.39	NS	NS	NS	NS	1.34		
CV %	6.18	7.23	6.68	5.87	6.64	6.11	9.32	8.76	8.43	7.72		

Table - 4(a): Yield and plant characteristics as influenced with forage legumes under varying seed rates of intercrop at Ludhiana

Treatment	Crude pro	otein (%)	Crude protei	n yield (q/ha)	IVDMD co	ontent (%)	IVDMD yi	eld (q/ha)
	1 st cut	2 nd cut						
Sorghum + 25 %	9.63	10.50	4.58	7.04	55.4	56.6	26.4	37.9
cowpea								
Sorghum + 50 %	9.90	9.98	4.45	7.01	56.0	55.8	25.1	39.2
cowpea								
Sorghum + 75 %	8.75	7.70	4.36	5.05	54.6	59.3	27.2	38.9
cowpea								
Sorghum + 100 %	9.45	8.23	4.64	5.49	55.5	54.2	26.6	36.2
cowpea								
Sorghum + 25 %	9.45	11.20	4.70	7.34	55.8	59.4	27.7	39.0
guar								
Sorghum + 50 %	10.50	10.68	5.78	6.56	56.8	57.0	31.2	34.9
guar								
Sorghum + 75 %	11.38	8.23	6.19	4.80	57.0	59.3	31.0	34.6
guar	44.00	0.00	0.54	5.05	F7 0	55.0	20.0	04.0
Sorgnum + 100 %	11.38	9.30	6.51	5.35	57.0	55.0	32.6	31.6
guar								
Sorghum pure	7.70	8.75	3.30	5.79	54.4	54.8	23.3	36.3
SEm <u>+</u>			0.19	0.26			1.13	1.44
C D 5 %			0.57	0.80			3.48	4.44
CV %			6.53	7.42			7.01	6.84

Table - 4(b): Crude protein and IVDMD as influenced with forage legumes under varying seed rates of intercrop at Ludhiana

Treatment	GFY (q/ha) at 1 st	cut	Sorghum GFY Equivalent	DMY (q/ha) at 1 st	cut	Yields of s (q/ha) at	sorghum 2 nd cut	Sorghum GFY Equivalent
	Sorghum	Legume	Total	I Cut	Sorghum	Legume	Total	GFY	DMY	Total
Sorghum Sole	184.58	0.00	184.58	184.58	46.37	0.00	46.37	111.75	27.55	296.32
Others	99.57	131.51	231.08	318.75	24.70	27.03	51.73	141.23	35.22	459.98
SEm <u>+</u>	3.33	0.00	4.60	6.32	1.11		1.64	4.49	1.50	9.29
CD (0.05)	9.98	0.00	13.78	18.94	3.34		NS	13.46	4.50	27.85
Legumes										
Guar	82.95	151.00	233.95	334.61	20.41	34.28	54.69	136.03	34.10	470.64
Cowpea	116.20	112.01	228.21	302.88	28.99	19.77	48.77	146.44	36.34	449.32
SEm. <u>+</u>	2.80	3.52	4.47	6.47	0.86	1.20	1.55	4.74	1.59	9.56
CD (0.05)	8.51	10.66	NS	19.62	2.60	3.64	4.71	NS	NS	NS
Seed Rate										
25%	129.17	92.64	221.81	283.56	31.08	18.62	49.71	124.60	31.39	408.16
50%	109.55	115.85	225.40	302.63	26.91	24.32	51.23	137.46	34.70	440.09
75%	90.60	159.55	250.16	356.52	23.32	32.38	55.70	148.33	37.24	504.86
100%	68.96	157.98	226.94	332.27	17.49	32.78	50.28	154.54	37.56	486.81
SEm. <u>+</u>	3.97	4.97	6.33	9.15	1.21	1.70	2.20	6.70	2.25	13.53
CD (0.05)	12.03	15.08	19.19	27.74	3.67	5.15	NS	20.33	NS	41.02
CV (%)	10.58	9.76	7.05	7.20	14.24	16.21	11.12	11.27	15.13	7.28

Table- 4(c): Yield of multicut sorghum with forage legumes under varying seed rate of intercrop (legume) at Bikaner

Treatment	CP % Sorghum I CUT	CP % Legume I CUT	Total (sorghum + legume) CP yield (q/ha) I CUT	CP % Sorghum II CUT	Crude protein yield (q/ha) Total
Sorghum Sole	9.85	0.00	4.58	10.32	7.42
Others	10.31	17.46	7.20	11.09	11.11
SEm <u>+</u>	0.14		0.25	0.15	0.36
CD (0.05)	NS		0.75	0.44	1.06
Legumes					
Guar	10.26	16.51	7.76	11.09	11.55
Cowpea	10.36	18.41	6.64	11.10	10.68
SEm <u>+</u>	0.15	0.17	0.26	0.16	0.37
CD (0.05)	NS	0.51	0.78	NS	NS
Seed Rate					
25%	10.41	17.48	6.46	10.94	9.89
50%	10.11	17.42	6.87	11.17	10.74
75%	10.28	17.73	8.08	10.99	12.16
100%	10.44	17.21	7.40	11.28	11.66
SEm. <u>+</u>	0.21	0.24	0.36	0.22	0.53
CD (0.05)	NS	NS	1.10	NS	1.60
CV (%)	4.77	3.60	12.61	4.62	11.50

 Table- 4(d): Crude protein yield and content of multicut sorghum with forage legumes under varying seed rate of intercrop (legume) at Bikaner

Treatment	Green fodder yield (q/ha)	Dry matter yield (q/ha)	Crude protein yield (q/ha)	Gross monetary return (Rs./ha)	Net monetary return (Rs./ha)	Benefit cost ratio
Sole Sorghum	343.0	93.2	7.27	20560	8060	0.65
Cowpea S ₁ 25%	287.0	65.7	8.28	17240	5740	0.50
S ₂ 50%	282.0	63.5	7.18	16900	5400	0.47
S ₃ 75%	292.0	66.2	7.95	17520	6020	0.52
S ₄ 100%	316.0	73.4	8.60	18940	7440	0.65
Rice bean S_1 25%	244.0	55.2	6.83	14640	3140	0.27
S ₂ 50%	293.0	69.7	8.51	17540	6040	0.53
S ₃ 75%	309.0	70.4	8.59	18540	7040	0.61
S ₄ 100%	241.0	59.6	7.13	16440	4940	0.43
SEm±	13.1	2.95	0.50	787.1	787.1	0.07
CD at 5%	39.3	8.85	1.49	2359.6	2359.6	0.21

Table - 4(e): Yield and economics as influenced with forage legumes under varying seed rates of intercrop at Pantnagar

Treatment	Total green	Total dry matter	Crude protein	Crude protein	Net monetary	Benefit cost	Land
	todder yield	yield (q/ha)	yield (q/ha)	(%)	return (Rs./ha)	ratio	equivalent
	(q/ha)						ratio
Sorghum + 100%	453.00	101.47	16.16	15.9	36293.0	4.03	1.65
Cowpea							
Sorghum + 75%	481.00	99.95	14.71	14.7	39393.0	4.52	1.77
Cowpea							
Sorghum + 50%	429.00	91.81	11.76	12.8	34493.0	4.10	1.42
Cowpea							
Sorghum + 25%	403.00	91.19	9.96	10.9	32193.0	3.97	1.12
Cowpea							
Sorghum + 100%	468.00	96.42	15.46	16.0	37793.0	4.20	1.67
Rice bean							
Sorghum + 75%	524.00	110.35	15.24	13.8	43693.0	5.02	1.87
Rice bean							
Sorghum + 50%	430.00	95.23	10.28	10.8	34593.0	4.11	1.39
Rice bean							
Sorghum + 25%	409.00	88.18	9.28	10.5	32793.0	4.05	1.23
Rice bean							
Sole Sorghum	377.0	87.98	8.08	9.2	30193.0	4.02	
Solo Cowpoo	120.00	20.64	2 70	17.0	1210.0	0.49	
Sole Cowpea	129.00	20.04	3.70	17.9	4210.0	0.40	
Sole Ricebean	156.00	20.64	4.04	19.5	6910.0	0.80	
SEm <u>+</u>	8.66	1.81	0.33	0.34	865.0	0.10	0.03
CD at 5%	25.54	5.36	0.99	1.10	2553.0	0.30	0.09
0.101		4.00					. = .
CV%	5.96	4.83	5.41	4.26	4.96	4.97	3.70

Table - 4(f): Yield and economics as influenced with forage legumes under varying seed rates of intercrop at Palampur

Treatment		Sorgum											
	Plant hei	ght (cm)	Shoot nu	mber/m	Green	fodder yiel	d (q/ha)	Dry n	natter yield	(q/ha)			
	1 st cut	2 nd cut	1 st cut	2 nd cut	1 st cut	2 nd cut	Total	1 st cut	2 nd cut	Total			
Sorghum + 100%	131.5	125.9	32.7	27.7	202.24	164.76	367.00	46.52	41.19	87.71			
Sorghum + 75% Cowpea	156.3	113.5	33.0	28.0	214.40	171.60	386.00	45.02	39.64	84.66			
Sorghum + 50% Cowpea	137.9	113.5	36.7	31.7	207.40	167.60	375.00	45.63	37.54	83.17			
Sorghum + 25% Cowpea	129.3	118.5	40.0	33.3	197.90	183.10	381.00	43.54	44.13	87.67			
Sorghum + 100% Rice bean	165.2	125.3	30.3	25.3	186.80	169.20	356.00	39.41	39.09	78.50			
Sorghum + 75% Rice bean	135.1	120.9	32.3	27.3	223.10	172.90	396.00	51.31	38.56	89.87			
Sorghum + 50%	152.1	118.0	32.7	27.7	219.40	145.60	365.00	52.66	32.18	84.83			
Sorghum + 25% Rice bean	153.9	116.2	33.3	28.7	212.60	158.40	371.00	46.77	35.32	82.10			
Sole Sorghum	145.9	120.5	38.0	29.3	223.00	154.00	377.00	51.02	36.96	87.98			
SEm <u>+</u>	6.8	4.49	1.80	1.47	6.63	4.49	8.36	1.51	1.04	1.82			
CD at 5%	20.6	NS	5.3	4.4	19.88	13.46	NS	4.53	3.12	5.50			
CV%	8.19	6.54	8.92	8.88	7.48	8.71	3.71	5.60	5.71	5.73			

Table – 4(g): Yield and plant characteristics as influenced with forage legumes under varying seed rates of intercrop at Palampur

Treatment		Cow	pea			Rice b	ean	
	Green fodder yield (q/ha)	Dry matter yield (q/ha)	Plant height (cm)	Plant number/m	Green fodder yield (q/ha)	Dry matter yield (q/ha)	Plant height (cm)	Plant number/m
T ₁	86.00	13.76	62.7	11.0	112.00	17.92	72.2	13.7
T ₂	95.00	15.28	63.2	8.7	128.00	20.48	73.0	11.0
T ₃	54.00	8.64	64.0	7.3	65.00	10.40	75.5	8.3
T ₄	22.00	3.52	64.2	6.0	38.00	6.08	73.5	7.0
T ₅	129.00	20.64	69.8	11.7	156.00	20.64	76.5	14.3
Sem <u>+</u>	5.45	0.88	1.02	0.31	4.12	0.98	0.48	0.49
CD at 5%	17.8	2.87	3.2	1.2	13.45	3.19	1.6	1.6
CV%	12.23	12.36	2.9	7.96	7.96	11.24	2.4	7.88

Table – 4(h): Yield and plant characteristics as influenced with forage legumes under varying seed rates of intercrop at Palampur

AST-5: Performance of forage crops raised through waste water under varied nutrient levels

(Location: Coimbatore and Hyderabad)

A new field experiment was started in kharif 2010 at two locations (Coimbatore and Hyderabad) to access the production, quality and economics of various forage crops raised through waste water under varied nutrient level. Twenty treatments consisted of combinations of forage crops (4) and nutrient levels (5) laid out in split plot design. Due to late planting at Hyderabad, data of the experiment of both the locations will be reported in Rabi 2011.

AST-6: Effect of tillage and nutrient management on productivity of rice – oat cropping system

(Location: Bhubaneswar, Ranchi, Kalyani, Jorhat and Raipur)

A field experiment was initiated in kharif 2010 at 5 locations to study the effect of tillage and nutrient management in oats on the productivity of rice – oat cropping system. Since, 2010 was considered as establishment year, hence, data of complete sequence/ system (Rice – Oat) would be reported in Rabi 2011.

B. LOCATION-SPECIFIC TRIALS

AST-7: Remunerative forage based cropping system for sustained productivity under irrigated conditions

(Location: Mandya)

The experiment was conducted in fifth year (kharif 2010) at Mandya at fixed site to find out the most remunerative forage based cropping system for the region. The results of complete sequence will be reported in Rabi 2011.

AST-8: Effect of soil amendments on productivity of rice-berseem and changes in soil properties of sodic soil

(Location: Faizabad)

This was the second year of experimentation at Faizabad to study the effect of soil amendments on productivity of rice-berseem and changes in soil properties of sodic soil. The results of complete sequence will be reported in Rabi 2011.

AST-9: Effect of soil amendments on productivity of rice-based cropping systems in acidic soil

(Location: Shillong)

A field experiment was started in Rabi 2010 (Originally initiated in Rabi 2009 but failed due to some reason) at Shillong (Meghalaya) to study the effect of soil amendments of rice based cropping systems in acidic soil. The data of complete sequence along with soil fertility will be reported in Rabi 2011.

AST-10: Banana based fodder intercropping in the homesteads of Kerala

(Location: Vellayani)

A new field experiment was started in kharif 2010 at Vellayani (Kerala) to evaluate the production potential, quality and economics of fodder crops in banana based production system. The data of the experiment will be reported in Rabi 2011.

AST-11: Chemical control of Acrachne racemosa weeds in sorghum fodder

(Location: Ludhiana)

A field experiment was conducted to evaluate the herbicides for the control of Acrachne racemosa weed in sorghum fodder. This was the first year of experimentation and data has been given in Tables 11 (a) and 11 (b). Acrachne racemosa weed was effectively controlled with all the herbicide treatments. The population of Acrachne racemosa weed in sorghum fodder was 3 to 33 weeds/m² in herbicide treatments as compared to 47 weeds/m² in control (weedy check). The dry weight of weeds decreased significantly with herbicides (0.25 to 1.40 g/ha) than 2.0 g/ha in control. Among herbicides, the combination of atrazine + stomp/treflan/lasso were highly effective than the application of single herbicide in controlling weeds in forage sorghum. The highest fodder yield (663.3 g/ha) was obtained with preemergence application of atrazine 0.75 kg/ha + stomp 2.5 l/ha which was significantly higher over rest of the treatments but was at par with atrazine 1.0 kg/ha + stomp 2.5 l/ha (613.8 q/ha). The combination of atrazine 0.75 or 1.0 kg/ha + lasso 2.5 l/ha herbicides had toxic effect on the crop. The crude protein content increased with the application of herbicides (5.10 to 6.48 %) as compared to 5.08 % in control. The highest crude protein yield (7.49 g/ha) was recorded with pre-emergence application of atrazine 0.75 kg/ha + stomp 2.5 l/ha and lowest crude protein yield (4.91 q/ha) was obtained in control.

Treatments	Green fodder (q/ha)	Dry matter (q/ha)	Plant height (cm)	Tillers/ m	Leaf stem ratio
Control	460.4	96.6	233.3	8.5	0.79
Atrazine 1kg/ha PE	572.6	110.0	259.8	10.1	0.85
Stomp 2.5 l/ha PE	516.4	115.1	235.6	9.1	0.72
Treflan 2.5 l/ha PE	548.2	49.1	250.6	10.0	0.67
Lasso 2.5 l/ha PE	228.8	139.3	215.2	5.3	0.67
Atrazine 0.75 + Stomp 2.5 l/ha PE	663.3	122.3	273.3	11.8	0.61
Atrazine 0.75 + Treflan 2.5 l/ha PE	623.2	60.5	272.6	10.1	0.61
Atrazine 0.75 + Lasso 2.5 l/ha PE	288.4	128.8	224.0	6.0	0.79
Atrazine 1.0 + Stomp 2.5 I/ha PE	613.8	109.1	267.5	10.1	0.67
Atrazine 1.0 + Treflan 2.5 l/ha PE	515.5	65.8	235.6	9.1	0.72
Atrazine 1.0 + Lasso 2.5 I/ha PE	313.6	112.9	233.3	7.0	0.67
Hand weeding	530.5	121.9	248.6	9.8	0.72
S Em <u>+</u>	23.9	4.82	13.01	0.27	
CD 5 %	69.9	14.1	38.1	0.80	
CV %	8.46	8.13	9.17	5.33	

Table 11(a): Effect of herbicides on the fodder yield and plant characteristics of sorghum at Ludhiana

Treatments	Weed intensity/ m ² (no)	Weeds dry wt. (q/ha)	WCE (%)	CP content (%)	CP yield (q/ha)
Control	47	2.00		5.08	4.91
Atrazine 1kg/ha PE	33	0.95	52.5	5.25	5.71
Stomp 2.5 l/ha PE	8	0.60	70.0	5.48	6.31
Treflan 2.5 l/ha PE	8	0.55	72.5	5.43	2.66
Lasso 2.5 l/ha PE	24	1.40	30.0	5.10	7.10
Atrazine 0.75 + Stomp 2.5 l/ha PE	3	0.30	85.0	6.13	7.49
Atrazine 0.75 + Treflan 2.5 l/ha PE	8	0.75	62.5	5.78	3.49
Atrazine 0.75 + Lasso 2.5 l/ha PE	14	0.45	77.5	5.60	7.21
Atrazine 1.0 + Stomp 2.5 l/ha PE	3	0.25	87.5	6.48	7.07
Atrazine 1.0 + Treflan 2.5 l/ha PE	8	0.25	87.5	6.48	4.26
Atrazine 1.0 + Lasso 2.5 l/ha PE	11	1.20	40.0	5.43	6.13
Hand weeding- 30 DAS		0.35	82.5	6.83	8.33
S Em <u>+</u>		0.04			0.34
CD 5 %		0.13			1.00
CV %		9.53			10.04

Table 11(b): Effect of herbicides on the Weed intensity, dry weight (30 days after sowing) and crude protein in sorghum at Ludhiana

C. AVT BASED TRIALS

AST-12: Effect of nitrogen levels on forage yield of promising entries of <u>Setaria</u> grass (Location: Palampur)

An AVT based experiment was conducted at palampur during kharif 2010 to study the effect of nitrogen levels on forage yield of promising entries of Setaria grass. Sixteen treatments consisted of four number of entries and four levels of nitrogen laid out in RBD design. The data of complete experiment will be reported in annual report of Rabi 2011.

AST-13: Effect of nitrogen levels on forage yield of promosing entries of pearlmillet under rainfed conditions(AVT 2)

(Locations: Ludhiana, Hisar, Bikaner, Rahuri, Faizabad, Bhubaneswar, Hyderabad and Anand)

A field trial was conducted to find out the response of promising AVT-2 entries of pearl millet (single cut grown for fodder) with supplementation of graded doses of nitrogen. The study was undertaken at 9 locations with 7 entries (including 2 national checks) and 4 N levels (0, 30, 60 and 90 kg N/ha). The data presented in Tables 13 (a) to 13 (f-2) revealed that none of the entries surpassed the national check Giant Bajra in green fodder (340.2 q/ha), dry matter yield 66.3 q/ha), crude protein content (8.57 %) and crude protein yield (5.97 q/ha). The green fodder yield of Giant Bajra ranged between 85.4 to 523.3 q/ha in different regions. Normally Central and Western regions produced higher yield of pearl millet than Eastern and Southern zone (except at Coimbatore). This national check was superior at Hisar, Rahuri, Hyderabad, Bikaner and Anand. Whereas, at Ludhiana, Coimbatore, Hyderabad, Bikaner, Faizabad, Bhubaneshwar the highest fodder yield was obtained with entry JHPM-08-1. The influence of N was linear up to the highest tested rate of application (90 kgN/ha). Magnitude of increase was 66.3, 33.4 and 17.1 % over control, 30 and 60 kg N/ha, respectively.

	Green fodder yield (q/ha)										
Treatment	Ludhiana	Hisar	Rahuri	Anand	Coimbatore	Hyderabad	Bikaner	Faizabad	Bhuba-	Mean	
									swar		
A. Entry											
JHPM – 08 – 1	401.5	408.2	507.43	373.0	563.87	89.54	176.17	248.29	254.59	335.84	
NDFB – 13	326.8	293.3	431.75	379.0	442.95	96.48	148.96	264.49	227.42	290.13	
NDFB – 11	214.1	248.7	341.35	237.0	427.07	90.24	160.32	218.19	217.79	239.41	
AFB – 4	296.8	279.7	382.02	307.0	391.65	99.96	125.15	210.67	180.52	252.60	
AFB – 3	363.6	300.5	395.06	347.0	459.71	104.81	193.40	194.46	224.30	286.98	
Raj Bajra Chari – 2	307.2	230.9	374.11	264.0	471.51	91.63	165.83	200.25	206.58	256.89	
Giant Bajra	346.1	434.9	523.31	473.0	556.92	85.38	182.36	237.29	222.21	340.16	
SEm <u>+</u>	7.85	16.13	13.80	8.02	14.5	4.26	4.57	7.44	14.91		
CD at 5%	24.20	45.87	39.12	22.75	41.08	12.08	12.96	20.61	41.32		
B. Nitrogen levels											
(kg/ha)											
0	232.1	244.8	362.53	233.0	422.6	57.52	68.35	148.82	161.51	214.58	
30	295.5	298.5	418.25	341.0	459.51	87.27	118.87	210.34	179.08	267.59	
60	350.5	335.6	445.95	375.0	486.44	99.56	186.08	251.35	213.77	304.91	
90	411.0	376.0	461.84	411.0	524.98	131.69	285.10	288.72	321.88	356.91	
SEm <u>+</u>	5.28	12.20	10.43	6.06	10.95	4.55	3.45	5.62	11.27		
CD at 5%	14.60	34.67	29.57	17.20	31.06	9.13	9.79	15.58	31.23		
C. Interaction											
Entry X Nitrogen											
level											
SEm <u>+</u>	13.97		27.60	16.04	28.98	8.53	9.14	14.87	9.94		
CD at 5%	38.7		NS	45.51	NS	NS	25.91	NS	27.54		
CV%	7.72		11.32	8.17	9.98		9.62	11.46	7.86		

AST-13 (a): Effect of nitrogen levels on green fodder yield of promising entries of pearl millet under rainfed conditions (AVT 2)

		Green fodo	ler yield (q/ha)		Mean
Entries/ Nitrogen levels	0	30	60	90	
JHPM – 08 – 1	298.2	366.5	416.4	524.7	401.5
NDFB – 13	224.9	327.4	360.7	394.0	326.8
NDFB – 11	158.3	188.3	213.2	296.5	214.1
AFB – 4	216.6	271.6	321.5	377.3	296.8
AFB – 3	266.6	332.2	416.5	438.2	363.6
Raj Bajra Chari – 2	246.6	274.9	335.7	371.5	307.2
Giant Bajra	213.2	306.5	389.8	474.8	346.1
Mean	232.1	295.5	350.5	411.0	
	Entry	N levels	Entry X N levels		
SEm <u>+</u>	7.85	5.28	13.97		
CD at 5%	24.20	14.60	38.7		
CV%			7.72		

AST-13 (a-1): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on green fodder yield at Ludhiana

AST-13 (a-2): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on green fodder yield at Anand

Entries/ Nitrogen levels		Green fodder yield (q/ha)						
	0	30	60	90				
JHPM – 08 – 1	286.0	336.0	417.0	454.0	373.0			
NDFB – 13	215.0	411.0	422.0	468.0	379.0			
NDFB – 11	146.0	261.0	264.0	278.0	237.0			
AFB – 4	236.0	310.0	326.0	356.0	307.0			
AFB – 3	278.0	340.0	371.0	400.0	347.0			
Raj Bajra Chari – 2	171.0	275.0	283.0	328.0	264.0			
Giant Bajra	299.0	454.0	544.0	593.0	473.0			
Mean	233.0	341.0	375.0	411.0				
	Entry	N levels	Entry X N levels					
SEm <u>+</u>	8.02	6.06	16.04					
CD at 5%	22.75	17.20	45.51					
CV%			8.17					

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		Green fodder yield (q/ha)						
Entries/ Nitrogen levels	0	30	60	90				
JHPM – 08 – 1	69.64	128.42	189.28	317.33	176.17			
NDFB – 13	71.14	116.72	186.53	221.44	148.96			
NDFB – 11	71.17	122.81	181.50	265.81	160.32			
AFB – 4	66.44	100.44	136.92	196.81	125.15			
AFB – 3	67.28	129.53	209.06	367.75	193.40			
Raj Bajra Chari – 2	74.03	133.17	201.39	254.72	165.83			
Giant Bajra	58.78	101.00	197.86	371.81	182.36			
Mean	68.35	118.87	186.08	285.10				
	Entry	N levels	Entry X N levels					
SEm <u>+</u>	4.57	3.45	9.14					
CD at 5%	12.96	9.79	25.91					
CV%			9.62					

AST-13 (a-3): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on green fodder yield at Bikaner

AST-13 (a-4): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on green fodder yield at Bhubaneswar

		Green fodder yield (q/ha)						
Entries/ Nitrogen levels	0	30	60	90				
JHPM – 08 – 1	170.89	179.22	285.51	382.73	254.59			
NDFB – 13	159.43	197.98	222.99	329.27	227.42			
NDFB – 11	206.32	201.11	210.48	253.21	217.79			
AFB – 4	127.12	137.54	152.13	305.31	180.52			
AFB – 3	164.64	179.22	201.11	352.20	224.30			
Raj Bajra Chari – 2	135.46	187.56	232.37	270.92	206.58			
Giant Bajra	166.72	170.89	191.73	359.49	222.21			
Mean	161.51	179.08	213.77	321.88				
	Entry	N levels	Entry X N levels					
SEm <u>+</u>	14.91	11.27	9.94					
CD at 5%	41.32	31.23	27.54					
CV%			7.86					

