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



**Proceeding of the National Group Meeting- Rabi 2011-12**

held at  
IGFRI, Jhansi

during  
September 8-9, 2011

**PART II : RABI 2011-12**

Project Coordinating Unit  
All India Coordinated Research Project on Forage Crops  
IGFRI, Jhansi-284 003 (U.P.)

October 2011



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**2011-12**

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**(Held at IGFRI, Jhansi, during September 8-9, 2011)**

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## PREFACE

The National Group Meet, Rabi 2011-12 of All India Coordinated Research Project on Forage Crops was organized with the objective to review the accomplishments of Technical programme including in-house research activities and forage technology demonstration (FTDs) executed during Rabi 2010-11 at different coordinating and cooperating centres. In addition, formulation of technical programme for Rabi 2011-12 alongwith future thrust areas for fodder research were discussed in detail. The meeting was jointly organized by Indian Council of Agricultural Research and Indian Grassland and Fodder Research Institute, Jhansi, during September 8-9, 2011.

The meeting was attended by the scientists mainly engaged in forage research working under coordinating and collaborating centres located at different SAUs, ICAR institutes and NGOs. Representative of NDDDB, NSC, RSFP&D, DCCFF, private seed company also participated in the programme and being important stake holders contributed in the development of programme and linkages strengthening future course of action keeping in view the changing agricultural needs of the farmers. Besides this the local participation included scientists from IGFRI and electronic and print media of the region.

This compilation contains brief report of National Group Meet, Rabi 2011-12 covering highlights on forage crop improvement (entries identified), forage production and plant protection technology generated, proceedings of different technical sessions and technical programme for the coming Rabi season 2011-12. The national group meet members discussed and planned future strategies for improving the forage productivity, quality, nutritive value to address the regional and national forage security for the livestock. The finalized technical programme on forage crop improvement, forage crop production and forage crop protection for Rabi 2011-12 have been given in annexure(s).

The successful conductance of the programme is attributed to the joint efforts made by the participating scientists, authorities of IGFRI and the Council, the core staff of Project Coordinating Unit, Principal Investigators and other staff. The team of All India Coordinated Research Project on Forage Crops sincerely acknowledges their technical and organizational assistance and cooperation for successful organization of the meeting.

S A Faruqui  
Project Coordinator

## Highlights: Technology Generated

### A. Entries identified for release as Variety:

#### 1. Rice bean: Variety KRB-19 and JRBJ-05-2

The committee considered the proposal of two Rice bean varieties namely KRB-19 submitted by BCKV, Kalyani and JRBJ-05-2 submitted by JNKVV, Jabalpur. It was observed that the two varieties have performed consistently superior to the check for green forage and dry matter yield to the check variety Bidhan-1 across the locations. The KRB-19 variety has been selected from the material collected from Tengnaupal, Manipur state whereas other variety JRBJ-05-2 has been collected from district Dindori (M.P.). Considering the adaptabilities of these varieties, the variety KRB-19 is identified for North-East Plain zone and JRBJ-05-2 is identified for Central zone.

#### 2. Forage Bajra: Variety AFB-3

The committee considered the release proposal of forage bajra variety AFB-3 submitted by AAU Anand. The variety showed its consistent superiority for green forage and dry matter yield over the locations and years in states of Haryana, Punjab and Rajasthan. Hence the variety is identified for these states.

#### 3. Oat: Variety SKO-96

The committee considered the proposal of forage oat variety SKO-96 submitted by SKUAST, Srinagar. This variety performed consistently better than check and other qualifying entries over the locations and years for the traits GFY, DMY and L/S ratio. This variety is highly resistance to leaf blight and powdery mildew hence this variety is identified for temperate and mid altitude areas of Hills in the states of Himachal Pradesh and Jammu and Kashmir.

### B. Forage Production Technology

- Among different forage based cropping systems, maize + cowpea (fodder) – sunflower (seed) - finger millet (Grain) was found most remunerative (Rs 66447/ha) cropping sequence on the basis of trials at Mandya centre.
- On the basis of three years of the experimentation at Rahuri and Urulikanchan, sowing of lucerne under line sowing + regular cutting for green fodder and leaving for seed production in second week of March every year realized the highest seed yield of 2.14 q/ha/year and net monetary returns of Rs. 1, 05,211/ha/year with benefit cost ratio of 2.59.

### C. Forage Protection Technology

- For disease management in oat seed production: Seed treatment with Vitavax @ 2.5 g /kg seed + *Trichoderma viride* @ 5 g/kg seed followed by foliar sprays of propiconazole @ 0.01% at 15 days interval with the appearance of the disease which, gave net return of Rs. 12484/- over control.
- For the management of root rot in oat : Apply pitcher compost\* @ 3 % as soil application at the time sowing which, gave net return of Rs. 8064/- over control. (Location specific recommendation for Orissa State)

**TECHNICAL SESSION – I**  
**REVIEW OF RESEARCH ACTIVITIES: CENTRE WISE PRESENTATION**

**Chairman** : Dr. R. P. Dua, ADG (FFC)  
**Co-Chairman** : Dr. S. A. Faruqui, PC, AICRP-FC  
**Rapporteurs** : Drs. J.K.Bisht & S.K.Bilaiya

The Session started with introductory remarks by the Chairman. He emphasized upon the seed production of forage crops by different centers and its impact thereby. Pls of different discipline have discussed about points related to data reporting. Rajouri center has not reported any data. For this it was decided that they should submit the AUC for the given fund. It has been advised that the respective centre should come out with the germplasm status at their centre. For the development of a variety a center should have an ample amount of germplasm with high level of variability. The Project Coordinator stressed that every centre has to inform about the status and characterization of germplasm available with them. After this, center wise presentation was held

- Palampur centre has a good collection of Fescue grass while Srinagar had of Oat. Fescue grass variety EC 178182 has released by CVRC from Palampur.
- Almora center is working on dual purpose wheat for fodder availability during winter lean season.
- Hisar center has not presented as per prescribed format
- Bikaner centre has not released any variety during last 13 years
- Pantnagar is having a good collection of oat germplasm including dual purpose.
- In eastern region, work of Faizabad centre was appreciated, in spite of unfavorable working environment
- Good number of rice bean and maize germplasm are being maintained at Kalyani centre.
- Bhubaneshwar centre has not released any variety since its inception.
- Ranchi centre don't have any breeding programme in rabi.
- Jabalpur center has released a Oat variety JO2003-91 from CVRC for central region
- It was advised to Anand center that there should have separate programme under states scheme and AICRPFC.
- For Rahuri, it was suggested that they should give more emphasis on maize variety development programme.
- Hyderabad center was advised to concentrate more on the in house breeding programme.
- Coimbatore centre has a good programme on Bajra Napier hybrid.
- The work on transfer of forage production technology by Vellayani center was appreciated.
- Publications including CD of annual report were also released during the session.

Some of the important recommendations emerged out after thread bear discussion:

- All the germplasm available with different centers need to be characterized and IC numbers should be obtained from NBPGR.
- Every center has to make a compilation regarding the entries submitted by them to IVTs and its status during last five years and later on.
- To strengthen the forage improvement programme emphasis should be given to germplasm collection from different sources
- It was also decided that the cadre strength in every center should be reviewed properly and strength of non performing center should reduced accordingly.

The session was concluded with the thanks to Chair.

**TECHNICAL SESSION –II**  
**FORMULATION OF TECHNICAL PROGRAMME (CONCURRENT)**  
**FORAGE CROP IMPROVEMENT**

**Chairman** : Dr. Pankaj Kaushal, Head, CI Division, IGFR  
**Rapporteurs** : Drs. V.K. Sood & G.B. Dash

Dr.R.V. Kumar, PS & PI, Plant Breeding highlighted the results of ten breeding trials conducted during rabi 2010-11 on two annuals namely berseem and oat and perennials namely lucerne and tall fescue.

After discussion in the house, the breeding trials were formulated as per the details given below:

- In IVT berseem, three entries, HFB-165-1, JB-03-17 & JHB-10-1 exhibited significant superiority in CZ and NEZ. Therefore, these three entries are promoted to AVT-1 berseem for these two zones.
- Fresh IVT on Berseem was constituted by having five new entries from centres i.e. Jhansi (2), Ludhiana (2) and Jabalpur (1).
- In oat single cut, ten entries namely, SKO-188, SKO-170, UPO-10-1, UPO-10-2, JHO-2010-1, JHO-2010-2, OS-377, JO-03-99, JO-03-97 and OL-1079 have been promoted from IVTO (SC) to AVTO-1 (SC) on the basis of their superiority.
- Fresh IVT on oat (SC) has been constituted by having 10 new entries from centres i.e. Jabalpur(1), Srinagar (1), Jhansi (1), Pantnagar (2), Faizabad (2), Bikaner (1), Hisar (1) and Ludhiana (1).
- Eight entries of oat, namely, JHO-2009-2, UPO-09-1, UPO-09-2, JO-03-95, JHO-2009-1, SKO-148, SKO-156 and OS-363 were promoted from AVT oat (SC-1) to AVT oat (SC-2) on the basis of their superiority for fodder traits. The same entries will also be evaluated for seed potential under AVT O (SC-2) (Seed) .
- In oat multicut, three entries namely, UPO-09-3, JHO-2009-3 and JO-03-301 have been promoted from AVTO (MC-1) to AVTO (MC-2). The same entries will also be evaluated for seed potential under AVT O (MC-2) (Seed).
- Fresh IVT on oat (MC) has been constituted by having 6 new entries from centres i.e. Jabalpur (1), Jhansi (1), Pantnagar (1), Hisar (2) and Ludhiana (1).
- In lucerne (perennial), new trial has been formulated with 7 entries from centres, namely, Anand (1), Urlikanchan (1), IGFR, Dharwad (1), Rahuri (1), Coimbatore (1), Bikaner (1) and Advanta (1). The ongoing trial on lucerne VTLP-2010 which is already in progress will continue in second year also.
- The trial VTTF (2009) which is already in progress will continue in third year also.
- New trial on Lathyrus has been constituted with 4 entries from centres, Kalyani (3) and Johrat (1).
- New trial on dual purpose oat has been formulated with nine entries from centres i.e. Jhansi (2), Ludhiana (1), Srinagar (1), Palampur (1), Hisar (1), Pantnagar (1) and Bikaner (1).



- Another new trial on rye grass has been formulated with 4 entries from Private Seed Company Advanta. Seed sample of rye grass to remaining centres will also be supplied for testing its suitability in the region.

It was discussed in the house that oat and berseem germplasm received from NBPGR by different centres will be evaluated for different traits and multiplied in this season for its sharing among different centres in the next season.

Dr. R.V. Kumar also urged upon all the concerned breeders

1. To send the seed materials to PC (FC) by 30<sup>th</sup> Sep. 2011 positively.
2. To supply Rabi fodder trials data by 20<sup>th</sup> June 2012 and seed trials data by 5<sup>th</sup> July, 2012.

The detailed technical programme is being circulated separately.

The session ended with vote of thanks to the chair.

**TECHNICAL SESSION –II**  
**FORMULATION OF TECHNICAL PROGRAMME (CONCURRENT)**  
**FORAGE CROP PRODUCTION**

**Chairman:** Dr. S. K. Tiwari, Head, CP Division, IGFR  
**Convener:** Drs U.S.Tiwana, Naveen Kumar and S.R Kantwa  
**Rapporteurs:** Drs. K.K. Sharma and Amit Jha

Session began with introductory remarks of Dr. S. K. Tiwari. Welcoming the delegates he highlighted the issues to be taken up for present and future strategies in forage agronomic research. The issues to be addressed for formulating the research programme included are:

1. Resource optimization ,sustainable forage production and economization of forage production system
2. Resource conservation technology
3. Forage production in stress environment
4. Searching for new niches like non competitive land use considering IFS mode and link mode
5. Utilization of verities in system mode

House decided to continue 10 ongoing trials. One exploratory trial on “effect of cutting management on oat, barley and/or wheat will be conducted with a view to explore the dual type potential of the crops in all zones except south zone. All together 6 new experiments plus 3 AVT trials (Total 10 experiments) has been formulated and approved by the house. The titles of the experiments are:

1. Effect of stubble management on productivity of rice –oat cropping system.
2. Effect of sources of nitrogen on productivity of oat and residual effect on succeeding crops
3. Performance of forage crops under different moisture regimes during lean period
4. Effect of weed management on green forage, seed yield and quality of berseem.
5. Effect of sowing time , zinc and thiourea spray on seed yield and quality of oat
6. Performance of BN hybrid as influenced by micronutrients under irrigated condition.

Two trials were concluded and following recommendations were emerged out:

- Among different forage based cropping systems, maize + cowpea (fodder) – sunflower (seed) - finger millet (Grain) was found most remunerative (Rs 66447/ha) cropping sequence on the basis of trials at Mandya centre.
- On the basis of three years of the experimentation at Rahuri and Urulikanchan, sowing of lucerne under line sowing + regular cutting for green fodder and leaving for seed production in second week of March every year realized the highest seed yield of 2.14 q/ha/year and net monetary returns of Rs. 1, 05,211/ha/year with benefit cost ratio of 2.59. (Location specific recommendation for Maharashtra state).

Session ended with vote of thanks to the chair.

