



अखिल भारतीय समन्वयित अनुसंधान परियोजना—  
चारा फसलें एवं उपयोगिता  
(भारतीय कृषि अनुसंधान परिषद)

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

कार्यवृत्त—राष्ट्रीय समूह बैठक रबी—2015—16  
एम.पी.के.वी., राहुरी  
सितम्बर 2—4, 2015

**Proceedings of the National Group Meeting-Rabi-2015-16**  
**M.P.K.V., Rahuri**  
**September 2-4, 2015**

परियोजना समन्वयन इकाई  
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**All India Coordinated Research Project on Forage Crops & Utilization**  
**ICAR-IGFRI, Jhansi-284 003 (U.P.)**  
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held at  
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**September 2-4, 2015**

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**Proceedings of the National Group Meeting: Rabi 2015-16**  
**(Held at MPKV, Rahuri during September 2-4, 2015)**

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## PREFACE

The National Group Meet, *Rabi* 2015-16 of All India Coordinated Research Project on Forage Crops & utilization was organized to review the accomplishments of Technical programme executed during *Rabi* 2014-15 at different coordinating and cooperating centres, in-house research activities and Forage Technology Demonstrations (FTDs); Tribal sub-plan(TSPs), Breeder seed production etc. Other objectives included formulation of technical programme for *Rabi* 2015-16. One of the highlights of this meeting was one day brain storming session was organized to formulate strategies for varietal development programme. The meeting was jointly organized by Indian Council of Agricultural Research and MPKV, Rahuri during September 2-4, 2015.

The meeting was attended by the scientists engaged in forage research working at coordinating and collaborating centres located at different SAUs, ICAR institutes and NGOs. Representatives of Milk Cooperative Federation, private seed companies, farmers, livestock keepers etc. also participated in the programme and being important stakeholders contributed in the development of programme and linkages. Electronic and print media also participated in the meet and gave wide coverage of the programme.

This compilation contains brief report of National Group Meet, *Rabi* 2014-15 proceedings of different technical sessions and technical programme for the coming *Rabi* season 2015-16. The participants discussed and planned future strategies for improving the forage productivity and quality through development of the regional and national forage technologies. The results of *Rabi* 2014-15 in the field of crop improvement, crop production, crop protection, breeder seed production etc were also critically discussed and technical programme were formulated based on the inputs and suggestions given by various participants. The finalized technical programme on forage crop improvement, forage crop production and forage crop protection for *Rabi* 2013-14 have been given in annexure(s).

The compilation also includes deliberations of one day “Brain Storming Session on Breeding Strategies for Selected Forage Crops”. Talks were delivered by experts and strategies for various forage crops were formulated and given as annexure. Based on the inputs and the resources available as well as anticipated, the modules were prepared for execution from coming season.

The successful conductance of the programme is attributed to the joint efforts made by the participating scientists, authorities of MPKV, Rahuri and the ICAR, Project Coordinating Unit, and other staff. All India Coordinated Research Project on Forage Crops & Utilization sincerely acknowledges their contribution in successful organization of the event. We sincerely thank authorities, staff and students of MPKV, Rahuri for their warm hospitality, excellent arrangements and professional conductance of the programme.

A. K. Roy  
Project Coordinator

## INAUGURAL SESSION

National Group Meet **Rabi -2015-16** of All India Coordinated Research Project of Forage Crops & Utilization was organized by ICAR and Mahatma Phule Krishi Vidyapeeth, Rahuri during 2-4 September, 2015 at MPKV, Rahuri, Maharashtra.

Dr. A. K. Roy, Project Coordinator presented the XII plan initiatives and brief outline of achievements of *Rabi* 2014-15 in the field of forage crop improvement, production, protection and breeder seed production as well as popularizing the technologies by Fodder Technology Demonstrations and Tribal sub-plan.

Dr. T. G. Nageswar Rao, Director, Indian Institute of Millets Research, Hyderabad presented the research work and future thrust for forage and dual purpose Sorghum.

Dr. R. S. Patil, Director of Research, MPKV presented a scenario of livestock and fodder situation especially in Maharashtra and also glimpses of forage research at MPKV, Rahuri. He narrated the current drought situation in certain parts of the country and hardship being faced by farmers and livestock keepers and appreciated the importance of livestock in combating the drought situation. He also gave a brief account of the mitigation measures adopted by the farmers.

The meeting was chaired by Dr. I. S. Solanki ADG (FFC), ICAR, New Delhi. In his address, he stressed upon the need of developing and popularizing technologies for fodder crops in different ecological zones. He also expressed his concern on meager scientific strength for forages to deal with large number of forage crops.

Dr. R. W. Bharud, Head, Department of Botany, MPKV welcomed the delegates and presented vote of thanks.

In the next session, field visit and interaction meeting was held with participation of livestock keepers, fodder growers, private sector, forage seed producers.

It was followed by five technical sessions on various aspects discussing the results of previous season and formulating technical programmes for coming season.

### Highlights: Technology Generated

#### Forage Production Technology:

At Bikaner, four years of study revealed that, sowing of dual purpose oats on 15<sup>th</sup> November supplemented with 30:40:40 kg/ ha N:P:K and 12.5 kg ZnSO<sub>4</sub>/ha as basal dose followed by 30 kg N each at 30 and 60 DAS as top-dressing and foliar sprays of 0.5% ZnSO<sub>4</sub>/ha in 300 liter water at 60 DAS proved most productive and profitable in terms of GFY (246.1 q/ha) and grain yield (20.29 q/ha) with B:C ratio (2.39). The crop should be harvested in second week of January for fodder and in second week of April for seed.

## TECHNICAL SESSION- I

### INTERACTIVE SESSION WITH STAKEHOLDERS

**Chairman** : **Dr. I. S. Solanki, ADG (FFC), ICAR**  
**Rapporteurs** : **Drs A. K. Mehta, P.S. Takawale, M. S. Pal**

In this session the field visit was organized at MPKV, Rahuri experimental farm. Various advanced breeding lines, released varieties, technologies were demonstrated. The stakeholders including private seed growers, private companies, farmers, livestock keepers, NSC, NDDB, scientists, delegates participated and discussion was held. Various queries were answered and suggestions were given for future course of discussion and work. Farmers and livestock keepers were interested in different fodder crops and varieties. Dual purpose sorghum varieties and other technologies were appreciated by the participants.

## TECHNICAL SESSION- II

### BREEDER SEED PRODUCTION (RABI 2015-16)

**Chairman** : Dr. T. G. Nageswar Rao, Director, IIMR, Hyderabad  
**Co- Chairman** : Dr. Dinesh Kumar, ICAR, New Delhi  
**Rapporteurs** : Drs. T. Shashikala and Yogesh Jindal

At the outset, the chairman Dr. T. G. Nageswar Rao, Director, IIMR, Hyderabad welcomed all the delegates. Dr A. K. Mall, PI, Crop Improvement presented the breeder seed production report of Rabi 2014-15.