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	Dry matter yield (q/ha)									
Treatment	Ludhiana	Hisar	Rahuri	Anand	Coimbatore	Hyderabad	Bikaner	Faizabad	Bhuba-	Mean
									swar	
A. Entry										
JHPM – 08 – 1	85.9	118.1	99.40	48.6	84.50	17.30	38.73	45.53	54.84	65.87
NDFB – 13	66.6	85.0	73.31	54.6	66.35	19.76	32.37	49.11	48.63	55.08
NDFB – 11	39.6	72.1	52.99	36.3	62.48	18.53	36.62	39.71	44.88	44.80
AFB – 4	62.7	81.0	70.98	60.3	58.57	21.60	28.45	38.89	37.20	51.07
AFB – 3	72.7	87.2	72.65	53.7	68.06	21.47	44.31	35.33	46.28	55.74
Raj Bajra Chari – 2	68.6	67.1	65.73	57.6	73.16	18.53	38.39	37.02	42.20	52.03
Giant Bajra	69.3	126.1	100.44	67.8	83.34	18.44	37.74	44.24	49.60	66.33
SEm <u>+</u>	1.58	4.67	4.06	1.36	2.38	0.98	1.48	1.41	3.08	
CD at 5%	4.88	13.27	11.51	3.86	6.73	2.77	4.18	3.92	8.56	
B. Nitrogen levels										
(kg/ha)										
0	49.6	71.1	61.20	35.3	63.43	11.62	18.82	27.70	34.25	41.44
30	61.7	86.5	73.81	56.7	69.32	17.99	29.73	38.71	37.69	52.46
60	72.0	97.3	82.38	38.8	71.88	20.82	42.13	46.47	45.32	57.45
90	82.6	108.9	88.61	65.7	79.06	27.09	55.97	52.73	67.68	69.81
SEm <u>+</u>	1.25	3.53	3.07	1.03	1.80	0.74	1.12	1.07	2.33	
CD at 5%	3.47	10.03	8.70	2.93	5.09	2.09	3.16	2.96	6.47	
C. Interaction										
Entry X Nitrogen										
level										
SEm <u>+</u>	2.96		8.12	2.72	4.75	1.96	2.95	2.82	2.05	
CD at 5%	8.20		NS	7.73	NS	NS	8.37	NS	5.70	
CV%	7.2		18.38	8.73	10.28		13.94	11.82	7.71	

Table-13 (b): Effect of nitrogen levels on dry matter yield of promising entries of pearl millet under rainfed conditions (AVT 2)

		Dry matter yield (q/ha)						
Entries/ Nitrogen levels	0	30	60	90				
JHPM – 08 – 1	66.2	79.5	89.5	108.6	85.9			
NDFB – 13	48.4	67.8	72.9	77.6	66.6			
NDFB – 11	29.6	35.2	39.9	54.0	39.6			
AFB – 4	47.6	57.6	67.5	78.1	62.7			
AFB – 3	54.7	66.6	83.3	86.3	72.7			
Raj Bajra Chari – 2	57.2	62.4	74.5	80.6	68.6			
Giant Bajra	44.1	62.8	76.8	93.5	69.3			
Mean	49.6	61.7	72.0	82.6				
	Entry	N levels	Entry X N levels					
SEm <u>+</u>	1.58	1.25	2.96					
CD at 5%	4.88	3.47	8.20					
CV%			7.2					

AST-13 (b-1): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on dry matter yield at Ludhiana

AST-13 (b-2): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on dry matter yield at Anand

Entries/ Nitrogen levels		Dry matter yield (q/ha)						
-	0	30	60	90				
JHPM – 08 – 1	34.3	46.3	54.2	59.5	48.6			
NDFB – 13	29.1	60.8	59.1	69.3	54.6			
NDFB – 11	22.8	44.1	38.8	39.4	36.3			
AFB – 4	44.9	64.4	61.4	70.4	60.3			
AFB – 3	45.8	50.0	57.5	61.4	53.7			
Raj Bajra Chari – 2	32.3	63.3	62.1	72.8	57.6			
Giant Bajra	37.9	68.1	78.4	86.6	67.8			
Mean	35.3	56.7	38.8	65.7				
	Entry	N levels	Entry X N levels					
SEm <u>+</u>	1.36	1.03	2.72					
CD at 5%	3.86	2.93	7.73					
CV%			8.73					

		Dry matter yield (q/ha)						
Entries/ Nitrogen levels	0	30	60	90				
JHPM – 08 – 1	19.00	31.08	42.20	62.64	38.73			
NDFB – 13	18.81	28.35	41.73	40.61	32.37			
NDFB – 11	18.86	30.19	43.15	54.29	36.62			
AFB – 4	18.85	25.48	31.49	37.99	28.45			
AFB – 3	19.28	33.57	49.49	74.92	44.31			
Raj Bajra Chari – 2	21.28	34.59	45.89	51.82	38.39			
Giant Bajra	15.64	24.83	40.94	69.56	37.74			
Mean	18.82	29.73	42.13	55.97				
	Entry	N levels	Entry X N levels					
SEm <u>+</u>	1.48	1.12	2.95					
CD at 5%	4.18	3.16	8.37					
CV%			13.94					

AST-13 (b-3): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on dry matter yield at Bikaner

AST-13 (b-4): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on dry matter yield at Bhubaneswar

Entries/ Nitrogen levels		Dry matter yield (q/ha)					
_	0	30	60	90			
JHPM – 08 – 1	36.99	38.17	61.41	82.80	54.84		
NDFB – 13	34.46	42.03	48.21	69.85	48.63		
NDFB – 11	42.24	41.58	43.83	51.84	44.88		
AFB – 4	26.64	28.31	31.33	62.55	37.20		
AFB – 3	34.32	37.16	41.78	71.83	46.28		
Raj Bajra Chari – 2	27.79	38.24	47.62	55.12	42.20		
Giant Bajra	37.37	38.28	43.07	79.71	49.60		
Mean	34.25	37.69	45.32	67.68			
	Entry	N levels	Entry X N levels				
SEm <u>+</u>	3.08	2.33	2.05				
CD at 5%	8.56	6.47	5.70				
CV%			7.71				

	Crude protein yield (q/ha)									
Treatment	Ludhiana	Hisar	Rahuri	Anand	Coimbatore	Hyderabad	Bikaner	Faizabad	Bhuba-	Mean
									neswar	
A. Entry										
JHPM – 08 – 1	6.11	11.50	7.94	4.13	6.96	1.05	4.14	3.67	4.38	5.54
NDFB – 13	4.40	10.56	6.09	3.83	5.00	0.99	3.86	4.05	4.00	4.75
NDFB – 11	3.03	6.75	4.41	3.64	5.18	0.75	3.60	3.22	3.59	3.79
AFB – 4	4.65	8.71	5.68	5.09	4.64	1.09	2.64	3.13	3.04	4.29
AFB – 3	4.86	9.86	6.06	4.23	5.49	1.33	5.23	2.78	3.71	4.83
Raj Bajra Chari – 2	5.48	8.07	5.50	5.13	6.19	1.06	3.80	2.91	3.41	4.61
Giant Bajra	4.90	15.11	8.17	5.66	7.00	1.20	4.10	3.62	4.03	5.97
SEm <u>+</u>	0.10		0.36	0.12	0.21	0.07	0.17	0.12	0.28	
CD at 5%	0.30		1.00	0.33	0.59	0.19	0.48	0.33	0.77	
B. Nitrogen levels										
(kg/ha)										
0	3.08	7.43	4.39	2.82	4.92	0.61	1.80	1.95	2.49	3.27
30	4.17	9.86	5.90	4.91	5.54	1.05	3.03	3.00	3.00	4.49
60	5.28	10.99	6.87	4.89	5.96	1.18	4.48	3.84	3.71	5.24
90	6.57	13.08	7.90	5.50	6.71	1.42	6.33	4.57	5.77	6.42
SEm <u>+</u>	0.07		0.27	0.09	0.16	0.05	0.13	0.09	0.21	
CD at 5%	0.19		0.76	0.25	0.44	0.15	0.36	0.25	0.58	
C. Interaction										
Entry X Nitrogen										
level										
SEm <u>+</u>	0.19		0.71	0.23	0.42	0.14	0.34	0.23	0.18	
CD at 5%	0.53		NS	0.60	NS	0.39	0.96	NS	0.51	
CV%	6.93		19.67	8.93	9.80		15.02	12.17	8.67	

Table-13(c): Effect of nitrogen levels on crude protein yield of promising entries of pearl millet under rainfed conditions (AVT 2)

		Crude protein yield (q/ha)						
Entries/ Nitrogen levels	0	30	60	90				
JHPM – 08 – 1	3.97	5.41	6.62	8.47	6.11			
NDFB – 13	2.71	4.20	4.96	5.74	4.40			
NDFB – 11	2.01	2.60	3.11	4.43	3.03			
AFB – 4	3.14	4.03	5.19	6.25	4.65			
AFB – 3	3.11	4.13	5.50	6.72	4.86			
Raj Bajra Chari – 2	4.00	4.74	6.11	7.09	5.48			
Giant Bajra	2.64	4.14	5.53	7.29	4.90			
Mean	3.08	4.17	5.28	6.57				
	Entry	N levels	Entry X N levels					
SEm <u>+</u>	0.10	0.07	0.19					
CD at 5%	0.30	0.19	0.53					
CV%			6.93					

AST-13 (c-1): Interaction effect of nitrogen levels and AVT-2 entries of pearl millet on crude protein yield at Ludhiana

AST-13 (c-2): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on crude protein yield at Anand

			Mean		
Entries/ Nitrogen levels	0	30	60	90	
JHPM – 08 – 1	3.07	3.81	4.66	5.00	4.13
NDFB – 13	1.83	5.06	4.45	3.98	3.83
NDFB – 11	2.55	4.67	3.09	4.24	3.64
AFB – 4	3.02	5.75	4.94	6.65	5.09
AFB – 3	3.17	4.20	4.43	5.12	4.23
Raj Bajra Chari – 2	3.14	4.93	4.46	5.99	5.13
Giant Bajra	2.95	5.96	6.24	7.50	5.66
Mean	2.82	4.91	4.89	5.50	
	Entry	N levels	Entry X N levels		7
SEm <u>+</u>	0.12	0.09	0.23		
CD at 5%	0.33	0.25	0.60		
CV%			8.93		

		Crude protein yield (q/ha)						
Entries/ Nitrogen levels	0	30	60	90				
JHPM – 08 – 1	1.74	2.99	4.59	7.22	4.14			
NDFB – 13	2.09	3.27	5.02	5.06	3.86			
NDFB – 11	1.64	2.79	4.19	5.78	3.60			
AFB – 4	1.56	2.28	2.89	3.81	2.64			
AFB – 3	2.01	3.88	5.80	9.22	5.23			
Raj Bajra Chari – 2	1.94	3.37	4.50	5.40	3.80			
Giant Bajra	1.60	2.59	4.40	7.80	4.10			
Mean	1.80	3.03	4.48	6.33				
	Entry	N levels	Entry X N levels					
SEm <u>+</u>	0.17	0.13	0.34					
CD at 5%	0.48	0.36	0.96					
CV%			15.02					

AST-13 (c-3): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on crude protein yield at Bikaner

AST-13 (c-4): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on crude protein yield at Bhubaneswar

		Crude prot	ein yield (q/ha)		Mean
Entries/ Nitrogen levels	0	30	60	90	
JHPM – 08 – 1	2.761	2.938	4.859	6.954	4.38
NDFB – 13	2.452	3.300	3.932	6.040	4.00
NDFB – 11	3.116	3.255	3.671	4.279	3.59
AFB – 4	1.910	2.233	2.602	5.418	3.04
AFB – 3	2.470	2.904	3.494	5.981	3.71
Raj Bajra Chari – 2	1.976	3.008	3.897	4.765	3.41
Giant Bajra	2.681	3.018	3.553	6.902	4.03
Mean	2.49	3.00	3.71	5.77	1
	Entry	N levels	Entry X N levels		
SEm <u>+</u>	0.28	0.21	0.18		
CD at 5%	0.77	0.58	0.51		
CV%			8.67		

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		Crude protein yield (q/ha)							
Entries/ Nitrogen levels	0	30	60	90					
JHPM – 08 – 1	0.49	1.13	0.85	1.73	1.05				
NDFB – 13	0.57	0.67	1.26	1.46	0.99				
NDFB – 11	0.47	0.93	0.89	0.70	0.75				
AFB – 4	0.73	1.14	1.21	1.28	1.09				
AFB – 3	0.71	1.02	1.88	1.73	1.33				
Raj Bajra Chari – 2	0.76	1.39	0.68	1.42	1.06				
Giant Bajra	0.58	1.11	1.49	1.60	1.20				
Mean	0.61	1.05	1.18	1.42					
	Entry	N levels	Entry X N levels						
SEm <u>+</u>	0.07	0.05	0.14						
CD at 5%	0.19	0.15	0.39						
CV%									

AST-13 (c-5): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on crude protein yield at Hyderabad

		Crude protein (%)								
Treatment	Ludhiana	Hisar	Rahuri	Coimbatore	Hyderabad	Bikaner	Faizabad	Bhubaneswar	Mean	
A. Entry										
JHPM – 08 – 1	7.0	12.28	7.91	8.23	5.91	10.29	7.93	7.88	8.42	
NDFB – 13	6.5	12.42	8.24	7.53	4.92	11.79	8.08	8.00	8.43	
NDFB – 11	7.5	9.36	8.13	8.30	4.27	9.55	7.95	8.00	7.88	
AFB – 4	7.3	10.75	7.95	7.93	5.14	9.15	7.92	8.00	8.01	
AFB – 3	6.5	11.31	8.20	8.09	6.01	11.53	7.70	8.00	8.41	
Raj Bajra Chari – 2	7.9	12.03	8.28	8.43	5.80	9.76	7.77	8.00	8.49	
Giant Bajra	6.9	11.98	8.06	8.41	6.56	10.65	8.06	8.00	8.57	
SEm <u>+</u>			0.10	0.17	0.21	0.15	0.07	0.19		
CD at 5%			NS	0.48	0.59	0.42	0.19	0.53		
B. Nitrogen levels										
(kg/ha)										
0	6.2	10.45	7.13	7.76	5.31	9.58	7.03	7.23	7.58	
30	6.8	11.40	8.02	8.00	5.91	10.15	7.73	7.83	8.23	
60	7.3	11.91	8.36	8.28	5.59	10.59	8.24	8.22	8.56	
90	7.9	12.01	8.92	8.48	5.25	11.23	8.66	8.51	8.87	
SEm <u>+</u>			0.08	0.13	0.16	0.11	0.05	0.14		
CD at 5%			0.22	0.36	0.45	0.32	0.15	0.40		
C. Interaction										
Entry X Nitrogen level										
SEm <u>+</u>			0.21	0.34	0.42	0.30	0.14	0.12		
CD at 5%			NS	NS	1.19	NS	NS	0.35		
CV%			4.41	6.38		4.95	3.04	2.79		

Table-13 (d): Effect of nitrogen levels on crude protein content of promising entries of pearl millet under rainfed conditions (AVT 2)

		Crude	orotein (%)		Mean
Entries/ Nitrogen levels	0	30	60	90	
JHPM – 08 – 1	4.81	7.00	4.81	7.00	5.91
NDFB – 13	4.81	3.94	5.69	5.25	4.92
NDFB – 11	4.81	4.81	4.81	2.63	4.27
AFB – 4	4.81	6.34	4.81	4.59	5.14
AFB – 3	5.25	5.25	7.88	5.69	6.01
Raj Bajra Chari – 2	6.13	7.43	4.59	5.03	5.80
Giant Bajra	6.56	6.56	6.56	6.56	6.56
Mean	5.31	5.91	5.59	5.25	
	Entry	N levels	Entry X N levels		
SEm <u>+</u>	0.21	0.16	0.42		
CD at 5%	0.59	0.45	1.19		
CV%					

AST-13 (d-1): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on crude protein content at Hyderabad

AST-13 (d-2): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on crude protein content at Bhubaneswar

		Crude	protein (%)		Mean
Entries/ Nitrogen levels	0	30	60	90	
JHPM – 08 – 1	7.485	7.692	7.915	8.394	7.88
NDFB – 13	7.118	7.856	8.160	8.650	8.00
NDFB – 11	7.378	7.831	8.373	8.249	8.00
AFB – 4	7.168	7.868	8.305	8.663	8.00
AFB – 3	7.194	7.819	8.355	8.317	8.00
Raj Bajra Chari – 2	7.112	7.866	8.181	8.645	8.00
Giant Bajra	7.172	7.886	8.250	8.658	8.00
Mean	7.23	7.83	8.22	8.51	
	Entry	N levels	Entry X N levels		
SEm <u>+</u>	0.19	0.14	0.12		
CD at 5%	0.53	0.40	0.35		
CV%			2.79		

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		Plant height (cm)								
Treatment	Ludhiana	Hisar	Rahuri	Anand	Coimbatore	Hyderabad	Bikaner	Faizabad	Bhuba-	Mean
									neswar	
A. Entry										
JHPM – 08 – 1	211.7	229.0	168.67	179.0	246.83	112.99	151.4	185.0	199.21	187.08
NDFB – 13	155.5	209.6	202.75	198.0	245.17	105.53	118.4	200.6	195.00	181.17
NDFB – 11	162.5	202.1	181.17	196.0	237.92	107.58	121.0	177.9	199.00	176.13
AFB – 4	147.2	205.8	190.75	205.0	237.75	106.53	125.3	171.4	168.9	173.18
AFB – 3	185.5	216.1	197.25	199.0	244.83	97.04	163.4	154.0	189.00	182.90
Raj Bajra Chari – 2	165.5	198.0	195.67	205.0	245.00	128.47	123.5	156.9	187.22	178.36
Giant Bajra	132.7	235.1	183.25	199.0	250.75	82.30	152.8	182.8	188.42	178.56
SEm <u>+</u>	4.96	4.66	2.53	4.2	2.89	3.22	3.5	4.9	5.41	
CD at 5%	15.3	13.26	7.18	11.9	8.20	9.13	9.8	13.6	15.00	
B. Nitrogen levels										
(kg/ha)										
0	141.9	185.1	174.71	178.0	239.57	78.94	66.4	135.2	164.28	151.56
30	163.5	206.1	185.33	197.0	241.57	99.57	110.9	167.8	174.20	171.77
60	171.9	224.1	192.00	203.0	245.48	112.12	152.4	192.0	194.14	187.46
90	185.7	239.2	196.24	209.0	249.52	132.47	216.5	207.0	225.41	206.78
SEm <u>+</u>	3.19	3.53	1.91	3.18	2.19	2.44	2.6	3.7	4.09	
CD at 5%	8.9	10.02	5.42	9.1	6.20	6.90	7.4	10.3	11.34	
C. Interaction										
Entry X Nitrogen level										
SEm <u>+</u>	8.45		5.06	8.4	5.78	9.10	6.9	9.8	3.61	
CD at 5%	23.4		NS	NS	NS	NS	19.6	NS	10.00	
CV%	8.83		4.69	7.3	4.08		8.75	9.7	3.29	

Table-13 (e): Effect of nitrogen levels on plant height of promising entries of pearl millet under rainfed conditions (AVT 2)

		Plant h	eight (cm)		Mean
Entries/ Nitrogen levels	0	30	60	90	
JHPM – 08 – 1	204.3	208.3	211.6	222.9	211.7
NDFB – 13	119.3	157.3	167.6	178.0	155.5
NDFB – 11	143.4	155.6	171.4	179.7	162.5
AFB – 4	112.3	152.0	156.1	168.6	147.2
AFB – 3	171.3	177.6	188.6	205.6	185.5
Raj Bajra Chari – 2	135.2	166.6	171.6	188.6	165.5
Giant Bajra	107.7	129.3	137.0	157.1	132.7
Mean	141.9	163.5	171.9	185.7	
	Entry	N levels	Entry X N levels		
SEm <u>+</u>	4.96	3.19	8.45		
CD at 5%	15.3	8.9	23.4		
CV%			8.83		

AST-13 (e-1): Interaction effect of nitrogen levels and AVT-2 entries of pearl millet on plant height at Ludhiana

AST-13 (e-2): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on plant height at Bikaner

		Plant height (cm)							
Entries/ Nitrogen levels	0	30	60	90	1				
JHPM – 08 – 1	75.1	116.1	176.5	238.0	151.4				
NDFB – 13	59.7	97.8	134.6	181.3	118.4				
NDFB – 11	58.8	105.4	135.1	184.5	121.0				
AFB – 4	66.2	104.9	134.2	195.8	125.3				
AFB – 3	66.7	122.1	192.1	272.8	163.4				
Raj Bajra Chari – 2	65.9	106.4	130.1	191.7	123.5				
Giant Bajra	72.3	123.3	164.1	251.7	152.8				
Mean	66.4	110.9	152.4	216.5					
	Entry	N levels	Entry X N levels						
SEm <u>+</u>	3.5	2.6	6.9						
CD at 5%	9.8	7.4	19.6						
CV%			8.75						

		Plant hei	ght (cm)		Mean
Entries/ Nitrogen levels	0	30	60	90	
JHPM – 08 – 1	168.30	174.65	217.40	236.50	199.21
NDFB – 13	161.40	185.40	208.70	224.30	195.00
NDFB – 11	196.50	186.50	198.70	214.30	199.00
AFB – 4	145.80	150.40	157.40	221.60	168.9
AFB – 3	163.40	173.60	191.20	227.50	189.00
Raj Bajra Chari – 2	147.80	177.60	204.30	219.20	187.22
Giant Bajra	166.70	171.20	181.30	234.50	188.42
Mean	164.28	174.20	194.14	225.41	
	Entry	N levels	Entry X N levels		
SEm <u>+</u>	5.41	4.09	3.61		
CD at 5%	15.00	11.34	10.00		
CV%			3.29		

AST-13 (e-3): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on plant height at Bhubaneswar

	Leaf stem ratio								
Treatment	Ludhiana	Rahuri	Anand	Coimbatore	Hyderabad	Bikaner	Faizabad	Bhuba- neswar	Mean
A. Entry									
JHPM – 08 – 1	1.08	0.54	1.30	0.26	0.23	0.27	0.49	1.00	0.64
NDFB – 13	0.87	0.50	0.83	0.21	0.25	0.24	0.54	0.86	0.53
NDFB – 11	0.87	0.56	0.97	0.25	0.25	0.22	0.45	1.00	0.57
AFB – 4	0.94	0.58	0.92	0.26	0.22	0.25	0.45	0.73	0.54
AFB – 3	0.95	0.52	0.98	0.24	0.22	0.27	0.40	0.86	0.55
Raj Bajra Chari – 2	0.87	0.50	0.97	0.22	0.23	0.24	0.43	0.83	0.53
Giant Bajra	1.08	0.60	0.85	0.29	0.28	0.26	0.53	0.84	0.59
SEm <u>+</u>		0.04		0.018	0.02	0.005	0.01	0.04	
CD at 5%		NS		0.05	NS	0.014	0.03	0.12	
B. Nitrogen levels									
(kg/ha)									
0	1.07	0.44	0.78	0.22	0.25	0.18	0.39	0.66	0.49
30	0.99	0.51	0.88	0.23	0.24	0.23	0.46	0.73	0.53
60	0.93	0.58	0.99	0.26	0.23	0.26	0.50	0.86	0.57
90	0.81	0.65	1.25	0.27	0.24	0.32	0.53	1.11	0.64
SEm <u>+</u>		0.03		0.013	0.01	0.004	0.01	0.03	
CD at 5%		0.08		0.04	NS	0.010	0.02	0.09	
C. Interaction									
Entry X Nitrogen level									
SEm <u>+</u>		0.08		0.037	0.03	0.010	0.02	0.03	
CD at 5%		NS		NS	NS	0.027	NS	0.08	
CV%		24.90		7.37		6.73	8.58	5.78	

Table-13 (f): Effect of nitrogen levels leaf stem ratio of promising entries of pearl millet under rainfed conditions (AVT 2)

		Leaf st	tem ratio		Mean
Entries/ Nitrogen levels	0	30	60	90	
JHPM – 08 – 1	0.187	0.253	0.297	0.337	0.27
NDFB – 13	0.193	0.233	0.243	0.273	0.24
NDFB – 11	0.153	0.203	0.237	0.293	0.22
AFB – 4	0.177	0.220	0.253	0.333	0.25
AFB – 3	0.203	0.250	0.277	0.353	0.27
Raj Bajra Chari – 2	0.160	0.230	0.253	0.297	0.24
Giant Bajra	0.203	0.237	0.270	0.343	0.26
Mean	0.182	0.232	0.261	0.319	
	Entry	N levels	Entry X N levels		
SEm <u>+</u>	0.005	0.004	0.010		
CD at 5%	0.014	0.010	0.027		
CV%			6.73		

AST-13 (f-1): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on leaf stem ratio at Bikaner

AST-13 (f-2): Interaction effect of nitrogen levels and AVT 2 entries of pearl millet on leaf stem ratio at Bhubaneswar

		Leaf ste	m ratio		Mean
Entries/ Nitrogen levels	0	30	60	90	
JHPM – 08 – 1	0.65	0.73	1.01	1.25	1.00
NDFB – 13	0.61	0.81	0.93	1.07	0.86
NDFB – 11	0.90	0.84	0.93	0.98	1.00
AFB – 4	0.55	0.57	0.59	1.17	0.73
AFB – 3	0.63	0.75	0.87	1.15	0.86
Raj Bajra Chari – 2	0.55	0.76	0.96	1.01	0.83
Giant Bajra	0.71	0.68	0.76	1.19	0.84
Mean	0.66	0.73	0.86	1.11	
	Entry	N levels	Entry X N levels		
SEm+	0.04	0.03	0.03		
CD at 5%	0.12	0.09	0.08		
CV%			5.78		

AST-14: Effect of phosphorus levels on forage yield of promising entries of rice-bean (AVT 2)

(Location: Kalyani, Jorhat and Jabalpur)

An agronomical trial for testing response of P levels to rice-bean entries promoted to AVT- 2 stage was conducted at 3 locations. The treatments consisted of 4 entries (including one national check) and 4 P levels (0, 30, 60 and 90 kg P_2O_5 /ha) and the data has been presented in Tables 14 (a) to 14 (e-2). The inference of location mean data indicated that entries KRB -19 and JRBJ 05-02 were superior in green fodder yield (by 7.4 and 24.8 %), dry matter (by 5.06 and 22.8 %) and crude protein yield (by 1.28 and 11.65%) over the check, respectively. Entry JRBJ 05-02 out yielded at Jorhat and Jabalpur, whereas, K-1 (check) was superior at Kalyani. Among entries, JRBJ 05-02 recorded highest green fodder (368.98 q/ha), dry matter yield (70.61 q/ha) and crude protein yield (9.58 q/ha) over rest of the entries. At different location, there was large variation in yield potential. Response of P to rice-bean was significantly superior up to 60 kg P_2O_5 /ha. Significantly higher green fodder yield was realized with 30 kg P_2O_5 /ha.