**TECHNICAL SESSION –II**  
**FORMULATION OF TECHNICAL PROGRAMME (CONCURRENT)**  
**FORAGE CROP PROTECTION**

**Chairman:** Dr. S. A. Faruqui, Project Coordinator (FC)  
**Convener:** Dr. R.B. Bhaskar, Principal Investigator (Plant Protection)  
**Rapporteurs:** Drs. D.K. Banyal and A. B. Tambe

Forage Scientists of Plant Pathology, Entomology and Biochemistry disciplines discussed in detail the achievements of the last *Rabi* season along with the ongoing technical programme. The Chairman gave valuable suggestions for further improvement of the technical programme. Based on the discussion and suggestions made by the Chairman, the following recommendations were emerged.

1. The trials PPT-1, PPT-2: A&B, will continue as they are of continuous nature. PPT-11, PPT-12 and PPT-15 will also continue in the *Rabi* 11-12 because this was the second year of the trial.
2. Under PPT-2, the shared germplasm of berseem and oat will also be evaluated for resistance to pest and diseases at their respective centres.
3. In PPT-11, quality parameters will also be recorded from *Rabi*-11-12
4. A new centre Dharwad will also conduct trials *viz.*, PPT-1, PPT-2 and PPT-11 from ensuing *Rabi* season.
5. PT-10 trial has been conducted for 3 years. Therefore, the most effective treatment of this trial will be validated on the large farm area during *Rabi* 11-12 as PPT-16.

Technology generated :

- i. For disease management in oat seed production: Seed treatment with Vitavax @ 2.5 g /kg seed + *Trichoderma viride* @ 5 g/kg seed followed by foliar sprays of propiconazole @ 0.01% at 15 days interval with the appearance of the disease which, gave net return of Rs. 12484/- over control.
- ii. For the management of root rot in oat : Apply pitcher compost\* @ 3 % as soil application at the time sowing which, gave net return of Rs. 8064/- over control. (Location specific recommendation for Orissa State)

**\*Preparation of pitcher compost:**

Add 1 kg of cow dung + 1 l cow urine + 1 kg neem leaves + 1 kg karanj leaves + 1 kg *Calotropis* leaves + 50 g jaggery ( gur ) – fermented for 7- 10 days and strained through four layered muslin cloth – diluted to 3 % and sprayed / applied to soil.

The meeting ended with vote of thanks to Chair.

## TECHNICAL SESSION-III DISCIPLINE WISE PRESENTATION

**Chairman** : Dr. R. P. Dua, ADG (FFC), ICAR, New Delhi  
**Rapporteurs** : Drs. Naveen Kumar and Rahul Kapoor

The Project coordinator Dr. S. A. Faruqui welcomed the chairman in the session and requested the Principal Investigators to present discipline wise report.

### **Forage Crop Improvement**

Dr. R. V. Kumar, PI (Plant Breeding), presented report of experiments conducted during *Rabi* season. During the season ten breeding trials of two annuals and two perennial forage viz., berseem, oats, lucerne and tall fescue grass were conducted at 30 locations with success rate of 95%. The results of all the various zones were identified for further evaluation under advance trials in the respective zones.

The chairman suggested for multi-locational testing of the promising germplasm of berseem and oats from *Rabi* 2011-12. To start with the programme in berseem, Jhansi, Jabalpur, Ludhiana and Hisar centres will contribute 50, 10, 25 and 25 germplasm, respectively. In oats (multicut) Pantnagar, Jabalpur, Jhansi, Hisar and Srinagar will contribute 10 germplasm each.

### **Crop Production**

Dr. S. R. Kantwa, (PI) Agronomy, presented the result of crop production trials undertaken at 22 locations in the five zones under four heads viz., coordinated, location specific, AVT based and new exploratory trials. The experiments were conducted on, seed and fodder production in relation to cutting management, resource conservation through forages, remunerative forage based cropping systems, nutrient management studies in forages, use of soil amendments in forage based cropping systems and also in saline & sodic soils, banana based forage production system. The concluded experiment revealed that:

- At Mandya, maize + cowpea (Fodder) - Sunflower (Grain) – Ragi (Grain) cropping sequence proved most remunerative forage based sequence in the region.

### **Forage Crop protection**

Dr. R. B. Bhaskar, PI (Crop Protection), presented the results of crop protection trials conducted at 8 locations in the country. The crop protection programme aimed at, to study occurrence and abundance of major pests and diseases in forages, screening of breeding material and development of management technology for the control of different pests and diseases in forage. During the season under report root rot of berseem, leaf blight & leaf rot of oats were major diseases at Bhubaneswar. In Lucerne, thrips, jassids and white fly were the major pests at Anand. Screening of breeding material at various locations resulted in the identification of resistant sources viz., CAP-3-2 and ACP-3-1 of lucerne against leaf Anthracnose; UPO-10-2, SKO-96 & SKO-156 of oats against leaf blight and UPO-10-2, JO-03-98 JHO-2010-1, ANDO-3, UP-10-1 and JHO-99-2 of oats against *Sclerotium* rot.

The session ended with vote of thanks to the chair.

## TECHNICAL SESSION – IV BREEDER SEED PRODUCTION

**Chairman:** Dr. D. R. Malaviaya, Head, Seed Technology Division, IGFRI  
**Rapporteurs:** Drs. A. K. Mehta & S. S. Shekhawat

At the outset, the Chairman of the session welcomed all the participants. Dr. R. V. Kumar, Principal Investigator (Plant Breeding) presented the status of Breeder Seed Production in forage crops for *Rabi* 2010-11.

Against the target of 277.74 q of breeder seed production of 24 varieties in four forage crops viz., oats, berseem, lucerne and gobhi sarson, the actual production was 363.11 q that indicates the surplus of 85.37 q, i.e. 30.74%. The shortfall in the breeder seed production in different varieties of different crops was as follows:

- In oat, there was shortfall in production of variety JHO-99-1 and JHO-200-4 by 2.50 and 3.50q, respectively. The reason for this was due to less quantity of nucleus seed of newly released varieties.
- In berseem, there was shortfall in production of variety Bundel Berseem-3, Mescavi, BL-10, BL-42 and BL-180 by 4.50, 5.45, 17.40, 7.90 and 0.50q, respectively. Less seed production in Mescavi and BL-42 was due to heavy rains while, BL-10 was non-availability of adequate nucleus seed and BL-180 was due to inadequate isolation distance.
- In Lucerne, heavy rains at seed maturity caused shortfall in seed production of variety T-9 by 0.32 q whereas production was not taken for variety Sirsa Type-9, as no genotype is registered on this name.

Dr. R. V. Kumar also presented the breeder seed production targets for *Rabi*-2011-12. The quantity allotted for production is 1428.81q for *Rabi* crops, which is almost five times more than the last year indent. The Chairman remarked that

- In berseem, the indented variety BL-2 shall be named as BL-22.
- Faizabad centre requested that the breeder seed production target shall come through Director Research of their University, so that the targeted quantity can be achieved.
- Incharge, Coimbatore centre is unable to produce breeder seed (3.0q) of variety Co-1 because of lack of infrastructure facilities. The chairman remarked that I/C centre shall write a letter to PI, Plant Breeding regarding this matter.
- The indent for breeder seed production of teosinte shall be considered in *kharif* season instead of current *Rabi* season because the crop is of *kharif* season.
- The chairman pointed out that the indent of grasses and planting material should come through DAC.
- It was also pointed out that DAC may be informed about the latest varieties in different forage crops.

The session ended with vote of thanks to the Chair.

## TECHNICAL SESSION –V PGR and IPR ISSUES

**Chairmain:** Dr A.K. Roy, Head, GSM Division, IGFRI  
**Rapporteurs:** Drs K. Velayudham and Tejveer Singh

**Speaker:** Dr MK Rana, Sr. Scientist, NBPGR, New Delhi

Dr SA Faruqui, Director IGFRI and PC (forage crops) have introduced the speaker. The session was chaired by Dr AK Roy, Principal scientist and head, IGFRI, Jhansi. Dr MK Rana has given a lucid account on the following issues pertaining to PGR and IPR issues of forage crops:

- Germplasm collection and evaluation for various forage crops is going on.
- Status of forage crops germplasm present in NGB and field gene bank at NBPGR.
- Guidelines to submit germplasm for conservation as base collection and allotment of IC number.
- He briefed the guidelines for registration of novel plant germplasm.
- He suggested future thrusts like collection of germplasm from specific areas, identification of duplicate accessions and conservation of germplasm in NGB.
- Narrated the agenda and recommendations of germplasm advisory committee.
- Cleared the doubts related to policy issues on germplasm exchange.
- Answered the queries related to issues of phytosanitary Certificate.

Finally the chairman concluded that NBPGR is a dynamic/proactive organisation and urged the scientists to utilize the services of NBPGR towards procurement of germplasm from exotic and indigenous sources.

The session ended with vote of thanks to the Chair.

## RECOMMENDATIONS OF THE VARIETY IDENTIFICATION COMMITTEE

The meeting of the Varietal Identification Committee of the AICRP-FC was held under the Chairmanship of Dr. R. P. Dua, ADG (FFC), ICAR, New Delhi on September 08, 2011 at IGFRI, Jhansi during the AICRP-FC, National Group Meet, Rabi, 2011-12.

Five proposals of three forage crops viz., Rice bean, Pearl millet and Oat were submitted to the committee for identification. The proposals were discussed thoroughly. The recommendations of the committee are as following:

### 1. Ricebean : Variety KRB-19 and JRBJ-05-2

The committee considered the proposal of two Ricebean varieties namely KRB-19 submitted by BCKV, Kalyani and JRBJ-05-2 submitted by JNKVV, Jabalpur. It was observed that the two varieties have performed consistently superior to the check for green forage and dry matter yield to the check variety Bidhan-1 across the locations. The KRB-19 variety has been selected from the material collected from Tengnaupal, Monipur state whereas other variety JRBJ-05-2 has been collected from district Dindori (M.P.). Considering the adaptabilities of these varieties, the variety KRB-19 is identified for North-East Plain zone and JRBJ-05-2 is identified for Central zone.

### 2. Oat : Variety NDO-25

The committee considered the proposal of oat variety NDO-25 submitted by NDUAT, Faizabad for North-West Plain and Central zone. In North West Plain zone the variety did not perform its superiority over check variety OL-125 and in Central zone, JO-03-93 the other qualifying variety has already been identified during last Rabi 2010-11 meet held at CSKHPKV, Palampur. Hence the variety is not identified for either of the two zones.

### 3. Forage Bajra : Variety AFB-3

The committee considered the release proposal of forage bajra variety AFB-3 submitted by AAU Anand. The variety showed its consistent superiority for green forage and dry matter yield over the locations and years in states of Haryana, Punjab and Rajasthan. Hence the variety is identified for these states.

### 4. Oat : Variety SKO-96

The committee considered the proposal of forage oat variety SKO-96 submitted by SKUAST, Srinagar. This variety performed consistently better than check and other qualifying entries over the locations and years for the traits GFY, DMY and L/S ratio. This variety is highly resistance to leaf blight and powdery mildew hence this variety is identified for temperate and mid altitude areas of Hills in the states of Himachal Pradesh and Jammu and Kashmir.

## TECHNICAL SESSION –VI PLENARY SESSION

- Chairman** : Dr. S. A. Faruqui, Director, IGFRI and Project Coordinator, Forage Crops
- Co-Chairman** : Dr. N. Das, Head, PAR Division, IGFRI, Jhansi
- Rapporteurs** : Drs. R. V. Kumar and S. R. Kantwa

The session was started with introductory remarks of the Chairman. Dr. N. Das, Co-chairman, discussed about fodder scarcity in the country and urged the fodder researcher to assure fodder seed availability to the farmers as they are permanently dependent on the public/private agencies for fodder seed. He also urged the fodder scientists to look into the research aspect of staggered planting of forage crops for increasing the duration of green fodder availability. The Chairman invited the Rapporteurs of different technical sessions for presentations of proceedings. The aspect and issues pertaining to Rabi 2010-11 programme in specific and forage research in general were discussed. The recommendations of Technical Sessions were discussed and accepted after approval of the house. Looking to future requirements, some specific suggestions and recommendations were also made for strengthening the forage research and development in the country.

- B-carotene (yellow pigment) estimation facility need to be established at SKUAT, Srinagar in XII plan for quality analysis of dual purpose barley, oats etc.
- Timely submission of AUC and research data is mandatory for release of the Fund.
- Studies on nitrate content of the forage crops influenced by different sources of Nitrogen should be done in agronomical trials.
- While submitting the release proposal in Varietal Identification Committee, proposal should be prepared on the basis of superiority of the different characters tested at different centres irrespective of its performance better/poor at all the locations zone-wise/all India basis.
- Germplasm collected from different sources must be evaluated, characterized and submitted to NBPGR, New Delhi for getting IC number.
- The centres having germplasm of Berseem and Oat obtained from NBPGR, New Delhi, will have to multiply it during Rabi 2011-12 and will be shared by different centres for evaluation in Rabi 2012-13.

At the end of the plenary session, Dr. R. B. Bhaskar, Organizing Secretary (NGM), IGFRI, Jhansi extended vote of thanks to the Chairman, Dr. S. A. Faruqui, Director, IGFRI and PC (Forage Crops), and his team, participants and local team for successful conductance of National Group Meet.

Dr. S. A. Faruqui, Project Coordinator (Forage Crops) also expressed heartiest thanks to Dr. R. P. Dua, ADG (FFC), ICAR and team of Director, IGFRI, Jhansi, members of organizing committee and all other staff involved in organization of this meeting for providing all facilities and support for successful conductance of the meeting.