- During this period, as per indent of DAC, GOI, 328.28q breeder seed production of 25 varieties in three crops viz., Oats, Berseem and Lucerne was allocated to 10 centres across the country. The indent was for 10 varieties in oat amounting to 282.65q, 12 varieties of Berseem amounting to 41.25 q and 3 varieties of Lucerne amounting to 4.4q. As per BSP IV received from different centers, a quantity of 258.74q of breeder seed was produced. In Oats, the deficit in breeder seed production was 66.5 q.
- Dr I. S. Solanki, ADG, FFC, observed that some of the centres have not achieved the target. He emphasized the importance of breeder seed production and requested all the centers to be careful in future to produce the indented quantity. The deficit in breeder seed production is a matter of concern for all.
- It is noted that at Jhansi & Rahuri, high rains during flowering period in Oats led to the low production of breeder seed. At Pantnagar, heavy incidence of insect pest was reported after rains which contributed to the low breeder seed production.
- Chairman suggested the staggered planting of the crop to avoid losses due to climatic vagaries. The seed should be treated with chemical before lifting by indenters.
- Dr. A. K. Mall, PI, crop improvement presented breeder seed indent (409.23q) received from DAC for Rabi 2016-17 (production year 2015-16) as follows:

Crop	No. of varieties	Total quantity indented (q)
Oat	14	357.75
Lucerne	03	4.6
Berseem	12	46.73
Gobi sarson	01	0.15

- The allocation of these seeds has been done to different centers and BSP 1 will be issued.
- The house felt that still some old varieties are being indented. It was decided that all the breeding centers will inform the indenting departments especially lines departments of their respective states to replace the old varieties with the new ones. Similarly the farmers should also be informed and trained to use the new varieties and technologies. The new varieties should be popularized at field/ kisan mela, other extension methodologies.
- The chairman also suggested timely supply of good seed to the indenter.
- Seed production technology should be provided by breeder / institutions.

The session ended with thanks to the chair.



**TECHNICAL SESSION –III**  
**DISCIPLINE WISE REPORT**

**Chairman** : Dr. I. S. Solanki, ADG (Food and Fodder Crops), ICAR, New Delhi  
**Rapporteurs** : Drs K. K. Sharma and U. S. Tiwana

The report of the Crop Improvement Programme was presented by Dr. A. K. Mall. During *Rabi* 2014-15, a total of 15 breeding trials covering annual and perennial species were conducted at 32 locations covering five zones. A total of 123 entries were evaluated which belonged to berseem, oat (single, multicut and dual purpose), lathyrus, and perennial lucerne. Three AVT-2 trials on Berseem (Single cut), Oat (single cut), oat (multicut) were completed. Based on the performance of entries in IVT and AVT-1, proposals were made to advance them in AVT-1 and AVT-2 respectively. Results of different trials were highlighted. One perennial trial on Lucerne is to continue.

Forage crop production programme was presented by Dr. R. K. Agrawal, PI Crop Production. A total of 22 programme (cultural management-5, fertility management - 8, Weed management-1 cropping systems-5 and Silage-1) were conducted at 23 locations. Thus a total of 81 trials were conducted and the success rate of conducting trials was 100%. The highlight of various experiments were presented and discussed. One trial- Effect of sowing time and Zn and Thiourea spray on seed yield of dual purpose oat conducted at Bikaner center has been concluded. The recommendation emerged out is - At Bikaner, sowing of dual purpose oats on 15<sup>th</sup> November supplemented with basal 12.5 kg ZnSO<sub>4</sub>/ha at sowing followed by its foliar sprays (0.5%) proved most productive and profitable in terms of GFY (246.1 q/ha and grain yield (20.29 q/ha) and B:C ratio (2.39).

Report of plant protection programme was presented by Dr. P. Saxena, PI Plant Protection. Eleven trials were conducted on oat, berseem and lucerne at 7 locations. The success rate of conducting trial was 100%. The aspects included monitoring of pest and diseases, reaction against pest and diseases, pathogenic variability, evaluation of entomo pathogenic diseases, management of soil borne diseases and integrated disease management. All the entries in oat, berseem and Lucerne in various stages of multilocation testing were evaluated. Highlights of results included (a) powdery mildew and clover rot control- seed treatment with carbendazim (2 g/kg) and *Trichoderma viride* (5g/kg seed) followed by alternate sprays of carbendazim (0.1%) and hexaconazole (0.05%) (b) Oat blight control -seed treatment with *Trichoderma viride* + foliar application of Propiconazole 25 EC after 21 DAS)

The session ended with thanks to the chair.

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

<b>Chairman</b>	: Dr. I. S. Solanki, ADG (FFC), ICAR, New Delhi
<b>Co- Chairman</b>	: Dr. P. Kaushal, IGFRI, Jhansi
<b>Rapporteurs</b>	: Drs. Rahul Kapoor & H.P. Parmar
<b>Finalization of varietal Trials</b>	: Dr. A. K. Mall

At the outset, the chairman welcomed the delegates and Dr. A. K. Mall, presented the breeding trial report of *Rabi* 2014-15 to the house for finalization of the technical programme for *Rabi* 2015-16. Following trials were decided to be conducted by the house for *Rabi* 2015-16 in three different crops viz; berseem, oat and lucerne. Following were the suggestions and recommendations:

- Four new trials were constituted in two crops viz; berseem (IVTB) and oats (IVTO-SC, IVTO-MC and IVTO-dual).
- Three entries viz; JB-04-23, JB-4-21 and PC 75 were promoted to AVT-1 berseem from IVT berseem.
- From IVTO SC, eight entries viz; OS-424, OL-1766-1, OL-1769-1, OL-1802-1, SKO-225, JO-04-19, UPO-10-3 & OS-432 were promoted to AVTOSC-1.
- Nine entries viz; RO-11-1, OL-1804, OS-406, JO-04-18, RSO-8, SKO-196, SKO-198, SKO-199, OL-1689 were promoted to AVTOSC-2 from AVTOSC-1.
- Three entries viz; OS-414, OL-1845 and JO-04-319 were promoted to AVTO-1 MC from IVTO MC.
- From AVTO-1 MC, two entries viz; JO-4-317 & OL-1802 were promoted to AVTO-2 MC.
- Regarding oat (dual) trials -a criteria for promotion of the entry was finalized that an entry showing superiority in either GFY/DMY or seed yield but not inferior for either GFY/DMY or seed yield by 10 per cent as compared to best check variety will be promoted.
- No new trials were formulated in crops viz; Lathyrus, Ryegrass and Lucerne. Breeders were suggested to contribute good entries to formulate new trials next year.
- Two locations viz; Bikaner and Jalore were dropped for conducting IVT berseem trial
- For IVTO-SC trial it was decided to drop three locations viz; Jalore, Kanpur and Udaipur and to include Dhari, Karzat and Almora. Chairman suggested exploring more locations. It was also decided to add the newly released variety OS 377 as Central zone check in addition to JHO 822 from this year onward starting from IVT.
- Meerut was included as a new location for conducting AVTO-1 SC and AVTO-2 SC.
- One perennial trial on Lucerne is to be continued.
- To ensure the uniform yield data in multicut crops like lucerne, it was recommended to take minimum of six cuts
- At the end chairman and co chairman of this session emphasized on contribution of good material for IVTs by each centre.

The session ended with vote of thanks from the chairman.