Treatment	Green fodder yield (q/ha)			
	Jorhat	Jabalpur	Kalyani	Mean
A. Entry				
JRB – 10	176.92	284.8	328.67	263.46
KRB – 19	211.42	412.4	329.17	317.66
JRPJ 05 – 02	282.17	498.6	326.17	368.98
K – 1 (Bidhan -1)	200.00	298.7	388.17	295.62
SEm <u>+</u>	10.02	4.93	2.60	
CD at 5%	33.73	14.46	7.10	
B. Phosphorus levels				
(kg/ha)				
0	146.17	295.4	315.33	252.30
30	236.17	365.7	346.67	316.18
60	243.50	412.1	355.58	337.06
90	244.67	421.3	354.58	340.18
SEm <u>+</u>	10.02	4.93	3.10	
CD at 5%	33.73	14.46	7.50	
C. Interaction				
	20.04	0.50	0.00	
SEII <u>+</u>	20.04	8.58	0.63	
CD at 5%	67.45	28.9	NS	
CV%	17.7	7.65	13.17	

AST-14 (a): Effect of phosphorus levels on green fodder yield of promising entries of rice bean

Entries/	Green fodder yield (q/ha)				Mean
levels	0	30	60	90	
JRB – 10	106.67	193.33	200.00	207.67	176.92
KRB – 19	149.00	223.33	226.67	246.67	211.42
JRPJ 05 – 02	195.67	283.33	318.67	331.00	282.17
K – 1 (Bidhan -1)	133.33	244.67	228.67	193.33	200.00
Mean	146.17	236.17	243.50	244.67	
	Entry	P levels	Entry X P levels		
SEm <u>+</u>	10.02	10.02	20.04		
CD at 5%	33.73	33.73	67.45		
CV%			17.7		

AST-14 (a-1): Interaction effect of phosphorus levels and AVT 2 entries on rice bean green fodder yield at Jorhat

AST-14 (a-2): Interaction effect of phosphorus levels and AVT 2 entries on rice bean green fodder yield at JabalpurP

Entries/	Green fodder yield (q/ha)				Mean
levels	0	30	60	90	
JRB – 10	194.0	279.8	329.2	336.3	284.8
KRB – 19	351.6	413.9	442.1	442.1	412.4
JRPJ 05 – 02	417.4	484.5	544.4	548.0	498.6
K – 1 (Bidhan -1)	218.7	284.6	332.8	358.6	298.7
Mean	295.4	365.7	412.1	421.3	
	Entry	P levels	Entry X P levels		
SEm <u>+</u>	4.93	4.93	8.58		
CD at 5%	14.46	14.46	28.9		
CV%			7.65		

Treatment	Dry matter yield (q/ha)			
	Jorhat	Jabalpur	Kalyani	Mean
A. Entry				
JRB – 10	33.58	53.9	60.10	49.19
KRB – 19	40.50	80.5	60.25	60.41
JRPJ 05 – 02	53.17	98.8	59.88	70.61
K – 1 (Bidhan -1)	38.33	57.3	76.88	57.50
SEm <u>+</u>	1.64	0.95	3.20	
CD at 5%	5.52	2.70	8.00	
B. Phosphorus levels				
(kg/ha)				
0	28.17	56.5	55.21	46.63
30	44.75	70.8	66.13	60.56
60	45.83	80.7	68.71	65.08
90	46.83	82.6	67.07	65.50
SEm <u>+</u>	1.64	0.95	0.68	
CD at 5%	5.52	2.70	1.70	
C. Interaction Entry X Phosphorus level				
SEm <u>+</u>	3.28	1.91	0.14	
CD at 5%	11.03	5.52	NS	
CV%	14.9	6.9	8.43	

AST-14 (b): Effect of phosphorus levels on dry matter yield of promising entries of rice bean

Entries/	Dry matter yield (q/ha)				Mean
Phosphorus levels	0	30	60	90	
JRB – 10	20.67	36.00	37.67	40.00	33.58
KRB – 19	28.33	42.67	43.33	47.67	40.50
JRPJ 05 – 02	38.00	54.33	58.67	61.67	53.17
K – 1 (Bidhan -1)	25.67	46.00	43.67	38.00	38.33
Mean	28.17	44.75	45.83	46.83	
	Entry	P levels	Entry X P levels		
SEm <u>+</u>	1.64	1.64	3.28		
CD at 5%	5.52	5.52	11.03		
CV%			14.9		

AST-14 (b-1): Interaction effect of phosphorus levels and AVT 2 entries on rice bean dry matter yield at Jorhat

AST-14 (b-2): Interaction effect of phosphorus levels and AVT 2 entries on rice bean dry matter yield at Jabalpur

Entries/	Dry matter yield (q/ha)				Mean			
Phosphorus levels	0	30	60	90				
JRB – 10	36.1	52.5	62.9	64.2	53.9			
KRB – 19	67.9	80.8	86.5	86.6	80.5			
JRPJ 05 – 02	80.9	95.5	108.9	110.0	98.8			
K – 1 (Bidhan -1)	41.2	54.3	64.3	69.5	57.3			
Mean	56.5	70.8	80.7	82.6				
	Entry	P levels	Entry X P levels					
SEm <u>+</u>	0.95	0.95	1.91					
CD at 5%	2.70	2.70	5.52					
CV%			6.9					
Treatment	Crude protein yield (q/ha)							
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	Jorhat	Jabalpur	Kalyani	Mean				
A. Entry								
JRB – 10	4.20	7.2	9.59	6.99				
KRB – 19	5.08	11.3	9.70	8.69				
JRPJ 05 – 02	6.81	13.8	8.15	9.58				
K – 1 (Bidhan -1)	4.76	7.8	13.20	8.58				
SEm <u>+</u>	0.20	0.12	0.50					
CD at 5%	0.66	0.35	1.40					
B. Phosphorus levels								
(kg/ha)								
0	3.44	7.7	8.02	6.38				
30	5.53	9.7	10.60	8.61				
60	5.82	11.2	11.14	9.38				
90	6.06	11.5	10.88	9.48				
SEm <u>+</u>	0.20	0.12	1.10					
CD at 5%	0.66	0.35	2.70					
C. Interaction								
Entry X Phosphorus level								
SEm <u>+</u>	0.39	0.26	0.02					
CD at 5%	1.31	0.76	NS					
CV%	14.40	8.6	7.26					

AST-14 (c): Effect of phosphorus levels on crude protein yield of promising entries of rice bean

Entries/		Crude prote	ein yield (q/ha)		Mean
Phosphorus levels	0	30	60	90	
JRB – 10	4.8	7.0	8.4	8.7	7.2
KRB – 19	9.4	11.2	12.2	12.2	11.3
JRPJ 05 – 02	11.0	13.1	15.4	15.7	13.8
K – 1 (Bidhan -1)	5.5	7.3	8.8	9.5	7.8
Mean	7.7	9.7	11.2	11.5	
	Entry	P levels	Entry X P levels		
SEm <u>+</u>	0.12	0.12	0.26		
CD at 5%	0.35	0.35	0.76		
CV%			8.6		

AST-14 (c-1): Interaction effect of phosphorus levels and AVT 2 entries on rice bean crude protein yield at Jabalpur

AST-14 (c-2): Interaction effect of phosphorus levels and AVT 2 entries on rice bean crude protein yield at Jorhat

Entries/		Crude prot	ein yield (q/ha)		Mean
Phosphorus levels	0	30	60	90	
JRB – 10	2.53	4.31	4.79	5.18	4.20
KRB – 19	3.42	5.26	5.50	6.12	5.08
JRPJ 05 – 02	4.69	6.91	7.54	8.10	6.81
K – 1 (Bidhan -1)	3.13	5.62	5.46	4.84	4.76
Mean	3.44	5.53	5.82	6.06	
	Entry	P levels	Entry X P levels		
SEm <u>+</u>	0.20	0.20	0.39		
CD at 5%	0.66	0.66	1.31		
CV%			14.40		

Treatment	Plant height (cm)							
	Jorhat	Jabalpur	Kalyani	Mean				
A. Entry								
JRB – 10	171.00	129.4	106.63	135.67				
KRB – 19	180.83	151.0	106.44	146.09				
JRPJ 05 – 02	183.83	144.0	105.18	144.33				
K – 1 (Bidhan -1)	178.67	138.5	107.03	141.40				
SEm <u>+</u>	4.03	1.48	5.50					
CD at 5%	13.57	4.30	NS					
B. Phosphorus levels								
(kg/ha)								
0	169.00	128.8	103.48	133.76				
30	178.33	138.9	106.53	141.25				
60	181.17	143.5	108.12	144.26				
90	185.83	151.6	107.14	148.28				
SEm <u>+</u>	4.03	1.48	8.20					
CD at 5%	13.57	4.30	NS					
C. Interaction								
Entry X Phosphorus level								
SEm <u>+</u>	8.06	2.95	1.64					
CD at 5%	27.13	8.6	NS					
CV%	7.9	4.66	8.66					

AST-14 (d): Effect of phosphorus levels on plant height of promising entries of rice bean

Entries/		Mean			
Phosphorus levels	0	30	60	90	
JRB – 10	115.70	129.43	130.13	142.40	129.4
KRB – 19	143.83	148.63	153.26	158.20	151.0
JRPJ 05 – 02	132.40	141.40	147.93	154.13	144.0
K – 1 (Bidhan -1)	123.36	136.33	142.53	151.83	138.5
Mean	128.8	138.9	143.5	151.6	
	Entry	P levels	Entry X P levels		
SEm <u>+</u>	1.48	1.48	2.95		
CD at 5%	4.30	4.30	8.6		
CV%			4.66		

AST-14 (d-1): Interaction effect of phosphorus levels and AVT 2 entries on rice bean plant height at Jabalpur

AST-14 (d-2): Interaction effect of phosphorus levels and AVT 2 entries on rice bean plant height at Jorhat

Entries/		Plant height (cm)							
Phosphorus levels	0	30	60	90					
JRB – 10	152.67	171.67	179.00	180.67	171.00				
KRB – 19	171.00	182.00	180.00	190.33	180.83				
JRPJ 05 – 02	177.67	186.33	185.00	186.33	183.83				
K – 1 (Bidhan -1)	174.67	173.33	180.67	186.00	178.67				
Mean	169.00	178.33	181.17	185.83					
	Entry	P levels	Entry X P levels						
SEm <u>+</u>	4.03	4.03	8.06						
CD at 5%	13.57	13.57	27.13						
CV%			7.9						

Treatment	Leaf stem ratio							
	Jorhat	Jabalpur	Kalyani	Mean				
A. Entry								
JRB – 10	0.95	0.8	0.80	0.85				
KRB – 19	0.91	0.9	0.97	0.92				
JRPJ 05 – 02	1.02	1.0	0.76	0.92				
K – 1 (Bidhan -1)	0.93	0.8	1.14	0.95				
SEm <u>+</u>	0.04	1.48						
CD at 5%	0.14	4.30						
B. Phosphorus levels								
(kg/ha)								
0	0.93	0.8	0.74	0.82				
30	0.93	0.9	0.91	0.91				
60	0.98	0.9	0.99	0.96				
90	0.96	1.0	0.93	0.75				
SEm <u>+</u>	0.04	1.48						
CD at 5%	0.14	4.30						
C. Interaction								
Entry X Phosphorus level								
SEm <u>+</u>	0.07	2.97						
CD at 5%	0.24	8.6						
CV%	13.7	7.66						

AST-14 (e): Effect of phosphorus levels on leaf stem ratio of promising entries of rice bean

Entries/		Leaf s	stem ratio		Mean
Phosphorus levels	0	30	60	90	
JRB – 10	0.71	0.81	0.85	0.87	0.8
KRB – 19	0.77	0.88	0.93	0.95	0.9
JRPJ 05 – 02	0.85	0.95	1.01	1.09	1.0
K – 1 (Bidhan -1)	0.76	0.83	0.87	0.89	0.8
Mean	0.8	0.9	0.9	1.0	
	Entry	P levels	Entry X P levels		
SEm <u>+</u>	1.48	1.48	2.97		
CD at 5%	4.30	4.30	8.6		
CV%			7.66		

AST-14 (e-1): Interaction effect of phosphorus levels and AVT 2 entries on rice bean leaf stem ratio at Jabalpur

AST-14 (e-2): Interaction effect of phosphorus levels and AVT 2 entries on rice bean leaf stem ratio at Jorhat

Entries/		Leafs	stem ratio		Mean
Phosphorus levels	0	30	60	90	
JRB – 10	1.01	0.85	0.99	0.95	0.95
KRB – 19	0.89	0.92	0.94	0.88	0.91
JRPJ 05 – 02	0.92	1.06	1.04	1.04	1.02
K – 1 (Bidhan -1)	0.88	0.89	0.94	0.99	0.93
Mean	0.93	0.93	0.98	0.96	
	Entry	P levels	Entry X P levels		
SEm <u>+</u>	0.04	0.04	0.07		
CD at 5%	0.14	0.14	0.24		
CV%			13.7		

FORAGE CROP PROTECTION

CHAPTER-3

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Forage crop protection trials in major kharif forages included pest occurrence, evaluation of varietal resistance in improved breeding materials and pest management. The trials were conducted at Anand, Bhubneshwar, Hisar, Hyderabad, Jhansi, Ludhiana, Palampur and Rahuri. The major emphasis was on occurrence of disease and pests in different Kharif crops under different agroclimatic conditions, strengthening pest management.

PPT-1. MONITORING OF DISEASE, INSECT PESTS AND NEMATODES IN SORGHUM, PEARLMILLET, MAIZE AND COWPEA ECOSYSTEM.

LOCATIONS: (Anand, Bhubneshwar, Hisar, Hyderabad, Jhansi, Ludhiana, Palampur and Rahuri)

Four cultivated forage crops sorghum, pearl millet, maize and cowpea were screened with an objective to record the occurrence and abundance of disease, insect pests and nematodes and their relationships with weather parameters at different locations. The crop wise occurrence of pests and their abundance has been recorded as follows:

Sorghum

Disease

At Jhansi zonate leaf spot (*Gleocercospora sorghi*), sooty stripe (*Ramulispora sorghi*), anthracnose (*Colletotrichum graminicola*) and gray leaf spot (*Cercospora sorghi*) were the major disease occurred in various sorghum germplasm lines in the month of July and August. During this period the mean temperature was around 35 °C and humidity 80-95%. At Anand maximum disease incidences of anthracnose, leaf blight, zonate leaf spot and gray leaf spot were observed at head formation of the crop, which was 12.45, 9.15, 12.96 and 4.19 %, respectively. At Ludhiana gray leaf spot was predominating disease, which progressed steadily when mean RH was 90-95% and mean temperature 30-33 °C. The disease severity reached to 75% in the month of October. At Bhubneshwar mild incidences of leaf spot and leaf blight were observed.

Insect fauna

At Anand, shoot fly infestation was 79% in the third week of August. The maximum stem borer infestation was 92% during second week of September. The myllocerus weevil started appearing from the last week of July and reached maximum 100 insects/100 during second week of September. At Jhansi minor incidences of leafhoppers was observed. At Rahuri the incidences of shoot fly was moderate to high on the crop sown during third week of July. The maximum percentage of dead hearts (60.23%) was recorded during the second week of August. The incidences of stem borer were negligible. The aphid (*Rhopalosiphum maidis*) population in leaf whorl was moderate in the second week of September (9.60 aphids/plant) and was at moderate level in the fourth week of September (20 aphids/plant). The population of predatory lady bird beetles (1.2 adult and 2.6 grubs/plant) and *Chrysoperla carnea* (1.0-1.7/plant) were also recorded.

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Nematode fauna

At Jhansi three major and dominant plant parasitic nematodes *viz., Tylenchorhynchus vulgaris, Pratylenchus zea* and *Helicotylenchus dihystera* were found to be associated and these constituted 37.0, 25.5 and 17.5 percent of the total parasitic nematode population, respectively. The population density varied from 550-1050/250g soil. High populations of these nematodes were often found to be associated with stunted and chlorotic patches of the plants. Peak population densities of these nematodes were observed during middle of October.

Pear millet

1.2.1 Diseases

At Bhubneshwar leaf spot and blight (*Helmithosporium sp.*) incidences (1.0-3.4) were recorded on 1-5 scale during the crop season. At Jhansi leaf spot caused by *Pyricularia spp.* and rust, *Puccinia pennisiti* were the predominating disease. At Anand disease incidences appeared at flowering stage and intensity increased up to head formation stage. The leaf blast (*Pyricularia* sp.), rust (*Puccinia pennisiti*) and downy mildew (*Sclerospora graminicola*) were the major diseases which showed 8.56, 4.78 and 5.39 disease intensity respectively.

1.2.2 Insect fauna

At Anand shoot fly infestation started during last week of July and reached maximum (41%) in the last week of August. The Myllocerus weevil population was uniform (100 insects/100plants) during August and September. At Hyderabad, shoot borer and *Myllocerus* weevil infestation (1-8/plant) observed during the entire crop season. At Rahuri shoot fly (*Atherigona approximata*) incidence was appeared on crop sown during third week of July and remained up to the harvest with 10-15% infestation. At Jhansi heavy infestation of shoot borer larvae was recorded during early vegetative stage of the crop.

1.2.3 Nematode fauna

Five major nematodes *viz., Helicotylenchus, Pratylenchus, Hoplolaimus, Tylenchorhynchus* and *Meloidogyne spp.* were recorded with moderate to high population densities (246-1020/250 g soil) at Jhansi. High population of lesion nematode, *P. zeae* were often found to be recorded from the roots and rhizosphere of the crop showing patches of stunted and yellowing of the plants. Sporadic incidences of root knot nematodes were also recorded this year. In addition, lower population of this nematode was often associated with high spore density (545/100g soil) and root colonization (72%)of VAM fungi.

Maize

Diseases

At Anand the incidences of leaf blight and leaf spot was first observed at the beginning of flowering and continued to increase up to the head formation stage of the crop with maximum disease incidence 3.95 and 3.16 respectively. Banded leaf blight (*Rhizoctonia sp*) occurred at Palampur with maximum disease severity 7% during third week of August. At

Ludhiana mild disease incidence of *Helminthosporium* blight was recorded on maize var. BAUFM-08-5-1. The maximum disease intensity was around 40% during the fourth week of September when mean RH 76% and temperature 26.9 °C. At Jhansi mild incidence (21.6%) of brown leaf spot (*Helminthosporium maidis*) was recorded in various germplasm lines. At Bhubneshwar leaf blight (*T. turcicum*) and maize mosaic virus incidences were 3.4 and 2.8, respectively on 1-5 scale.

Insect fauna

Moderate incidences of defoliators were observed at Jhansi and Bhubneshwar (0.8-4.2/10plants). Shoot borer, Shoot fly and *Myllocerus* weevil infestations were low – moderate(2-7 insect/plant) at Hyderabad. At Anand *Myllocerus* weevil appeared in the last week of July and continued to increase 70-78 adults/100 plants. The stem borer appeared in the first week of August and continued to increase (78%) till the last week of August.

1.3.3 Nematode fauna

At Jhansi, stunt nematode, *T. vulgaris* was found to be the major and dominant nematode species and high population density (950-1056/250g soil) of this nematode was often found to be associated with irregular patches of thin chlorotic and stunted plant populations. The root systems of heavily infested plants were also observed to be highly reduced. Sporadic incidences of root knot nematode *Meloidogyne* sp. in the form of small galls on the roots were also observed at few localities. Maize appears to be a very good host of VAM fungi especially for *Glomus spp*. since high root colonization (75-85%) and spores (218-315/100g soil) were recovered from the rhizospere.

Cowpea

Diseases

At Jhansi incidences (18-28%) of root rot was observed in different germplasm lines. Incidences of Anthracnose (*Colletotricum lundimuthianum*) were also observed to a moderate level (12-18.6%). Cowpea mosaic virus incidence was observed in the seed crop of cowpea. At Anand anthracnose and mosaic incidences occurred at 50% flowering stage and continued to increase up to 5.01 and 7.23% respectively. The root-rot incidences appeared at medium vegetative stage with 2.14% PDI, which reached, to 7.33 at seed setting stage. Severe incidences of root-rot at Palampur (53%) were recorded. *Ascochyta* blight was severe (5-22%) during last week of July to last week of August, Anthracnose and CPMVincidences appeared in the first week and continued to increase up to eighth week after sowing at Bhubneshwar. Yellow mosaic and leaf spot (*Cercospora spp.*) were severe at Bhubneshwar. At Ludhiana moderate incidences of anthracnose and Cercospora leaf spot were recorded.

Insect fauna

At Anand, the jassid population continued to increase with crop growth and attain a peak population (1.02/plant). Varying population of Spodoptera (6-15/100plants) and semilooper (15-21/100plants) were also recorded. At Hyderabad, flea beetle and aphids

were observed as major insect pests in this season and continued to occur through out the crop period. At Rahuri moderate to high infestations of aphids and jassids infestations were recorded during the second week of August. The range of jassid population was 2.7-10.60/plant whereas the aphid population was highest (2.42-26.67aphids/plant). The yellow mosaic virus was found moderate to high through out the crop period At Jhansi, aphids and semilooper appeared as predominating insect pest of the crop with an infestation range of 25-45 percent. At Bhubneshwar cowpea aphid and flea beetle were the dominating insect pests with 66.4 aphids/top leaf and 82.8 holes/plant respectively. Population of defoliators was also recorded from 1.4-5.8/10plants.

Nematode fauna

Two species of root knot nematodes (*Meloidogyne spp.*) and reniform nematode, *Rotylenchulus renifomis* were the major and dominant nematode species in this crop. Higher root-knot incidences (RKI >3.0) were invariably found to be associated with higher root-rot disease at Jhansi. Pigeonpea cyst nematode *Heterodera cajani* were also observed in the form of white cysts on the roots in some of the field.

PPT-2. EVALUATION OF VARIETAL TRIALS OF COWPEA, MAIZE AND PEARL MILLET FOR RESISTANCE TO DISEASES, INSECT - PESTS AND NEMATODES

(Location: Anand, Bhubaneswar, Hisar, Hyderabad, Jhansi, Ludhiana, Rahuri and Palampur)

2.1. Cowpea

The cowpea entries of initial and advance varietal trials were evaluated for reaction to various diseases, insect-pests and nematodes The results for insect-pest and root knot nematode in IVT entries are presented in table PPT 2.1. The aphid and jassid population was minimum (5.83and 3/leaf) in UPC 803 entry at Rahuri. The same entry showed resistance (RKI=1.5) and entries MPFC-10-1 and UPC-9202 were moderately resistant to nematode, *Meloidogyne spp.* at Jhansi.

The reaction of various diseases in the initial varietal trial entries is shown in the table PPT 2.2. At Jhansi entry UPC-804 showed minimum root rot disease (9.4%) followed by entry UPC-622 (12.4%). Rest of the entries did not differ significantly in disease incidence. Incidence of yellow mosaic virus did not differ much among the entries at Anand, Bhubneswar, Hyderabad, Rahuri and Hisar. However, at Anand, Bundel lobia-1 was free from leaf spot disease.

Pest reaction among entries of AVT is presented in table PPT 2.3. The aphid population was least (3.2/leaf) in IC-202797 at Jhansi whereas minimum jassids (2.25/leaf) was recorded in UPC-9202 entry at Rahuri center. Bundel Lobia- 2 showed resistance (RKI=1.2) against root knot nematode, *Meloidogyne* spp.at Jhansi.

The disease reaction among different entries of advance varietal trial is presented in Table PPT 2.4. At Palampur all the entries were susceptible to leaf blight. The entries, UPC-622

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and Bundel lobia-1 showed resistance to root rot at Jhansi however, at Anand all the entries showed least root rot incidence. At Rahuri and Anand all the entries were least susceptible to yellow mosaic virus disease. Entries MPFC-08-14, BL-1 and IL-1177 were found to be free from anthracnose disease.

2.2 Pearl Millet

The results of initial varietal trial entries to various pests are presented in table PPT 2.5. The leaf spot disease incidence was minimum (1.2-2.3) in RBB-1 and AFB-5 at Bhubneswar, NDFB-904 at Jhansi and PAC-981 at Hisar. The shoot fly incidences were found to be least in NDFB-914 at Anand. The shoot borer incidences were least (3.7) in RBC-2 at Hyderabad. Entry RBC-2 showed resistance to root lesion nematode.

In advance varietal trial, two entries, AFB-3 and AFB-4 showed resistance to leaf pot at Jhansi whereas at Bhubneswar entries did not differ in the degree of disease incidence. Enties RBC-2 and JHPM-08-1 were found resistant to stem borer at Hyderabad. The entries, RBC-2, NDFB-11 and JHPM-08-1 were moderately resistant to nematode, *P.zeae* at Jhansi. (Table PPT 2.6).

2.3 Soybean

In AVT (Table 2.7) all the entries showed less than 10% incidences of YMV at Hisar and Jhansi. Gidle beetle infestation was found to be at par in all the entries. Entries JS-07-24-8 found to be resistant to root knot nematode.

2.4 Ricebean

In IVT (Table 2.8) entries JRB-13 and Bidhan-1 were found resistant to leaf blight at Jhansi. However, at Bhubneswar entries bid not differ in terms of disease incidences. Entry JRB-13 was resistant to yellow mosaic virus at Jhansi. Flea beetle incidences were least (14.8) in BFRB-15 at Bhubneswar. All the entries except JRB-05-4 showed moderately resistant reaction to root knot nematode.

In AVT(Table 2.9) the leaf blight incidences were least in Bidhan –1. However, the same entries beside JRBJ-10 were found to be resistant to yellow mosaic virus at Jhansi. The flea beetle infestation was least in the above entries at Hyderabad. All the entries except JRBJ-05-2 showed moderately resistant reaction agaist root knot nematode.

2.5 Maize

The results of initial varietal trial is presented in table 2.10. Entry APFM-08-1 showed minimum leaf blight disease incidence at Bhubneswar, Jhansi and Palampur. Shoot borer infestation was least (12.75%) in entry MFM-09-2 at Hyderabad. However, at Anand all the entries did not differ with respect to shoot borer infestation. The shoot fly incidences were also least in MFM-09-2 at Hyderabad.