**AICRP ON FORAGE CROPS**  
**FINALIZED TECHNICAL PROGRAMME OF THE FORAGE BREEDING TRIALS**  
**RABI 2011-12**

**Abbreviations:**

**HZ= Hill Zone, NWZ= North West Zone, NEZ =North East Zone,  
CZ= Central Zone, SZ= South Zone**

**1. IVT Berseem : Initial Varietal Trial in Berseem**

**No. of Entries : 5 + 2 NC +1 ZC**

Name of Entries : Jhansi-2, Ludhiana-2, Jabalpur-1

National check : Wardan, Mescavi

Zonal check : BL- 22 (HZ), Bundel Berseem-2 (NWZ & CZ), Bundel Berseem- 3 (NEZ)

Design : RBD with 3 replications

Plot size : 3.0 x 3.0 m

Spacing : Row to row - 30 cm (each plot accommodating 10 rows of 3 m length)

Seed rate : 25 g per plot (approx. 25 kg/ha)

**Seed requirement from contributors: 1.75 kg /entry**

**Nutrients : N-20 kg, P-80 kg/ha**

Irrigation, inter-culture and other agronomic practices as per agronomic norms and requirements of the crop.

Location (19): **HZ-** Palampur, Srinagar **NWZ-** Pantnagar, Ludhiana, Hisar, Jalore, Udaipur, Meerut **NEZ-** Kalyani, Ranchi, Faizabad, Bhubaneswar, Pusa **CZ-** Jhansi, Rahuri, Jabalpur, Urulikanchan, Karjat, Kanpur

**2. AVT-1 Berseem : First Advanced Varietal Trial in Berseem**

**No. of Entries : 3+ 2 NC +1 ZC**

Name of Entries : **HFB-165-1, JB-03-17, JHB-10-1**

National check : Wardan, Mescavi

Zonal check : Bundel Berseem-2 (CZ), Bundel Berseem- 3 (NEZ)

Design : RBD with 4 replications

Plot size : 4.0 x 3.0 m

Spacing : Row to row - 30 cm (each plot accommodating 10 rows of 4 m length)

Seed rate : 30 g per plot (approx. 25 kg/ha)

**Seed requirement from contributors : 1.400 kg /entry**

**Nutrients : N-20 kg, P-80 kg/ha**

**Location (10): NEZ-** Kalyani, Ranchi, Faizabad, Pusa **CZ-** Jhansi, Rahuri, Jabalpur, Urulikanchan, Karjat, Kanpur

### **3. IVT Oat (SC): Initial Varietal Trial in Oat (Single cut)**

**No. of Entries : 10 + 2 NC +1 ZC**

Name of Entries : Pantnagar-2, Faizabad-2, Jabalpur-1, Srinagar-1, Jhansi-1, Bikaner-1, Hisar-1, Ludhiana-1

National checks : Kent and OS-6

Zonal check : SKO-90 (HZ), OL-125 (NWZ), JHO-99-2 (NEZ), JHO-822 (CZ) ,  
JHO- 2000-4 (SZ)

Design : RBD with 3 replications

Plot size : 3.0 x 3.0 m

Spacing : Row to row : 25 cm (each plot accommodating 12 rows of 3 m length)

Seed rate : 100 g per plot (approx. 100 kg/ha)

**Seed requirement from contributors: 9.00 kg/entry**

**Nutrients : N- 80 kg, P-40 kg/ha**

Location (27): **HZ-** Palampur, Srinagar **NWZ-** Bikaner, Jalore, Hisar, Ludhiana, Pantnagar, Udaipur, Meerut **NEZ-** Jorhat, Kalyani, Bhubaneswar, Ranchi, Pusa, Faizabad, CAU Imphal **CZ-** Jhansi, Rahuri, Urulikanchan, Karjat, Kanpur, Anand, Jabalpur, Raipur **SZ-** Hyderabad, Mandya, Coimbatore (Ooty)

### **4 IVT Oat (Dual): Initial Varietal Trial in Oat (Dual)**

**No. of Entries : 9 + 4 NC**

Name of Entries : Jhansi-2, Ludhiana-1, Srinagar-1, Pantnagar-1, Jabalpur-1, Palampur- 1, Hisar-1, Bikaner-1

National checks : Kent, OS-6, UPO-212 and JHO -822

Design : RBD with 3 replications

Plot size : 3.0 x 3.0 m

Spacing : Row to row : 25 cm (each plot accommodating 12 rows of 3 m length)

Seed rate : 100 g per plot (approx. 100 kg/ha)

**Seed requirement from contributors: 6.50 kg/entry**

**Nutrients : N- 80 kg, P-40 kg/ha**

Location (20): **HZ-** Palampur, Srinagar **NWZ-** Bikaner, Jalore, Hisar, Ludhiana, Pantnagar, Udaipur, **NEZ-** Jorhat, Bhubaneswar, Ranchi, Pusa, Faizabad, **CZ-** Jhansi, Rahuri, Urulikanchan, Karjat, Anand, Jabalpur, Raipur

### 5. AVT Oat (SC)-1: First Advanced Varietal Trial in Oat (Single cut)

No. of Entries : 10+ 2 NC +1 ZC

Name of Entries : SKO-188, SKO-170, UPO-10-1, UPO-10-2, JHO-2010-1, JHO-2010-2, OS-377, JO-03-99, JO-03-97, OL-1709

National checks : Kent and OS-6

Zonal check : Palampur-1(HZ), OL-125 (NWZ), JHO-99-2 (NEZ), JHO-822 (CZ) , JHO- 2000-4 (SZ)

Design : RBD with 3 replications

Plot size : 4.0 x 3.0 m

Spacing : Row to row- 25 cm (each plot accommodating 12 rows of 4 m length)

Seed rate : 120 g per plot (approx. 100 kg/ha)

**Seed requirement from contributors : 10.50 kg /entry** Nutrients : N- 80 kg, P- 40 kg/ha

Location (27): **HZ-** Palampur, Srinagar, **NWZ-** Bikaner, Jalore, Hisar, Ludhiana, Pantnagar, Udaipur, Meerut **NEZ-** Jorhat, Kalyani, Bhubaneswar, Ranchi, Pusa, Faizabad, CAU Imphal **CZ-** Jhansi, Rahuri, Urulikanchan, Karjat, Kanpur, Anand, Jabalpur, Raipur **SZ-** Hyderabad, Mandya, Coimbatore (Ooty)

### 6. AVT Oat (SC)- 2 : Second Advanced Varietal Trial in Oats (Single cut)

No. of Entries : 8+ 2 NC +1 ZC

Name of Entries : JHO-2009-1, JHO-2009-2, UPO-09-1, UPO-09-2, SKO-148, SKO-156, OS-363, JO-03-95

National checks : Kent and OS-6

Zonal check : Palampur-1(HZ), OL-125 (NWZ) JHO-99-2 (NEZ), JHO-822 (CZ) , JHO- 2000-4 (SZ)

Design : RBD with 3 replications

Plot size : 4.0 x 3.0 m

Spacing : Row to row- 25 cm (each plot accommodating 12 rows of 4 m length)

Seed rate : 120 g per plot (approx. 100 kg/ha)

**Seed requirement from contributors: 9.00 kg /entry**

**Nutrients : N- 80 kg, P-40 kg/ha**

Location (24): **HZ-** Palampur, Srinagar, **NWZ-** Bikaner, Jalore, Hisar, Ludhiana, Pantnagar, Meerut **NEZ-** Jorhat, Kalyani, Bhubaneswar, Ranchi, Pusa, Faizabad, CAU Imphal **CZ-** Jhansi, Rahuri, Urulikanchan, Kanpur, Anand, Jabalpur, **SZ-** Hyderabad, Mandya, Coimbatore (Ooty)

## 7. AVT Oat (SC)-2 (Seed): Advanced Varietal Trial –2 in Oats (Single cut) for Seed

**No. of Entries : 8+ 2 NC +1 ZC**

Name of Entries : **JHO-2009-1, JHO-2009-2, UPO-09-1, UPO-09-2, SKO-148, SKO-156, OS-363, JO-03-95**

National checks : Kent and OS-6

Zonal check : Palampur-1(HZ), OL-125 (NWZ), JHO-99-2 (NEZ), JHO-822 (CZ) , JHO- 2000-4 (SZ)

Design : RBD with 3 replications

Plot size : 4.0 x 3.0 m

Spacing : Row to row- 25 cm (each plot accommodating 12 rows of 4 m length)

Seed rate : 100 g per plot (approx. 80 kg/ha)

**Seed requirement from contributors: 3.00 kg /entry**

**Nutrients : N- 80 kg, P-40 kg/ha**

Location (10): **HZ-** Palampur, Srinagar, **NWZ-** Hisar, Pantnagar, **NEZ-** Jorhat, Ranchi **CZ-** Jhansi, Jabalpur, **SZ-** Mandya, Coimbatore (Ooty)

### 7A. AVT Oat (SC)-2 (Agronomy)

Name of Entries : **JHO-2009-1, JHO-2009-2, UPO-09-1, UPO-09-2, SKO-148, SKO-156, OS-363, JO-03-95**

National checks : Kent and OS-6

Zonal check : Palampur-1(HZ), OL-125 (NWZ), JHO-99-2 (NEZ), JHO-822 (CZ) , JHO- 2000-4 (SZ)

Location (10): **HZ-** Palampur, Srinagar, **NWZ-** Hisar, Pantnagar, **NEZ-** Jorhat, Ranchi **CZ-** Jhansi, Jabalpur, **SZ-** Mandya, Coimbatore (Ooty)

**Seed requirement for Agronomy trial : 12.00 kg/entry**

## 8. IVTO (MC): Initial Varietal Trial in Oats (Multi cut)

**No. of Entries : 6 + 4 NC**

Name of Entries : Hisar-2, Jhansi-1, Pantnagar-1, Jabalpur-1, Ludhiana-1

National checks : Kent, UPO-212, JHO-851 and RO-19

Design : RBD with 3 replications

Plot size : 3.0 x 3.0 m

Spacing : Row to row-25 cm (each plot having 12 rows of 3.0 m length)

Seed rate : 90 g per plot (approx. 100 kg/ha)

Seed requirement from contributors: 5.50 kg /entry

**Nutrients : N-80 kg, P- 40 kg/ha**

Locations (18): **HZ-** Palampur, Srinagar **NWZ-** Pantnagar, Hisar, Jalore, Ludhiana, Udaipur **NEZ-** Ranchi, Pusa, Faizabad, Jorhat, Bhubanewar **CZ-** Jhansi, Anand, Jabalpur, Rahuri, Urulikanchan, Karjat

**9. AVT Oat (MC)-2: Second Advanced Varietal Trial in Oat (Multi cut)**

**No. of Entries : 3+ 3 NC +1 ZC**

Name of Entries : **UPO-09-3, JHO-2009-3, JO-03-301**  
National checks : Kent, UPO-212 and RO-19  
Zonal check : Palampur-1(HZ), JHO-822 (CZ)  
Design : RBD with 3 replications  
Plot size : 4.0 x 3.0 m  
Spacing : Row to row-25 cm (each plot having 12 rows of 4.0 m length)  
Seed rate : 120 g per plot (approx. 100 kg/ha)

Seed requirement from contributors: 2.600 kg /entry

**Nutrients : N-80 kg, P- 40 kg/ha**

Locations (7): **HZ-** Palampur, Srinagar **CZ-** Jhansi, Anand, Jabalpur, Rahuri, Urulikanchan

**10. AVT Oat (MC)-2 (seed) : Second Advanced Varietal Trial in Oat (Multi cut) (seed)**

**No. of Entries : 3+ 3 NC +1 ZC**

Name of Entries : **UPO-09-3, JHO-2009-3, JO-03-301**  
National checks : Kent, UPO-212 and RO-19  
Zonal check : Palampur-1(HZ), JHO-822 (CZ)  
Design : RBD with 3 replications  
Plot size : 4.0 x 3.0 m  
Spacing : Row to row-25 cm (each plot having 12 rows of 4.0 m length)  
Seed rate : 100 g per plot (approx. 80 kg/ha)

Seed requirement from contributors: 2.250 kg /entry

**Nutrients : N-80 kg, P- 40 kg/ha**

Locations (7): **HZ-** Palampur, Srinagar **CZ-** Jhansi, Anand, Jabalpur, Rahuri, Urulikanchan

**10a. AVT Oat (MC)-2 (Agronomy) : Second Advanced Varietal Trial in Oat (Multi cut) (Agronomy)**

Name of Entries : **UPO-09-3, JHO-2009-3, JO-03-301**

National checks : Kent, UPO-212 and RO-19  
Zonal check : Palampur-1(HZ), JHO-822 (CZ)  
Seed requirement from contributors: 9.000 kg /entry

Locations (7): **HZ-** Palampur, Srinagar **CZ-** Jhansi, Anand, Jabalpur, Rahuri, Urulikanchan

**11. VT Lucerne (P) - 2011: Varietal Trial in Lucerne (Perennial)-1<sup>st</sup> year**

No. of Entries : **7 + 2 NC**

Name of Entries: Anand-1, Urulikanchan-1, Dharwad-1, Rahuri-1, Coimbatore-1, Bikaner-1, Advanta-1

National checks: Ananad-2, RL-88

Design : RBD with 3 replications

Plot size : 4.0 x 3.0 m

Spacing : Row to row: 30 cm (each plot accommodating 10 rows of 4.0 m length)

Seed rate : 30.0 g per plot (Approx. 25 kg/ha)

**Nutrients : N-80kg, P-40 kg/ha**  
**Seed requirement from contributors: 1.250 kg /entry**

Location (12): **NWZ-** Ludhiana, Hisar, Bikaner, Jalore, Udaipur **CZ-** Rahuri, Urulikanchan, Anand, **SZ-** Hyderabad, Coimbatore, Mandya, Dharwad

**12. VT Lucerne (P) - 2010: Varietal Trial in Lucerne (Perennial)-2<sup>nd</sup> year**

No. of Entries : **9 + 2 NC**

Name of Entries : Rahuri-4, Anand-3, Coimbatore-1, Bikaner-1

National checks : Ananad-2, RL-88

Design : RBD with 3 replications

Plot size : 4.0 x 3.0 m

Spacing : Row to row : 30 cm (each plot accommodating 10 rows of 4.0 m length)

Seed rate : 30.0 g per plot (Approx. 25 kg/ha)

**Nutrients : N-80kg, P-40 kg/ha**

Location (10): **NWZ-** Ludhiana, Bikaner, Udaipur **CZ-** Rahuri, Urulikanchan, Anand, **SZ-** Hyderabad, Coimbatore, Mandya, Dharwad.