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

<b>Chairman</b>	: Dr. M. B. Dhonde Head, Dept of Agronomy, MPKV, Rahuri
<b>Co- Chairman</b>	: Dr R.K Agrawal and Dr U. S. Tiwana
<b>Rapporteurs</b>	: Dr. C. K. Kundu and Dr. R. Joseph Koireng
<b>Finalization of Trials</b>	: Dr R.K Agrawal

The session started with introductory remarks by the chairman. Need for generation of research information on berseem seed production and low cost production technology on hydroponic fodder production on pilot basis was felt. After a thread bear discussion on new research programme, the house finalised the following new programmes.

**Coordinated trials**

1. Productivity of oat – lathyrus intercropping system as influenced by nutrient management, to be conducted at Kalyani, Ranchi and Imphal.
2. Exploratory trial on screening the technologies for enhancing seed production of Berseem at Rahuri, Jabalpur, Mandya and Anand.

**Location specific trials**

3. Productivity of oat-pea intercropping system as influenced by nutrient management at Jorhat.
4. Effect of Zinc and Boron on seed production potentiality of oat under red and lateritic soil of West Bengal at Sriniketan, W.B.
5. Evaluation of sowing window suitable for forage oats cultivation in the coastal region of Puducherry at Puducherry
6. Standardization of seed rate of berseem with rye grass under mixed cropping system at NDRI Karnal
7. Study on lucerne + oats /sarson fodder production system at variable seed rates of mixed crop under irrigated condition at Bikaner
8. Study on berseem + oats /sarson fodder production system at variable seed rates of mixed crop under irrigated condition at Mukteshwar
9. On a pilot basis, a few centres will take up the studies on feasibility on low cost hydroponics fodder production technology.

Altogether 22 experiments were conducted at 23 locations. Out of which 6 trials were concluded and 17 trials will be continued for coming Rabi 2015-16. Seven new experiments were also formulated for different zones

**The following experiments were concluded:**

- Performance of Bajra Napier hybrid grass as influenced by micronutrients under irrigated conditions.
- Effect of stubble management and INM on forage productivity in Rice-Oat cropping system.
- Performance of dual purpose forage crops under different cutting management system.
- Effect of weed management on forage and seed yield of berseem (*Trifolium alexandrinum* L.).
- Effect of integrated nutrient management on yield and quality of oat.
- Effect of sowing time and Zn & thio-urea application on seed yield of dual purpose oat.

The session ended with vote of thanks to the chair.

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

**Chairman** : Dr. S.G. Borker, Head, Deptt. of Plant Pathology, MPKV, Rahuri  
**Co- Chairman** : Dr. S. S. Jadhav, Head, Deptt. of Entomology, MPKV, Rahuri  
**Rapporteurs** : Drs. D. K. Banyal and M. Anuradha  
**Finalization of Trials** : Dr. Pradeep Saxena

Forage Scientists of Plant Pathology and Entomology disciplines discussed in detail the achievements of the last *rabi* season along with the ongoing technical programme. Dr T G Nageshwar Rao Director, IIMR Hyderabad also joined the group. The Chairman, Co-chairman and Director IIMR gave valuable suggestions for further improvement of the technical programme. Based on the discussion and suggestions, the following recommendations emerged.

- The group should also study the effect of crops grown around the fodder crops on the development of pest and diseases.
- The trials PPT-1 and PPT-2, A & B will continue as they are of continuous nature.
- The trials PPT-17, PPT-20, PPT-21, PPT-22 and PPT-23 will continue as such in *Rabi* 2015-16.
- PPT-12 and PPT-18 were concluded and will be validated on large plots as new trials PPT-24 and PPT 25, respectively.

The meeting ended with vote of thanks to Chair

## TECHNICAL SESSION V

### CENTRE-WISE PRESENTATIONS

<b>Chairman</b>	<b>:</b>	<b>Dr. I. S. Solanki, ADG (FFC), ICAR, New Delhi</b>
<b>Co- Chairman</b>	<b>:</b>	<b>Dr. T. G. Nageshwar Rao, Director, IIMR, Hyderabad</b>
<b>Convener</b>	<b>:</b>	<b>Dr. A. K. Roy, PC (FCU), IGFRI, Jhansi</b>
<b>Rapporteurs</b>	<b>:</b>	<b>Drs. M.R. Krishnappa and C. Babu</b>

The meeting started with Chairman's introductory remarks followed by centre-wise presentations. Chairman appreciated the research works of all the centres. After discussion and close scrutiny of each centre activities, following points emerged

#### **Hill zone:**

**CSK, HPKV, Palampur:** Palampur centre was reiterated to put more emphasis on white clover and rye grass and to contribute entries for next *rabi* 2016-17 co-ordinated trials.

#### **North west zone:**

**CCS, Hisar:** While maintaining large germplasm collections of berseem, it was suggested to ensure the genetic purity of the material.

**PAU, Ludhiana:** Center was advised to analyse the forage samples for IVDMD too while estimating for quality parameters. In case of oats, suggestion was given to limit the number of crosses so as to handle the segregating population effectively.

#### **North east zone:**

**BAU, Ranchi:** It was advised to do more number of crosses in oats to get elite segregants.

**AAU, Jorhat:** It was suggested to collect large number of cowpea germplasm from different places for utilization in hybridization programme.

**CAU, Imphal:** It was advised to collect advanced breeding materials from AAU, Jorhat or other centers for utilization till the breeder post is filled.

#### **Central zone:**

**AAU, Anand:** Anand centre was suggested to concentrate on multicut fodder oats and also asked to submit the endorsement copy of varieties to the respective originating centres for reference.

#### **General remarks:**

- While giving the details and addresses of the beneficiaries of FTD, it was suggested to give the Mobile no. of beneficiaries also for future reference.
- Chairman asked the scientists of IGFRI, Jhansi to present their research highlights in workshops.

The session ended with vote of thanks by the Chairman.

## TECHNICAL SESSION-VI FTD & TSP FORMULATION

**Chairman : Dr. A. K. Roy, Project Coordinator**  
**Rapporteurs : Dr. P. Saxena & Dr. Rajeev Agrawal**

Chairman welcomed the participants and invited suggestion and programme for all the centers regarding FTDs and TSP activities to be conducted by different centers. It was pointed out that due to fund crunch, AICRP coordinating unit will not be able to provide funds as per norm for FTD activities. All the centers should conduct the FTDs with resources of CAU/SAUs/ institutions with convergence of various ongoing programme of state government or other agencies.

Regarding TSP activities, it was emphasized that norms already circulated to all the centers and also available at ICAR and Tribal welfare ministry web sites should be strictly followed

Following centers showed and presented plan to be carried out under TSP activities regarding forage and livestock activities. KAU, Vellyani; BAIF, Urulikanchan; IGKV, Raipur, CAU, Imphal; AAU, Jorhat; GBPUAT, Pantnagar; MPKV, Rahuri, BAU, Ranchi; JNKVV, Jabalpur; PJTSAU, Hyderabad etc.