Entry	Aphid infestation		ation	Flea	Jassids/	Ne	matode
				Beetle	leaf	M. ii	ncognita
	Bhuba-	Rahuri	Hyderabad	Bhuba-	Rahuri	RKI	Reaction
	neswar			neswar			
UPC-803	22.6	5.83	21.79	30.4	3.0	3.5	MS
UPC-804	25.3	7.11	24.95	18.8	2.0	3.5	MS
BL-1	19.7	6.67	25.50	22.6	4.11	3.2	MS
UPC-5286	23.4	6.11	18.35	16.3	4.00	2.5	MR
MPFC-10-1	18.7	9.89	24.78	25.3	7.89	3.0	MR
MPFC-09-1	21.4	6.00	24.57	15.8	2.78	3.2	MS
BL-2	24.6	6.38	-	20.9	4.22	3.5	MS
UPC-622	-	-	-	-	-	4.0	S
UPC-9202	-	-	20.83	-	-	3.5	MS

Table PPT 2.1. Screening for pest resistance in Cowpea- Initial Varietal Trial

Table PPT 2.2. Screening for disease resistance in Cowpea- Initial Varietal Trial

Entry	Root	rot	Leaf spot	Yellow mosaic virus				
	Bhub- neswar	Jhansi	Hisar	Anand	Bhub- neswar	Rahuri	Hisar	Hydera- bad
UPC-803	4.99	11.2	1.7	2.35	1.6	1.33	3.00	3.63
UPC-804	4.33	18.4	3.0	2.79	2.8	1.00	3.00	3.06
BL-1	9.99	22.2	1.0	1.57	1.6	2.00	2.30	3.37
UPC-5286	4.99	34.0	3.0	1.12	1.8	2.00	3.70	2.42
MPFC-10-1	4.66	18.4	1.0	2.68	1.2	2.67	1.00	3.51
MPFC-09-1	6.99	16.6	2.3	1.95	1.4	2.00	3.00	2.58
BL-2	-	14.2	1.3	-	-	2.67	4.30	-
UPC-622	5.33	12.2	-	-	1.6	-	-	-
UPC-9202	-	12.8	-	5.78	-	-	-	2.56

AICRP on Forage Crops

Entries	Aphid/leaf		Jassids/leaf		Meloidogyne	spp (Jhansi)	
	Jhansi	Rahuri	Anand	Rahuri	Jhansi	RKI	Reaction
BL-2	8.2	-	-	-	4.4	1.5	R
UPC-622	7.6	-	-	-	4.9	3.5	MS
UPC-9202	6.2	4.08	6.0	2.25	5.8	3.5	MS
MFC-08-14	5.4	9.84	6.0	7.92	5.9	2.5	MR
IC-202797	3.2	80.67	8.0	10.59	6.8	4.2	S
BL-1	9.6	6.17	11.0	4.00	4.6	2.5	MR
UPC-5286	9.2	9.83	11.0	6.33	6.8	3.5	MS
IL-1177	5.2	-	8.0	-	4.2	2.5	MR

 Table PPT 2.3. Screening for pest resistance in Cowpea- Advance Varietal Trial 2

Table PPT 2.4. Screening for disease resistance in Cowpea- Advance Varietal Trial-1

Entry	Leaf blight	Root rot		Yellow mo	Anthracnose	
	Palampur	Anand	Jhansi	Anand	Rahuri	Anand
BL-2	-	-	12.1	-	-	-
UPC-622	51.3	-	9.4	-	-	-
UPC-9202	-	6.48	10.6	5.22	1.00	1.30
MFC-08-14	62.0	1.55	18.4	2.78	3.25	0.00
IC-202797	83.8	1.68	14.6	1.21	4.25	2.41
BL-1	66.9	2.65	8.4	1.13	1.75	0.00
UPC-5286	31.3	1.84	22.4	2.12	2.75	0.00
IL-1177	-	2.02	14.2	2.52	-	0.00

Entries	Leafs	spot	Shoot fly (%DH)	Stem borer (%)	Leaf spot	Nen	natode
	Bhuba- neswar	Jhansi	Anand	Hydera- bad	Hisar	Root lesion index	Reaction
NDFB-904	1.4	1.2	17	8.66	5.7	2.5	MR
NDFB-914	1.6	2.0	15	7.86	4.3	3.0	MS
RBB-1	1.2	1.4	20	9.01	5.0	3.5	MS
RBC-2	1.6	2.2	20	3.72	3.7	1.0	R
GIANT BAJRA	2,6	2.8	27	6.32	4.3	3.5	MS
AFB-5	1.2	1.4	17	8.97	3.0	3.0	MS
PAC-981	12.8	1.6	23	11.70	2.3	3.2	MS

Table PPT 2.5. Screening for disease resistance in Pearl Millet- Initial Varietal Trial

Table PPT 2.6. Screening for pest resistance in Pearl Millet - Advance Varietal Triai-2

	Shoo ⁻ Infe	t fly % sted	Leaf spot	Stem borer (% DH)	P. Ze (Jhar	eae nsi)	
Entries	Anand	Jhansi	Bhuba- neswar	Hyderabad	Root Lesion Index	Reaction	
RBC-2	25	2.66	1.80	8.43	2.2	MR	
NDFB-11	27	2.00	2.30	12.69	2.6	MR	
NDFB-13	30	1.80	1.40	12.03	3.4	MS	
AFB-3	27	1.60	1.60	11.89	3.5	MS	
AFB-4	25	1.20	1.20	10.57	3.2	MS	
JHPM-08-1	25	2.20	1.80	8.16	2.4	MR	
GIANT BAJRA	30	1.40	1.20	8.89	3.6	MS	
Scale for Down	y mildew and	d leaf spot		So	ale for nemato	des	
1-No symptom		= Highly Re	sistant (1) 1:	= Resistant		
Upto 10% (infed	cted plants)	=Resistant	(2) 2:	2= Moderately resistant		
11-25% ((infect	ed plants)	= Moderate	ly resistant (3) 3	3= Moderately Susceptible		
26-50 ((infect	ed plants)	= Susceptib	le (4) 4= Susceptible			
>50 ((infecte	ed plants)	=Highly sus	ceptible (5) 5	=Highly susce	ptible	

Entries	Hisar	Jhansi					
	YMV	Girdle beetle YMV		Meloide	og <i>yn</i> e spp.		
		% severity		RKI	Reaction		
JS-07-21-7	6.3	100	4.6	2.5	MR		
JS-07-24-13	7.7	80	4.4	2.5	MR		
JS-07-24-8	7.0	76	3.2	1.5	R		
JS-07-24-1	5.7	100	5.6	4.0	S		

Table PPT. 2.7 Screening for pest resistance in Soybean- Advance Varietal Trial-1

Table PPT. 2.8 Screening for pest resistance in Rice bean - Initial Varietal Trial

Entry	Leaf	blight	Mosaic virus		Fleabeetle	<i>Meloidogyne</i> spp	
	Bhuba- neswar	Jhansi	Bhuba- neswar	Jhansi	Bhuba- neswar	RKI	Reaction
Bidhan-1	1.6	0.8	1.2	1.4	28.6	2.1	MR
JRB-13	1.2	1.4	1.6	1.0	31.4	2.5	MR
JRB-14	1.4	1.4	1.4	1.6	18.7	2.3	MR
BFRB-15	1.8	1.6	1.2	2.2	14.8	2.3	MR
JRB-05-4	-	2.6	-	2.0	-	3.5	MS

Entry	Leaf	blight	Mosaic virus		Fleabeetle	abeetle <i>Meloidogyne</i> sp	
	Bhubane swar	Jhansi	Bhuba- neswar	Jhansi	Bhuba- neswar	RKI	Reaction
JRBJ- 05-2	1.4	1.2	1.6	1.0	25.4	3.5	MS
KRB 19	1.6	1.6	1.8	1.6	34.2	2.5	MR
Bidhan-1	1.2	1.0	1.4	0.4	15.8	1.5	MR
JRB- 10	1.4	1.4	1.2	0.0	17.6	2.5	MR

Entries		Lea	f Blight	Stem	Shoot			
								Fly
	Anand	Bhub- neswar	Jhansi	Palam- pur	Hi- sar	Anand	Hydera -bad	Hydera -bad
J-1006	7.89	1.6	2.0	18.3	2.3	78	18.69	11.2
MFM-09-2	8.12	1.4	1.8	23.8	3.7	71	12.75	8.67
APFM-08-1	8.58	1.2	1.0	14.5	3.0	70	16.06	9.32
African Tall	7.62	1.8	1.6	15.0	3.7	73	19.44	13.50
PMC-6	9.11	1.6	1.4	15.5	3.0	68	15.90	10.10
BAUFM-08-5-1	-	-	1.6	-	3.7	-	16.57	10.20

Table PPT. 2.10 Screening for pest resistance in maize - Initial Varietal Trial

PPT.7. INTEGRATED DISEASE MANAGEMENT IN FODDER MAIZE Location: Ludhiana and Palampur

The trial was conducted for the second year for integrated disease management of maize diseases at Ludhiana and Palampur. The trial consisted of ten treatments involving three seed treatments *viz.,* vitavex @ 2g/kg, *Trichoderma viridae* @ 5g/kg and *Pseudomonas fluorescens* @5g/kg and their combinations with spray of mancozeb @ 0.25% and *Pseudomonas fluorescens* @3g/lit compared against untreated control.

The results of various disease incidences and fodder yield in different treatments are presented in Table 7.1. All of the treatments at Palampur provided superior control of the leaf blight, brown spot and banded leaf blight. At both the locations T_4 (ST vitavex @ 2g/kg + mancozeb spray @ 0.25%) provided maximum control of leaf blight diseases.

The fodder yield in different treatments significantly increased in all the treatments as compared to untreated control. The maximum green fodder yield was obtained in T_4 (ST vitavex @ 2g/kg + mancozeb spray @ 0.25%) at both the locations, Palampur and Ludhiana.

PPT.8. Management of cowpea sucking pests and yellow mosaic virus in seed crop. Location: Anand, Bhubaneswar, Jhansi, Hyderabad, Rahuri, Ludhiana and Palampur

The trial was initiated during last year for the management of insect pests and yellow mosaic virus for increasing seed production in cowpea. The trial consisted of 9 treatments viz. T_{1} = Seed treatment with Imdacloprid @5 g/kg, T_{2} = spraying of NSKE @ 5% at 10 days interval, T_{3} = spraying of *Verticillium leccanie* @ 5g/lit at 10 days interval, T_{4} = spraying of Imidacloprid @ 0.3 ml/lit at 15 days interval, T_{5} = T_{1} + T_{2} , T_{6} = T_{1} + T_{3} , T_{7} = T_{1} + T_{4} , T_{8} = T_{1} + T_{2} + T_{3} , T_{9} = untreated control in three replications in RBD.

The results presented in Table PPT 8.1 revealed that all the treatments reduced the pest and disease incidence to a varying degree. However, maximum control was obtained in T_7 (seed treatment with Imdaclopid @5 g/kg) followed by foliar spray of Imidaloprid @ 0.3 ml/lit at Anad, Palampur and Rahuri.

The seed yield in different treatments is given in table PPT 8.2. Maximum seed yield (7.80q/ha) and (6.75q/h) was obtained in T_2 and T_7 at Bhubneswar and Rahuri respectively. At Jhansi maximum seed yield (6.97q/h) was recorded in T_1 .

Treatment	Leaf I	Blight	Brown	Banded leaf	Green fo	dder yield
			Spot	blight	q	/ha
	Ludhi-	Palam-	Palam-	Palam-	Palam-	Ludhiana
	ana	pur	pur	pur	pur	
T ₁	28.09	14.3	6.8	1.5	305.3	244.59
T ₂	27.89	17.0	8.0	2.7	301.4	245.66
T ₃	27.55	17.7	8.6	2.7	300.9	252.33
T ₄	21.81	2.4	1.0	0.8	328.4	264.60
T ₅	21.71	2.1	2.4	1.7	319.1	266.80
T ₆	22.64	2.7	2.4	1.9	317.0	260.13
T ₇	24.26	11.1	6.0	1.7	319.8	256.80
T ₈	27.23	14.8	7.4	2.8	309.1	247.92
T ₉	28.09	15.2	6.8	3.3	312.4	245.66
T ₁₀	40.01	24.1	11.4	4.7	294.3	236.79
CD (5%)	3.09	2.04	0.09	0.74	7.70	2.67

Table PPT. 7.1 Per cent disease severity in different treatments

 $\begin{array}{l} T_1 = \text{Seed treatment (ST) vitavex } @ 2g/kg, T_2 = \text{ST } \textit{Trichoderma viridae} @ 5g/kg, T_3 = \text{ST} \\ \textit{Pseudomonas fluorescens } @ 5g/kg, T_4 = T_1 + \text{mancozeb spray } @ 0.25\%, T_5 = T_2 + \\ \text{mancozeb spray } @ 0.25\%, T_6 = T_2 + \text{mancozeb spray } @ 0.25\%, T_7 = T_1 + \textit{Pseudomonas fluorescens spray } @ 3g/lit, T_8 = T_2 + \textit{Pseudomonas fluorescens spray } @ 3g/lit, T_9 = T_3 + \\ \textit{Pseudomonas fluorescens spray } @ 3g/lit, T_{10} = \text{Untreated control} \end{array}$

Treatment	Anand	Bhub	Bhubaneswar Palampur		Rahuri		
	YMV	YMV	Aphid	ΥΜ٧	Aphid	YMV	Aphid
T ₁	2.61	35.13	18.23	6.9	4.5	1.50	4.56
T ₂	2.66	16.26	12.30	5.5	3.4	2.67	6.17
T ₃	2.90	22.30	15.93	7.0	4.0	1.83	1.28
T ₄	2.53	16.93	6.20	2.0	1.1	1.00	0.00
T ₅	2.61	15.56	13.73	3.7	2.2	1.67	3.34
T ₆	2.88	23.30	12.80	3.9	2.5	6.17	0.17
T ₇	2.50	20.76	7.10	1.8	0.8	1.00	0.00
T ₈	2.64	18.20	6.93	2.1	1.0	2.00	0.00
T ₉	3.32	43.60	26.8	8.4	5.7	4.00	16.28
CD	0.017	5.53	4.590	0.50	0.43		0.26
$T_1 = Seed treatm$	nent (ST) w	ith imidacl	oprid WS @ 3	3a/ka,T ₂ =	= Spraving	of NSKI	E 5% at 10

Table PPT. 8.1 Pest incidence in different treatments

$$\begin{split} T_1 &= \text{Seed treatment (ST) with imidacloprid WS @ 3g/kg, T_2 = \text{Spraying of NSKE 5\% at 10} \\ \text{days interval, } T_3 &= \text{Spraying of Verticillium leccani @ 5g/l at 10 days interval, } T_4 &= \text{Spraying with with imidacloprid @ 0.3 mlg/l at 15 days interval, } T_5 &= T_1 + T_2 \ , T_5 &= T_1 + T_3, \ T_7 &= T_1 + T_4, \\ T_8 &= T_1 + T_2 + T_3, \qquad T_9 &= \text{Untreated control} \end{split}$$

Treatment	Anand	Bhubaneswar	Jhansi	Rahuri
T ₁	4.56	2.28	6.97	6.25
T ₂	7.80	2.64	6.02	5.11
T ₃	5.80	2.61	5.97	6.08
Τ ₄	6.13	3.41	5.11	6.81
T ₅	5.61	3.27	5.50	5.52
T ₆	5.91	2.64	4.50	6.09
T ₇	6.08	3.59	5.44	6.75
T ₈	4.88	3.37	4.35	5.82
T ₉	5.44	1.73	3.19	4.80
CD (5%)	0.53	0.74	1.00	0.98

Table PPT. 8.2. S	Seed yield ((q/ha) in	different	treatments
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PPT 9. Mangement of shootfly in forage sorghum Locations: Hyderabad and Jhansi

The trial PPT 9 was initiated during this year for the management of shoot fly in forage sorghum at four locations with eight treatments viz. T_1 = Seed treatment with Thiomethoxam @ 2g/kg seed; T_2 = Seed treatment with NSK powder @50g/kgseed followed by NSE spray @ 5% at 10 days after sowing; T_3 = Seed treatment with imidacloprid @ 5g/kg seed; T_4 = Foliar spray of Thiomethoxam 25 WSC @ 0.0125% at10 days after sowing; T_5 = Foliar spray of NSE @ 5% at 10 days after sowing; T_6 = Foliar spray with imidacloprid @ 0.3ml/l at 10 days after sowing; T_7 = Foliar spray with Endosulfan @ 0.07% at10 days after sowing; T_8 = Untreated control.

The results presented in table 9.1 revealed that all the treatment significantly reduced the shoot fly incidence and increase the forage yield to a varying degree. Maximum reduction(>50%) was obtained at Hyderabad in T_6 and at Jhansi in T_1 . The same treatment yielded maximum GFY and DMY at the above centers.

Treatment	Shoot fly (% infestation)		GF	⁻ Y (q/h)	DMY (q/h)		
	Jhansi	Hyderabad	Jhansi	Hyderabad	Jhansi	Hyderabad	
T ₁	16	18.21	366.08	152.8	80.53	49.2	
T ₂	22	35.21	337.16	102.8	74.17	46.3	
T ₃	17	19.07	341.66	141.7	80.00	73.5	
T ₄	24	22.68	337.16	155.6	77.54	72.2	
T ₅	26	26.28	314.41	91.7	75.45	61.3	
Т ₆	20	10.71	358.33	166.7	82.41	76.0	
T ₇	26	13.18	337.75	186.1	72.37	77.5	
Т ₈	42	29.36	305.50	77.8	70.26	42.2	
CD (5%)	6.0	6.72	2.17	22.06	1.79	1.56	

Table PPT. 9.1. Shoot fly incidence and fodder yield in different treatments.

 T_1 = Seed treatment with Thiomethoxam @ 2g/kg seed; T_2 = Seed treatment with NSK powder @50g/kgseed followed by NSE spray @ 5% at 10 days after sowing; T_3 = Seed treatment with imidacloprid @ 5g/kg seed; T_4 = Foliar spray of Thiomethoxam 25 WSC @ 0.0125% at10 days after sowing; T_5 = Foliar spray of NSE @ 5% at 10 days after sowing; T_6 = Foliar spray with imidacloprid @ 0.3ml/l at 10 days after sowing; T_7 = Foliar spray with Endosulfan @ 0.07% at10 days after sowing; T_8 = Untreated control.

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PPT. 10. Management of root rot disease in cowpea Locations: Bhubneshwar

The experiment was conducted for the first year as location specific trial with seven different treatments viz. T_1 = Seed treatment with *Trichoderma viridae* @ 5 g/kg seed + FYM @ 2t/ha.; T_2 = Seed treatment with *Pseudomonas fluorescence* @ 5 g/kg seed; T_3 = Seed treatment with Neem Seed Kernal Powder @ 50 g/kg seed; T_4 = Seed Soaking in solution of gum of Asafoetida @ 0.4 % for 4 hrs; T_5 = Seed treatment with Carbendazim @ 2 g/kg seed; T_6 = Soil drenching with 3% pitcher compost at the time of sowing; T_7 = Untreated control. The results presented in table PPT 10.1 revealed that all the treatment significantly reduced the disease incidence and increased the GFY and DMY. However, seed treatment with *Trichoderma viridae* @ 5 g/kg seed + FYM @ 2t/ha provided minimum root rot disease incidence (10.80%) with maximum GFY (271.25q/ha), DMY (65.61q/ha) and net monetary return Rs.15700/ha/yr. as compared to the untreated control.

Table PPT. 10.1 Percent disease incidence, green and dry fodder yield and net monitory return in different treatments.

Treatment	Percent disease	GFY (q/ha)	DFY (q/ha)	Net monitory return
	incidence			(Rs/ha/year)
Τ ₁	10.80	271.25	65.61	15700
T ₂	15.25	247.20	59.33	13780
T ₃	17.75	220.07	51.74	11606
Τ ₄	19.50	212.35	50.23	10988
T ₅	12.75	255.25	59.80	14402
Т ₆	17.10	237.75	56.49	13020
T ₇	23.80	194.25	46.03	9540
CD (5%)	4.83	31.73	7.9	255.26

CHAPTER-4 BREEDER SEED PRODUCTION

BREEDER SEED PRODUCTION IN FORAGE CROPS, BSP-IV (KHARIF-2010)

(Table Reference: 1 & 2)

In Kharif 2010, the indent for breeder seed production was received from DAC, GOI for 19 varieties in five major forage crops *viz.*, Maize, Cowpea, Pearl Millet, Sorghum and Teosinte (BSP-1). The allocation of total quantity of Breeder seed (106.92q) was made to nine breeder seed producing centres of the different SAUs/ICAR institutes. Among quantity indented the maximum was for Maize i.e. 63.22 q (59.13%) followed by Sorghum (23.00q-21.51%) and in other forage crop i.e. Teosinte (10.00q-9.35%), Cowpea (9.20q-8.60%) and Pearl millet (1.50q-1.40%) it was less than 10 percent which shows that among several forage crops seed of only these two crops was demanded in substantial quantity.

The final breeder seed production report (BSP-IV) received from different producing centres indicated that except for Teosinte, breeder seed production in all other crops was higher than the indented quantity. As compared to indent in Maize (63.22q), the actual production was 92.68q, in Sorghum against indent of 23.00q, production was 28.62q, in Cowpea, against indent of 9.20q, production was 16.10q and in Pear millet against indent of 1.50q actual production was 8.50q. The over all breeder seed production was 42.07 percent higher as evident from seed production of 151.90q against the indent for 106.92q.

The production of Cowpea variety CL-367 couldn't take place due to heavy rains. Simultaneously, seed yield of Teosinte variety TL-1 was lees i.e. 6q as against indent of 10q, due to crop damage by heavy rains.

			(q)			
SI. No.	Name of Producing Centre /State	Name of Variety	DAC Indent	Actual allocation as per BSP-1 target	Actual production	Production Surplus (+)/ Deficit (-) over BSP-1 target
1.	BAIF, Urulikanchan	African Tall	25.80	25.80	33.90	(+) 8.10
2.	MPKV, Rahuri	African Tall	19.00	19.00	23.88	(+) 4.88
3.	PAU,	J-1006	15.10	15.10	20.00	(+) 4.90
	Ludhiana	Vijay Composite	0.32	0.32	4.90	(+) 4.58
		CL-367	1.00	1.00	Nil*	(-) 1.00
		FBC-16	1.00	1.00	1.50	(+) 0.50
		TL-1	10.00	10.00	6.00**	(-) 4.00
4.	GBPUAT,	UPC-9202	1.00	1.00	1.50	(+) 0.50
	Pantnagar	UPC-8705	0.50	0.50	1.50	(+) 1.00
		Pant Chari-6	1.00	1.00	1.00	-
		Pant Chari-5	1.00	1.00	Nil	(-) 1.00
5.	IGFRI, Jhansi	EC-4216	5.70	5.70	12.50	(+) 6.80
		MP Chari	5.00	5.00	10.00	(+) 5.00
6.	IARI RRS,	Pusa Chari-23	14.00	14.00	13.40***	(-) 0.60
	Karnal	Pusa Chari-9	0.50	0.50	2.15***	(+) 1.65
		Pusa Chari-6	1.00	1.00	1.57***	(+) 0.57
7.	RAU, Bikaner	RBC-2	0.50	0.50	7.00	(+) 6.50
8.	CCS HAU,	HL-88 (CS-88)	1.00	1.00	0.60	(-) 0.40
	HISAR	HC-136	0.50	0.50	0.50	-
9.	MPUAT, Udaipur	Pratap Makka Chari-6	3.00	3.00	10.00	(+) 7.00

Remarks: * - Crop damaged due to heavy rains, **- Less yield due to heavy rains, ***-Including carry over seeds

-				(q)
SI. No.	Varieties	Actual allocation as per BSP-1	Actual Production	Production Surplus (+)/ Deficit (-) over BSP-1
1.	Maize			
	African Tall	44.80	57.78	(+) 12.98
	Vijay Composite	0.32	4.90	(+) 4.58
	J-1006	15.10	20.00	(+) 4.90
	Pratap Makka Chari-6	3.00	10.00	(+) 7.00
	Total	63.22	92.68	(+) 29.46
2.	Cowpea CL-367	1.00	Nil*	(-) 1.00
	UPC-9202	1.00	1.50	(+) 0.50
	Haryana Lobia-88 (CS-88)	1.00	0.60	(-) 0.40
	UPC-8705	0.50	1.50	(+) 1.00
	EC-4216	5.70	12.50	(+) 6.80
	Total	9.20	16.10	(+) 6.90
3.	Pearl Millet - FBC-16	1.00	1.50	(+) 0.50
	Raj Bajra Chari-2	0.50	7.00	(+) 6.50
	Total	1.50	8.50	(+) 7.00
4.	Sorghum - Pant Chari-6	1.00	1.00	-
	Pant Chari-5	1.00	Nil	(-) 1.00
	Pusa Chari-23	14.00	13.40	(-) 0.60
	Pusa Chari-9	0.50	2.15	(+) 1.65
	Pusa Chari-6	1.00	1.57	(+) 0.57
	HC-136	0.50	0.50	-
	MP Chari	5.00	10.00	(+) 5.00
	Total	23.00	28.62	(+) 5.62
	Teosinte-			
5.	TL-1	10.00	6.00	(-) 4.00
	Total	10.00	6.00	(-) 4.00
	G. Total	106.92	151.90	(+) 44.98

WEATHER REPORT FOR KHARIF-2010

The weather report of the centres across the different zones during kharif-2010 programme has been presented in this section. The weather parameters from 26^{th} week (June 25-July 01, 2010) to 44^{th} week (October 29-Nov. 04, 2010) were taken into consideration, which covers the *kharif* 2010 season for all the testing locations under AICRP on forage crops [Table MET-1.1(a) to 1.4(x)]. During the reporting period, weather variations are clearly visible in maximum and minimum temperature and day length in different zones, which has wide impact on growth and yield of different forage crop and varieties. The weather parameters influenced the growth and yield performance of different crop varieties. **Temperature :**

Minimum temperature was recorded in Hill Zone irrespective of locations. Within Hill Zone Srinagar remained the coolest location recording 5.8 to 2.9 ^OC from 42nd to 43rd meteorological week. Among Hill Zone locations, maximum average temperature was highest at Almora i.e. 30.7 ^oC during 26th week. In same Zone the average minimum temperature over the season was recorded lowest at Srinagar location. Whereas the average highest temperature was recorded at Almora. In North-West Zone, Hisar recorded lowest minimum temperature (12.8 ^OC) during 44th meteorological week. Maximum temperature was also highest at Hisar and Bikaner (41.8 °C each) followed by Jodhpur (41.6 ^oC) during 26th meteorological week. In North-East Zone, Faizabad recorded the lowest temperature i.e. 17.5 to 13.6 ^oC during 43rd to 44th meteorological week. In this zone, the maximum temperature was also recorded at Faizabad (38.9 ^oC) during 26th week followed by Ranchi (36.2 ^oC), Jorhat (34.7 ^oC) during 32nd meteorological week and Bhubaneswar (34.6 °C) during 39th SMW. In Central Zone, Jhansi recorded the lowest temperature (11.7 ^oC) during 43rd SMW followed by Kanpur (14.4 ^oC) during the same week. In this zone, the maximum temperature was recorded at Jhansi (42.0 °C) during 26th SMW followed by Anand (41.7 °C) during 42nd SMW. Anand and Jhansi locations experienced higher temperature during 26th to 44th SMW in comparison to Urulikanchan and Jamnagar. In South zone, lowest temperature was recorded during 42nd to 43rd SMW at Mandya (19.4 to 20.1 ^oC) followed by Hyderabad (19.6 to 20.0 ^oC) during 43rd to 44th SMW and Vellayani (22.3 to 22.2 °C) during 40th to 41st SMW. The maximum temperature was recorded at Vellayani (35.1 °C) during 42nd SMW followed by Hyderabad (33.5 °C) during 26th SMW, Mandya $(33.0 ^{\circ}C)$ during 40^{th} SMW.