**(Being perennial in nature, trial will be continued in Rabi 2011-12)**

**13. IVT Rye grass: Varietal Trial in Rye grass**

No. of Entries : **4 + 1 C (PBRG-1) (State release)**

Name of Entries: Advanta-4

Design : RBD with 4 replications

Plot size : 3.0 x 3.0 m

Spacing : Row to row: 30 cm (each plot accommodating 10 rows of 4.0 m length)

Seed rate : 20.0 g per plot (Approx. 20 kg/ha)

**Nutrients : N-80kg, P-40 kg/ha**

**Seed requirement from contributors: 0.750 kg /entry**

Location (8): **HZ-** Palampur, Srinagar, Almora **NWZ-** Pantnagar, Ludhiana, Udaipur, **NEZ-** Jorhat, Barapani

#### **14. IVT Lathyrus : Varietal Trial in Lathyrus**

**No. of Entries : 6 + 1 (Nirmal) (NC)**  
Name of Entries: Kalyani-3, Jhansi-2, Jorhat-1

Design : RBD with 3 replications  
Plot size : 3.0 x 3.0 m  
Spacing : Row to row: 30 cm (each plot accommodating 10 rows of 4.0 m length)  
Seed rate : 40.0 g per plot (Approx. 40 kg/ha)  
**Nutrients : N-20kg, P-40 kg/ha**  
**Seed requirement from contributors: 1.000 kg /entry**

Location (8): Jorhat, Kallyani, Bhubneshwar, Ranchi, Pusa, Jhansi, Jabalpur, Kanpur

#### **15. VTTF (2009)- 3<sup>rd</sup> Year : Varietal Trial In Tall Fescue Grass Under Sub-Temperate & Temperate Himalayan Rangelands**

**No. of Entries : 2+ 2 NC**

Name of Entries : Hima-14, Hima-15

National checks : Hima-1 and Hima-4

Design : RBD with 5 replication

Plot size : 2.1m x 1.5m

Spacing : slip to slip- 15 cm and row to row- 30 cm

No. of rows per plot-7

No. of hills per row-10, Root slips per hill-3

Sowing method : By rooted slips

Fertilization (kg/ha) : NPK 40:40:30 kg/ha at the time of sowing in the first year  
NPK 80:60:30 kg/ha in subsequent years. Half of N will be applied in the month of November and remaining half in equal splits after each cut

Harvesting: Green forage cuts should be take after 40 to 50 days interval (three to four cuts)

Locations (3): (CSKHPKV, Palampur, VPKAS, Almora, SKUA&T, Srinagar)

**( Being perennial in nature, trial will be continued in Rabi 2011-12)**

#### **15a VTTF (Agronomy) (2009)- 3<sup>rd</sup> Year : Varietal Trial In Tall Fescue Grass Under Sub-Temperate & Temperate Himalayan Rangelands (Agronomy)**

Name of Entries : Hima-14, Hima-15

National checks : Hima-1 and Hima-4

**Seed requirement from contributors: 1200seedlings/entry/location**

Locations (2): (Palampur, Bajaura)

**For conductance of Germplasm Evaluation Trial, it was decided by house that all the centres having germplasm of Berseem and Oat from NBPGR, New Delhi, will multiply it in this Rabi 2011-12 and will be shared by different centres for evaluation in Rabi 2012-13.**

## **DATA TO BE RECORDED ON BREEDING TRIALS**

- GFY, DMY and DM% cut-wise in case of multi cut.
- Production potential of the entries for green fodder yield (q/ha/day) in case of single cut Oats.
- Ancillary characters, like plant height, leafiness (Leaf / Stem ratio), and DM%.
- Seed yield in case of Seed trial.
- In IVT trials, only CP (%) and CP yield will be taken in all the cuts.
- In AVT trials, CP(%), CP yield, NDF (%), ADF (%) and IVDMD (%) will be taken in all the cuts.
- In IVT (Dual) Oat, first cut will be taken after 50 days of sowing and next will be taken at the time of seed harvest.

**Note :** In case of Single cut, data are to be recorded at 50% flowering stage. In case of multi-cut, data are to be recorded cut wise.

$$\text{Yield Conversion Factor : } \quad \text{Yield (q/ha) = } \frac{\text{Yield (kg. /plot)}}{\text{Net plot size (m}^2\text{)}} \times 100$$

### **Important**

- ❖ Seed of checks and entries are to be supplied by contributors to AICRP (FC) unit, Jhansi by 30.9. 2011.
- ❖ Seed for trials will be dispatched by AICRP (FC) unit, Jhansi to the testing locations/centers by 10.10. 2011.
- ❖ Rabi trial's data are to be submitted by testing centres to PC (FC) Jhansi upto June 20, 2012. In case of seed yield and quality traits upto 5<sup>th</sup> July 2012.



**IMPORTANT & URGENT**

**For Breeding and Agronomy (AVT-2) trials, seed of the check varieties are to be supplied by the concerned scientist to PC (FC) by September 30, 2011.**

<b>S. No.</b>	<b>Crop variety &amp;</b>	<b>Quantity required</b>	<b>Seed source</b>
1.	Berseem		
	Mescavi	3.500 kg	<b>Dr. R.K. Yadav,</b> Head, Forage Section CCS HAU, Hisar
	BL-22	0.500 kg	Dr. U. S. Tiwana , <b>OIC- Forage Section</b> PAU, Ludhiana
	Bundel Berseem-2	2.000 kg	<b>Dr. D.R. Malviya</b> Head, Div. of Seed Technology IGFRI, Jhansi
	Bundel Berseem-3	1.250 kg	
	Wardan	3.500 kg	
2.	Oat		
	Kent	72 kg	<b>Dr. D.R. Malviya</b> Head, Div. of Seed Technology IGFRI, Jhansi
	JHO- 2000-4	9 kg	
	JHO- 822	31 kg	
	JHO-99-2	14 kg	
	JHO-851	6 kg	
	UPO-212	28 kg	<b>Dr. Y.P. Joshi</b> OIC – AICRP (Forage Section) GBPUAT, Pantnagar
	OS-6	51 kg	<b>Dr. R.K. Yadav,</b> Head, Forage Section CCS HAU, Hisar
	OL-125	12 kg	<b>Dr. U. S. Tiwana</b> OIC – AICRP (Forage Section) PAU, Ludhiana

	Palampur-1	12 kg	<b>Dr. Naveen Kumar</b> In-charge AICRP-FC CSK HPKV, Palampur
	<b>RO-19</b>	<b>22 kg</b>	<b>Dr. A.H. Sonone</b> Forage Breeder & OIC Forage Crops, <b>MPKV, Rahuri</b>
	<b>SKO-90</b>	<b>1.250 kg</b>	<b>Dr. Gulzafar Mir</b> SKUAST, Srinagar
<b>3.</b>	Lucerne		
	<b>Anand-2</b>	<b>1.250 kg</b>	<b>Dr. H.R. Kher</b> Principal Scientist (Forage Breeding) & OIC AAU, Ananad
	<b>RL-88</b>	<b>1.250 kg</b>	<b>Dr. A.H. Sonone</b> Forage Breeder & OIC Forage Crops, PMKV, Rahuri
<b>4.</b>	Rye Grass		
	<b>PBRG-1</b>	<b>1.000 kg</b>	<b>Dr. U. S. Tiwana</b> OIC – AICRP (Forage Section) Dept. of Plant Breeding <b>PAU, Ludhiana</b>
<b>5.</b>	Lathyrus		
	<b>Nirmal</b>	<b>1.250 kg</b>	<b>Dr. D.K. De,</b> Sr. Forage Breeder BCKV, Kalyani
<b>6.</b>	Tall Fescue		
	<b>Hima-1</b>	<b>1200seedlings/entry/location</b>	<b>Dr. Naveen Kumar</b> In-charge AICRP-FC CSK HPKV, Palampur
	<b>Hima-4</b>	<b>1200seedlings/entry/location</b>	

**FINALIZED TECHNICAL PROGRAMME  
FORAGE CROP PRODUCTION TRIALS  
RABI 2011 – 20112**

**(A) ON-GOING COORDINATED TRIALS**

**AST 1 (AST-2): RESOURCE CONSERVATION THROUGH FORAGES**

**Objectives:**

- To study the effect of resource conservation techniques (RCT) on forage yield of the system
- To study the effect of resource conservation through forages (RCT) on physico - chemical status of soil.
- To study the economics of the system.

Year of start : Kharif 2009 (Establishment)

Duration : Five years

Methodology :

**Phase I : (2009)**

- Studies on initial physico-chemical status of the soil i.e., WHC, Infiltration rate, pH, OC (%), available N, P & K and microbial population.
- Formulation of zone specific resource conservation techniques through forage crops in pilot trial mode.

**Phase II: (2010-2011)**

- Execution of the experiments as per the technical programme in the respective zone
- Recording observation on growth, yield and quality in different seasons of the system in each year
- Recording observation on soil fertility status after end of the in each year.

**Phase III: (2012-13)**

- Recording final physico-chemical soil status after completion of the study
- Computation of data and analysis and preparation of the report

**Observation to be recorded:**

**A. Crop growth:**

- i. Plant / shoot population at harvest (per m<sup>2</sup>)
- ii. Plant height at harvest
- iii. Leaf : Stem ratio

**B) Yield (q/ha) :**

- i. Green fodder
- ii. Dry matter
- iii. Grain
- iv. Straw
- v. Forage equivalent yield

**C) Quality:**

- i. Crude protein content (%)
- ii. Crude protein yield (q/ha)

**D) Economics:**

- i. Cost of cultivation (Rs./ha)
- ii. Gross monetary return (Rs./ha)

- iii. Net monetary return (Rs./ha)
- iv. Benefit : cost ratio

E) Soil studies:

Soil fertility status i.e., pH, OC (%), EC, available NPK and microbial population before and after completion of experiment.

(F) Soil moisture conservation studies: Soil moisture data from 0-15 and 15-30 cm depth at initial, 15 days after germination and later on every 30 days interval.

**NOTE:** Specific observations will be recorded as per experimental need.

**1. Hill Zone :**

**Subtitle: Effect of vegetative cover barriers and improved forage species on conservation of degraded grassland**

Design : Split  
Replication (s) : Three  
Treatments :

A. Vegetative barriers

- i. No vegetative barrier
- ii. Napier Bajra Hybrid
- iii. Setaria

B. Planting of improved species

- i. Local grass
- ii. Setaria
- iii. *Stylo*
- iv. Setaria + *Stylo*

**Location (3):** Palampur, Rajouri and Srinagar

**2. North-West Zone**

**a) Irrigated conditions**

**Subtitle: Effect of different tillage practices on productivity of forage crop in the prevalent crop sequence**

Design : RBD

Replication(s) : Three

**Treatments :**

T<sub>1</sub>-Conventional tillage (1 Disc harrow + 2 Cultivator)

T<sub>2</sub>-2 Cultivation( 1 Disc harrow + 1 Cultivator)

T<sub>3</sub>-2 cultivation ( Rotavator)

T<sub>4</sub>-1 cultivation ( Disc harrow)

T<sub>5</sub>-1 cultivation ( Rotavator)

T<sub>6</sub>-Broadcasting of seed before T-3

T<sub>7</sub>-Broadcasting of seed before T-5

T<sub>8</sub>-No cultivation (zero tillage)

**Location (3):** Ludhiana, Hisar and Pantnagar

## **b) Rainfed conditions**

**Subtitle: Conservation of rangelands by incorporating grass species in alleys of improved variety of Khejari (*Prosopis cineraria*)**

Design: Split plot

Replications: 3

### **Treatments**

A. Alley foliage utilization (main plot)

- i. 100 % foliage as fodder
- ii. 100 % foliage incorporation as litter
- iii. 50 % foliage as fodder + 50 % foliage as litter incorporation

B. Grass species (sub plot)

- i. *Lasiurus indicus*
- ii. *Cenchrus ciliaris*
- iii. *Cenchrus setigerus*
- iv. *Panicum antidotale*

Specific observation:

1. Rate of decomposition of litter

**Location (2):** Bikaner

### **3. Central Zone:**

**Sub title: Effect of planting methods and forage crop combinations on fodder productivity through moisture conservation**