### All India Coordinated Research Project on Forage Crops FTDs ALLOTTED TO AICRP (FC) CENTRES FOR RABI 2015-16

S. No.	Centre name	Crop-wise FTDs to be conducted during Rabi 2015-16					Total
		Berseem	Lucerne	Oat (SC)	Oat (MC)	Other crops	
1.	Jorhat			20			20
2.	Kalyani	5		20		5 (Lathyrus)	30
3.	Ranchi	5		5		5 (Lathyrus)	15
4.	Faizabad			10			10
5.	Jabalpur	10			5		15
6.	Anand		10	10			20
7.	BAIF Urul.	5		10			15
8.	Rahuri	5			10		15
9.	Bikaner		10	15			25
10.	Ludhiana	10			15	25 (rye grass)	50
11.	Hisar	20		20			40
12.	Pantnagar	30			10	20 (spring maize)	60
13.	Coimbatore		5			5 (Guinea grass) 15 (cowpea)	25
14.	Hyderabad		10	20		10 (Hedge lucerne)	40
15.	Mandya		10	10			20
16.	Palampur				10	5 ( Tall fescue)	15
17.	Vellayani					15 (Napier Bajra)	15
18.	Raipur				5	5 (Lathyrus)	10
19.	Imphal			20	20		40
20.	Karjat	10		10			20
21.	Srinagar			50			50
	<b>Total</b>	<b>100</b>	<b>45</b>	<b>220</b>	<b>75</b>	<b>110</b>	<b>550</b>

Variety developed by SAU/ICAR institute for the region will be preferred for FTDs. In case of non availability of prescribed variety (decided in NGM) go for alternate variety.

It was also informed that due to funds constraints, funds will not be provided. All the centers are requested to conduct FTDs based on SAU, CAU, Center and AICRP FCU resources. In case of fund availability, it may be provided in due course.

### Proceedings of Varietal identification committee meeting

The meeting of varietal identification committee of AICRP on Forage Crops and Utilization was held under the Chairmanship of Dr I.S. Solanki, ADG, ICAR, New Delhi on 03.09.2015 at MPKV, Rahuri. Following members were present in the meeting:

1.	Dr I.S. Solanki, ADG , ICAR, New Delhi	Chairman
2.	Dr M B Dhonde, Head, Deptt. of Agronomy, MPKV, Rahuri	Member
3.	Mr. Rakesh Jadhav, J K Arigenetics Ltd.	Member
4.	Dr Y G Fulpagare, Head, Deptt. of AHDS, MPKV, Rahuri	Member
5.	Dr S S Jadhav , Head, Deptt. of Agril. Entomology, MPKV, Rahuri	Member
6.	Dr R W Bharud, Head, Deptt. of Agril. Botany, MPKV, Rahuri	Member
7.	Dr S G Borkar, Head, Deptt. of Plant Pathology, MPKV, Rahuri	Member
8.	Dr Dinesh Kumar, Principal Scientist, FFC, ICAR, New Delhi	Member
9.	Mr. Digvijay Singh, Manager, NDDB,	Member
10.	Dr S R More, Member, Mula Agro Production PVT. Ltd.	Member
11.	Dr A K Roy, Project Coordinator, AICRPF&U, IGFRI, Jhansi	Member Secretary

The following five proposals were put up before the committee:

**ENTRY OL-1760 (Oat Single Cut):** The proposal was submitted by PAU Ludhiana for South Zone. The committee considered the proposal and found that no data on plant protection aspect is available for South Zone. Therefore, it was recommended to test it again during in 2015-2016 for observation on disease reaction in South Zone only at 2 centers along with national and zonal checks.

**ENTRY OS-405 (Oat Single Cut):** The proposal was submitted by CCS HAU, Hisar for All India. The committee considered the proposal and found that it is superior for green fodder yield and dry matter yield. Regarding pathological /entomological observations, the committee felt that data from different centers are not in uniform format, hence committee recommends that the full trial (AVT-2) be retested for one more year at 2 locations in each zone. The data on plant protection aspect should be recorded under uniform set of guidelines by a team of pathologist and entomologist.

**ENTRY OS-403 (Oat Single Cut):** The proposal was submitted by HAU, Hisar for North West Zone. The committee considered the proposal. Regarding pathological /entomological observations, the committee felt that data from different centers are not in uniform format, hence committee recommends that the material be retested along with National and Zonal checks for one more year at 2 locations in NW zone. The data on plant protection aspect should be recorded under uniform set of guidelines by a team of pathologist and entomologist.

**JO-04-315 (Oat Multicut):** The proposal was submitted by JNKVV, Jabalpur for Central Zone. The committee considered the proposal. Regarding pathological /entomological observations, the committee felt that data from different centers are not in uniform format, hence committee recommends that the material be retested along with National and Zonal checks for one more year at 2 locations in Central zone. The data on plant protection aspect should be recorded under uniform set of guidelines by a team of pathologist and entomologist.

**NUTRICORN-786 (Hybrid Maize):** The proposal was resubmitted by Advanta Ltd for All India which was submitted in last meeting. As no new information was added, it was not considered by the Committee. If the developers want they can give the material again for retesting in subsequent new trials.

## **TECHNICAL SESSION VII ADMINISTRATIVE AND SCIENTIFIC ISSUES**

Chairman : Dr. A. K. Roy, Project Coordinator (FCU)  
Rapporteurs : Drs. Mareen Abraham and Seuji Bora Neog

- Dr. A. K. Roy presented the list of varieties identified during last 10 years along with their notification status and breeding institutions. It was pointed out that a number of varieties identified by VIC meeting held at various AICRP NGM are still not notified. OIC and Breeders of each center were specifically told to expedite the process and submit the proposal to CVRC in prescribed new proforma urgently so that before next meeting all the identified varieties are released and notified by CVRC. The proforma were provided to them. Similar steps should be taken by centres for state identified and released varieties. Such varieties should also be notified at national level. All such information should be provided to Project coordinator for record and further action.
- The AUC signed by statutory authority should be submitted by the centres with immediate effect.
- The break up of AUC signed by the Comptroller and OIC should be submitted by the centres with immediate effect. It was emphasized that details of balance amount should be given in different heads like Pay, contingency, TA, FTDs, TSP, and Capital etc.
- All the centres are requested to improve quality and quantity of their publications.
- All the centres are requested to send by email revised copy of presentation made to QRT for records.
- Centres are also requested to send pdf files of popular articles by email, to be uploaded on website.

The session ended with vote of thanks to the chair.



## **Brain Storming Session on “Breeding strategies for selected forage crops”**

The inaugural session was held under the chairmanship of Dr. T. A. More, Hon'ble Vice Chancellor, MPKV, Rahuri . Dr. I. S. Solanki, ADG (FFC), Dr. Rajendra Prasad, PD, Directorate of Seed Research, Mau were co-chairman. Dr. A. K. Roy, Project coordinator, AICRP on Forage Crops and Utilization was convener of the meeting.

Dr. A. K. Roy welcomed the dignitaries and other participants and presented the objectives of this brain storming session. It is a matter of concern that in a few fodder crops the varietal improvement situation is not up to the mark and much needs to be done.

Dr. I. S. Solanki, ADG (FFC), stressed upon the need to put more emphasis on varietal development of forage crops. He pointed out that more efforts are required as the number of plant breeders per crop is very less and with limited human and physical resources, we should plan well and execute the planning to get optimum results. It needs active cooperation of IGFRI and AICRP centers in terms of action plan and sharing of germplasm and breeding lines. Suitable guidelines can be developed for due credit sharing among partners for varieties, publications, germplasm etc. Active collaboration among AICRP on forage, Bajra, Maize and Sorghum is required.