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Rainfall :

The 80-90 percent rainfall in Indian Sub-continent is mostly received through southwest monsoon from June-September. This phenomenon is reflected in the data on rainfall and rainy days as in most of the locations rains were received during this period. In Hill zone, Palampur received maximum rainfall (2050.1 mm) in 74 rainy days and Almora received (1090.5 mm) rainfall in 61 rainy days. Whereas Srinagar received lowest rainfall (255.5 mm) in same Zone. In North-West Zone Hisar received maximum rainfall (660 mm) during the period under report and more than 38% of rainfall (254.6 mm) was received in the month of July. At Bikaner, lowest rain (290.8 mm) in 12 rainy days was received during this period. Ludhiana received well distribution of rainfall in 36 rainy days with 629.8 mm rainfall. In North-East Zone more than 1000 mm rainfall was received in Jorhat and Bhubaneswar during the 26th to 44th standard meteorological week. Among these maximum rainfall (1350.8 mm) was received at Jorhat in 84 rainy days. At the same time Faizabad received lowest rainfall (640.7 mm) during same period in 40 rainy days among all the centres of North-East Zone. In Central Zone, maximum rainfall (1548.4 mm) was received at Jabalpur followed by Jamnagar (1516.2 mm) in 43 rainy days. At Urulikanchan, lowest rain (607.8) in 38 rainy days was received during the period with well distribution of rainfall. In South Zone, Vellayani received maximum rainfall (979.1 mm) in 62 rainy days followed by Hyderabad (838.2 mm) whereas, Coimbatore received minimum rainfall (269 mm) in just 16 rainy days.

Relative Humidity :

In Hill Zone, Relative Humidity (RH) was higher (99.3%) in morning at Almora as compared to Palampur (95.9%) and Srinagar (94.0%) Whereas, lowest afternoon Relative Humidity was recorded at Almora (39.2%) in 44th SMW. In North-West Zone RH ranged from 48.0 to 98.0% in morning hours but in afternoon ranged between 19.0% to 91.0%. Lowest RH was recorded at Jodhpur in morning (48.0%) and at Hisar and Jodhpur in afternoon (19.0% each). In the same zone, the maximum RH was recorded in morning and afternoon hours at Hisar (98.0 and 91.0%, respectively). In North-East Zone maximum (97.6%) and minimum RH (78.2%) was recorded at Kalyani, during morning hours. In afternoon RH was minimum (53.8%) at Ranchi and maximum (86.0%) at Bhubaneswar. Whereas, average RH was highest at Kalyani (90.4%). In Central-Zone minimum RH (67.0%) was recorded in morning at Jhansi and maximum (100%) was recorded at Urulikanchan centre. At Urulikanchan RH was 98.6 to 100.0% in morning hours. In South-Zone RH at Vellayani and Mandya location was higher in morning as compare to Hyderabad. In the same zone the maximum (95.0%) and minimum RH (83.0%) in morning hours was recorded at Hyderabad centre. Whereas, in afternoon hours the maximum (89.7%) and minimum RH (41.9%) was recorded at Vellayani and Mandya centres, respectively.

Sunshine hours:

Sunshine hours were recorded at different locations in different zone. In Hill Zone, sunshine hours were maximum (11.7 h) in Srinagar as compare to Almora (8.8 h). In North-West Zone, sunshine hours were maximum at Jodhpur (10.4 h) followed by Ludhiana (10.1 h) and Bikaner (9.9 h). On the mean basis over the crop season, Jodhpur recorded maximum sunshine hours (7.24 h) followed by Bikaner (7.06 h) and lowest being with Ludhiana (5.64 h). Bhubaneswar recorded maximum sunshine (8.8 h) followed by Kalyani (7.7 h) in North-East Zone. On the mean basis across the crop season maximum sunshine was recorded at Ranchi (6.42 h) followed by Kalyani (5.7 h) in the same zone. In Central zone sunshine hours were maximum at Anand (10.0 h) followed by Jhansi (9.8 h), on the mean basis over the crop season the maximum sunshine (6.54 h) was recorded at Jhansi in the same zone. In South Zone maximum sunshine was recorded at Coimbatore and Mandya (7.8 h each). Whereas, on the mean basis over the season Mandya recorded maximum sunshine (5.19 h) followed by Coimbatore.

			Hill	zone		
Met. Week & Month	Palar	npur	Aln	nora	Srin	agar
	Max.	Min.	Max.	Min.	Max.	Min.
26 June 25-July 01, 2010	30.4	19.7	30.7	20.1	25.3	13.6
27 July 02-July 08, 2010	26.4	19.3	27.8	20.1	29.3	13.4
28 July 09-July 15, 2010	27.6	20.2	30.5	21.4	31.6	15.5
29 July 16-July 22, 2010	26.7	20.9	25.9	20.3	25.6	14.9
30 July 23-July 29, 2010	25.9	20.0	28.9	20.9	23.8	17.0
31 July 30-Aug.05, 2010	27.0	19.8	28.4	20.4	27.5	18.6
32 Aug.06-Aug.12, 2010	25.9	20.3	28.4	21.3	26.0	20.2
33 Aug.13-Aug.19, 2010	25.8	20.3	28.6	21.1	30.8	19.3
34 Aug.20-Aug.26, 2010	25.2	19.2	25.8	20.6	25.0	16.6
35 Aug.27-Sep.02, 2010	26.7	19.8	28.9	21.2	29.0	14.8
36 Sep.03-Sep.09, 2010	26.0	19.1	27.4	20.0	29.0	16.0
37 Sep.10-Sep.16, 2010	25.1	17.7	26.4	19.7	25.3	14.5
38 Sep.17-Sep.23, 2010	24.4	17.2	24.1	17.4	27.0	12.0
39 Sep.24-Sep.30, 2010	25.9	14.8	29.3	15.9	25.5	08.3
40 Oct. 01- Oct.07, 2010	27.2	15.0	29.0	13.3	27.5	07.8
41 Oct. 08- Oct.14, 2010	26.5	14.3	28.1	13.1	27.0	07.0
42 Oct. 15- Oct.21, 2010	26.7	15.0	29.4	08.9	25.0	05.8
43 Oct. 22- Oct.28, 2010	23.1	10.0	26.3	07.9	13.3	02.9
44 Oct. 29- Nov.04, 2010	23.7	10.6	25.6	07.3		

Table MET -1.1 (a): Temperature (⁰C) at AICRP-FC trial locations during crop growth period, kharif 2010

AICRP on Forage Crops

	North West Zone										
Met. Week & Month	His	sar	Bikaner		Jodhpur		Lud	hiana			
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.			
26 June 25-July 01,2010	41.8	28.3	41.8	31.2	41.6	31.2	37.0	26.7			
27 July 02-July 08, 2010	36.0	25.5	38.0	29.3	38.8	28.6	32.2	25.9			
28 July 09-July 15, 2010	36.5	26.7	38.6	29.4	36.9	28.1	34.3	26.9			
29 July 16-July 22, 2010	36.3	27.3	41.1	30.9	39.6	29.5	31.5	27.5			
30 July 23-July 29, 2010	32.7	26.2	35.0	28.0	33.7	24.6	33.2	26.9			
31 July 30-Aug.05, 2010	33.2	26.2	35.7	27.4	33.5	26.1	33.3	27.5			
32 Aug.06-Aug.12, 2010	35.7	26.4	37.0	28.2	34.1	27.1	34.0	27.0			
33 Aug.13-Aug.19, 2010	33.8	26.2	35.2	26.9	32.9	26.2	32.5	26.7			
34 Aug.20-Aug.26, 2010	32.4	25.4	35.2	27.2	32.7	26.1	32.2	25.9			
35 Aug.27-Sep.02, 2010	34.3	26.3	38.4	27.5	36.0	27.2	34.1	25.8			
36 Sep.03-Sep.09, 2010	33.1	25.3	36.2	26.2	33.6	26.0	32.6	25.9			
37 Sep.10-Sep.16, 2010	32.3	24.0	33.3	25.3	31.2	24.7	30.6	24.0			
38 Sep.17-Sep.23, 2010	29.6	22.9	34.0	24.0	34.1	23.1	30.1	21.8			
39 Sep.24-Sep.30, 2010	33.2	20.1	36.3	22.5	35.4	20.2	32.8	21.2			
40 Oct. 01- Oct.07, 2010	34.3	20.8	37.6	24.7	37.7	22.1	33.0	21.7			
41 Oct. 08- Oct.14, 2010	34.5	19.3	37.0	22.7	36.4	21.3	33.0	20.6			
42 Oct. 15- Oct.21, 2010	33.9	20.2	36.9	23.7	36.9	23.1	32.5	21.0			
43 Oct. 22- Oct.28, 2010	31.5	14.2	33.9	18.8	36.3	27.1	29.0	14.2			
44 Oct. 29- Nov.04, 2010	30.0	12.8	31.5	16.1	32.4	18.5	29.0	13.6			

Table MET -1.1 (b): Temperature (⁰C) at AICRP-FC trial locations during crop growth period, kharif 2010

AICRP on Forage Crops

					North E	ast Zone				
Met. Week & Month	Faiza	abad	Bhuba	neswar	Jor	hat	Ran	chi	Kal	yani
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
26 June 25-July 01, 2010	38.9	27.6	33.5	25.8	31.0	25.3	36.2	24.5	32.0	26.6
27 July 02-July 08, 2010	35.8	27.5	33.1	25.4	32.8	25.8	35.3	24.3	32.8	26.4
28 July 09-July 15, 2010	35.3	26.7	34.0	26.7	31.7	25.8	34.8	24.2	33.3	26.8
29 July 16-July 22, 2010	32.2	25.1	34.0	27.1	31.5	25.7	34.5	24.0	33.8	27.0
30 July 23-July 29, 2010	32.8	26.7	30.9	25.7	31.7	25.9	34.0	24.0	33.0	26.4
31 July 30-Aug.05, 2010	32.4	26.2	32.6	26.1	31.7	26.0	33.6	23.9	31.5	25.8
32 Aug.06-Aug.12, 2010	33.3	27.2	33.3	26.6	34.7	26.3	33.4	23.8	33.8	26.3
33 Aug.13-Aug.19, 2010	32.5	26.0	33.8	27.1	32.6	26.3	33.2	23.8	33.0	26.8
34 Aug.20-Aug.26, 2010	30.4	25.4	34.2	26.4	32.0	26.5	33.0	23.6	33.4	26.9
35 Aug.27-Sep.02, 2010	33.6	26.3	31.8	25.9	31.8	25.7	32.8	23.6	32.9	26.6
36 Sep.03-Sep.09, 2010	32.0	26.2	33.3	26.5	31.8	25.5	32.6	23.6	33.3	26.8
37 Sep.10-Sep.16, 2010	31.1	25.2	32.5	25.4	32.2	25.5	32.5	23.4	31.9	25.9
38 Sep.17-Sep.23, 2010	31.1	24.7	31.1	25.3	31.1	24.6	32.3	23.3	31.6	25.9
39 Sep.24-Sep.30, 2010	34.0	23.1	34.6	25.3	31.7	24.2	29.7	18.2	33.7	25.7
40 Oct.01- Oct.07, 2010	33.5	22.7	32.2	24.8	32.2	24.5	29.6	18.6	32.8	25.5
41 Oct.08- Oct.14, 2010	33.0	22.0	30.9	25.0	28.6	22.5	29.2	18.3	31.3	24.0
42 Oct.15- Oct.21, 2010	31.3	23.1	31.6	24.5	30.2	23.3	29.0	18.1	33.7	25.2
43 Oct.22- Oct.28, 2010	31.0	17.5	32.9	24.2	29.5	22.0	28.9	17.5	32.4	23.9
44 Oct.29-Nov.04, 2010	29.6	13.6	28.5	22.3	28.5	19.7	28.3	16.9	30.0	20.6

Table MET -1.1 (c): Temperature (⁰C) at AICRP-FC trial locations during crop growth period, kharif 2010

	Central zone									
Met. Week & Month	Ana	and	Jhansi		Urulikanchan		Jamn	agar		
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		
26 June 25-July 01, 2010	38.0	28.3	42.0	26.3	31.0	23.0				
27 July 02-July 08, 2010	34.4	26.2	36.7	26.2	29.2	22.3	32.8	23.6		
28 July 09-July 15, 2010	33.7	26.3	37.5	27.1	31.1	22.6	33.2	26.4		
29 July 16-July 22, 2010	33.6	27.2	35.1	26.1	30.9	22.8	32.9	26.0		
30 July 23-July 29, 2010	31.1	26.1	32.9	26.1	26.6	22.2	31.1	24.5		
31 July 30-Aug.05, 2010	31.4	25.3	32.1	25.4	27.3	22.5	30.6	24.9		
32 Aug.06-Aug.12, 2010	30.5	25.1	33.5	25.3	29.6	22.0	30.4	25.2		
33 Aug.13-Aug.19, 2010	32.3	25.9	33.6	25.3	29.8	22.4	31.7	25.5		
34 Aug.20-Aug.26, 2010	32.1	25.5	32.2	25.3	29.9	22.0	31.4	25.5		
35 Aug.27-Sep.02, 2010	32.9	25.1	33.9	25.4	27.7	22.2	32.0	24.4		
36 Sep.03-Sep.09, 2010	29.9	25.3	33.0	25.6	27.8	21.7	30.9	25.5		
37 Sep.10-Sep.16, 2010	29.3	24.7	33.0	24.9	31.2	20.3	30.2	24.7		
38 Sep.17-Sep.23, 2010	32.8	24.6	31.3	23.3	33.4	21.6	32.7	24.0		
39 Sep.24-Sep.30, 2010	35.8	24.0	34.1	19.4	34.3	21.1	33.5	23.3		
40 Oct.01- Oct.07, 2010	37.9	22.8	35.4	19.5	34.3	20.2	36.7	24.0		
41 Oct.08- Oct.14, 2010	34.9	23.5	35.7	19.3	33.3	18.9	33.3	23.6		
42 Oct.15- Oct.21, 2010	41.7	27.9	33.2	21.6	32.7	21.4	35.0	24.9		
43 Oct.22- Oct.28, 2010	35.4	21.9	34.2	16.1	33.0	18.7				
44 Oct.29-Nov.04, 2010			31.3	11.7	32.1	15.5				

Table MET -1.1 (d): Temperature (°C) at AICRP-FC trial locations during crop growth period, kharif 2010

Cont....

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		Central zone											
Met. Week & Month	Rał	nuri	Kan	pur	Jaba	alpur							
	Max.	Min.	Max.	Min.	Max.	Min.							
26 June 25-July 01, 2010	33.3	23.0			37.4	25.4							
27 July 02-July 08, 2010	30.5	22.1	36.4	28.2	33.1	24.8							
28 July 09-July 15, 2010	31.6	22.4	35.3	27.2	31.7	24.2							
29 July 16-July 22, 2010	30.9	22.3	32.1	26.3	33.5	25.2							
30 July 23-July 29, 2010	29.5	22.3	33.4	27.1	30.7	24.5							
31 July 30-Aug.05, 2010	30.0	21.9	33.2	26.5	31.5	23.5							
32 Aug.06-Aug.12, 2010	29.8	21.1	34.0	27.3	31.9	23.1							
33 Aug.13-Aug.19, 2010	30.1	21.9	33.1	27.0	33.3	23.3							
34 Aug.20-Aug.26, 2010	29.1	21.1	32.1	26.2	32.9	23.7							
35 Aug.27-Sep.02, 2010	28.7	21.6	33.5	27.3	33.5	23.6							
36 Sep.03-Sep.09, 2010	29.0	21.5	32.6	26.3	33.0	23.3							
37 Sep.10-Sep.16, 2010	31.0	20.6	32.9	25.9	31.9	23.6							
38 Sep.17-Sep.23, 2010	30.8	21.6	31.1	24.9	30.4	22.5							
39 Sep.24-Sep.30, 2010	30.8	21.5	32.2	23.6	32.0	20.6							
40 Oct.01- Oct.07, 2010	30.6	20.8	33.3	22.9	32.3	20.8							
41 Oct.08- Oct.14, 2010	32.0	19.1	32.9	21.2	32.7	19.7							
42 Oct.15- Oct.21, 2010	31.2	21.7	32.1	23.6	31.8	19.8							
43 Oct.22- Oct.28, 2010	30.7	19.8	31.6	18.1	30.9	18.1							
44 Oct.29-Nov.04, 2010	29.9	17.7	30.1	14.4	29.3	15.3							

Table MET -1.1 (e): Temperature (⁰C) at AICRP-FC trial locations during crop growth period, kharif 2010

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		South Zone										
Met. Week & Month	Hyder	abad	Vellayani		Coimb	Coimbatore		ndya				
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.				
26 June 25-July 01, 2010	33.5	24.6	30.2	24.2	32.0	23.5	32.1	21.8				
27 July 02-July 08, 2010	29.5	21.9	30.4	24.1	30.2	23.4	31.1	21.0				
28 July 09-July 15, 2010	30.1	22.9	30.3	23.2	32.6	23.2	30.1	20.8				
29 July 16-July 22, 2010	30.0	22.7	30.2	23.0	30.5	23.5	29.3	20.8				
30 July 23-July 29, 2010	27.7	22.5	30.3	24.0	30.8	23.5	28.9	20.0				
31 July 30-Aug.05, 2010	29.0	22.5	30.3	24.2	30.7	23.3	28.6	20.3				
32 Aug.06-Aug.12, 2010	29.5	22.2	30.3	23.8	32.3	23.0	30.3	19.9				
33 Aug.13-Aug.19, 2010	30.9	23.1	30.2	23.1	30.7	23.6	30.9	21.3				
34 Aug.20-Aug.26, 2010	31.3	22.5	30.4	24.3	30.4	22.2	29.9	20.2				
35 Aug.27-Sep.02, 2010	28.3	22.7	30.5	25.2	30.4	22.4	28.9	19.8				
36 Sep.03-Sep.09, 2010	27.4	22.2	30.6	24.3	30.8	23.0	28.9	20.4				
37 Sep.10-Sep.16, 2010	30.2	22.5	30.4	23.8	30.4	23.0	28.7	20.1				
38 Sep.17-Sep.23, 2010	29.2	21.9	30.8	23.3	32.0	22.0	30.7	20.9				
39 Sep.24-Sep.30, 2010	31.2	21.9	30.7	22.5	32.0	23.4	32.6	20.8				
40 Oct.01- Oct.07, 2010	30.7	21.7	29.6	22.3	31.5	23.4	33.0	21.2				
41 Oct.08- Oct.14, 2010	31.8	20.4	29.7	22.2	30.8	22.3	30.4	20.2				
42 Oct.15- Oct.21, 2010	28.3	21.3	35.1	25.9	31.2	22.8	30.0	19.4				
43 Oct.22- Oct.28, 2010	29.9	19.6	31.0	25.0	31.4	22.2	30.0	20.1				
44 Oct.29-Nov.04, 2010	26.7	20.0	30.7	24.0	29.3	22.1						

Table MET -1.1 (f): Temperature (⁰C) at AICRP-FC trial locations during crop growth period, kharif 2010

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	Hill zone							
Met. Week & Month	Palampur		Almora		Srinagar			
	RF	RD	RF	RD	RF			
26 June 25-July 01, 2010	090.0	4	013.5	1	05.4			
27 July 02-July 08, 2010	132.0	4	081.0	5	00.0			
28 July 09-July 15, 2010	009.2	3	058.0	2	01.4			
29 July 16-July 22, 2010	153.2	4	156.0	7	40.4			
30 July 23-July 29, 2010	179.9	7	051.5	2	14.4			
31 July 30-Aug.05, 2010	246.8	7	051.0	6	01.8			
32 Aug.06-Aug.12, 2010	190.6	6	030.0	6	08.1			
33 Aug.13-Aug.19, 2010	272.4	7	076.0	5	68.8			
34 Aug.20-Aug.26, 2010	326.4	7	098.5	6	17.4			
35 Aug.27-Sep.02, 2010	097.9	4	021.5	4	56.6			
36 Sep.03-Sep.09, 2010	202.6	7	088.5	5	00.0			
37 Sep.10-Sep.16, 2010	092.0	6	073.0	6	02.8			
38 Sep.17-Sep.23, 2010	011.8	4	255.5	4	01.8			
39 Sep.24-Sep.30, 2010	012.4	1	031.0	1	02.6			
40 Oct.01- Oct.07, 2010	001.8	2	000.0	0	00.0			
41 Oct.08- Oct.14, 2010	002.5	1	000.0	0	01.0			
42 Oct.15- Oct.21, 2010	000.0	0	000.0	0	00.0			
43 Oct.22- Oct.28, 2010	028.6	2	005.5	1	33.0			
44 Oct.29-Nov.04, 2010	000.0	0	000.0	0				

Table MET -1.2 (g): Rainfall (RF, mm) and Rainy days (RD, No.) at AICRP-FC trial locations during crop growth period, Kharif 2010

AICRP on Forage Crops

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	North West Zone									
Met. Week & Month	Hisar	Bikaner		Ludhiana		Jodhpur				
	RF	RF	RD	RF	RD	RF	RD			
26 June 25-July 01, 2010	002.5	00.0	0	010.7	2	000.0	0			
27 July 02-July 08, 2010	035.9	00.0	0	156.2	5	021.4	1			
28 July 09-July 15, 2010	036.0	10.3	1	097.6	3	000.0	0			
29 July 16-July 22, 2010	045.6	29.0	1	111.2	5	001.3	0			
30 July 23-July 29, 2010	134.6	38.0	1	012.2	3	111.2	4			
31 July 30-Aug.05, 2010	050.3	34.0	3	002.4	0	058.2	4			
32 Aug.06-Aug.12, 2010	064.2	12.0	1	007.8	1	003.9	1			
33 Aug.13-Aug.19, 2010	003.4	58.5	3	046.2	2	043.6	2			
34 Aug.20-Aug.26, 2010	139.9	00.0	0	049.4	4	000.3	0			
35 Aug.27-Sep.02, 2010	000.0	01.0	0	008.8	1	014.7	1			
36 Sep.03-Sep.09, 2010	030.3	42.0	1	030.0	3	049.8	2			
37 Sep.10-Sep.16, 2010	065.0	66.0	1	028.0	3	153.1	5			
38 Sep.17-Sep.23, 2010	052.3	00.0	0	060.5	3	000.0	0			
39 Sep.24-Sep.30, 2010	000.0	00.0	0	000.0	0	000.0	0			
40 Oct.01- Oct.07, 2010	000.0	00.0	0	000.0	0	000.0	0			
41 Oct.08- Oct.14, 2010	000.0	00.0	0	000.0	0	000.0	0			
42 Oct.15- Oct.21, 2010	000.0	00.0	0	000.0	0	000.0	0			
43 Oct.22- Oct.28, 2010	000.0	00.0	0	008.8	1	000.0	0			
44 Oct.29-Nov.04, 2010	000.0	00.0	0	000.0	0	000.0	0			

Table MET -1.2 (h): Rainfall (RF, mm) and Rainy days (RD, No.) at AICRP-FC trial locations during crop growth period, Kharif 2010
		North East Zone											
Met. Week & Month	Faiza	abad	Bhubar	neswar	Jor	hat	Kaly	ani					
	RF	RD	RF	RD	RF	RD	RF	RD					
26 June 25-July 01, 2010	014.4	1	067.9	3	086.0	7	019.9	7					
27 July 02-July 08, 2010	072.9	3	065.1	6	135.5	6	007.6	3					
28 July 09-July 15, 2010	039.8	2	011.7	2	55.2	6	029.7	4					
29 July 16-July 22, 2010	079.2	5	003.3	1	134.0	7	017.7	2					
30 July 23-July 29, 2010	012.4	3	095.7	6	100.2	5	016.8	3					
31 July 30-Aug.05, 2010	046.8	3	149.9	6	084.6	2	141.5	7					
32 Aug.06-Aug.12, 2010	007.2	1	081.6	2	089.0	3	005.1	2					
33 Aug.13-Aug.19, 2010	060.3	4	016.2	2	062.3	6	035.0	2					
34 Aug.20-Aug.26, 2010	107.4	5	001.4	0	142.4	6	017.0	3					
35 Aug.27-Sep.02, 2010	019.6	3	043.6	6	058.6	5	035.0	6					
36 Sep.03-Sep.09, 2010	015.0	2	041.3	5	066.6	6	028.9	5					
37 Sep.10-Sep.16, 2010	126.4	4	086.0	4	095.5	4	133.3	6					
38 Sep.17-Sep.23, 2010	007.6	2	130.8	6	040.3	6	082.8	5					
39 Sep.24-Sep.30, 2010			022.3	1	019.3	4	026.9	3					
40 Oct.01- Oct.07, 2010			058.5	5	002.9	0	030.8	2					
41 Oct.08- Oct.14, 2010			044.2	1	076.9	5	031.4	3					
42 Oct.15- Oct.21, 2010	031.7	2	068.1	4	008.6	3	027.0	3					
43 Oct.22- Oct.28, 2010			016.5	2	032.6	2	000.0	Nil					
44 Oct.29-Nov.04, 2010			013.5	3	060.3	1	000.7	1					

Table MET -1.2 (i): Rainfall (RF, mm) and Rainy days (RD, No.) at AICRP-FC trial locations during crop growth period, Kharif 2010

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		Central zone									
Met. Week & Month	Anar	nd	Jhan	si	Uruli	kanchan	Jamn	agar			
	RF	RD	RF	RD	RF	RD	RF	RD			
26 June 25-July 01,2010	000.0	0	001.8		50.4	1					
27 July 02-July 08, 2010	043.7	4	100.4	4	11.4	2	136.2	6			
28 July 09-July 15, 2010	060.7	3	005.2				025.1	4			
29 July 16-July 22, 2010	019.1	2	101.2	3	43.6	2	139.5	3			
30 July 23-July 29, 2010	093.8	4	028.6	3	42.0	4	435.5	7			
31 July 30-Aug.05, 2010	171.5	4	093.0	5	14.6	4	279.5	3			
32 Aug.06-Aug.12, 2010	086.8	3	003.0		09.2	1	096.7	4			
33 Aug.13-Aug.19, 2010	021.8	1	036.8	2	14.8	3	022.0	4			
34 Aug.20-Aug.26, 2010	018.0	1	025.8	1			011.5	1			
35 Aug.27-Sep.02, 2010	074.7	2	046.4	3	78.0	5	142.0	6			
36 Sep.03-Sep.09, 2010	076.7	4	101.6	2	23.2	1	026.5	2			
37 Sep.10-Sep.16, 2010	175.1	3	004.0	1			199.0	2			
38 Sep.17-Sep.23, 2010	010.0	1	085.6	3	78.0	4	0.000	0			
39 Sep.24-Sep.30, 2010	000.0	0	000.0		63.0	4	002.7	1			
40 Oct.01- Oct.07, 2010	000.0	0	000.0		72.4	2	0.000	0			
41 Oct.08- Oct.14, 2010	000.0	0	000.0		12.6	1	0.000	0			
42 Oct.15- Oct.21, 2010	000.0	0	000.0		61.0	3	000.0	0			
43 Oct.22- Oct.28, 2010	000.0	0	000.0		33.6	1					
44 Oct.29-Nov.04, 2010	000.0	0	000.0								

 Table MET -1.2 (j): Rainfall (RF, mm) and Rainy days (RD, No.) at AICRP-FC trial locations during crop growth period, Kharif 2010

 Contd....