Design : RBD

Replication(s) : Three

Treatments :

A. Moisture conservation techniques (main plot)

- i. Ridge and furrow
  - ii. Flat bed
- B. Combination of grasses and legumes

- i. Cenchrus + Desmenthus
- ii. Cenchrus + Stylosanthes
- iii. Dicanthium + Desmenthus
- iv. Dicanthium + Stylosanthes

**Location (4):** Rahuri, Jabalpur, Anand, Urulikanchan

#### 4. North East Zone:

##### **Sub title: Effect of moisture conservation practices on production of perennial grasses**

Design : RBD  
Replication(s) : Three

Treatments :  
A. Perennial grasses

- i. *Brachiaria*
- ii. Guinea grass/Hybrid Napier
- iii. *Setaria* grass

B. Moisture conservation

- i. Control (Without mulch)
- ii. Soil mulch
- iii. Inter cropping with legume (Cowpea/Rice bean - Berseem/Ricebean-Cowpea)

**Location (6):** Jorhat, Faizabad, Raipur, Ranchi, Bhubaneswar and Kalyani

#### 5. South Zone:

##### **(a) Sub title: Intensive forage production through silvipasture system under rainfed ecosystem**

Design : RBD  
Replication(s) : Three

Treatments : 8  
T<sub>1</sub> – Subabool + *Cenchrus ciliaris*  
T<sub>2</sub> – Subabool + *Stylosanthes*  
T<sub>3</sub> – Subabool + *Desmenthus*  
T<sub>4</sub> – Subabool + *Cenchrus ciliaris* + *Stylosanthes* (3:1)  
T<sub>5</sub> – Subabool + *Cenchrus ciliaris* + *Desmenthus* (3:1)  
T<sub>6</sub> – Subabool + Sorghum + Horse gram (2:1)  
T<sub>7</sub> – Subabool + Pearl millet + horse gram (2:1)  
T<sub>8</sub> – Subabool (Sole)

Note : Spacing of subabool – 3 m x 2 m

**Location (3) :** Hyderabad, Coimbatore and Mandya

##### **b) Sub title: Cassava based sustainable alley farming system for rainfed areas of the humid tropics**

Design: RBD  
Replication: 3  
Treatments: 12

(A) Grasses

- i. BN Hybrid
- ii. *Brachiaria brizantha*
- iii. No grass

(B) Legumes

- i. Fodder cowpea

- ii. No fodder legume
- (C) Biofertilizer
- i. VAM
  - ii. No biofertilizer

**Location:** Vellayani

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### **AST 2 (AST-3): INFLUENCE OF NUTRIENTS (MACRO & MICRO) ON FORAGE PRODUCTION AND QUALITY OF BERSEEM IN NORTH WEST ZONE**

Year of Start : Rabi 2009 - 10  
Duration : Three Years  
Design : RBD  
Replications : Three  
Plot Size : 3m x 3m

Treatments : 15

- i. Absolute control
- ii. RDF
- iii. FYM @ 5 t/ha
- iv. FYM @ 10 t/ha
- v. RDF + FYM @ 5 t/ha
- vi. RDF + FYM @ 10 t/ha
- vii. RDF + S + Mo + B
- viii. FYM @ 5 t/ha + S + Mo + B
- ix. FYM @ 10 t/ha + S + Mo + B
- x. RDF + FYM @ 5 t/ha + S + Mo + B
- xi. RDF + FYM @ 10 t/ha + S + Mo + B

Rate of application:

S = 30 kg/ha (elemental Sulphur)

B = 4 kg/ha (Borax)

Mo = 1 kg/ha (Sodium molybdate)

RDF = as per recommendation

**Observations to be recorded:**

- GFY, DMY CP yield, CF Yield, Plant height and Leaf : Stem ratio
- Initial and final fertility status

**Location:** Ludhiana, Hisar, Pantnagar

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### **AST 3 (AST-6): OPTIMIZATION OF NITROGEN FOR SORGHUM IN DIFFERENT CROPPING SYSTEMS**

Year of start : Rabi-2009-10  
Duration : Three years  
Design : Split plot  
Replications : Three

Plot size :5mx4m

Treatments : 6x4=24

(a) Cropping System (6)

- i. Wheat – Sorghum (F)
- ii. Wheat – Maize (F)– Sorghum (F)
- iii. Wheat – Cowpea (F) – Sorghum (F)
- iv. Berseem – Sorghum (F)
- v. Oat – Maize (F)– Sorghum (F)
- vi. Oat – Cowpea (F)– Sorghum (F)

(b) Nitrogen Levels (4)

- i. 50% of Recommended dose
- ii. 75% of Recommended dose
- iii. 100% of Recommended dose
- iv. 125% of Recommended dose

**Note:** N levels treatments will be applied to sorghum. Other crops of the sequence will be grown with recommended NPK doses and other packages.

**Observations to be recorded:**

**A. Crop Growth**

- i. Plant Population/m<sup>2</sup>
- ii. Growth parameters (Plant height and leaf stem ratio)
- iii. Green fodder, dry matter, forage equivalent and crude protein yield (q/ha)

**B. Economics (Rs./ha/year)**

- i. Cost of cultivation
- ii. Gross monetary returns
- iii. Net monetary returns
- iv. Benefit : Cost ratio

**C. Nutrient Studies**

- i. Nitrogen uptake by each crop and entire system
- ii. Nitrogen use efficiency
- iii. Soil fertility status before and after completion of sequence

**Location: Ludhiana, Pantnagar**

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**AST-4: EFFECT OF TILLAGE AND NUTRIENT MANAGEMENT ON PRODUCTIVITY OF RICE-OAT CROPPING SYSTEM**

**Objective:**

- To study the effect of tillage and nutrient management in oats on the productivity of the system
- |             |   |            |
|-------------|---|------------|
| Design      | : | Split plot |
| Replication | : | 3          |
| Plot size   | : | 4m x 3m    |



Year of start : *Kharif 2010* (Raipur and Jabalpur - Kharif 2011)

**Treatment: 12**

**Main plot – Tillage practices (3)**

- S<sub>1</sub>- Zero tillage
- S<sub>2</sub>. Minimal tillage
- S<sub>3</sub>. Conventional tillage

**Sub Plot - nutrient management (4)**

- M<sub>1</sub> – 75 % Recommended Dose of NPK (RD)
- M<sub>2</sub> – 75 % RD + Biofertilizers (*Azotobactor* + PSB)
- M<sub>3</sub> – 100 % RD
- M<sub>4</sub> – 100 % RD + Biofertilizers (*Azotobactor* + PSB)

**Note: Tillage and nutrient management will be done in oat crop and residual effect of the treatments will be studied on *Kharif* rice. Data will be reported in Rabi.**

**Observations:**

- Initial and final status of soil fertility and microbial population
- Yield of grain and straw for rice
- Yield of green and dry matter of oat
- Weed studies
- CP% and CP yield of oat
- Economics.

**Locations (6) : Bhubaneswar, Ranchi, Kalyani, Jorhat, Raipur and Jabalpur**

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**AST-5: PERFORMANCE OF FORAGE CROPS RAISED THROUGH WASTE WATER UNDER VARIED NUTRIENT LEVELS**

**Objectives**

- To access the production and quality of various forage crops raised through waste water under varied nutrient level
- To workout the economics

Year of Start : *Kharif 2010*  
Duration : 3 years  
Design : Split Plot  
Replications : Three

**Treatments**

**Main Plot -Forage Crops – 4**

- C<sub>1</sub> – Cumbu Napier Hybrid grass - CO(CN)4/ APBN-1
- C<sub>2</sub> – Guinea Grass - CO(GG)3
- C<sub>3</sub> – Multicut fodder sorghum - CO(FS)29 / Para grass
- C<sub>4</sub> – Lucerne - CO 1

**Sub Plot -Nutrient Levels – 5**

- S<sub>0</sub>- Control
- S<sub>1</sub>- 25% RDF
- S<sub>2</sub> – 50% RDF
- S<sub>3</sub> – 75% RDF
- S<sub>4</sub> – 100% RDF

**Observations:**

- Plant population / m row, Plant height at harvest, Leaf stem ratio
- Green fodder and dry matter yield (q/ha)
- Crude protein content (%) and Crude protein yield (q/ha)
- Economics (Rs/ha/yr)
- Chemical analysis of waste water, soil and fodder for heavy metals
- Soil fertility at initial and at end of the year

**Note: Data will be reported in Rabi**

**Locations (2): Coimbatore and Hyderabad**

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## B- ONGOING LOCATION SPECIFIC TRIALS

### AST 6: OPTIMIZATION OF NITROGEN FOR MAIZE IN DIFFERENT FORAGE BASED CROPPING SYSTEMS

**Year of start** : Rabi 2011-12  
**Duration** : Three years  
**Design** : Split plot  
**Replications** : Three  
**Plot size** : 5m x 4m

**Treatments** : 4x4=16

#### (a) Cropping System (4)

- i. Oat – Maize – Cowpea
- ii. Oat – Maize – Rice bean
- iii. Barley – Maize – Cowpea
- iv. Barley – Maize – Rice bean

#### (b) Nitrogen Levels (4)

- i. 50% of Recommended dose
- ii. 75% of Recommended dose
- iii. 100% of Recommended dose
- iv. 125% of Recommended dose

**Note:** N levels treatments will be applied to maize. Other crops of the sequence will be grown with recommended NPK doses and other packages.

#### Observations to be recorded

##### A. Crop Growth

- i. Plant Population/m<sup>2</sup>
- ii. Growth parameters (Plant height and leaf stem ratio)
- iii. Green fodder, dry matter, forage equivalent and crude protein yield (q/ha)

##### B. Economics (Rs./ha/year)

- i. Cost of cultivation
- ii. Gross monetary returns
- iii. Net monetary returns
- iv. Benefit : Cost ratio

##### C. Nutrient Studies

- i. Nitrogen uptake by each crop and entire system
- ii. Nitrogen use efficiency
- iii. Soil fertility status before and after completion of sequence

**Location:** Shillong

**(Data reporting: Kharif)**

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## **AST 7 (AST 7): EFFECT OF SOIL AMENDMENTS ON PRODUCTIVITY OF RICE-BERSEEM AND CHANGES IN SOIL PROPERTIES OF SODIC SOIL**

Year of start : Kharif 2009  
Duration : Five years  
Plot size : 4m x 3m  
Design : RBD  
Replication : 3

### **Treatments:**

T1 = RDF (Control)  
T2 = RDF + FYM 10 t/ha  
T3 = RDF + Gypsum @ 75 % Gypsum Requirement (GR)  
T4 = RDF + Gypsum @ 50 % GR  
T5 = RDF + Pressmud @ 75 % GR  
T6 = RDF + Pressmud @ 50 % GR  
T7 = RDF + Gypsum @ 75 % GR + FYM 10 t/ha  
T8 = RDF + Gypsum @ 50 % GR + FYM 10 t/ha  
T9 = RDF + Pressmud @ 75 % GR + FYM 10 t/ha  
T10 = RDF + Pressmud @ 50 % GR + FYM 10 t/ha

### **Note:**

1. All the soil amendment treatments will be applied to rice only. Hence, berseem crop will be grown with recommended fertilizer dose.
2. Calculation of doses of soil amendments will be based on gypsum requirement.

### **Observations to be recorded:**

- i. Plant /shoot population at harvest (per m<sup>2</sup>) , Plant height at harvest, grain and straw yield and Harvest index (Rice).
- ii. GFY, DMY, Forage equivalent yield, CP % and CPY (Berseem)
- iii. Net monetary return (Rs/ha/yr)
- iv. Uptake of N, P and K (kg/ha) by each crop and entire system
- v. Initial soil fertility status viz., pH, EC, Exch. Na, OC and available NPK
- vi. Soil fertility status after completion of sequence i.e. pH, EC, OC, available NPK and exchangeable sodium percentage

**Location : Faizabad**  
**(Data reporting: Rabi)**

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## **AST-8 (AST 11): EFFECT OF SOIL AMENDMENTS ON YIELD OF FODDER SORGHUM IN SALINE ALKALI SOIL**

### **Objectives:**

1. To know the effects of soil amendments on fodder yield
2. Enhancing productivity, Water and land use efficiency
3. To work out economics

### **Technical details:**

Treatments: Eight  
Design: RCBD  
Replication: Three  
Duration: Three years

Year of start: Rabi 2010-11

**Treatment details:**

1. Rec. NPK alone through inorganics
2. Rec. NPK + FYM 10t ha<sup>-1</sup>
3. Rec. NPK + Press mud 10t ha<sup>-1</sup>
4. Rec. NPK + Vermi compost 5t ha<sup>-1</sup>
5. Rec. NPK + FYM 10t ha<sup>-1</sup> + Elemental sulphur 25 kg ha<sup>-1</sup>
6. Rec. NPK + FYM 10t ha<sup>-1</sup> + Gypsum 100 %GR
7. Rec. NPK + FYM 10t ha<sup>-1</sup> + ZnSO<sub>4</sub> 20 kg ha<sup>-1</sup>
8. Rec. NPK + FYM 10t ha<sup>-1</sup> + ZnSO<sub>4</sub> 20 kg ha<sup>-1</sup> + Gypsum 100% GR