Dr. H. P. Yadav, PC Pearl millet, stressed upon the need of dual purpose bajra as food and fodder sources especially for moisture stress situation. Germplasm sharing between AICRP centres on Bajra and Forage is required for better output. There should be more effective collaboration between AICRP on forage and Bajra.

Dr. S. Rajendra Prasad, PD, DSR, Mau elaborated upon the problems being faced in large scale fodder seed production. He pointed out that food and fodder should go together as they are two parts of a coin and it is very important for food security. There are constraints for production at various levels including farmers, agencies (NSC&SSC) and even at policy level. Detailed action plan needs to be worked out for enhancing forage seed production.

Dr. T. A. More, VC, MPKV, Rahuri In his address exhorted the scientists to develop technologies for poor and marginal farmers. A farmer is ready to adopt any technology if it provides an additional income to him/her. Fodder crops have unique problems as we have a large number of forage crops. Different forage crops require different type of breeding programme for development of varieties and hybrids. So we must stress upon increasing the production or productivity by breeding programme. Furthermore, each technology should come with proper worked out cost and benefit ratio. Dual type of crops are much in demand because of food, feed requirement and should be given due emphasis. There is urgent need of seed production in large scale. Biotic and abiotic stresses should be taken into consideration in developing technologies.

Dr. A. Sonone presented vote of thanks.

Subsequently technical sessions were held and highlights of different presentations are given below.

Dr S. Rajendra Prasad, Director, DSR, Mau presented talk on strengthening the forage seed chain: conceiving a way out. The scenario of forage seed production and demand in the country was presented. It was highlighted that only about 15% quality seed demand is being met. There is lack of seed chain and hence seed replacement rate is also dismal. There is lack of organised market and distribution system for forage seed. The involvement of various agencies such as NSC, SSC, DAH &F, DAC is required to address the problem. In NE and MP, large area is under rice –fallow that can be utilized for production of leguminous fodder and fodder seed. He highlighted the marketing problems and need of catch up grants and seed pricing policy for augmenting fodder seed shortage. There is an urgent need to develop Seed Mission Umbrella project. Village seed bank committees should involve the NARS, RRS, IARI, Dairy cooperatives, SHG, farmers, NGO's for seed multiplication.

Dr. H. P. Yadav, PC, AICRP on Pearl Millet, Jodhpur presented the scenario of dual purpose Bajra. Dual purpose pearl millet can be used as food, feed and forage, as different varieties are available for these purposes. Most of the pearl millet varieties are state released so there is a need of consolidated data base. Area specific development and multiplication of varieties are required for different farming systems. It is a matter of concern that the public sector varieties and hybrids are not as much popular as the hybrids and varieties of private sector companies. Thrust should be given on early maturing types that could help in development of drought resistant or escape types; diverse material for downy mildew resistance, A4 type of CMS source for dual types. For being competitive, the public sector should provide well in advance indent for seed demand and the parental seed materials for hybrid production; He informed that donors are available for quality attributes and can be shared with IGFRI and AICRP centres. There should be common working strategy for dual purpose with equal credit to all.

Dr. Pankaj Kaushal, Head Crop Improvement Division, IGFRI presented talk on breeding strategy in grasses: utilization of apomixis. He highlighted the importance of range grass breeding problems and scope. Due to apomictic nature, wild and weedy nature and polyploidy, the genetic manipulation becomes very difficult. The research achievements of IGFRI in apomictic research and search for sexual lines were highlighted. It was felt that exploration, collection, evaluation, documentation and selection should be given more priority in range grasses.

Dr. Joginder Singh, Principal Scientist, IIW&BR, Karnal presented paper on breeding strategies for dual purpose barley. He highlighted the importance of Barley as feed and dual purpose crop. Three varieties have so far been released having distinct dual purpose (feed and Fodder) advantage. Thrust areas are rust and blight resistant and corn leaf aphid tolerant lines; good quality of grain as feed, six rowed barley for fodder purposes. Strategies for developing forage type and dual type varieties needs to be developed as it is a preferred crop in the areas with limited irrigation facilities.

Dr. Tejveer Singh, Scientist, IGFRI, Jhansi presented talk on Genetic improvement of berseem in India: present status and future prospects. He presented the current status on Berseem. He presented three ecotypes for single, dual and multicut types. Despite introduction of large materials from abroad, we still face the problem of narrow genetic base. He highlighted the creation of genetic variability through interspecific hybridization following embryo rescue at IGFRI. Use of ploidy manipulation and mutation breeding for developing varieties were also highlighted. The centres involved in Berseem improvement are IGFRI, PAU, HAU, and JNKVV. Important areas requiring immediate attention are development of root rot resistant lines, extended growth period and molecular linkage map. Besides there is need to overcome the problem of low dry matter, low seed yield, seed shattering, and nodulation capacity. In general, it was felt that problem lies in seed production and root rot and stem rot tolerance in northern India.

Dr. Vijay Yadav, Principal Scientist, IGFRI, Jhansi presented paper on PGR in forage crops and utilization in crop improvement. The need for more introduction of trait specific germplasm was highlighted. The various rules and regulations in introduction were also discussed. Exploration should be taken up for trait specific selections especially in NE hill region, eastern and Himalayan range. There is need to deposit all the collected material at MTS in IGFRI and at NBPGR in LTS and obtain uniform IC number for indigenous collections and EC number for exotic germplasm. These numbers should always be used uniformly to avoid duplications.

Dr. A. K. Roy, Project coordinator Forage crops, presented breeding strategy in oat: achievements and prospects. At present, we have sufficient diversity as materials were introduced from several sources including Nordic Gene Bank, USDA, USSR, Canada, Australia, UK etc. Furthermore, the interspecific and intraspecific hybridization carried out at various centers such as IGFRI, PAU, HPKVV, HAU, GBPUAT, SKUAST etc. have created a lot of diverse materials. The point of concern is lack of suitable materials for multicut and dual purpose oats. Furthermore, keeping emerging trends we should also concentrate on oat grains for human and animal consumption.

In the plenary session, Dr. A. K. Roy presented the major objectives, partners and work plan of major fodder crops such as Berseem, oat, Lucerne, maize, bajra, rice bean, Lathyrus, temperate pasture crops, tropical range pasture crops. Following plan was approved in principle for execution.

Dr. I. S. Solanki, ADG (FFC) instructed all the scientists to sincerely carryout the programme as agreed. It is required to give a boost to varietal development plan in selected forage crops which is a serious issue. The credit sharing will be worked out to benefit all concerned workers.

Dr. K. D. Kokate, Director of Extension, MPKV and ex- DDG (Extension), ICAR in his remarks expressed concern over the fodder shortage in the country and stressed upon the need to develop suitable technologies for all categories of farmers and involve different stakeholders for increasing forage resource in the country.

Dr A. H. Sonone, OIC, AICRP forage crops, MPKV presented vote of thanks.