				Central zone										
Met. Week & Month	Dh	ari	Ra	huri	Ka	npur	Jabalpur							
	RF	RD	RF	RD	RF	RD	RF							
26 June 25-July 01,2010			132.8	4			044.0							
27 July 02-July 08, 2010	129.0	5	035.4	4	069.7	1	082.4							
28 July 09-July 15, 2010	030.0	1	084.9	2	048.0	3	148.2							
29 July 16-July 22, 2010	223.0	3	018.7	1	239.1	5	041.0							
30 July 23-July 29, 2010	054.0	5	011.4	3	024.2	2	170.3							
31 July 30-Aug.05, 2010	178.0	4	018.2	4	066.7	4	122.0							
32 Aug.06-Aug.12, 2010	009.0	1	026.6	1	026.6	2	102.5							
33 Aug.13-Aug.19, 2010	012.0	1	020.2	3	035.8	2	128.0							
34 Aug.20-Aug.26, 2010	007.0	1	011.9	1	124.4	6	024.0							
35 Aug.27-Sep.02, 2010	115.2	6	138.3	5	027.6	4	095.0							
36 Sep.03-Sep.09, 2010	051.2	4	046.3	3	089.4	3	312.7							
37 Sep.10-Sep.16, 2010	016.0	2			030.1	2	080.0							
38 Sep.17-Sep.23, 2010	005.0	1	105.8	5	079.2	4	118.5							
39 Sep.24-Sep.30, 2010	022.0	1	103.4	5			000.0							
40 Oct.01- Oct.07, 2010			001.5				000.0							
41 Oct.08- Oct.14, 2010			001.0		016.6	1	000.0							
42 Oct.15- Oct.21, 2010			008.6	1	000.8		079.4							
43 Oct.22- Oct.28, 2010			003.2	1			000.0							
44 Oct.29-Nov.04, 2010							000.4							

Table MET -1.2 (k): Rainfall (RF, mm) and Rainy days (RD, No.) at AICRP-FC trial locations during crop growth period, Kharif 2010

				Sou	uth Zone			
Met. Week & Month	Hyder	abad	Vellay	yani	Coimb	atore	Man	dya
	RF	RD	RF	RD	RF	RD	RF	RD
26 June 25-July 01, 2010	01.0	0	42.8	5	00.4		04.2	1
27 July 02-July 08, 2010	96.8	4	10.6	1	00.6		06.4	1
28 July 09-July 15, 2010	59.4	3	49.8	5	00.7		87.0	3
29 July 16-July 22, 2010	82.1	4	98.5	7	01.1		15.0	2
30 July 23-July 29, 2010	30.6	4	14.2	3	05.3	1	11.4	2
31 July 30-Aug.05, 2010	13.8	2	18.2	4	02.3		01.0	0
32 Aug.06-Aug.12, 2010	25.2	2	26.6	2	06.0	1	00.0	0
33 Aug.13-Aug.19, 2010	64.5	4	46.8	5	01.2		39.8	2
34 Aug.20-Aug.26, 2010	73.6	5			61.0	2	19.8	3
35 Aug.27-Sep.02, 2010	35.0	1					04.1	1
36 Sep.03-Sep.09, 2010	42.4	4	26.8	2	00.2		02.6	0
37 Sep.10-Sep.16, 2010	26.4	2	21.2	3	12.8	1	16.4	3
38 Sep.17-Sep.23, 2010	85.4	3	23.6	3	10.2	1	28.6	3
39 Sep.24-Sep.30, 2010	75.8	3	62.8	6	02.4		03.0	1
40 Oct.01- Oct.07, 2010	27.8	3	371.2	7	41.8	4	29.8	4
41 Oct.08- Oct.14, 2010	00.0	0	124.2	3	05.8	1	35.4	3
42 Oct.15- Oct.21, 2010	47.2	3	03.2	1	02.4		00.0	0
43 Oct.22- Oct.28, 2010	32.2	1	06.4	1	31.0	1	15.6	2
44 Oct.29-Nov.04, 2010	19.0	1	32.2	4	83.8	4		

Table MET -1.2 (I): Rainfall (RF, mm) and Rainy days (RD, No.) at AICRP-FC trial locations during crop growth period, Kharif 2010

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	Hill zone										
Met. Week & Month		Palampur			Almora			Srinagar			
	М	AN	AV	М	AN	AV	М	AN	AV		
26 June 25-July 01,2010	73.3	60.7	67.0	87.2	52.3	69.8	80.5	62.0	71.3		
27 July 02-July 08, 2010	85.6	79.9	82.8	90.9	70.9	80.9	72.0	50.0	61.0		
28 July 09-July 15, 2010	83.7	77.7	80.7	89.4	70.9	80.2	67.5	52.5	60.0		
29 July 16-July 22, 2010	92.1	92.4	92.3	98.1	84.6	91.4	82.0	65.0	73.5		
30 July 23-July 29, 2010	90.7	85.3	88.0	92.0	75.6	83.8	91.0	75.5	83.3		
31 July 30-Aug.05, 2010	94.3	75.9	85.1	94.7	74.6	84.7	88.0	62.5	75.3		
32 Aug.06-Aug.12, 2010	95.9	88.0	92.0	96.2	75.5	85.9	87.5	77.5	82.5		
33 Aug.13-Aug.19, 2010	93.1	88.0	90.6	96.8	76.9	86.9	83.5	61.0	72.3		
34 Aug.20-Aug.26, 2010	93.0	90.4	91.7	98.7	84.3	91.5	89.0	72.0	80.5		
35 Aug.27-Sep.02, 2010	93.6	84.0	88.8	95.4	75.8	85.6	88.0	44.0	66.0		
36 Sep.03-Sep.09, 2010	94.1	88.4	91.3	97.1	80.9	89.0	86.5	62.5	74.5		
37 Sep.10-Sep.16, 2010	92.6	86.3	89.4	99.3	80.0	89.7	91.0	59.5	75.3		
38 Sep.17-Sep.23, 2010	93.9	84.6	89.3	97.4	81.6	89.5	90.0	53.0	71.5		
39 Sep.24-Sep.30, 2010	84.7	73.7	79.2	95.1	65.0	80.1	92.5	49.5	71.0		
40 Oct.01- Oct.07, 2010	87.1	67.6	77.4	96.6	53.4	75.0	91.0	61.0	76.0		
41 Oct.08- Oct.14, 2010	77.3	57.7	67.5	97.6	60.4	79.0	94.0	69.0	81.5		
42 Oct.15- Oct.21, 2010	83.6	61.6	72.6	97.2	50.2	73.7	91.5	58.0	74.8		
43 Oct.22- Oct.28, 2010	72.1	54.7	63.4	96.1	51.4	73.8	88.5	73.5	81.0		
44 Oct.29-Nov.04, 2010	75.5	51.0	63.3	95.7	39.2	67.5					

Table MET – 1.3 (m): Relative humidity (M = Morning, AN = Afternoon, AV = Average; %) at AICRP-FC trial locations during crop growth Period, Kharif 2010

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	North West Zone										
Met. Week & Month		Bikaner			Ludhiana						
	М	AN	AV	М	AN	AV					
26 June 25-July01,2010	53	25	39.0	69.0	47.0	58.0					
27 July 02-July 08, 2010	71	48	59.5	85.0	74.0	79.5					
28 July 09-July 15, 2010	66	40	53.0	87.0	63.0	75.0					
29 July 16-July 22, 2010	60	38	49.0	91.0	90.0	90.5					
30 July 23-July 29, 2010	83	56	69.5	90.0	72.0	81.0					
31 July 30-Aug.05, 2010	83	60	71.5	86.0	67.0	76.5					
32 Aug.06-Aug.12, 2010	79	47	63.0	89.0	71.0	80.0					
33 Aug.13-Aug.19, 2010	87	56	71.5	91.0	77.0	84.0					
34 Aug.20-Aug.26, 2010	76	50	63.0	93.0	77.0	85.0					
35 Aug.27-Sep.02, 2010	80	43	61.5	93.0	66.0	79.5					
36 Sep.03-Sep.09, 2010	82	54	68.0	89.0	81.0	85.0					
37 Sep.10-Sep.16, 2010	90	64	77.0	95.0	74.0	84.5					
38 Sep.17-Sep.23, 2010	82	37	59.5	93.0	71.0	82.0					
39 Sep.24-Sep.30, 2010	61	26	43.5	95.0	58.0	76.5					
40 Oct.01- Oct.07, 2010	65	28	46.5	96.0	56.0	76.0					
41 Oct.08- Oct.14, 2010	66	24	45.0	92.0	51.0	71.5					
42 Oct.15- Oct.21, 2010	73	27	50.0	91.0	55.0	73.0					
43 Oct.22- Oct.28, 2010	65	30	47.5	82.0	48.0	65.0					
44 Oct.29-Nov.04, 2010	62	28	45.0	93.0	44.0	68.5					

Table MET – 1.3 (n): Relative humidity (M = Morning, AN = Afternoon, AV = Average; %) at AICRP-FC trial locations during crop growth Period, Kharif 2010

			North We	st Zone		
Met. Week & Month		Hisar			Jodhpur	
	М	AN	AV	М	AN	AV
26 June 25-July01, 2010	64	45	54.5	55	29	42.0
27 July 02-July 08, 2010	85	72	78.5	71	43	57.0
28 July 09-July 15, 2010	87	57	72.0	74	43	58.5
29 July 16-July 22, 2010	86	62	74.0	75	42	58.5
30 July 23-July 29, 2010	91	71	81.0	90	69	79.5
31 July 30-Aug.05, 2010	91	72	81.5	91	70	80.5
32 Aug.06-Aug.12, 2010	88	60	74.0	70	56	63.0
33 Aug.13-Aug.19, 2010	93	73	83.0	89	73	81.0
34 Aug.20-Aug.26, 2010	95	77	86.0	83	65	74.0
35 Aug.27-Sep.02, 2010	90	62	76.0	84	50	67.0
36 Sep.03-Sep.09, 2010	94	79	86.5	89	67	78.0
37 Sep.10-Sep.16, 2010	98	75	86.5	90	77	83.5
38 Sep.17-Sep.23, 2010	95	77	86.0	76	37	56.5
39 Sep.24-Sep.30, 2010	88	51	69.5	69	29	49.0
40 Oct.01- Oct.07, 2010	92	44	68.0	69	29	49.0
41 Oct.08- Oct.14, 2010	88	33	60.5	67	29	48.0
42 Oct.15- Oct.21, 2010	91	43	67.0	59	26	42.5
43 Oct.22- Oct.28, 2010	88	28	58.0	48	19	33.5
44 Oct.29-Nov.04, 2010	88	31	59.5	54	24	39.0

Table MET – 1.3 (o): Relative humidity (M = Morning, AN = Afternoon, AV = Average; %) at AICRP-FC trial locations during crop growth Period, Kharif 2010

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	North East Zone												
Met. Week & Month	Faizabad	Bh	ubanesw	var		Jorhat			Ranchi			Kalyani	
	AV	М	AN	AV	М	AN	AV	М	AN	AV	М	AN	AV
26 June 25-July01,2010	65.5	93	78	85.5	95	80	87.5	78.2	53.8	66.0	96.3	80.4	88.4
27 July 02-July 08, 2010	73.7	94	78	86.0	95	75	85.0	80.0	66.4	73.2	91.3	71.3	81.3
28 July 09-July 15, 2010	77.4	90	72	81.0	95	77	86.0	81.3	59.1	70.2	91.7	75.1	83.4
29 July 16-July 22, 2010	85.1	89	68	78.5	96	82	89.0	82.1	59.4	70.7	92.6	71.1	81.9
30 July 23-July 29, 2010	76.9	94	81	87.5	95	74	84.5	82.7	61.0	71.8	94.1	72.4	83.3
31 July 30-Aug.05, 2010	84.9	94	86	90.0	95	74	84.5	83.3	62.6	72.9	97.0	79.6	88.3
32 Aug.06-Aug.12, 2010	78.9	91	66	78.5	90	69	79.5	83.6	63.4	73.5	93.7	70.6	82.1
33 Aug.13-Aug.19, 2010	84.6	93	72	82.5	94	74	84.0	83.9	64.4	74.1	95.0	78.0	86.5
34 Aug.20-Aug.26, 2010	88.3	89	70	79.5	95	81	88.0	83.8	65.2	74.5	93.9	69.0	81.4
35 Aug.27-Sep.02, 2010	80.5	93	83	88.0	95	77	86.0	83.8	65.8	74.8	94.7	76.4	85.6
36 Sep.03-Sep.09, 2010	83.8	92	73	82.5	95	81	88.0	83.8	66.5	75.1	95.9	61.3	78.6
37 Sep.10-Sep.16, 2010	85.4	95	73	84.0	95	73	84.0	84.0	66.8	75.4	96.3	84.6	90.4
38 Sep.17-Sep.23, 2010	86.5	97	77	87.0	95	75	85.0	84.2	67.3	75.7	97.6	82.0	89.8
39 Sep.24-Sep.30, 2010	73.4	92	77	84.5	95	73	84.0	85.0	68.3	76.6	94.7	67.3	81.0
40 Oct.01- Oct.07, 2010	75.5	92	60	76.0	95	70	82.5	84.0	72.0	78.0	92.7	74.3	83.5
41 Oct.08- Oct.14, 2010	70.7	92	78	85.0	96	77	86.5	84.0	70.0	77.0	96.4	74.3	85.4
42 Oct.15- Oct.21, 2010	82.2	95	70	82.5	95	70	82.5	83.0	70.0	76.5	95.0	69.0	82.0
43 Oct.22- Oct.28, 2010	73.7	91	73	82.0	94	71	82.5	83.0	70.0	76.5	93.4	64.9	79.1
44 Oct.29-Nov.04, 2010	73.7	86	61	73.5	96	69	82.5	82.0	70.0	76.0	89.3	62.9	76.1

Table MET – 1.3 (p): Relative humidity (M = Morning, AN = Afternoon, AV = Average; %) at AICRP-FC trial locations during crop growth Period, Kharif 2010

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									Cont.
				Cen	tral zone				
Met. Week & Month		Urulikanchan			Jamnaga	r		Jhansi	
	М	AN	AV	М	AN	AV	м	AN	AV
26 June 25-July 01,2010	98.6	70.1	84.4				67	34	50.5
27 July 02-July 08, 2010	99.4	74.7	87.1	95	81	88.0	84	55	69.5
28 July 09-July 15, 2010	98.9	66.6	82.7	91	71	81.0	81	51	66.0
29 July 16-July 22, 2010	98.9	69.3	84.1	93	77	85.0	89	72	80.5
30 July 23-July 29, 2010	100.0	89.7	94.9	98	88	93.0	89	71	80.0
31 July 30-Aug.05, 2010	98.4	81.7	90.7	96	81	88.5	93	86	89.5
32 Aug.06-Aug.12, 2010	99.4	72.9	86.1	95	89	92.0	91	71	81.0
33 Aug.13-Aug.19, 2010	100.0	73.7	86.9	95	80	87.5	94	76	85.0
34 Aug.20-Aug.26, 2010	100.0	74.9	87.4	90	75	82.5	91	77	84.0
35 Aug.27-Sep.02, 2010	100.0	87.9	93.9	97	79	88.0	94	73	83.5
36 Sep.03-Sep.09, 2010	100.0	83.4	91.7	94	85	89.5	94	76	85.0
37 Sep.10-Sep.16, 2010	100.0	66.3	83.1	94	78	86.0	93	70	81.5
38 Sep.17-Sep.23, 2010	100.0	65.1	82.6	94	60	77.0	91	74	82.5
39 Sep.24-Sep.30, 2010	100.0	64.1	81.8	88	53	70.5	83	49	66.0
40 Oct.01- Oct.07, 2010	100.0	55.6	77.8	87	49	68.0	83	47	65.0
41 Oct.08- Oct.14, 2010	100.0	50.7	75.4	90	57	73.5	79	39	59.0
42 Oct.15- Oct.21, 2010	100.0	66.7	83.4	89	54	71.5	89	59	74.0
43 Oct.22- Oct.28, 2010	100.0	53.6	76.8				81	33	57.0
44 Oct.29-Nov.04, 2010	100.0	49.1	74.6				85	33	59.0

Table MET – 1.3 (q): Relative humidity (M = Morning, AN = Afternoon, AV = Average; %) at AICRP-FC trial locations during crop growth Period, Kharif 2010

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				Ce	ntral zone	ral zone									
Met. Week & Month		Rahuri			Anand		Jabalpur								
	М	AN	AV	М	AN	AV	М	AN	AV						
26 June 25-July 01,2010	94	57	75.5	79	44	61.5	76.0	42.0	59.0						
27 July 02-July 08, 2010	93	67	80.0	89	76	82.5	86.0	71.0	78.5						
28 July 09-July 15, 2010	93	68	80.5	89	75	82.0	89.0	75.0	82.0						
29 July 16-July 22, 2010	93	64	78.5	89	72	80.5	88.0	63.0	75.5						
30 July 23-July 29, 2010	94	65	79.5	91	75	83.0	89.0	75.0	82.0						
31 July 30-Aug.05, 2010	93	66	79.5	93	81	87.0	88.0	75.0	81.5						
32 Aug.06-Aug.12, 2010	93	63	78.0	95	79	87.0	88.0	63.0	75.5						
33 Aug.13-Aug.19, 2010	93	67	80.0	95	71	83.0	85.0	64.0	74.5						
34 Aug.20-Aug.26, 2010	92	70	81.0	94	66	80.0	86.0	73.0	79.5						
35 Aug.27-Sep.02, 2010	94	75	84.5	97	77	87.0	84.0	70.0	77.0						
36 Sep.03-Sep.09, 2010	92	68	80.0	98	84	91.0	93.0	70.0	81.5						
37 Sep.10-Sep.16, 2010	91	53	72.0	97	86	91.5	90.0	69.0	79.5						
38 Sep.17-Sep.23, 2010	94	62	78.0	96	62	79.0	93.0	69.0	81.0						
39 Sep.24-Sep.30, 2010	94	64	79.0	86	51	68.5	88.0	47.0	67.5						
40 Oct.01- Oct.07, 2010	92	56	74.0	83	34	58.5	89.0	51.0	70.0						
41 Oct.08- Oct.14, 2010	94	42	68.0	88	51	69.5	86.0	45.0	65.5						
42 Oct.15- Oct.21, 2010	92	56	74.0	94	54	74.0	94.0	60.0	77.0						
43 Oct.22- Oct.28, 2010	92	47	69.5	90	36	63.0	92.0	42.0	67.0						
44 Oct.29-Nov.04, 2010	91	44	67.5				91.0	42.0	66.5						

Table MET – 1.3 (r): Relative humidity (M = Morning, AN = Afternoon, AV = Average; %) at AICRP-FC trial locations during crop growth Period, Kharif 2010

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	South Zone									
Met. Week & Month	I	Hyderabad	1		Vellayani		Coimbatore		Mandya	
	Μ	AN	AV	м	AN	AV	AV	М	AN	AV
26 June 25-July 01, 2010	83	58	70.5	90.14	85.1	87.6	77	91.0	42.9	67.0
27 July 02-July 08, 2010	88	81	84.5	88.3	83.2	85.8	84	91.0	48.6	69.8
28 July 09-July 15, 2010	88	64	76.0	90.3	85.0	87.7	89	91.0	52.4	71.7
29 July 16-July 22, 2010	89	78	83.5	90.0	89.7	89.9	81	91.0	55.6	73.3
30 July 23-July 29, 2010	91	84	87.5	89.3	80.9	85.1	78	91.0	52.7	71.9
31 July 30-Aug.05, 2010	88	70	79.0	90.3	82.4	86.4	76	91.0	54.1	72.6
32 Aug.06-Aug.12, 2010	90	72	81.0	91.0	80.5	85.8	89	91.0	49.9	70.5
33 Aug.13-Aug.19, 2010	93	76	84.5	89.0	79.7	84.4	89	91.0	49.4	70.2
34 Aug.20-Aug.26, 2010	95	75	85.0	88.0	79.0	83.5	95	91.0	54.1	72.6
35 Aug.27-Sep.02, 2010	88	81	84.5	89.0	79.0	84.0	85	91.0	52.0	71.5
36 Sep.03-Sep.09, 2010	91	82	86.5	89.0	78.0	83.5	81	91.0	58.9	75.0
37 Sep.10-Sep.16, 2010	90	67	78.5	88.0	78.0	83.0	90	91.0	58.9	75.0
38 Sep.17-Sep.23, 2010	90	68	79.0	89.2	77.5	83.4	90	91.0	49.1	70.1
39 Sep.24-Sep.30, 2010	88	68	78.0	89.0	78.0	83.5	88	91.0	42.3	66.7
40 Oct.01- Oct.07, 2010	86	66	76.0	91.0	78.4	84.7	92	91.0	41.9	66.5
41 Oct.08- Oct.14, 2010	83	50	66.5	90.5	79.0	84.8	92	91.0	51.0	71.0
42 Oct.15- Oct.21, 2010	89	74	81.5	88.4	77.0	82.7	87	91.0	53.0	72.0
43 Oct.22- Oct.28, 2010	86	60	73.0	88.4	78.4	83.4	91	91.0	53.7	72.4
44 Oct.29-Nov.04, 2010	90	86	88.0	90.4	75.4	82.9	95			
on Forage Crops							1	Ann	ual Report-	Kharif-2010

Table MET – 1.3 (s): Relative humidity (M = Morning, AN = Afternoon, AV = Average; %) at AICRP-FC trial locations during crop growth Period, Kharif 2010

	Hill Zone									
Met. Week & Month	Palampur	Almora	Srinagar							
26 June 25-July 01, 2010	7	6.4	07.8							
27 July 02-July 08, 2010	4	4.5	11.7							
28 July 09-July 15, 2010	5	5.9	10.8							
29 July 16-July 22, 2010	2	1.4	06.0							
30 July 23-July 29, 2010	1	4.3	07.5							
31 July 30-Aug.05, 2010	5	4.5	01.2							
32 Aug.06-Aug.12, 2010	1	3.2	03.0							
33 Aug.13-Aug.19, 2010	2	3.7	06.2							
34 Aug.20-Aug.26, 2010	2	1.4	02.3							
35 Aug.27-Sep.02, 2010	5	4.0	08.2							
36 Sep.03-Sep.09, 2010	3	2.4	05.9							
37 Sep.10-Sep.16, 2010	4	1.9	08.8							
38 Sep.17-Sep.23, 2010	4	1.7	06.5							
39 Sep.24-Sep.30, 2010	7	7.3	08.6							
40 Oct. 01- Oct.07, 2010	8	8.2	08.6							
41 Oct. 08- Oct.14, 2010	8	7.6	07.4							
42 Oct. 15- Oct.21, 2010	8	8.8	06.4							
43 Oct. 22- Oct.28, 2010	7	8.0	03.4							
44 Oct. 29-Nov.04, 2010	8	7.8								

Table MET – 1.4 (t): Sunshine (h) at AICRP-FC trial locations during crop growth period, Kharif 2010

	North west zone					
Met. Week & Month	Ludhiana	Jodhpur	Hisar	Bikaner		
26 June 25-July 01, 2010	06.3	09.8	6.8	2.9		
27 July 02-July 08, 2010	04.3	06.9	4.2	5.6		
28 July 09-July 15, 2010	07.6	07.2	7.5	7.4		
29 July 16-July 22, 2010	00.7	06.4	5.9	5.9		
30 July 23-July 29, 2010	04.6	03.9	4.6	5.0		
31 July 30-Aug.05, 2010	08.3	04.4	5.2	7.3		
32 Aug.06-Aug.12, 2010	03.6	07.0	7.8	8.7		
33 Aug.13-Aug.19, 2010	03.7	05.0	5.4	6.1		
34 Aug.20-Aug.26, 2010	04.8	05.1	4.9	6.8		
35 Aug.27-Sep.02, 2010	06.9	06.7	7.6	7.8		
36 Sep.03-Sep.09, 2010	05.5	05.3	5.1	7.3		
37 Sep.10-Sep.16, 2010	06.2	03.9	5.7	5.1		
38 Sep.17-Sep.23, 2010	06.2	09.0	4.5	4.8		
39 Sep.24-Sep.30, 2010	10.1	10.4	9.7	9.6		
40 Oct. 01- Oct.07, 2010	06.8	10.1	8.9	9.5		
41 Oct. 08- Oct.14, 2010	05.1	09.9	8.1	9.6		
42 Oct. 15- Oct.21, 2010	03.6	09.7	8.2	9.9		
43 Oct. 22- Oct.28, 2010	06.7	09.5	7.0	8.7		
44 Oct. 29-Nov.04, 2010	06.2	07.5	7.1	6.1		