**Observation to be recorded**

- i) plant height
- ii) number of tillers
- iii) leaf:stem ratio
- iv) Green fodder yield
- v) Dry matter yield
- vi) Crude protein content (%) and yield (q/ha)
- vii) Economics (Gross Returns, Net Returns (Rs/ha) and BC Ratio)
- viii) Soil pH , OC%. And NPK status before and after experimentation

**Location : Mandya**

**(Data reporting: Rabi)**

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**AST 9: PRODUCTION POTENTIAL OF FORAGE CROPS IN RICE FALLOWS UNDER  
NITROGEN LEVELS**

**VARIED**

**Objectives:**

1. To identify suitable crops in rice fallow
2. To identify optimum dose of nitrogen for sustained yield

**Technical Details:**

Design : Split Plot  
Replication : 4  
Treatments : 9  
Plot size : 3m X 3.6 m

**Treatments Details:**

**A. Main plot (Crops- 3)**

- C1- Sorghum+ cowpea (3;1)
- C2- Maize + Cowpea (3:1)
- C3- Pearl millet + Cowpea (3:1)

**B. Sub plot (Nitrogen levels – 3)**

N1: 50% RDN

N2: 75% RDN

N3: 100% RDN

- FYM 10 ton / ha common in all treatment
- P&K as per recommended dose

**Observation to be recorded**

- a. plant height
- b. leaf:stem ratio
- c. Green fodder yield
- d. Dry matter yield

- e. Crude protein yield
- f. Soil pH, OC%. And NPK status before and after experimentation
- g. Economics (Gross Returns, Net Returns and BC Ratio)

**Location: Mandya**

(Data reporting: Rabi)

## **AST-10: BANANA BASED FODDER INTERCROPPING IN THE HOMESTEADS OF KERALA**

### **Objectives**

- To evaluate the production potential, quality and economics of fodder crops in banana based production system

Year of Start : *Kharif* 2010  
 Duration : 3 years  
 Design : RBD  
 Replication : 3  
 Plot size : 5.8 m x 5.4 m  
**Treatments : 12**

T<sub>1</sub> –Banana+ Guinea grass  
 T<sub>2</sub> – Banana + Hybrid Napier  
 T<sub>3</sub> – Banana + Congo signal  
 T<sub>4</sub> – Banana + cowpea  
 T<sub>5</sub> – Banana sole  
 T<sub>6</sub> – Guinea grass sole  
 T<sub>7</sub> – Hybrid Napier sole  
 T<sub>8</sub> – Congo signal sole  
 T<sub>9</sub> – Cowpea sole

### **Observations to be recorded:**

#### **Banana**

- Bunch yield (q/ha)

#### **Fodder Crops**

- Plant height at harvest (cm), plant population ,Leaf stem ratio
- Forage yield and forage equivalent yield(q/ha)
- Crude protein content (%) and Crude protein yield (q/h)
- Crude fibre content (%) and Crude fibre yield (q/ha)
- Economics (Gross Returns, Net Returns and BC Ratio)

#### **Nutrient studies**

- NPK uptake by each crop and entire system
- Nutrient use efficiency of NPK by each crop and entire system
- Soil fertility status before and after completion of the sequence i.e., pH, OC (%)
- EC, available NPK before and after completion of experiment

**Note: Data will be reported in Rabi**

**Location: Vellayani**

## **C: AVT – 2 BASED AGRONOMY TRIALS**

### **AST 11: EFFECT OF N LEVELS ON PROMISING ENTRIES OF TALL FESCUE GRASS**

Year : Rabi 2011-12  
 Duration : Two years  
 Design : RBD  
 Replications : 4  
 Plot Size : 3m x 3m

**Treatments: 16**

(A) Entries (4) = 2+2 - (HIMA-14, HIMA-15, HIMA-1(ZC) and HIMA-4(ZC)

(B) N-levels: 4 = (0, 40, 80 and 120 kg N/ha) in three splits i.e. half as basal, ¼<sup>th</sup> at first cut and ¼<sup>th</sup> at second cut

**Observations to be recorded**

- i. Plant population/ shoot number /m<sup>2</sup>
- ii. Growth parameters ( Plant height and Leaf : stem ratio)
- iii. Green fodder, dry matter and crude protein yield (q/ha)

Seedling requirements= 1200 seedling per entry per location (Source-Palampur)

**(Data reporting: Rabi)**

**Location: Palampur and Bajaura**

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**AST 12: EFFECT OF NITROGEN LEVELS OF FORAGE YIELD OF PROMISING ENTRIES OF OAT (AVT- 2 SC)**

Year : Rabi 2011-12  
Design : Split plot  
Replications : Three  
Plot size : 4 m x 3 m  
Seed rate : 100 g/plot (80 kg/ha)  
Spacing : R X R-25 cm  
Treatments : Combinations: 11x 3=33

**Treatment details:**

**Main plot:**

**(A) Entries** : 11 (8+2(NC)+ 1 (ZC):

**Entries (8):** JHO-2009-1, JHO-2009-2, UPO-09-1, UPO-09-2, SKO-148, SKO-156, OS363, JO-03-95,

**National checks (2):** Kent, OS-6

**Zonal checks (1):** Palampur-1 (HZ), OL-125 (NWZ), JHO-99-2 (NEZ), JHO-822 (CZ), JHO-2000-4 (SZ)

**Sub-plot:**

**(B) N- levels:** 3 (40, 80, and 120 kg N /ha) (Split application of nitrogen)

**Observations to be recorded:**

- Tiller number /m<sup>2</sup> at harvest
- Growth parameters (Plant height (cm) and leaf: stem ratio)
- Green fodder, dry fodder yields (q/ha)
- Crude protein content (%) and CP yield (q/ha)

**Seed distribution:** Project Coordinating Unit, AICRP-FC, Jhansi

**Locations (10):** HZ-Palampur, Srinagar; NWZ-Hisar, Pantnagar; NEZ-Jorhat , Ranchi CZ-Jhansi, Jabalpur; SZ- Mandya, Coimbatore

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**AST 13: EFFECT OF NITROGEN LEVELS OF FORAGE YIELD OF PROMISING ENTRIES OF OAT (AVT- 2 MC)**

Year : Rabi 2011-12  
Design : Split plot  
Replications : Three  
Plot size : 4 m x 3 m  
Seed rate : 100 g/plot (80 kg/ha)  
Treatments : Combinations: 7 x 3=21  
Spacing : R X R-25 cm

**Treatment details:**

**Main plot:**

**(A) Entries** : 7 (3+3(NC) + 1 (ZC):

**Entries (3)** (UPO-09-3, JHO-2009-3, JO-03-301,

**National checks (3)** Kent (NC), UPO-212 (NC), RO-19 (NC);

**Zonal check (1):** Palampur-1 (ZC-HZ) and JHO 822 (ZC-CZ)

**Sub-plot:**

(B) N- levels: 3 ( 40, 80, and 120 kg N /ha) (Split application of Nitrogen)

**Observations to be recorded:**

(i) Plant population/m<sup>2</sup>

(ii) Growth parameters (Plant height and leaf: stem ratio)

(iii) Green fodder, dry fodder, crude protein content and CP yield (q/ha)

**Seed distribution:** Project Coordinating Unit, AICRP-FC, Jhansi

**Locations (7):** HZ-Palampur, Srinagar; CZ- Jhansi, Anand, Jabalpur, Rahuri and Urulikanchan

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## D: NEW RESEARCH TRIALS

### (1) Coordinated trials

#### AST 14 (NT): Studies on the effect of irrigation levels on green forage yield and quality of different forage crops during Lean period

**Objectives:**

1. To study the performance of forage crops under varied moisture regimes
2. To identify suitable and most remunerative crop for existing situation / under limited irrigations

**Technical details**

**Design** : Split plot

**Replication** : Three

**Treatments** : 12

**Plot size** : 4.0m x 3.6m

**Year of start** : Rabi -2011-12

**Duration** : Two years

**Treatments- 12**

**Treatment details:**

**Main plot (Irrigation levels-3)**

I<sub>1</sub>- IW/CPE—0.6

I<sub>2</sub>- IW/CPE—0.8

I<sub>3</sub>- IW/CPE—1.0

**Sub plot (Crops – 4)**

C1-Fodder maize

C2-Fodder sorghum

C3-Fodder pearl millet

C4- Baby corn

**Observation to be recorded:**

- Plant height (cm)
- L: S ratio
- Green and dry fodder yield (q/ha)
- Crude protein content (%) crude protein yield 9q/ha)
- WUE (kg/ha/cm)
- Gross and net returns (Rs./ha)
- Benefit-cost ratio

**Location: Mandya, Hyderabad and Dharwad**

**Data reporting: Rabi**

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#### AST-15 (NT): Effect of stubble management and INM on forage productivity in Rice-Oat cropping system

**Objectives:**

1. To study the effect of different cutting height of rice stubble on crop establishment and forage productivity of oat
2. To evaluate the relative performance of different stubble management and INM treatment on Productivity of Rice -Oat cropping system.

**Treatments: 12**

**Main Plot- Rice Stubble management**

- S1- Cutting of rice stubble at ground level
- S2- Cutting of rice stubble at 30cm height
- S3- Normal cultivation

**Sub Plot- INM treatment**

- M1- 100% NPK (Inorganic fertilizer)
- M2-50% N through FYM+50%NPK through inorganic fertilizer
- M3-25% N through FYM+ Green Manure+50% NPK through inorganic fertilizer + Biofertilizer
- M4 -50% N through FYM +GM+ PSB+ Biofertilisers

**Design** : Split Plot Design

**Replication** : 3

**Plot size** : 4mx3m

**Year of Start** : Kharif 2012

- INM treatment will be given to Rice crops
- 50% RDF will be given to oat crop
- In stubble management practices except normal cultivation system oat will be sown behind the plough

**Observation:**

- Initial and final fertility status of soil
- Yield of component crop.
- Equivalent yield.
- Economics.
- Soil fertility before and after of the harvesting of crop cycle.

**Location: Jorhat and Bhubaneswar**

**Data reporting: Rabi**

**AST 16 (NT) Performance of dual purpose forage crops under different cutting management system (EXPLORATORY)**

**Objectives:**

- To study the effect of cutting management on forage and seed production potential of forage crops

**Technical details:**

**Treatment (12)**

**(a)Main plot (Crops-3)**

- Oats
- Barley
- Wheat

**(b)Sub plots (Cutting management -4)**

**(For Hill Zone)**

- No cutting
- Cutting of fodder at 70 days after sowing
- Cutting of fodder at 80 days after sowing
- Cutting of fodder at 90 days after sowing

**(For NWZ, NEZ and Central Zone)**

- No cutting
- Cutting of fodder at 50 days after sowing
- Cutting of fodder at 60 days after sowing
- Cutting of fodder at 70 days after sowing



**(Second cut will be taken for seed)**

**Design** : Split plot design  
**Replications** : 3  
**Plot Size** : 4.00 m X 3.00 m  
**Duration** : Two years  
**Year of start** : Rabi -2011-12

**Observations to be recorded**

- Plant population or Tiller No. / m row length
- Plant height (cm)
- Leaf: Stem ratio
- Green and dry fodder yields (qha<sup>-1</sup>)
- Grain/seed and straw yields (qha<sup>-1</sup>).
- Crude protein content (%) and crude protein yield (q/ha)
- Gross and net returns (Rs. ha<sup>-1</sup>)
- Benefit: Cost ratio.

**Locations (10):** (1) HZ-Palampur, Srinagar, Almora, (2) NWZ- Ludhiana, Hisar, Bikaner, (3) NEZ- Jorhat and Bhubaneswar, (4) CZ- Jabalpur, Raipur

(Data reporting: Rabi)

**((NB: The recommended varieties of the crops for a particular location for the purpose will be used and crops will be grown with recommended package of practices. Seed availability: Testing centers will make their own arrangement of seed)**

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**AST 17 (NT): Effect of weed management on forage and seed yield of berseem  
(*Trifolium alexandrinum* L.) (Exploratory)**

**Objectives**

To assess the effect of weed management treatments on forage and seed yield of berseem  
To study the efficacy of herbicides in controlling weed in berseem

**Technical details:**

**Treatment details (10)**

T<sub>1</sub> – Weedy check (Control)

T<sub>2</sub> – Weed free check.

T<sub>3</sub> – One hoeing at 3 week after sowing and one hand weeding at 5 week after sowing.

T<sub>4</sub> – Pendimethalin @1.00 kg a.i.ha<sup>-1</sup>

T<sub>5</sub> – Pendimethalin @1.00 kg a.i.ha<sup>-1</sup> + one hand weeding at 5 week after sowing.

T<sub>6</sub> – Oxyflourfen @ 0.100 kg a.i.ha<sup>-1</sup>

T<sub>7</sub> – Oxyflourfen @ 0.100 kg a.i.ha<sup>-1</sup> + one hand weeding at 5 week after sowing.

T<sub>8</sub> – Pendimethalin @1.00 kg a.i.ha<sup>-1</sup> + Imazethapyr @ 0.150 kg a.i.ha<sup>-1</sup>  
(Immediate after harvest of I<sup>st</sup> cut).

T<sub>9</sub> – Oxyflourfen @ 0.100 kg a.i.ha<sup>-1</sup> + Imazethapyr @ 0.150 kg a.i.ha<sup>-1</sup>  
(Immediate after harvest of I<sup>st</sup> cut).