**AICRP ON FORAGE CROPS & UTILIZATION**  
**FINALIZED TECHNICAL PROGRAMME OF THE FORAGE BREEDING TRIALS**  
**RABI 2015-16**

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**

<b>Number of entries:</b>	4 + 2 NC + 1 ZC
<b>Contributors:</b>	Ludhiana (1), Hisar (2), Jabalpur (1)
<b>National checks:</b>	Wardan & Mescavi (2)
<b>Zonal checks:</b>	BL-22 (HZ), Bundel Berseem-2 (CZ & NWZ), Bundel Berseem-3 (NEZ)
<b>Design:</b>	RBD with 3 replications
<b>Plot size:</b>	3.0 x 3.0 m
<b>Spacing:</b>	Row to row-30 cm (each plot accommodating 10 rows of 3 m length)
<b>Seed rate:</b>	22 g per plot (approx. 25 Kg/ha)
<b>Seed requirement</b>	1.5 Kg/entry from each contributor & NC; 0.5 Kg for BL-22 & BB-3 and 1.0 Kg for BB-2
<b>Fertilizer:</b>	N-20 Kg, P <sub>2</sub> O <sub>5</sub> 80 Kg/ha
<b>Locations (19):</b>	<b>HZ</b> - Palampur, Srinagar, <b>NWZ</b> -Pantnagar, Hisar, Ludhiana, Meerut & Udaipur, <b>NEZ</b> -Kalyani, Ranchi, Faizabad, Bhubaneswar, Pusa; <b>CZ</b> - Jhansi, Rahuri, Jabalpur, Urulikanchan, Karjat, Kanpur, Raipur

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

<b>Number of entries:</b>	3 + 2 NC + 1 ZC
<b>Contributors:</b>	JB-04-23, JB-4-21, PC-75
<b>National checks:</b>	Wardan & Mescavi (2)
<b>Zonal checks:</b>	Bundel Berseem-2 (CZ & NWZ)
<b>Design:</b>	RBD with 4 replications
<b>Plot size:</b>	4.0 x 3.0 m
<b>Spacing:</b>	Row to row-30 cm (each plot accommodating 10 rows of 4 m length)
<b>Seed rate:</b>	30 g per plot (approx. 25 Kg/ha)
<b>Seed requirement</b>	1.8 Kg/entry from each contributor & 1.8 Kg for each national & zonal check
<b>Fertilizer:</b>	N-20 Kg, P <sub>2</sub> O <sub>5</sub> 80 Kg/ha
<b>Locations (13):</b>	<b>NWZ</b> -Bikaner, Hisar, Ludhiana, Jalore, Meerut & Udaipur <b>CZ</b> - Jhansi, Rahuri, Jabalpur, Urulikanchan, Karjat, Kanpur, Raipur

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

<b>Number of entries:</b>	10 + 2 NC + 1 ZC
<b>Contributors:</b>	Faizabad (1), Meerut (2), Ludhiana (2), Hisar (2), Jhansi (2), Jabalpur (1)
<b>National checks:</b>	Kent & OS-6
<b>Zonal check:</b>	SKO-90 (HZ), OL-125 (NWZ), JHO-99-2 (NEZ), OS-377 (CZ), JHO-2000-4 (SZ)
<b>Design:</b>	RBD with 3 replications
<b>Plot size:</b>	3.0 x 3.0 m
<b>Spacing:</b>	Row to row: 25 cm (each plot accommodating 12 rows of 3 m length)
<b>Seed rate:</b>	90 g per plot (approx. 100 Kg/ha)
<b>Seed requirement:</b>	10.0 Kg/entry from each contributor & 3.0 Kg for each zonal check
<b>Fertilizer:</b>	N- 80 Kg, P <sub>2</sub> O <sub>5</sub> -40 Kg/ha
<b>Locations (32):</b>	<b>HZ</b> -Palampur, Srinagar, Almora, Mukteswar <b>NWZ</b> -Bikaner, Jalore, Hisar, Ludhiana, Pantnagar, Dhari, Meerut <b>NEZ</b> -Jorhat, Kalyani, Bhubaneswar, Ranchi, Pusa, Faizabad, Imphal <b>CZ</b> -Jhansi, Rahuri, Urulikanchan, Palgarh, Kanpur, Karjat, Anand, Jabalpur, Raipur <b>SZ</b> -Hyderabad, Mandya, Coimbatore (Ooty), Karaikal, Mattupetty, Raichur

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

<b>Number of entries:</b>	8 + 2 NC +1 ZC
<b>Name of entries:</b>	OS-424, OL-1766-1, OL-1769-1, OL-1802-1, SKO-225, JO-04-19, UPO-10-3 & OS-432
<b>National checks:</b>	Kent and OS-6
<b>Zonal checks:</b>	SKO-90 (HZ), OL-125 (NWZ), JHO-822 (CZ)
<b>Design:</b>	RBD with 3 replications
<b>Plot size:</b>	4.0 x 3.0 m
<b>Spacing:</b>	Row to row-25 cm (each plot accommodating 12 rows of 4 m length)
<b>Seed rate:</b>	120 g per plot (approx. 100 Kg/ha)
<b>Seed requirement</b>	8.0 Kg/entry from each contributor & 4.5 Kg for each zonal check
<b>Fertilizer:</b>	N- 80 Kg, P <sub>2</sub> O <sub>5</sub> -40 Kg/ha
<b>Locations (17):</b>	<b>HZ:</b> Palampur, Srinagar, Almora <b>NWZ-</b> Bikaner, Jalore, Hisar, Ludhiana, Pantnagar, Udaipur, <b>CZ-</b> Jhansi, Rahuri, Urulikanchan, Palgarh, Kanpur, Anand, Jabalpur, Raipur

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

<b>Number of entries</b>	9 + 2 NC +1 ZC
<b>Name of entries:</b>	RO-11-1, OL-1804, OS-406, JO-04-18, RSO-8, SKO-196, SKO-198, SKO-199, OL-1689
<b>National checks:</b>	Kent & OS-6
<b>Zonal check:</b>	OL-125 (NWZ), JHO-99-2 (NEZ), JHO-822 (CZ), JHO-2000-4 (SZ)
<b>Design:</b>	RBD with 3 replications
<b>Plot size:</b>	4.0 x 3.0 m
<b>Spacing:</b>	Row to row-25 cm (each plot accommodating 12 rows of 4 m length)
<b>Seed rate:</b>	120 g per plot (approx. 100 Kg/ha)
<b>Seed requirement</b>	11.0 Kg/entry from each contributor & 4.0 Kg for each zonal check
<b>Fertilizer:</b>	N-80 Kg, P <sub>2</sub> O <sub>5</sub> -40 Kg/ha
<b>Locations (24):</b>	<b>NWZ-</b> Bikaner, Jalore, Hisar, Ludhiana, Pantnagar, Udaipur <b>NEZ-</b> Jorhat, Kalyani, Bhubaneswar, Ranchi, Pusa, Faizabad, Imphal <b>CZ-</b> Jhansi, Rahuri, Urulikanchan, Palghar, Kanpur, Anand, Jabalpur, Raipur <b>SZ-</b> Hyderabad, Mandya, Coimbatore (Ooty)