Table MET – 1.4 (u): Sunshine (h) at AICRP-FC trial locations during crop growth period, Kharif 2010

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	North East zone								
Met. Week & Month	Bhubaneswar	Jorhat	Ranchi	Kalyani	Faizabad				
26 June 25-July 01, 2010	3.3	2.7	6.4	1.8	5.7				
27 July 02-July 08, 2010	5.9	3.0	6.3	7.7	6.4				
28 July 09-July 15, 2010	5.6	2.9	6.3	4.6	3.9				
29 July 16-July 22, 2010	8.8	1.2	6.6	5.6	0.7				
30 July 23-July 29, 2010	2.0	4.9	6.6	5.9	3.9				
31 July 30-Aug.05, 2010	2.9	6.3	6.6	5.2	4.4				
32 Aug.06-Aug.12, 2010	5.7	7.5	6.8	6.4	6.0				
33 Aug.13-Aug.19, 2010	5.2	2.9	6.7	5.2	2.7				
34 Aug.20-Aug.26, 2010	6.9	3.1	6.5	5.4	1.0				
35 Aug.27-Sep.02, 2010	2.9	3.3	6.4	6.4	3.9				
36 Sep.03-Sep.09, 2010	7.4	3.2	6.3	6.8	3.2				
37 Sep.10-Sep.16, 2010	3.9	3.9	6.2	4.1	2.4				
38 Sep.17-Sep.23, 2010	2.7	3.9	6.0	4.7	4.1				
39 Sep.24-Sep.30, 2010	7.2	4.0	6.4	7.1	7.5				
40 Oct.01- Oct.07, 2010	5.6	6.9	6.1	5.3	7.0				
41 Oct.08- Oct.14, 2010	3.8	2.7	6.3	5.3	7.2				
42 Oct.15- Oct.21, 2010	5.5	4.0	6.2	8.5	3.5				
43 Oct.22- Oct.28, 2010	5.3	4.2	6.7	5.9	7.2				
44 Oct.29-Nov.04, 2010	3.7	5.1	6.5	6.5	6.2				

Table MET – 1.4 (v): Sunshine (h) at AICRP-FC trial locations during crop growth period, Kharif 2010

	Central zone						
Met. Week & Month	Kanpur	Anand	Jhansi	Jabalpur			
26 June 25-July 01, 2010		7.9	6.9	6.5			
27 July 02-July 08, 2010	5.8	2.7	6.9	3.0			
28 July 09-July 15, 2010	4.6	4.3	5.9	2.6			
29 July 16-July 22, 2010	8.6	5.6	3.6	5.1			
30 July 23-July 29, 2010	5.0	3.5	4.9	2.7			
31 July 30-Aug.05, 2010	5.2	1.9	4.6	1.6			
32 Aug.06-Aug.12, 2010	6.8	2.8	6.4	4.2			
33 Aug.13-Aug.19, 2010	4.1	3.7	4.3	4.2			
34 Aug.20-Aug.26, 2010	2.4	4.4	4.1	4.6			
35 Aug.27-Sep.02, 2010	5.4	3.1	5.9	5.1			
36 Sep.03-Sep.09, 2010	1.7	3.4	4.9	2.7			
37 Sep.10-Sep.16, 2010	5.1	2.1	7.1	5.0			
38 Sep.17-Sep.23, 2010	4.4	5.8	5.4	4.3			
39 Sep.24-Sep.30, 2010	8.7	8.1	9.8	8.7			
40 Oct.01- Oct.07, 2010	8.3	9.6	9.8	8.4			
41 Oct.08- Oct.14, 2010	6.7	8.0	9.1	7.4			
42 Oct.15- Oct.21, 2010	5.2	10.0	6.6	4.3			
43 Oct.22- Oct.28, 2010	7.1	8.3	9.0	8.2			
44 Oct.29-Nov.04, 2010	8.1		9.0	7.6			

Table MET – 1.4 (w): Sunshine (h) at AICRP-FC trial locations during crop growth period, Kharif 2010

Met. Week & Month	Coimbatore	Hyderabad	Mandya
26 June 25-July 01, 2010	5.4	1.5	5.8
27 July 02-July 08, 2010	1.9	1.6	4.2
28 July 09-July 15, 2010	3.9	3.7	7.0
29 July 16-July 22, 2010	2.7	4.1	3.6
30 July 23-July 29, 2010	3.3	0.7	3.2
31 July 30-Aug.05, 2010	4.2	3.9	3.5
32 Aug.06-Aug.12, 2010	7.8	4.2	6.1
33 Aug.13-Aug.19, 2010	4.3	4.0	5.8
34 Aug.20-Aug.26, 2010	1.3	6.2	0.7
35 Aug.27-Sep.02, 2010	6.2	1.3	5.7
36 Sep.03-Sep.09, 2010	4.6	1.0	4.9
37 Sep.10-Sep.16, 2010	3.4	4.9	3.0
38 Sep.17-Sep.23, 2010	5.5	4.0	6.5
39 Sep.24-Sep.30, 2010	6.2	6.2	7.6
40 Oct.01- Oct.07, 2010	5.6	5.9	7.8
41 Oct.08- Oct.14, 2010	3.5	6.9	7.2
42 Oct.15- Oct.21, 2010	6.9	3.2	6.8
43 Oct.22- Oct.28, 2010	6.6	6.9	4.0
44 Oct.29-Nov.04, 2010	4.1	2.2	

Table MET – 1.4 (x): Sunshine (h) at AICRP-FC trial locations during crop growth period, Kharif 2010

APPENDICES

APPENDIX I: Forage Crops Breeding Trials at a Glance: Kharif-2010

										Cont.
Name of location	Maize	F	Pearl Mill	et	Cov	vpea		Rice bea	an	Soybean
	IVTM	IVTPM	AVT PM-2	AVT PM-2 (Seed)	IVTC	AVT C-1	IVTR	AVT R-2	AVT R-2 (Seed)	AVT-1 (Soy)
Trial No.	Tr No.1	Tr No.2	Tr No.3	Tr No.4	Tr No.5	Tr No.6	Tr No.7	Tr No.8	Tr No.9	Tr No.10
HZ										
1. Srinagar	DR									
2. Rajouri	DR				DR	DR				
3. Palampur	DR				DR	А				
4. Almora					DR	DR				
5. Kullu										
NWZ										
6 Pali										
7 Ludhiana	DR	DR	DR	DR	DR	DR				
8. Hisar	DR	DR	DR	DR	DR	DR		1		DR
9 Pantnagar	DR				DR	DR				
10 Udainur			-						-	+
11 Moorut					Δ					
		ΓP	ΓP	PP	~	+			+	+
12. Jaiour	DK									
14 Dikonor	-				DD	DD		-	1	
		DR	DR	DR	DR	DR				
15. Joanpur								-		
16. Jaisaimer										
17. Fatenpur										
Sneknawati								-		
NEZ										
18. Ranchi	DR		DR	A	DR	DR	DR	DR	A	DR
19. Faizabad	DR	DR	DR	DR	DR	DR				
20. Bhubaneswar	DR	DR	DR	A	DR	DR	DR	DR	DR	
21. Jorhat	DR				DR	DR	DR	DR	DR	
22. Pusa		DR			DR	DR	DR	DR	DR	DR
23. Kalyani					DR	DR	DR	DR	DR	
24. Imphal					A	A		DR	A	DR
25. Shilong					DR		DR			
CZ										
26. Anand	DR	DR	DR	DR	DR	DR				
27. Jhansi	DR	DR	DR	DR	DR	DR				DR
28. Jabalpur	DR	DR	DR	DR	DR	DR	DR	DR	A	DR
29. Rahuri	DR	DR	DR	DR	DR	DR				DR
30. Urulikanchan	DR	DR	DR	DR	DR	DR				
31.Dhari	DR	DR								
32. Jamnagar		DR	DR	DR						
33. Kanpur		1	1		DR	DR			1	1
SZ			Ì					1		
34. Hyderabad	DR	DR	DR	А	DR	DR	1	1	1	
35. Coimbatore	DR	DR	DR	DR	DR	DR			1	1
36. Vellavani	DR				DR	DR	DR	DR	DR	1
37. Mandva	DR	DR	DR	DR	DR	DR				1
38. Dharwad		DR	DR	DR	DR	DR		1		1
39 Pondicherry	1				DR	DR		1	1	
Total Trials (DR/A)	22/23	18/19	17/18	14/18	26/28	24/26	8/8	8/8	5/8	7/7
		1.07.10	1		-0/20			0,0	0.0	

Name of location	Sewan	Guinea Grass		Cenchrus cilliaris	BXN Hybrid	Setaria ancep	Cenchrus setigerus	Dinanath Grass	
	IVT sewan	VTGG- 2009	VTGG- 2008	VTGG- 2007	VTCC- 2008	VTBN- 2008	VT Set. 2008	VT C. seti.	VTD
Trial No.	Tr.No.11	Tr.No.12	Tr.No.13	Tr.No.14	Tr.No.15	Tr.No.16	Tr.No.17	Tr.No.18	Tr.No.19
Hz									
1. Srinagar									
2. Rajouri									
3. Palampur						DR	DR		
4. Almora						DR	DR		
5. Kullu							DR		
NWZ									
6. Pali								DR	
7. Ludhiana				А		DR			
8. Hisar									
9. Pantnagar						DR			
10. Udaipur									
11. Meerut									
12. Jalour	DR				DR			DR	
13. Avikanagar									
14. Bikaner	DR			DR				DR	
15. Jodhpur	DR				DR			DR	
16. Jaisalmer	DR								
17. Fatehpur	А								
shekhawati									
NEZ									
18. Ranchi		DR	DR	DR		DR		A	DR
19. Faizabad		DR	DR			DR		A	
20. Bhubaneswar		DR	DR	A		DR			
21. Jorhat									DR
22. Pusa									DR
23. Kalyani									DR
24. Imphal									
25. Shilong									
CZ									
26. Anand		DR	DR	DR		DR		DR	
27. Jhansi		DR		A	DR			A	
28. Jabalpur						DR			
29. Rahuri				A	DR	DR		DR	
30. Urulikanchan		DR	DR			DR			
31. Dhari								DR	
32. Jamnagar									
33. Kanpur									
SZ									
34. Hyderabad		DR		DR		DR		A	
35. Coimbatore		DR		A		DR		DR	
36. Vellayani		DR	DR	A		DR			
37. Mandya		DR	DR	A		DR			
38. Dharwad		DR	DR			DR			
39. Pondicherry									
Total Trials (DR/A)	4/5	11/11	8/8	4/11	4/4	16/16	3/3	8/12	4/4

DR – Data Reported, A – Trial Allotted

Data Reporting Percentage=211/237=89.02%

Location/ Trial	AST-1	AST-2	AST-3	AST-4	AST-5	AST-6	AST-7	AST-8	AST-9	AST-	AST-	AST-	AST-	AST-	TOTAL	Success
										10		12	15	14	TC)	(%)
	HILL ZONE															
Palampur	TC			DR								TC			3	100
Rajouri	TC														1	100
	NORTH WEST ZONE															
Hisar	TC												DR		2	100
Pantnagar	TC		DR	DR											3	100
Bikaner	TC			DR									DR		3	100
Ludhiana	TC		DR	DR							DR		DR		5	100
Jalore	TC														1	100
NORTH EAST ZONE																
Faizabad	TC							TC					DR		3	100
Ranchi	TC					TC									2	100
Kalyani	TC					TC								DR	3	100
Bhubaneswar	TC					TC							DR		3	100
Jorhat	TC					TC								DR	3	100
Raipur						TC									1	100
Imphal		TNC													-	00
Shillong		TNC							TC						1	50
							CENTR	AL ZON	E		•	•				
Jabalpur	TC													DR	2	100
Rahuri	TC												DR		2	100
Urulikanchan	TC														1	100
Anand	TC												DR		2	100
							SOUT	H ZONE								
Hyderabad	TC				TC								DR		3	100
Mandya	TC						TC								2	100
Coimbatore	TC				TC								DR		3	100
Vellayani	TC									TC					2	100
Total(DR & TC)	20	0	2	4	2	5	1	1	1	1	1	1	9	3	51	
Success Index (%)	100	0	100	100	100	100	100	100	100	100	100	100	100	100		96%

APPENDIX II: Forage Crop Production Trials at a Glance: Kharif -2010

Abbreviations: DR = Data reported, TC = Trial continued and data to be reported after completion of the sequence, TNC = Trial not conducted

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A-3

Trial	Hill Zone	Nor Z	th West Zone	North East Zone	Central Zone			South Zone	Total No. (DR/A)	Success Index (%)
	Palam-	Hi-	Ludhi-	Bhuba-	Anand	Jhansi	Rahuri	Hydera-		
	pur	sar	ana	neswar				bad		
PPT-1	DR	DR	DR	DR	DR	DR	DR	DR	8/8	100
PPT-2	DR	DR	DR	DR	DR	DR	DR	DR	8/8	100
PPT-7	DR		DR						2/2	100
PPT-8	DR			DR	DR	DR	DR		5/7	71.5
PPT-9						DR		DR	2/4	50.0
PPT-10				DR					1/1	100
Total No. (DR/A)	4/4	3/3	3/4	4/4	3/4	4/4	3/4	4/5	26/30	86.7
Success Index (%)	100	67	75	100	75	100	75	80	87	87

APPENDIX III: Forage Crops Protection Trials at a Glance: Kharif-2010

DR = Data Reported

APPENDIX IV. FORAGE BREEDING ACTIVITIES AT AICRP-FC DURING KHARIF 2010

A. HILL ZONE

1. PALAMPUR, CSKHPKV

Germplasm Holding

Сгор	No. of collections				
Setaria (Setaria anceps)	40				
Paspalum (<i>Paspalum wetstenii</i>)	1				
Heteropogon contortus	19				
Chrysopogon gryllus	17				
Rice Bean (Vigna umbellata)	78				
Maize (Zea mays)	32				

Germplasm addition during the period of report

Сгор	No. of collections
Heteropogon contortus	1
Chrysopogon gryllus	1
Maize (Zea mays)	2

Breeding work

I. Setaria

- a) Polycross progenies of 10 diverse parents namely PSS-1, PS-2, PS-3, PS-4, PS-5, S-92, PS-7, PS-8, PS-25 and PS-10 were planted and the trial has established well. Data on forage and quality attributes will be recorded during Kharif 2011 for identification of good general combiners and their further use for the constitution of synthetic variety.
- Evaluation of clonal selections of Setaria over years revealed superiority of selections S-18, S-20 and S-21 for fodder yields, quality traits and frost tolerance.
- c) Two new composite populations were also synthesized.

II. Maize

_

Thirty six land races/populations of maize were maintained. Land races PMG 3. PMG 9, PMG 97, Local Chadhiar and composite PMG 93-1 gave numerically higher yield and were found to be statistically at par with African tall for fodder yield.

2. SRINAGAR, SKUAST

DCD Status

а. г	ON Status		
Sr. No	Crop	Number	Source
1.	Maize	15 accessions	CIMMYT, Mexico
		7 inbred lines	
		8 pools	
2.	Cowpea	30 (Thirty) accessions Crop Plant	Crop Plant Research
		Research (IPK) Gatersleben,	(IPK) Gatersleben,
		Germany	Germany
3.	Sorghum	Forage Sorghum varieties	Directorate of
	-	1. SSG 59-3 multicut	Sorghum Research
		2. CSV 21F single cut	(ICAR)
		Dual purpose genotypes	Rajendranagar,
		1. CSV 15	Hyderabad.
		2. CSV 20	
		Sweet Sorghum varieties	
		1. SSV 84	
		2 CSV 1955	

b. New genetic material generated.

 F_1 generated from five inbred lines (as females) and 2 testers C-6, Shalimar Maize - 1 (as males) using Line x tester mating design.

B. NORTH WEST ZONE

3. LUDHIANA, PAU

I. Cowpea:

- a) Mutation breeding programme has been initiated (using gamma irradiations) in varieties *viz.*, C 88 and CL 367.
- b) 83 F₆ progenies have been screened/advanced following standard breeding procedures and methods.
- c) 135 germplasm lines (three replications, RBD design) have been evaluated for various morpho-agronomic parameters.
- d) A total of 236 germplasm lines were evaluated for fodder traits and resistance to root rot, mosaic and aphids. Out of these lines with high fodder yield, erect plant type, earliness, resistant to CMV and root rot have been selected will be used in hybridization programme.
- e) Six entries were tested in local trial, out of which FOS-1, CL-375, CL-396 and CL-391 performed better than the check C-88 with 26.77, 24.51, 17.09 and 12.26% increase in green fodder yield.

II. Bajra:

- a) Mutation breeding programme has been initiated (using gamma irradiations) in variety *viz.,* FBC 16.
- b) CMS lines have been evaluated for various morpho-agronomic parameters and their utilization in hybridization programme. New CMS lines and superior restorers suited for fodder purpose have been identified from the genetic resources available.
- c) Forty-three new fodder hybrids have been synthesised using superior CMS lines.
- d) Five local fodder trials comprising of top crosses synthesised during *Kharif* 2009 were conducted. Perusal of the data exhibited that four top crosses *viz.*, 503A x Baif bajra1, ICMA 92333A x Baif bajra1, ICMA 91777 x GFB 1 and 92333A x RBC2 showed respectively 16.0%, 13.5%, 11% and 10% superiority for green fodder yield over check entry PHBF1 (single cross hybrid) whereas these exhibited 18%, 18%, 16% and 15% superiority for dry matter yield over the check entry PHBF1.

Sr.No	Hybrid	S.No.	
1	91777 A X G. Bajra single cut	23	92333 A X Baif Bajra I
2	91777 A X Bajra Bawal	24	543 A X PIB 527
3	98222 A X FBC08	25	308 A X RBC-2
4	99111 A X RBC-2	26	92333 A X MJC-2
5	92111 A X Bajra Bawal	27	92333 A X DB-1
6	09333 A X PIB 681	28	93333 A x DB-1
7	274 AX PIB 306	29	93333 A X FBCO-8
8	315 AX PIB 618	30	305 A X CO(CU)9
9	00999 A X PIB 258	31	93333 A X FBC-16
10	305 A X PIB 311	32	305 A X FBC-16
11	408 A X PIB 308	33	93333 A X RBC-2
12	543 A X PIB 831	34	305 A X MRB-8
13	204 A X PIB 503	35	93333 A X Barif Bajra-I

New Crosses attempted in Fodder Bajra

14	204 A X PIB 507	36	305 A X PIB 527
15	204 A X PIB 116	37	263 A X FBCO-8
16	214 A X PIB 593	38	308 A X RBC-2
17	402 A X PIB 122	39	93333 A X NDFB-2
18	1220 A X PIB 503	40	93333 A X CO(CU)9
19	98666 A X PIB 929	41	503 A X Baif Bajra-I
20	04222 A X PIB 122	42	92222 A X FBC-16
21	04111 A X PIB 236	43	91777 A X GFB-I
22	92333 A X NDFB-2		

III. BNH:

- a) 52 new B X N crosses received from Coimbatore have been established and will be evaluated this season in perennial local fodder trials.
- b) One local fodder trial was conducted, in which entry PBN 346 exhibited 12.7% superiority for green fodder yield over the check entry PBN 233.

IV. Guinea grass:

- a) Two local fodder trials were conducted. In the first local trial entries PGG 729 and PGG 722 out yielded the check entry PGG 518 for green fodder yield by 18.43% and 9.41% respectively. In another trial, entry PGG 1000 exhibited 5.0% superiority for GFY over the check PGG 518.
- b) Maintenance breeding was taken up.

V. Guara:

a) Maintenance breeding was taken up.

VI. Sorghum:

- a) A total of seventy four lines consisting of CMS-lines, maintainer lines and sorghum varieties and hybrids were tested for HCN trait (antiquality trait) and six lines with low HCN content are identified and are used in hybridization programme.
- b) A total of six hybrids tested in Local Trials, out of which two hybrids 94056A X SGL87 and 94012A X SGL87 performed better than the check PSC-1 with 30.65 and 15.05 % increase in Green fodder yield.
- c) A total of sixteen cultivars were evaluated for resistance to sorghum leaf diseases and HC308 was found to be resistant to leaf diseases. The cultivar HC308 is being used in hybridization programme.

VII. Maize:

Under maize population improvement programme being run under the aegis of AICRP (FC), Jhansi, selections have been made from two populations received.

a. Pearl M	Aillet	
Sr. No.	Name of the cross	Quantity of seed (gm)
1.	Bajri Bawal x MJC-2	75
2.	Bajri Bawal x GFB-1	100
3.	MRB-8 x GFB-1	20
4.	MRB-8 x MJC-2	80
5.	MRB-8 x Bajri Bawal	130
6.	Baif Bajra x GFB-1	50
7.	Giant Bajra x MJC-2	40
8.	MJC-2 x MRB-8	120

4. HISAR, CCS HAU

The seventeen F_1 's developed last year were advanced to F_2 generation during current *Kharif* season.

b. Cow pea

Sr. No.	Name of the cross	No. of seed in each cross
1.	EC 4216 x CS-88	21
2.	CL 367 x CS-88	9
3.	KBC-2 x CO-2	10
4.	COFC-8 x CS-88	9
5.	SRM 194 x CS-88	15
6.	CO-2 x UPC-5287	12
7.	CO-2 x CS-88	18

The seven crosses attempted during kharif, 2010 were advanced to F₂ generation

5. PANTNAGAR, GBPUAT

Cowpea Germplasm Evaluated : 520

(A) Germplasm (Cowpea) Holding :

Indigenous	•	: 220
Exotic		: 90
Genetic		: 210

(B) F₂ populations desired out of special crossing nursery evaluated:

- TVu 3531-1-5 X Co 5
- EC 394-1 X V-92-2
- C 88 X Co 5
- C 88 X CoFC 8
- CoFC 8 X C 88

6. BIKANER, SKRAU

A. GERMPLASM MAINTENANCE, EVALUATION AND COLLECTION

Germplasm evaluation and maintenance work was done for the germplasm as given in the following table:

S. No.	Range grass	No. of accessions
1	Lasiurus sindicus	350
2	Cenchrus ciliaris	50
3	Cenchrus setigerus	90

B. BREEDING WORK PASTURE GRASSES

Some promising entries of the three range grasses were evaluated in RBD. Entries were 10 for *Lasiurus sindicus*, 6 for *Cenchrus ciliaris* and 12 for *Cenchrus setigerus*. 10 promising entries of *Cenchrus ciliaris* were evaluated in large plots of 100 m² size. A new station trial of *Cenchrus setigerus* having 23 entries including a check variety CAZRI-76 was also established.

OTHER CROPS

As a participating centre for breeding programme in BN Hybrids, 52 hybrids were received from Coimbatore centre for evaluation. The hybrid seed received was evaluated in RBD with three replications. For 29 entries, no hybrid plant could be obtained. Some hybrid plants were obtained only in 23 entries. The entries which gave hybrid plants and the number of hybrid plants obtained are given in the following table:

Entry No.	Cross	No. of hybrid plants obtained	Entry No.	Cross	No. of hybrid plants obtained
1	BAIF Bajra x FD 483	3	31	NDFB 8 x FD 433	1
2	BAIF Bajra x FD 477	2	33	NDFB 9 x FD 440	1
5	FBC 16 x FD 431	2	34	NDFB 9 x FD 471	6

B-4

8	RBC 2 x FD 464	1	35	NDFB 9 x FD 452	7
13	RHRB 140 x FD 440	4	37	NDFB 11 x FD 470	5
14	RHRB 145 x FD 461	1	40	NDFB 14 x FD 479	2
21	NDFB 4 x FD 440	1	41	NDFB 14 x FD 433	2
22	NDFB 4 x FD 480	2	45	NDFB 18 x FD 450	1
23	NDFD 6 x FD 460	1	49	NDFB 19 x FD 470	5
24	NDFD 6 x FD 463	2	51	CO 7 x FD 482	5
28	NDFB 7 x FD 439	4	52	CO 7 x FD 464	2
29	NDFB 7 x FD 482	2			

C. NORTH EAST ZONE

7. FAIZABAD, NDUAT

I. Forage Bajra

Germplasm collection, evaluation & maintenance

Crop	Existing	New	Total acc.	Source
	acc.	Collection		
Forage Bajra	80	5	85	Farmer's field of Barabanki, Lucknov and Ghaiipur
Forage cowpea	36	3	38	Farmer's field of Barabanki
N x B hybrid	25	1	26	Farmer's field of Ambedkar Nagar

Crosses made during Kharif 2010

S.N.	Cross combinations	S.N.	Cross combinations
1	NDFB 3 x Giant Bajra	6	NDFB 3 x AFB-4
2	NDFB 2 x BAIF Bajra	7	NDFB 5 x AFB-4
3	NDFB 2 x FBC 16	8	NDFB 5 x BAIF Bajra
4	NDFB 3 x Giant Bajra	9	NDFB 13 x AFB-3
5	NDFB 3 x BAIF Bajra	10	NDFB 13 x BAIF Bajra

 $F_1 = 15, F2 = 08, F3 = 12, Advance lines = 10$

8. RANCHI, BAU

I. Forage Maize:

- i) Twenty forage maize germplasm received fro NBPGR have been characterized and maintained for further use in breeding programme.
- ii) Twelve crosses have been made including African Tall and J 1006 as male parent.
- iii) Under national breeding programme, population received from MPKV, Rahuri including crosses involving African Tall was grown for further random mating. Selected plants harvested separately for further random mating.

II. Forage Cowpea :

F₂ generation seeds of 10 crosses were grown for further advancement of generation.

III. Bajra Napier hybrid programme:

 F_1 seeding materials of 52 Bajra Napier hybrid received from TNAU, Coembatore were raised for further evaluation and selection at this location.