T<sub>10</sub> – Imazethapyr @ 0.150 kg a.i. ha<sup>-1</sup> (Immediate after harvest of I<sup>st</sup> and II<sup>nd</sup> cut)

**Design** : RBD  
**Replications** : Three  
**Plot size** : **Gross:** 4.00 x 3.00 m<sup>2</sup>, **Net** : 3.40 x 2.40 m<sup>2</sup>  
**Crop & Variety** : Berseem (Wardan)  
**Seed rate** : 30 kg/ha  
**Year of start** : Rabi 2011-12  
**Duration** : 2 years

**Observations to be recorded:**

**Weed studies**

- Species wise weed count /m<sup>2</sup>
- Weed dry matter /m<sup>2</sup>
- Weed control efficiency (%)
- Weed Index

#### **B) Crop studies**

- Plant population/ m row length
- Plant height (cm) at harvest.
- Leaf: Stem ratio
- Green and dry fodder yields (qha<sup>-1</sup>)
- Seed and straw yield (qha<sup>-1</sup>)
- Crude protein content (%) and crude protein yield (qha<sup>-1</sup>)
- Residue content of herbicides in fodder

#### **E) Economics:**

- Gross and Net monetary returns (Rs. ha<sup>-1</sup>)
- Benefit: Cost ratio.

**(Locations: Rahuri, Jabalpur and Pantnagar)**

**(NB: Crop will be left for seed production after two-three forage cut)**

### **(2) Location specific trials**

#### **AST 18 (NT): Effect of sources of nitrogen on oat and residual effect on succeeding crops**

##### **Objectives**

- To find out the most feasible cropping sequence with respect to quality fodder production.
- To find out the best source of nitrogen and
- To work out the relative economics of the cropping sequences.

##### **Technical details:**

Design : Split Plot Design  
 Replication : Three (3)  
 Year of start : Rabi-2011-12  
 Duration : Three years

##### **Treatment details (10)**

##### **Main Plot (Cropping sequences-2)**

C1= Oat-Maize-Turnip

C2=Oat- Maize+ Cowpea-Turnip

##### **Sub Plot (Source of Nitrogen-5)**

F1= 100% N through Urea

F2= 75% N through urea + 25% N through FYM

F3= 50% N through urea + 50% N through FYM

F4= 75% N through urea + 25% N through sheep manure

F5= 50% N through urea + 50% N through sheep manure

##### **Observations to be recorded:**

- Plant height and Leaf stem ratio at 50% flowering
- Green fodder yield and Dry fodder yield (q/ha) at 50% flowering
- Crude protein content and Crude protein yield
- Cost of cultivation
- Gross monetary return
- Net monetary return
- Benefit-cost ratio
- Nitrogen content and uptake by each crop and entire system
- Soil fertility status before and after completion of sequence

Note: N sources will be applied to Oats. Other crops of the sequence will be grown with recommended package (instead of 100 % RDF, 75 % RDF will be applied to succeeding crops)  
Location: SKAUST, Srinagar.

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### **AST-19 (NT): Performance of Bajra Napier hybrid grass as influenced by micronutrients under irrigated conditions**

#### **Objectives:**

- To study the effect of conjoint application of organic manure, inorganic fertilizers and micronutrients on forage yield, economics of production and soil properties.

#### **Technical detail:**

##### **Treatments details: (9)**

- T<sub>1</sub>- NPK alone
- T<sub>2</sub> - NPK + FeSO<sub>4</sub> @50 kg/ha
- T<sub>3</sub> - NPK + FeSO<sub>4</sub> @100 kg/ha
- T<sub>4</sub> - NPK + ZnSO<sub>4</sub> @25 kg/ha
- T<sub>5</sub> - NPK + ZnSO<sub>4</sub> @50 kg/ha
- T<sub>6</sub> - NPK + FeSO<sub>4</sub> @50 kg/ha + ZnSO<sub>4</sub> @25 kg/ha
- T<sub>7</sub> - NPK + FeSO<sub>4</sub> @100 kg/ha + ZnSO<sub>4</sub> @25 kg/ha
- T<sub>8</sub> - NPK + FeSO<sub>4</sub> @50 kg/ha + ZnSO<sub>4</sub> @ 50kg/ha
- T<sub>9</sub>- NPK + FeSO<sub>4</sub> @ 100kg/ha + ZnSO<sub>4</sub> @ 50 kg/ha

**Design** : RBD  
**Replications** : Three  
**Year of start** : Kharif 2012  
**Duration** : 3 Years

- NB:-**
1. N – Basal and split as per recommendation
  2. P&K -Basal
  3. Micronutrients- Basal and split application
  4. FYM @ 25 t/ha as basal in the first year only.

#### **Observations to be recorded**

- Plant population at harvest (Per m<sup>2</sup>)
- Plant height at harvest
- Leaf stem ratio at harvest
- Green fodder and dry matter yields (q/ha)
- Crude protein content (%) and crude protein yield (q/ha)
- Gross and net return (Rs./ha)
- Benefit cost ratio
- Soil fertility status before and after completion of field trial i.e., pH, OC, EC, available NPK and Fe and Zn.

**(NOTE: During kharif 2012, micronutrient analysis of soil will be done. The experiment will be conducted under Zn and Fe deficit soils)**

**Location: Coimbatore**  
**(Data reporting: Rabi)**

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### **AST 20 (NT): Effect of sowing time and Zn & thiourea spray on seed yield of oat (Exploratory)**

- Objectives:**
- To find out the effect of sowing time on seed yield of oats.
  - To observe suitable Zinc fertilizer dose and thiourea application schedule for higher productivity and WUE of oat.

**Technical details:**

Year of start : Rabi 2011-12  
Design : Split plot design  
Replication : 3  
Plot size : 4m X 3m  
Duration : one season

**Treatment details****(a) Main plot (sowing time)**

- i) Mid November (timely sown)
- ii) Fourth week of November
- iii) Mid December

**(b) Sub plot (Zn & TU application)**

- i) Control (no Zn& no TU)
- ii) 25 kg ZnSO<sub>4</sub> / ha soil application at sowing
- iii) 12.5 kg ZnSO<sub>4</sub> / ha soil application at sowing followed by 0.5% ZnSO<sub>4</sub> sprays
- iv) 12.5 kg ZnSO<sub>4</sub> / ha soil application at sowing followed by 0.5% ZnSO<sub>4</sub>+ 0.05% TU sprays
- v) 12.5 kg ZnSO<sub>4</sub> / ha soil application at sowing followed by 0.05% TU sprays

**Observations to be recorded:**

- Plant stand/meter row length after germination
- Dry matter accumulation/meter row length at 1<sup>st</sup> cutting and at maturity
- Yield attributes (plant ht and I:S ratio) , GFY, DFY, Protein content (%), seed yield

**Location: Bikaner**

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## GENERAL SUGGESTIONS

- The technical programme must not be changed without prior approval of the Project Coordinator (FC). The data are to be recorded as per technical programme and reported to the Project Coordinator (FC) accordingly well in time scheduled. A hard copy with CD in MS-Word 2000 and also through E-mail must be provided to the Project Coordinator (FC). In case of location – specific trials, the text of the trial should also be supplied by the Centre concerned.
- Data must be analyzed factor-wise statistically (with two-way tables) having SEm±, CD at 5% and CV %. In case of interaction, two-way tables must be reported.
- Following (statistically analyzed) data with yield data must be reported for comparisons and making valid conclusions.
- Net monetary return (Rs./ha/yr) of the complete sequence (Crop sequences trial).
- Component-wise and total green fodder and dry matter yield (q/ha), net monetary return (Rs./ha/yr) and Land Equivalent Ratio (LER) (Intercropping trial)
- Component-wise and total crude protein yield (q/ha) as well as crude protein (%)
- Initial and final fertility status of the soil, i.e., after completion of trial which should essentially include pH, EC, OC (%), available N, P & K (Crop sequences and fertility trials).
- In trials on problematic soils, initial and final fertility status of the soil, i.e., after completion of trial and uptake of NPK by the crop(s) in each season is to be provided.
- In multi-cut crop(s)/variety(s), data on growth and quality parameters (i.e., plant population / m row length, L:S ratio, No. of tillers / m row length, No. of branches/plant and crude protein content (%) are to be recorded as per schedule given below :
- In Cereals and grasses, growth observations, in general, are to be recorded for first and last harvest. However, in cutting management trials or in trials with split application of N, the observations are to be taken for each cut.
- Data on dry matter estimation and crude protein analysis are to be recorded for each cut
- Centres / Locations are advised to send complete information on soil characteristics, variety (ies), agronomic recommendations, No. of cuts, etc., for the experiments in the prescribed format.
- In case of net monetary return, current market price (Rs./q) must be indicated.
- Centres /Locations are advised to provide trials at a glance in one sheet mentioning trials allotted, trials conducted, data reported (character-wise-analyzed) and trials not conducted (with valid reasons) while supplying data to the Project Coordinator (FC). The format is attached herewith.
- **The data of Rabi season should be send to PC Unit before 20<sup>th</sup> June.**

AICRP ON FORAGE CROPS  
 AGRONOMY TRIALS AT A GLANCE  
 Year: Rabi 2011-12      Centre/Location: .....

Trials Allocated (No. & Name)	Trials conducted No. & Name	Trials not conducted/failed, also give reason for not conducting the trial/failure (No. & name)

**FINALIZED TECHNICAL PROGRAMME  
FORAGE CROP PROTECTION TRIALS  
RABI 2011 – 20112**

PPT. 1: MONITORING OF INSECT-PESTS AND DISEASES ASSOCIATED WITH BERSEEM, LUCERNE AND OAT ECOSYSTEM

Location: **Anand, Bhubneswar, Dharwad, Hisar, Hyderabad, Jhansi, Ludhiana, Palampur & Rahuri**

Observation:

- **Occurrence and severity of pathogens, insect pests at 15 days interval.**

PPT-2. A.: FIELD SCREENING OF RABI BREEDING MATERIALS FOR RESISTANCE TO INSECT-PESTS AND DISEASES

Location: **Anand, Bhubneswar, Dharwad, Hisar, Hyderabad, Jhansi, Ludhiana, Palampur & Rahuri**

PPT-2.B.: EVALUATION OF BERSEEM ENTRIES FOR RESISTANCE TO ROOT AND STEM ROT DISEASE UNDER SICK PLOT

Location: **Hisar Jhansi Ludhiana and Palampur**

**PPT-11 : ASSESSMENT OF LOSSES DUE TO RUST DISEASE IN LUCERNE SEED CROP**

Location: **Anand, Dharwad, Hyderabad, Jhansi and Rahuri**

**Design : Paired block                      Replication : 20 (1 sq. m./replication)**

**Variety : Anand-2**

Treatments:

**T<sub>1</sub> – Protected: Alternate spray of Mancozeb @ 2.5 g/l and Tebuconazole @ 0.5 ml/l at 10 and 15 days interval, respectively**

**T<sub>2</sub> – Unprotected**

Observation :

**1. Disease severity**

**1. Seed yield (q/ha)**

2. Quality analysis (DM (%), CP %, HC %, ADF, NDF and chlorophyll content)

PPT-12: DISEASE MANAGEMENT IN WHITE CLOVER

**Location: Palampur**

**Design: RBD                      Replication: 3                      Plot size: 2 x 2 m<sup>2+</sup>**

Treatments:

T<sub>1</sub> = Seed treatment with carbendazim @ 2 g/kg seed

T<sub>2</sub> = Seed treatment with *T. viride* @ 5g/kg

T<sub>3</sub> = T<sub>1</sub> + Foliar spray of carbendazim @ 0.1 %

T<sub>4</sub> = T<sub>2</sub> + Foliar spray of carbendazim @ 0.1 %

T<sub>5</sub> = T<sub>1</sub> + Foliar spray of hexaconazole @ 0.05 %

T<sub>6</sub> = T<sub>2</sub> + Foliar spray of hexaconazole @ 0.05 %

T<sub>7</sub> = T<sub>1</sub> + Foliar spray of carbendazim @ 0.1 % + Foliar spray of hexaconazole @ 0.05 %

T<sub>8</sub> = T<sub>2</sub> + Foliar spray of carbendazim @ 0.1 % + Foliar spray of hexaconazole @ 0.05 %

T<sub>9</sub> = T<sub>1</sub> + T<sub>2</sub> + Foliar spray of carbendazim @ 0.1 % + Foliar spray of hexaconazole @ 0.05 %

T<sub>10</sub> = Control

Observations:

- 1. Disease severity of powdery mildew**
- 2. Disease incidence of clover rot**
- 3. Seed yield (q/ha)**

**PPT 15: EFFECT OF FOLIAR DISEASES ON THE QUALITY OF OAT VARIETIES**

Replications: 3    Design: RBD                      Plot size: 3x2 m<sup>2</sup>

**Location: Palampur, Ludhiana and Bhubaneswar**

**Treatments:**

- T<sub>1</sub>. Kent (protected)
- T<sub>2</sub>. Kent (unprotected)
- T<sub>3</sub>. PLP-1 (protected)
- T<sub>4</sub>. PLP-1 (unprotected)
- T<sub>5</sub>. OL-9 (protected)
- T<sub>6</sub>. OL-9 (unprotected)
- T<sub>7</sub>. OL-125 (protected)
- T<sub>8</sub>. OL-125 (unprotected)
- T<sub>9</sub>. OS-6(protected)
- T<sub>10</sub>. OS-6 (unprotected)

\*Protected with chemicals (foliar sprays of Hexaconazole/Propiconazole @0.05% at 15 day interval from the appearance of powdery mildew/leaf blight disease, respectively)