#### 5a. Agron. AVT Oat (SC)-2: Agronomy

<b>Number of entries</b>	9+ 2 NC +1 ZC
<b>Name of entries:</b>	RO-11-1, OL-1804, OS-406, JO-04-18, RSO-8, SKO-196, SKO-198, SKO-199, OL-1689
<b>National checks:</b>	Kent and OS-6
<b>Zonal check:</b>	OL-125 (NWZ), JHO-99-2 (NEZ), JHO-822 (CZ), JHO-2000-4 (SZ)
<b>Nitrogen levels</b>	40,80,120 (kg/ha)
<b>replications</b>	three
<b>Total plots</b>	108
<b>Design:</b>	Split plot with 3 replications
<b>Plot size:</b>	4.0 x 3.0 m
<b>Spacing:</b>	Row to row-25 cm (each plot having 12 rows of 4.0 m length)
<b>Seed rate:</b>	120 g per plot (approx. 100 Kg/ha)
<b>Seed requirement</b>	14.0 Kg/entry & each national check & 4.0 kg for each zonal check
<b>Locations (11):</b>	<b>NWZ:</b> Hisar, Ludhiana, Pantnagar <b>NEZ:</b> Pusa, Jorhat, Kalyani, <b>CZ:</b> Anand, Jabalpur, Rahuri <b>SZ-</b> Hyderabad, Mandya

**6. AVT Oat (SC)-2 (Seed): Second Advanced Varietal Trial in Oats (SC) for Seed**

<b>Number of entries</b>	9+ 2 NC +1 ZC
<b>Name of entries:</b>	RO-11-1, OL-1804, OS-406, JO-04-18, RSO-8, SKO-196, SKO-198, SKO-199, OL-1689
<b>National checks:</b>	Kent and OS-6
<b>Zonal check:</b>	OL-125 (NWZ), JHO-99-2 (NEZ), JHO-822 (CZ), JHO-2000-4 (SZ)
<b>Design:</b>	RBD with 3 replications
<b>Plot size:</b>	4.0 x 3.0 m
<b>Spacing:</b>	Row to row-25 cm (each plot accommodating 12 rows of 4 m length)
<b>Seed rate:</b>	100 g per plot (approx. 80 Kg/ha)
<b>Seed requirement</b>	4.5 Kg/entry from each contributor & 1.5 Kg for each zonal check
<b>Fertilizer:</b>	N-80 Kg, P <sub>2</sub> O <sub>5</sub> -40 Kg/ha
<b>Locations (10):</b>	<b>NWZ</b> -Hisar, Pantnagar, Ludhiana <b>NEZ</b> -Jorhat, Ranchi <b>CZ</b> -Jhansi, Jabalpur, Rahuri <b>SZ</b> -Mandya, Hyderabad

**7. AVT Oat (SC)-2: Second Advanced Varietal Trial in Oat (Single cut) (Repeat 13-14)**

<b>Number of entries</b>	1 + 2 NC +1 ZC
<b>Name of entries</b>	OS-403
<b>National checks</b>	Kent and OS-6
<b>Zonal checks</b>	OL-125 (NWZ)
<b>Design</b>	RBD with 5 replications
<b>Plot size</b>	4.0 x 3.0 m
<b>Spacing</b>	Row to row- 25 cm (each plot accommodating 12 rows of 4 m length)
<b>Seed rate</b>	120 g per plot (approx. 100 kg/ha)
<b>Seed requirement</b>	1.5 Kg/entry, zonal check and national check
<b>Fertilizer</b>	N- 80 kg, P <sub>2</sub> O <sub>5</sub> - 40 kg/ha
<b>Locations (2)</b>	<b>NWZ</b> - Ludhiana, Pantnagar

**8. AVT Oat (SC)-2: Second Advanced Varietal Trial in Oats (Single cut) Repeat 14-15**

<b>Number of entries</b>	9+ 2 NC +1 ZC
<b>Name of entries:</b>	UPO-12-1, JHO-2012-2, RSO-59, RSO-60, SKO-190, OS-405, JHO-2012-1, OL-1760, JO-04-14
<b>National checks:</b>	Kent & OS-6
<b>Zonal check:</b>	SKO-90 (HZ), OL-125 (NWZ), JHO-99-2 (NEZ), JHO-822 (CZ), JHO-2000-4 (SZ)
<b>Design:</b>	RBD with 3 replications
<b>Plot size:</b>	4.0 x 3.0 m
<b>Spacing:</b>	Row to row-25 cm (each plot accommodating 12 rows of 4 m length)
<b>Seed rate:</b>	120 g per plot (approx. 100 Kg/ha)
<b>Seed requirement</b>	4.0 Kg/entry & national check & 1.0 Kg for each zonal check
<b>Fertilizer:</b>	N-80 Kg, P <sub>2</sub> O <sub>5</sub> -40 Kg/ha
<b>Locations (10):</b>	<b>HZ</b> -Palampur, Srinagar <b>NWZ</b> - Hisar, Ludhiana, <b>NEZ</b> - Kalyani, Bhubaneswar, <b>CZ</b> - Rahuri, Jabalpur, <b>SZ</b> -Hyderabad, Mandya,

### 9. IVTO (MC): Initial Varietal Trial in Oat (Multi cut)

<b>Number of entries</b>	9 + 3 NC
<b>Name of entries:</b>	Jhansi (2), Hisar (2), Ludhiana (3), Jabalpur (1), Palampur (1)
<b>National checks:</b>	Kent, UPO-212 and RO-19
<b>Design:</b>	RBD with 3 replications
<b>Plot size:</b>	3.0 x 3.0 m
<b>Spacing:</b>	Row to row-25 cm (each plot having 12 rows of 3.0 m length)
<b>Seed rate:</b>	90 g per plot (approx. 100 Kg/ha)
<b>Seed requirement</b>	6.5 Kg/entry from each contributor & 6.5 Kg for each national check
<b>Fertilizer:</b>	N-80 Kg, P <sub>2</sub> O <sub>5</sub> -40 Kg/ha
<b>Locations (19):</b>	<b>HZ:</b> Palampur, Srinagar, Almora <b>NWZ:</b> Pantnagar, Hisar, Jalore, Ludhiana, Udaipur <b>NEZ:</b> Ranchi, Pusa, Faizabad, Jorhat, Bhubanewar, Imphal <b>CZ:</b> Jhansi, Anand, Jabalpur, Rahuri, Urulikanchan

### 10. AVTO-1 (MC): First Advanced Varietal Trial in Oat (Multi cut)

<b>Number of entries</b>	3 + 3 NC
<b>Name of entries:</b>	OS-414, OL-1845, JO-04-319
<b>National checks:</b>	Kent, UPO-212 and RO-19
<b>Design:</b>	RBD with 4 replications
<b>Plot size:</b>	4.0 x 3.0 m
<b>Spacing:</b>	Row to row-25 cm (each plot having 12 rows of 4.0 m length)
<b>Seed rate:</b>	120 g per plot (approx. 100 Kg/ha)
<b>Seed requirement</b>	2.0 Kg/entry from each contributor & 2.0 Kg for each national check
<b>Fertilizer:</b>	N-80 Kg, P <sub>2</sub> O <sub>5</sub> -40 Kg/ha
<b>Locations (3):</b>	<b>HZ:</b> Palampur, Srinagar, Almora, Mukteswar