9. KALYANI, BCKV

a. Breeding for stress tolerance in Rice bean

Fifteen genotypes of ricebean were screened for salt tolerance at germination and early seedling stage at a salinity level of 12 dS m⁻¹ imposed by a mixture of NaCl and CaCl₂. The genotypes showed wide ranges of variation for germination percentage, salt tolerance index as well as reduction in seedling length, fresh and dry weight under stress over non-stressed

control. Clustering of genotypes on the basis of principal component vectors (PC1 and PC2) and genetic similarity (Euclidean distance) revealed three groups. Bidhan 1, Bidhan 2 and KRB 8 constituted the most tolerant group with salt tolerance index ranging from 65.43-73.46%. KRB 9, KRB 19, KRB 105 and KRB 106 showing values of tolerance index between 34.31 to 39.26%, were found to be most susceptible genotypes. The remaining genotypes exhibited moderate to low salt tolerance. Further physiological studies indicated that KRB 106 (most susceptible) had much higher value of membrane injury index but lower value of chlorophyll stability index at 12 dS m⁻¹ than Bidhan 1 (most tolerant). Higher accumulation of proline and sugar in the leaves of Bidhan 1 at salinity helped the genotype in better maintenance of turgor in comparison with the susceptible genotype. Of the three antioxidative enzymes studied here, activity of peroxidase and superoxide dismutase increased at salinity stress in both the genotypes, while that of catalase decreased as compared with non-saline environment. Salinity adversely affected the level of nitrate reductase in leaves of 7-day old seedling in the present experiment. In contrast, the amylase enzyme in the germinating seeds registered enhanced activity at 24 hours of germination at 12 dS m⁻¹ in comparison to control and then declined gradually. The extent of increase was much higher in tolerant genotype than the susceptible one.

b. National Breeding Programme in Rice bean

Crossing in all possible combinations were made last year. The parental material comprised of ten different genotypes received two genotypes each from five different centres of AICRP on Forage Crops. The contributing centres were Bhubaneswar, Jorhat, Jabalpur and Kalyani. The F_1 seeds have been grown this year to obtain the seeds for F_2 generation The seed materials will be shared for distribution among all the above mentioned five centres. The breeding programme will be done in a participatory mode.

c. Breeding programme on Maize

Since the inbreds obtained through sib-pollination during the last two years did not germinate, this year again attempts have been made to obtain inbreds in the Kharif season. The seed materials have been sown again for further inbreeding in Rabil season. However, convergent breeding will be attempted for generation of new materials.

10. Bhubneshwar, OUAT

Germplasm collection and maintenance:

- Twelve germplasm of ricebean has been collected from different districts of Orissa. Those will be evaluated in Kharif 2011.
- Existing germplasm of ricebean and maize are maintained.

Generation of new genetic material:

- Mutation breeding was done with two genotypes and four mutagens. After M₅ Generation six higher fodder productive mutants were selected.
- The mutant lines TN2-3, TE1-2, PN2-1 and PG3-1 showed increase in green fodder yield but not much change in fibre and protein content.
- The mutant lines TE2-2 and PE2-1 showed increase in L:S ratio, decrease in fibre content and small increase in protein content making them more succulent and more quality fodder.

11. JORHAT, AAU

I. Germplasm Collection:	During Kharif 2010, 7	7 germplasm were collected from Karbi
Anglong District Assam. De	tail of the germplasm	is listed below:

Crop	Total no. Collected	Collected from
Ricebean	3	Karbi Anglong, Assam
Maize	4	Karbi Anglong, Assam

II. Evaluation of Ricebean Germplasm:

115 ricebean germplasm were evaluated for their earliness, productivity and disease resistance. Performance of the germplasms is given below:

SI No	Character	Entries
1	Earliness	JCR-08-16, JCR-08-17, JCR-08-24, JCR-08-1, JCR-08-4, JCR-07- 7, JCR-08-10, JCR-08-50, JCR-08-49, JCR-08-30, JCR-08-35, JCR- 08-13, JCR-08-49, JCR-08-32, JCR-08-6, JCR-08-14, JCR-08-
		55,JCR-08-29
2	High green	JCR-08-15, JCR-08-32, JCR-07-15, JCR-08-24, JCR-08-10, JCR-
	Forage	08-2, JCR-08-20, JCR-08-46, JCR-08-4, JCR-08-9, JCR-08-50,
	Yield (q/ha)	JCR-08-40, JCR-08-54, JCR-55, JCR-08-49, JCR-08-4
3.	High dry	JCR-08-15, JCR-08-32, JCR-07-15, JCR-08-24, JCR-08-10, JCR-
	matter yield	08-2, JCR-08-20, JCR-08-46, JCR-08-4, JCR-08-9, JCR-08-50,
	(q/ha)	JCR-08-40, JCR-08-54, JCR-55, JCR-08-49, JCR-08-4
4.	Plant Height	JCR-08-15, JCR-08-32, JCR-07-15, JCR-08-24, JCR-08-10, JCR-
	_	08-2, JCR-08-20, JCR-08-46, JCR-08-4, JCR-08-9, JCR-08-50,
		JCR-08-40, JCR-08-54, JCR-55, JCR-08-49, JCR-08-4

III. Hybridization programme on Ricebean: As per decision of Special Breeder's Meeting held at IGFRI Jhansi, in May 2009, a breeding programme has been formulated. According to the technical programme crosses were made between 10 entries of ricebean contributed by different AICRP centre *viz.* Kalyani, Jabalpur, Bhubaneswar, Villayni and Jorhat Centre in all possible combinations. The performances of $F_{1's}$ were evaluated during *kharif* 2010. New crosses were also attempted taking the same 10 parents.

IV. Evaluation of Maize germplasm: 56 maize entries were tested for their fodder quality. Crosses were made between 20 promising entries.

V. Growing of two groups of cross material involving Africal tall and J-1006 as parent: As per decision of Special Breeder's Meeting held at IGFRI Jhansi, in May 2009, a breeding programme on Forage maize has been formulated. According to the technical programme a group of forage maize was crossed with Africal Tall and J-1006 separately at Rahuri centre. These two crossed groups were grown at different dates of sowing and allowed for open pollination among selected plants at Jorhat centre during Kharif 2010.

C. CENTRAL ZONE

12. ANAND, AAU

I. New collections :

Sr. No.	Name of the crop	Number of samples
1.	Sorghum	2
2.	Lucerne	30
3.	Fodder Bajra	2

II. Maintenance of germplasm:

Sr. No.	Name of the crop	Total number of lines
1	Sorghum	517
2	Maize	172
3	Pearl millet	42
4	Cowpea	31

III. Crop wise detail information on National / State Breeding Programme carried out at Anand centre during *kharif*-2010 is as under

FORAGE MAIZE

A. National Programme:

For the development of high yielding composite forage maize variety coupled with better forage quality, six crosses were done during *kharif*-2009. Equal quantity of each cross seeds were mixed and sown during *kharif*-2010 in isolated area and their seeds were obtained for next cycle of population improvement (1) Isolation-1 (Anand) (2) Isolation-2 J-1006 (Anand). G-1 and G-2 seeds were received from Rahuri centre and also sown during *kharif*-2010. Their seeds were harvested for next cycle of population improvement.

B State Programme:

a) With an objective to develop high yielding, early and dual purpose forage maize variety, fifteen top crosses with African tall, were done during *kharif*-2009 and their F₁ seeds were sown during *kharif*-2010 for selfing and their seeds were obtained for next generation.

F₁ Seeds

1.	GYC-9006 x African tall
2.	GWC-9413 x African tall
3.	GWC-0208 x African tall
4.	GWC-0301 x African tall
5.	GWC-0210 x African tall
6.	GWC-0325 x African tall
7.	GYC-9666 x African tall
8.	GYC-9802 x African tall
9.	GYC-0311 x African tall
10.	GYC-0223 x African tall
11.	GM-6 x African tall
12.	Narmada Moti x African tall
13.	GM-3 x African tall
14.	GYS-703 x African tall
15.	GYS-706 x African tall

(b) Forty Five F_1 were sown during *kharif*-2010 and their self seeds obtained for next generation.

IV. FORAGE PEARLMILLET

A. National Programme :

(a) Thirteen F_2 plant progeny were raised during *kharif*-2010 season and 24 superior plants were selected on the basis of morphological characters. The selected plants were selfed and their seeds obtained for next generation.

B. State Programme :

- (a) Maintenance of A and B lines
- (b) To develop high yielding multicut variety of forage pearl millet, following crosses were attempted during *kharif*-2010 at this centre.
- 1. GFB-1 x BAIF
- 2. Giant Bajra x BAIF
- 3. GFB-1 x MRB-8
- 4. GFB-1 x MJC-2
- 5. Giant Bajra x MRB-8

(c) Heterosis Breeding Programme (CMS Based Hybrids) 88:

For the development of high yielding multicut hybrids having better forage quality, eight crosses were attempted using four A Lines and twenty two R Lines as mentioned below.

	A Lines (4)		R Lines (22)
1.	ICMA-01777	1.	GAB-28
2.	ICMA-05888	2.	GAB-44
3.	ICMA-99444	3.	GAB-51
4.	JMSA-101	4.	J-2290
		5.	J-2500
		6.	J-2507
		7.	J-2509
		8.	J-2514
		9.	221-SB
		10.	231-SB
		11.	246-SB
		12.	251-SB
		13.	GFB-1
		14.	FB-2
		15.	FB-3
		16.	FB-4
		17.	Giant <i>Bajra</i>
		18.	FB-8
		19.	FB-9
		20.	FB-13
		21.	BAIF
		22.	AFB-5

VI. FORAGE SORGHUM

(A) State Programme :

(a) Maintenance of A or B lines: 8 Nos.

(b) Fresh Crosses:

With a view to develop high yielding single / multicut variety, eleven crosses were made during *kharif* -2010 as listed bellow.

-	Female	Male
1.	S-1049	AFS-13
2.	S-1049	AFS-14
3.	S-1049	AFS-15
4.	S-1049	AFS-18
5.	S-1049	AFS-20
6.	S-1049	GFS-3
7.	S-1049	GFS-5
8.	S-1049	CoFS-29
9.	S-1049	M.P. Chari
10.	S-1049	IS-4776
11.	S-1049	SSG-59-3

(c) Segregating materials of Forage Sorghum:

Fresh crosses				Ger	neration			
	F ₂	F ₃	F_4	F_5	F_6	F	7	F
							В	8
11	17	23		9		5	1	1
								4

(d) Heterosis Breeding Programme (MS Based Hybrids): 72
 With a view to develop high yielding (single and multicut), early and variety suitable for *rabi* sowing, totally 72 hybrids were done using following four CMS lines and eighteen parents during *kharif*-2010.

	CMS Lines (4)		Male Parents (18)
1.	Surat-1	1.	S-1049 (Early)
2.	Surat-2	2.	GFS-3 (High yielding)
3.	Surat-4	3.	GFS-5 (High yielding)
4.	AKMS-14 A	4.	SSG-59-3 (Multicut)
		5.	CoFS-29 (Multicut)
		6.	MP Chari (Multicut)
		7.	Gundari (High yielding)
		8.	IS-4776 (High yielding, Single cut)
		9.	C-10-2 (High yielding, Single cut)
		10.	SRF-286 (High yielding)
		11.	Phule Amruta (<i>Rabi</i> season)
		12.	Phule chitra (<i>Rabi</i> season)
		13.	Maldandi-35-1 (<i>Rabi</i> season)
		14.	AFS-28 (High yielding)
		15.	AFS-30 (High yielding)
		16.	AFS-14 (High yielding)
		17.	AFS-15 (High yielding)
		18.	AFS-18 (High yielding)

(d) Seed multiplication of state trial entries: 24

VII. FODDER COWPEA

Seventeen plant progenies of (F_5 generation) cowpea were raised and superior plants were selected on the basis of morphological characteristics for next generation.

13. JABALPUR, JNKVV

Forage breeding

Crop	Existing accession	New collection	Total accession	Source/ Area of collection
Soybean	69	7	76	NRC Indore &
				Sehore
Rice bean	29	5	34	NBPGR, New Delhi

Generation of materials/entries/crosses made during-Kharif- 2010.

S.No.	Crop	Cross made	Cross advanced	Selection made
1	Soybean	6	5F1	-
			7F ₂	34
			8F ₃	20
			5F4	12
		3F5	04	

Crosses made

S.No.	Cross
i)	Kalitur x GP1559
ii)	JS 16-1 x EC 389189
iii)	EC 389189 x BR -7
iv)	Himso 1521 x JS 80-21
V)	MAUS 16-1 x JS 90-41
vi)	JS 76-205 x JS 11-1

F₁ generation

S.No.	Cross		
i)	Kalitur x S16-1		
ii)	JS 16-1 x BR 7		
iii)	Kalitur x NRC37		
iv)	JS 80-21 x Kalitur		
V)	GP1559 x MAUS 7		

F₂ generation

S.No.	Cross
i)	EC 389189 x S11-1
ii)	Kalitur x JS 16-1
iii)	NRC 37 x Kalitur
iv)	JS 80-21 x JS 62-1
V)	MAUS 7 x Kalitur
vi)	MAUS 61-2 x GP 1559
vií)	JS 16-1 x S 11-1

F₄ generation

S.No.	Cross	
i)	MAUS 61-2 x JS 04-133	
ii)	MAUS 61-2 x GP 851	
iii)	AMSS 39 x MAUS 61-2	
iv)	MAUS 61-2 x JS 94-66	
v)	NRC 43 x JS 04-75	

F₃ generation

S.No.	Cross
i)	JS(IS) 90-5-12-2 x Kalitur
ii)	BR7 x NRC 608
iii)	Kalitur x JS(IS) 90-5-12-2
iv)	Kalitur x NRC 37
V)	Kalitur x EC 393280
vi)	Himso1521 x Kalitur
vii)	GP 1559 x Kalitur
viii)	Kalitur x GP 1559

F₅ generation

S.No.	Cross	
i)	BR 7 x JS 04-133	
ii)	MAUS 61-2 x Kalitur	
iii)	EC 389159 x WT-49	

• Single plant progenies and promising genotypes were also evaluated for different fodder traits.

Rice bean

- Five new accessions were obtained by NBPGR, New Delhi
- Selections were made for different fodder traits in the mutation derived $M_{\rm 4}$ populations of Bidhan -1
 - (EMS 0.4% and 0.8% for 1, 2 and 4hrs treatments)
- New crossing programme was initiated using diverse genotypes of rice bean.
- Single plant selections were made using different fodder traits.

14. RAHURI, MPKV

A) MAIZE POPULATION IMPROVEMENT PROGRAMME

Kharif 2009	Initial crossing programme	
Summer 2010	 Sown equal no. of F1 seed for random mating in isolation Stratified bulk harvesting Distributed to 11 centers 	
Kharif 2010	 Sown bulk seed (in isolation) produced during Summer-2010 in large plot Uprooted / Detaselled rejected plants Allowed random mating among selected plants Harvest in bulk (200 plants) 	
Summer 2010	Repeat as above until desired level of uniformity	

	 Initial Random matting in isolation 	
Kharif 2009	 Single Cut (9 Germplasm) 	
	Multi Cut (7 Germplasm)	
	Grown harvested bulk seed	
	 Selected plants having 	
	- Tall & Quick growing	
Summer 2010	 More tillering ability 	
	- Broad & long leaves	
	- Better Nutritional Qly.	
	Selfed harvested in bulk	
	 Sown bulk seed (in isolation) produced during 	
	Summer-2010 in large plot	
Kharif 2010	 Uprooted rejected plants 	
Kharli 2010	 Allowed random mating among selected plants (200 	
	plants)	
	Harvest in bulk	
Summer 2010	Repeat as above (Random mate - Selfing) until	
Summer 2010	desired level of uniformity	

B) PEARLMILLET POPULATION IMPROVEMENT PROGRAMME

Grass Breeding Scheme, MPKV, RAHURI.

Generation of breeding material

A) Hybridization and evaluation of B x N hybrids:

The seventeen B x N crosses were made during Rabi 2009-10 and the F_1s were sown during summer 2010. The 228 heterotic clones from these F_1s were selected .The selected 228 clones were sown in progeny row in augmented block design during Kharif, 2010 for initial evaluation for forage and quality traits.

15. URULIKANCHAN, BAIF

I. Germplasm collection

In Maize four accessions (BAIF 284 to BAIF 287) and two accessions (BAIF 288 & BAIF 289) were collected from four districts of Orissa and one district of Gujarat respectively. Total germplasm holding of the center is as below.

Sr. No.	Сгор	No. of Accessions
1	Maize	172
2	Napier	12
3	Pearl millet	3
4	Lucerne	10
5	Stylosanthes	20
6	Range grasses & legumes	20
7	Sugarcane (Fodder type)	5

All the germplasm of perennial grasses and legumes is maintained in the field.

II. Breeding Programme

• Maize

a. National crossing programme – F₁ seeds of two groups *viz.*, African Tall (G1) and J-1006 (G2) were pooled together in two separate lots and were grown in isolation for random mating and gene recombination. Further individual plants (G1- 54 and G2-43) of desirable characters were selected from the progenies and seeds harvested from these plants were bulked together. Same seed will be shared by eleven designated centers for further cycles of recombination.

b. Evaluation of crosses- F₁ seeds of nine crosses were grown along with national checks i.e. African Tall and J-1006 in paired row. Crosses were evaluated for quantitative and qualitative forage traits in comparison to checks. Among the 9 F₁s, following four F₁s were found to be promising. These crosses will be developed in to composites.

A.Tall x BAIF 271	A. Tall x BAIF 243
A.Tall x J 1006	J. 1006 x BAIF 243

- c. Composite development- Twenty one individual selections were made from the base population of BAIF Maize-1 during *rabi* 2009-10 and seeds were bulked together. Progeny of these seeds was grown in isolation during *kharif* -2010 for further selection. Fifty five individual plant selections were made from the progeny and were allowed to mate randomly. Following criteria was used for selection.
 - Flowering in 55-60 DAS
 - Tall and thick stem
 - Broad and long leaves

Pearl millet

a. National crossing programme- Crossing programme was undertaken in multicut forage bajra during *Summer* -2010. Following seven crosses were attempted. These crosses will be evaluated for quantitative and qualitative forage parameters in *Summer*-2011.

BAIF Bajra-1 x MRB-8 Giant Bajra x MRB-8 MJC-2 x MRB-8 GFB-1 x Giant Bajra GFB-1 x MJC-2 GFB-1 x BAIF Bajra-1 GFB-1 x MRB-8

b. Evaluation of crosses for forage traits- During *kharif*-2009, eleven crosses were attempted in single cut bajra. Out of those, F₁ seeds of following ten crosses were sown in paired row along with BAIF Bajra -1 and were evaluated for forage characters.

BAIF Bajra -1 x NDFB-2	BAIF Bajra -1 x DB-2
BAIF Bajra -1 x FBC-16	BAIF Bajra -1 x RBC-2
BAIF Bajra -1 x DB-1	FBCO-8 x RBC-2
BAIF Bajra -1 x CO (CU)- 9	FBCO-8 x Giant Bajra
BAIF Bajra -1 x FBCO- 8	FBCO-8 x FBC-16

Sugarcane

Comparative study of Sugarcane genotypes with Hy. Napier- A station trial was established in June 2008 and continued for comparative study of forage sugarcane with hybrid Napier for yield and quality characters under multicut system in *kharif*-10. Five genotypes of sugarcane and Yashwant variety of Hy. Napier was grown in RBD with four replications. Data on growth and yield characters for 13 cuts in Hy. Napier and 6 cuts in sugarcane were collected.

D. SOUTH ZONE

16. MANDYA, UAS

I. Forage Maize

- i. In forage maize breeding, seven new composites are under final stage of constitution and they will be evaluated during 2011 kharif.
- ii. New inbreds are being developed with resistance to Sorghum Downy Mildew and forage traits in the background of African Tall and the material is in F_6 stage. Out of which 51 lines are with exceptional fodder traits which can either be promoted as OPVs or used in the constitution of new composites.
- iii. Two populations received from Rahuri center were grown and seeds were bulked from the tall plants.

Inbred development (F ₄)	532
New Crosses generated	60

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II.Cowpea

- i. Under National Crossing programme, 9 new crosses have been made during 2010 kharif and F_1 s are grown during 2011 rabi. 17 F_2 s produced during late rabi will be evaluated during Kharif
- ii. 24 advanced breeding lines were evaluated during *Kharif* 2010.

No. of new crosses effected	9
Segregating material advanced/handled	
F_1 s advanced to F_2	17
Advanced Breeding Lines	24

III.Bajra Napier Hybrid

About 258 selections have been made from 55 Bajra x Napier crosses received from Coimbatore center during 2010 kharif and are being evaluated.

17. COIMBATORE, TNAU

The following National breeding programmes were initiated at Coimbatore as lead centre under All India Co-ordinated Research Project on Forage Crops.

I. National crossing programme in Bajra Napier Hybrid

The Coimbatore centre had initiated the crossing programme of BN hybrids during 2009 and as a result, seeds of 52 hybrids have been sent to the Project Co-ordinator unit for onward transmission to 12 other participating centres on 31.05.2010 to enable the centres to evaluate the BNH during Kharif 2010.

The seeds of all the 52 hybrids were sown at Coimbatore centre on 22.07.2010 out of which, 40 promising hybrids have been selected and transplanted in the main field on 21.10.2010 for further selection and evaluation.

II. National Crossing Programme in Hybrid Fodder Bajra

Eight A lines and 5 R lines have been despatched separately from this centre on 17.06.2009 for initiating hybridization at Annand, Rahuri and Hyderabad. Hybrid seeds of 143 crosses obtained from the participating centres [Anand (40), Rahuri (40), Hyderabad (26) and Coimbatore (37)] were distributed to the above mentioned centres on 31.05.2010 for further evaluation during Kharif 2010.

At Coimbatore centre, the hybrid seeds of 143 crosses were sown in two replications on 21.07.2010. The green fodder yield of the hybrids was assessed on 06.09.2010 and found that none of the hybrids performed better than the check fodder bajra variety CO 8.

III. Crossing Programme in Fodder Cowpea

Coimbatore centre had synthesized 81 crosses using the 21 parents received from the PC unit and the crossed seeds were sown on 11.03.2010. The F_1 seeds harvested from the same set of crosses were sown on 28.07.2010 for further evaluation.

IV. National off season nursery in Fodder Cowpea

The F_1 seeds received from the four centres [Ranchi (6), Faizabad (10), Pantnagar (5) and Coimbatore (81)] were raised at Coimbatore as an off season nursery and the bulked seeds of F_2 have been despatched on 14.07.2010 to the above mentioned designated centres.

18. VELLAYANI, KAU

I. Germplasm Holding

SI.No	Сгор	Germplasm collected during Kharif 2010	Total germplasm
1	Guinea grass	5	200
2	Cowpea	5	121
3	Rice bean	4	90
4	Bajra	10	130
5	Minor forage crops		35

II. Rice bean

Four accessions collected during Kharif 2010 will be evaluated during summer 2011.Evaluation of 10 accessions collected during Rabi 2009 was done along with five accessions collected during Kharif 2009. Three accessions with high green fodder yield, leaf/stem ratio, branch number and tolerance to pests and diseases were selected.

III. Cowpea: Germplasm collection and evaluation

Based on specific combining ability, three crosses with high green fodder yield, more leaf/stem ratio and more number of tillers per plant were selected for F_2 evaluation . F_2 evaluation was done and ten superior plants were selected from the selected three crosses for further evaluation and selection .

Five accessions collected during Kharif 2010 were evaluated with ten accessions collected during Kharif 2009.Four accessions with high leaf/stem ratio, green fodder yield and dry matter yield were selected for hybridisation. Hybridisation was done between the four selected accessions and three popular varieties in Line X Tester pattern. Twelve cross combinations were produced.The evaluation of hybrids with parents will be done.

National Breeding Programmes

Special Programme for Varietal Improvement in fodder rice bean

Collection and evaluation of germplasm

Three superior accessions with high leaf area, leaf density and having more number of branches and green fodder yield selected during Kharif 2009 were evaluated against Bidhan-1 during Kharif 2010. Because of very heavy rainfall during flowering and seed setting, seed production was very poor in all the accessions. Evaluation will be repeated during summer 2011.

Intervarietal hybridisation

Using the 10 selected germplasm lines received on exchange basis from 5 AICRP Centres, intervarietal hybridisation was attempted. But hybridisation could not be completed in all the 10 lines simultaneously because of very low flowering and very heavy rainfall during the flowering period.Hybridisation will be repeated during Rabi 2010.

Farm trial

Seven improved cultures of cowpea developed through intervarietal hybridisation were tested during Rabi 2009 at different locations in farmers' fields in the southern region of Kerala. Culture 2 recorded the maximum green fodder yield (326.0q/ha) followed by Culture 4 (318.9 q/ha) and they are found to be promising.

Performance of Cowpea Cultures (Rabi 2009)

Mutation Breeding

Mutation breeding using the mutagen Ethyl Methane Sulphonate is also attempted in the variety Bidhan-1.

Evaluation of bajra-napier hybrids and development of hybrid varieties suited to Kerala

Fifty one bajara -napier hybrids developed at the Department of Forage Crops, Tamilnadu Agricultural University during Kharif 2009 were evaluated during Kharif 2010. Only few hybrid seeds have germinated. Out of the 51 hybrids sown, 20 hybrids have germinated and they are being multiplied.

19. HYDERABAD, ANGRAU FORAGE COWPEA

During the season under report, the following crosses in F_1 generation were advanced to F_2 generation and the segregating populations will be evaluated during summer, 2011.
S.No.	CROSS	S.No.	CROSS
1.	NSM 38 X Bundel Lobia	11	CN8076 X UPC 625
2	CO4 X UPC 625	12	CO(CP)7 X CO4
3	NSM 38 X NDFC6	13	Vu 8531 x Bundel Lobia
4	UPC5286 X NDFC6	14	CO2 X CO5
5	UPC5286 X KARS 162	15	NDFC6 X Bundel Lobia
6	HC 46 X Bundel lobia	16	SRM194 X CS 88
7	CN 8076 X SK57	17	KARS 163 X Bundel Lobia
8	HC46 X UPC 625	18	SRM194 X CO4
9	Bundel lobia X Selection local	19	CN8076 X Bundel Lobia
10	UPC5286 X CS88	20	CN8076 X SRM194

I. HYBRID BAJRA

143 Hybrids, developed during Kharif 2009 at four coordinated centers, were evaluated in Kharif 2010 against two popular check varieties viz., Giant Bajra and Raj Bajra Chari-2. From the results, it was observed, for green fodder yield, out of 143 hybrids studied, 38 showed more than more than 20% positive heterosis over the best check giant bajra and hybrid TNFB 3A x TNFB 17R (150%) recorded highest positive heterosis followed by TNFB 5A x TNFB 19R (141.5%. In case of dry fodder yield, more than 20% positive heterosis was recorded among 49 hybrids. Out of which, following are the four hybrids that have recorded more than 100% heterosis viz., TNFB 4A X 19R (100%); TNFB 5A X TNFB 19R (182.2%); TNFB 8A X TNFB 2R (116.3%); TNFB 8A X TNFB 19R (104.5%). In general performance of genotypes was low due to continuous rains during period of growth.

II. Bajra Napier Hybrids

50 hybrids were sown for evaluation during Kharif 2010, but due to continuous heavy rains affected the germination.

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