**Diseases of Oat**

Palampur (Powdery mildew), Ludhiana (Powdery mildew and Leaf blight) and Bhubaneswar (Leaf Blight)

**Observations:**

- i. Disease severity (%)
- ii. Quality analysis (DM (%), CP %, ADF, NDF, HC (%) and chlorophyll content)
- iii. Yield(q/ha)

**Seed will be shared among three centres**

**PPT-16: VALIDATION OF RECOMMENDED TREATMENT FOR BIO-INTENSIVE PEST AND DISEASE MANAGEMENT IN LUCERNE**

Location: **Anand, Jhansi, Hyderabad, and Rahuri**

**Design :** Paired plot design                      **Replication :** 3

**Plot Size :** 50 m<sup>2</sup>

**Treatment :**

- T1- Seed treatment with Neem seed powder @50gm/kg followed by foliar spray of NSKE @5% two week after each cut
- T2- Untreated control

**Observations to be recorded:**

- 1. No. of larvae of Lucerne weevil, *Spodoptera* and *Helicoverpa* /m<sup>2</sup> before spraying and 5 days after spraying.
- 2. No. of sucking insects / tiller (5 tillers / plot)
- 3. Nematode population before sowing and at harvest.
- 4. Green fodder yield and dry matter yield in q/ha
- 5. Disease intensity before and after spray

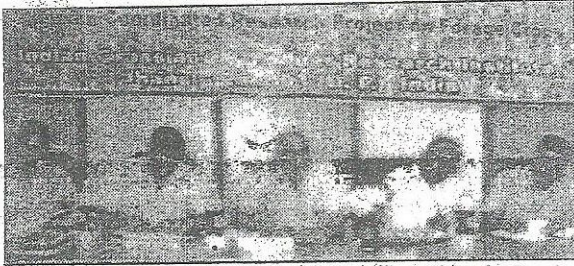
<b>List of Participants</b>	
<b>ALL INDIA COORDINATED RESEARCH PROJECT ON FORAGE CROPS</b>	
(Indian Council of Agricultural Research)	
<b>NATIONAL GROUP MEET – RABI-2011-12</b>	
Date : September 8-9, 2011	
Venue : IGFRI, Jhansi	
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93.	Mr. Ramesh Chandra
Advanta India Ltd., Hyderabad	
94.	Mr. G. Prabhakar Babu, Marketing Manager

## दो दिवसीय राष्ट्रीय संगोष्ठी प्रारम्भ, 150 वैज्ञानिक जुटे



कौशल, डॉ. पी के पाठक, डॉ. एस आर कांटवा, हरवंश सिंह, एवं संस्थान (उपायुक्त) के अन्य वैज्ञानिकों ने भाग लिया।

झाँसी। भारतीय चरागाह एवं चारा अनुसंधान संस्थान में भारत की कृषि जलवायु क्षेत्रों, यथा पहाड़ी, उत्तर पश्चिम, उत्तर-पूर्व, केन्द्रीय एवं दक्षिण क्षेत्रों में कृषि विश्वविद्यालय एवं भारतीय कृषि अनुसंधान परिषद् के संस्थानों से लगभग 150 वैज्ञानिकों ने हिस्सा लिया। इस कार्यशाला का प्रारम्भ करते हुए भारतीय कृषि अनुसंधान परिषद् के सहायक महानिदेशक डॉ. आर पी दुआ ने अपने अध्यक्षीय वक्तव्य में वैज्ञानिकों को जलवायु जन्य चारा प्रजाति विकास के साथ-साथ उत्पादन बढ़ाने एवं फसल सुरक्षा के परीक्षणों पर जोर दिया। संस्थान के निदेशक एवं चारा फसलों के परियोजना समन्वयक डॉ. शाहिद अहमद फारूकी ने विभिन्न प्रदेशों में चलाये जा रहे

शोध कार्यों, चारा प्रजाति विकास, चारा उत्पादन एवं रोग व कीट नियंत्रण सम्बन्धी उपलब्धियों के बारे में विस्तृत चर्चा की।

प्रधान वैज्ञानिक डॉ. आर वी कुमार ने देश भर में चलाये जा रहे चारा प्रजाति विकास एवं उसकी उत्पादकता पर किये जा रहे परीक्षणों की प्रगति, आख्या प्रस्तुत की। डॉ. आर बी भास्कर, प्रधान अन्वेषक, फसल सुरक्षा ने सभी परीक्षणों की प्रगति आख्या प्रस्तुत की। संगोष्ठी में सभी कृषि जलवायु क्षेत्रों के केन्द्रों से आये वैज्ञानिकों द्वारा प्रगति आख्या एवं कार्ययोजना का विस्तृत विवरण प्रस्तुत किया गया। कार्यक्रम में यू एस तिवाना, डॉ. वी के शाह, डॉ. जे एस वर्मा, डॉ. एन दास, डॉ. सुनील तिवारी, डॉ. ए के राय, डॉ. डी आर मालवीय, डॉ. पंकज

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9 सितम्बर, 2011

### ग्रासलैण्ड में चारा फसलों पर दो दिवसीय राष्ट्रीय संगोष्ठी आरम्भ

(आज समाचार सेवा)

झाँसी, 8 सितम्बर। भारतीय चरागाह एवं चारा अनुसंधान संस्थान, झाँसी में भारत की कृषि जलवायु क्षेत्रों यथा पहाड़ी, उत्तर पश्चिम, उत्तर-पूर्व, केन्द्रीय एवं दक्षिण क्षेत्रों के कृषि विश्वविद्यालय एवं भारतीय कृषि अनुसंधान परिषद् के संस्थानों से लगभग 150 वैज्ञानिकों ने हिस्सा लिया। इस कार्यशाला का आरम्भ करते हुए भारतीय कृषि अनुसंधान परिषद् के सहायक महानिदेशक डा. आर.पी. दुआ ने अपने अध्यक्षीय वक्तव्य वैज्ञानिकों को जलवायु जन्य चारा प्रजाति विकास के साथ-साथ उत्पादन बढ़ाने एवं चारा फसलों के परियोजना पर जोर दिया। कार्यक्रम के प्रारम्भ में संस्थान के निदेशक एवं चारा फसलों के परियोजना समन्वयक डा. शाहिद अहमद फारूकी ने विभिन्न प्रदेशों में चलाये जा रहे शोध कार्य, चारा प्रजाति विकास, चारा

उत्पादन एवं रोग एवं कीट नियंत्रण सम्बन्धी उपलब्धियों के बारे में विस्तृत चर्चा की। चारा परियोजना में प्रधान वैज्ञानिक डा. आर.वी. कुमार ने देश भर में चलाये जा रहे चारा प्रजाति विकास एवं उसकी उत्पादकता पर किये जा रहे परीक्षणों की प्रगति आख्या प्रस्तुत की। डॉ. आर.बी. भास्कर, प्रधान अन्वेषक, फसल सुरक्षा ने सभी परीक्षणों की प्रगति आख्या प्रस्तुत की। संगोष्ठी में यू.एस. तिवाना, डॉ. वी.के.

शाह, डॉ. जे.एस. वर्मा, एन.दास, डॉ. सुनील तिवारी, डॉ. ए.के. राय, डॉ. डी.आर. मालवीय, डॉ. पंकज कौशल, डॉ. पी.के. पाठक, डॉ. एस.आर. कांटवा एवं संस्थान के अन्य वैज्ञानिक ने भाग लिया।

## ग्रासलैण्ड में चारा फसलों पर संगोष्ठी का समापन

झांसी : ग्रासलैण्ड में अभा समन्वित चारा अनुसंधान परियोजना भारतीय कृषि अनुसंधान परिषद की राष्ट्रीय संगोष्ठी के दूसरे दिन बीज उत्पादन व बौद्धिक संपदा अधिकार आदि पर वैज्ञानिकों ने चर्चा की। इसमें डॉ. जेके विष्ट, डॉ. वीके सूद, डॉ. जेके शर्मा, डॉ. एवी ताम्बे, डॉ. नवीन कुमार, डॉ. एके मेहता व डॉ. के वेदयूधाम ने विचार व्यक्त किए।

निदेशक व परियोजना समन्वयक चारा फसल डॉ. एसए फारुकी ने चारा किस्मों की पहचान समिति की आख्या के बारे में बताया। संगोष्ठी में डॉ. यूएस तिवाना, डॉ. वीके शाह, डॉ. जेएस वर्मा, डॉ. एसआर काटवा, डॉ. सुनील तिवारी, डॉ. पंकज कौशल, डॉ. डीआर मालवीय, डॉ. एके राय उपस्थित रहे। संचिव आरबी भास्कर ने आभार व्यक्त किया।

## चारा किस्मों की पहचान का तरीका बताया

झांसी। अखिल भारतीय समन्वित चारा अनुसंधान परियोजना एवं भारतीय कृषि अनुसंधान परिषद के तत्वावधान में भारतीय चारागाह एवं चारा अनुसंधान संस्थान में चल रही राष्ट्रीय संगोष्ठी का शुक्रवार को समापन हो गया। इस अवसर पर तकनीकी सत्रों में चारा किस्मों की पहचान के बारे में जानकारी दी गई। राष्ट्रीय संगोष्ठी के दूसरे दिन वैज्ञानिकों ने प्रजनक बीज उत्पादन, पितृदृश्य संसाधन एवं बौद्धिक संपदा अधिकार पर चर्चा की। डॉ. जेके विष्ट, डॉ. वीके सूद, डॉ. केके शर्मा, डॉ. एवी ताम्बे, डॉ. नवीन कुमार, डॉ. एके मेहता एवं डॉ. के वेदयूधाम ने विभिन्न विषयों पर व्याख्यान प्रस्तुत किए। संस्थान निदेशक डॉ. एसए फारुकी ने जम्मू कश्मीर की जई, जबलपुर की राइस बीन तथा बाजरा की किस्म पहचान करने का तरीका बताया। संगोष्ठी में डॉ. यूएस तिवाना, डॉ. वीके शाह, डॉ. जेएस वर्मा, डॉ. एसआर काटवा, डॉ. सुनील तिवारी, डॉ. पंकज कौशल, डॉ. डीआर मालवीय, डॉ. एके राय आदि उपस्थित रहे। अंत में आयोजन सचिव आरबी भास्कर ने आभार व्यक्त किया।

## संगोष्ठी में किसानों को किया गया जागरूक

झांसी (एसएनबी)। भारतीय चारागाह एवं चारा अनुसंधान में अखिल भारतीय समन्वित चारा अनुसंधान परियोजना भारतीय कृषि अनुसंधान परिषद की राष्ट्रीय संगोष्ठी के द्वितीय दिवस के तकनीकी सत्रों में विषयवार आख्या प्रस्तुतिकरण प्रजनक बीज उत्पादन पितृदृश्य संसाधन एवं बौद्धिक संपदा अधिकार पर वैज्ञानिकों ने चर्चा की।

संस्तुतियों के प्रस्तुतिकरण में प्रथम तकनीकी सत्र के केन्द्रानुसार प्रस्तुतिकरण डॉ. जेके विष्ट, द्वितीय चारा फसल उत्पादन डॉ. वीके सूद, डॉ. केके शर्मा, चारा फसल सुरक्षा डॉ. एवी लाम्बे, तृतीय सत्र में विषयानुसार प्रस्तुतिकरण डॉ. नवीन कुमार चतुर्थ में प्रजनक बीज उत्पादन डॉ. एके मेहता, पांचवे सत्र में पितृदृश्य संसाधन एवं बौद्धिक संपदा अधिकार संवाधित डॉ. के वेदयूधाम ने किया।

संस्थान के निदेशक डॉ. एसए फारुकी ने चारा किस्मों के पहचान समिति की आख्या में जई, बाजरा, राइसबीन, के बारे में विस्तार से बताया। इस दौरान डॉ. यूएस तिवाना, वीके साहू, जेएट वर्मा, एसआर काटवा, डॉ. सुनील तिवारी, डॉ. पंकज कौशल, डीआर मालवीय, एके राय, आदि उपस्थित रहे। संचालन आरबी भास्कर ने किया।

## चारा फसलों पर संगोष्ठी का समापन

झांसी। भारतीय चारागाह एवं चारा अनुसंधान संस्थान में अखिल भारतीय समन्वित चारा अनुसंधान परियोजना भारतीय कृषि अनुसंधान परिषद की राष्ट्रीय संगोष्ठी रवि के द्वितीय दिवस के तकनीकी सत्रों में विषयवार आख्या का प्रस्तुतिकरण, प्रजनक, बीज उत्पादन, पितृदृश्य संसाधन एवं बौद्धिक संपदा अधिकार पर वैज्ञानिकों ने चर्चा की। संस्तुतियों के प्रस्तुतिकरण में प्रथम तकनीकी सत्र के केन्द्रानुसार प्रस्तुतिकरण डॉ. जेके विष्ट, द्वितीय फसल सुरक्षा डॉ. एवी ताम्बे, तृतीय सत्र में विषयानुसार प्रस्तुतिकरण डॉ. नवीन कुमार, चतुर्थ में प्रजनक बीज उत्पादन डॉ. एके मेहल, पांचवे सत्र में पितृदृश्य संसाधन एवं बौद्धिक संपदा अधिकार से सम्बन्धित डॉ. के वेदयूधाम ने किया। संगोष्ठी में डॉ. यूएस तिवारी, डॉ. पंकज कौशल, डॉ. डीआर मालवीय की उपस्थित रही।