### 11. AVTO-2 (MC): Second Advanced Varietal Trial in Oat (Multi cut)

<b>Number of entries</b>	2 + 3 NC
<b>Name of entries:</b>	JO-4-317 & OL-1802
<b>National checks:</b>	Kent, UPO-212 and RO-19
<b>Design:</b>	RBD with 4 replications
<b>Plot size:</b>	4.0 x 3.0 m
<b>Spacing:</b>	Row to row-25 cm (each plot having 12 rows of 4.0 m length)
<b>Seed rate:</b>	120 g per plot (approx. 100 Kg/ha)
<b>Seed requirement</b>	11.0 Kg/entry from each contributor & 11.0 Kg for each national check
<b>Fertilizer:</b>	N-80 Kg, P <sub>2</sub> O <sub>5</sub> -40 Kg/ha
<b>Locations (18):</b>	<b>HZ:</b> Palampur, Srinagar, Almora <b>NWZ:</b> Hisar, Jalore, Ludhiana, Udaipur <b>NEZ:</b> Ranchi, Pusa, Faizabad, Jorhat, Bhubanewar, Imphal <b>CZ:</b> Jhansi, Anand, Jabalpur, Rahuri, Urulikanchan

#### 11. Agron AVTO-2 (MC): Agronomy

<b>Number of entries</b>	2 + 3 NC
<b>Name of entries:</b>	JO-4-317 & OL-1802
<b>National checks:</b>	Kent, UPO-212 and RO-19
<b>Nitrogen levels</b>	40,80,120 (kg/ha)
<b>Design:</b>	RBD with 4 replications <b>Total plots</b> 60
<b>Plot size:</b>	4.0 x 3.0 m
<b>Spacing:</b>	Row to row-25 cm (each plot having 12 rows of 4.0 m length)
<b>Seed rate:</b>	120 g per plot (approx. 100 Kg/ha)
<b>Seed requirement</b>	14.0 Kg/entry & each national check, Zonal check 4.5 kg for CZ and 3.0 kg for HZ, NWZ, NEZ
<b>Locations (9):</b>	<b>HZ:</b> Palampur, Srinagar <b>NWZ:</b> Hisar, Ludhiana <b>NEZ:</b> Ranchi, Pusa <b>CZ:</b> Anand, Jabalpur, Rahuri

**12. AVTO-2 (Seed) (MC): Second Advanced Varietal Trial in Oat (Multi cut) for Seed**

<b>Number of entries</b>	2 + 3 NC
<b>Name of entries:</b>	JO-4-317 & OL-1802
<b>National checks:</b>	Kent, UPO-212 and RO-19
<b>Design:</b>	RBD with 4 replications
<b>Plot size:</b>	4.0 x 3.0 m
<b>Spacing:</b>	Row to row-25 cm (each plot having 12 rows of 4.0 m length)
<b>Seed rate:</b>	120 g per plot (approx. 100 Kg/ha)
<b>Seed requirement</b>	8.0 Kg/entry from each contributor & 8.0 Kg for each national check
<b>Fertilizer:</b>	N-80 Kg, P <sub>2</sub> O <sub>5</sub> -40 Kg/ha
<b>Locations (13):</b>	<b>HZ:</b> Palampur, Srinagar, <b>NWZ:</b> Pantnagar, Hisar, Ludhiana, <b>NEZ:</b> Ranchi, Jorhat, Bhubanewar, <b>CZ:</b> Jhansi, Anand, Jabalpur, Rahuri, Urulikanchan

**13. AVTO-2 (MC): Second Advanced Varietal Trial in Oat (Multi cut) Repeat 14-15**

<b>Number of entries</b>	1+ 3 NC
<b>Name of entries:</b>	JO-04-315
<b>National checks:</b>	Kent, UPO-212 and RO-19
<b>Design:</b>	RBD with 5 replications
<b>Plot size:</b>	4.0 x 3.0 m
<b>Spacing:</b>	Row to row-25 cm (each plot having 12 rows of 4.0 m length)
<b>Seed rate:</b>	120 g per plot (approx. 100 Kg/ha)
<b>Seed requirement</b>	1.5 Kg/entry & each national check
<b>Fertilizer:</b>	N-80 Kg, P <sub>2</sub> O <sub>5</sub> -40 Kg/ha
<b>Locations (2):</b>	<b>CZ:</b> Anand, Rahuri

**14. IVT Oat (Dual): Initial Varietal Trial in Oat (Dual)**

<b>Number of entries</b>	9 + 3 NC
<b>Name of entries:</b>	Jabalpur (1), Hisar (2), Jhansi (2), Ludhiana (2), Faizabad (1)
<b>National checks:</b>	RO-19, UPO-212 and JHO-822
<b>Design:</b>	RBD with 3 replications
<b>Plot size:</b>	3.0 x 3.0 m
<b>Spacing:</b>	Row to row: 25 cm (each plot accommodating 12 rows of 3 m length)
<b>Seed rate:</b>	90 g per plot (approx. 100 Kg/ha)
<b>Seed requirement</b>	7.0 Kg/entry from each contributor & 7.0 Kg for each national check
<b>Fertilizer:</b>	N-80 Kg, P <sub>2</sub> O <sub>5</sub> -40 Kg/ha
<b>Locations (18):</b>	<b>HZ</b> -Palampur, Srinagar <b>NWZ</b> -Bikaner, Jalore, Hisar, Ludhiana, Pantnagar, Udaipur, <b>NEZ</b> -Jorhat, Bhubaneswar, Ranchi, Faizabad <b>CZ</b> -Jhansi, Rahuri, Urulikanchan, Anand, Jabalpur, Raipur

**15. VT Lucerne (P)-2013: Varietal Trial in Lucerne (Perennial)-3<sup>rd</sup> year**

<b>Number of entries</b>	6 + 2 NC
<b>Name of entries:</b>	ALP-1-1 (BAIF Lucerne-3), TNLC-14, Anand-25, Anand-26 & RL-10-2
<b>National checks:</b>	Anand-2, RL-88



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

- GFY (q/ha), DMY(q/ha), per day productivity for green forage and dry matter yield (q/ha/day).
- Ancillary characters, like plant height, leafiness (Leaf / Stem ratio).
- Seed and stover yield in case of Seed trial.
- In IVT and AVT trials, CP (%), CP yield, NDF (%), ADF (%) and IVDMD (%) in 2<sup>nd</sup> cut or cut at 50% flowering in case of single cut.
- In Oat (SC), cut for fodder at the time of 50% flowering..
- In Oat (MC), two cut for fodder has to be taken, first cut after 55-60 days of sowing and second cut at 50% flowering
- In Oat (Dual), cut for fodder after 55-60 days of sowing and then left for grain harvesting. In this trial, biological yield has to be recorded.

**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.**

Yield (kg. /plot)

**Yield Conversion Factor:**      Yield (q/ha) = ----- X 100  
Net plot size (m<sup>2</sup>)

### **WORKING SCHEDULE FOR RABI 2015-16**

- Seed of checks and entries to be supplied by contributors to AICRP (FC) unit, Jhansi by 30.9. 2015.
- Seed for trials will be dispatched by AICRP (FC) unit, Jhansi to the testing locations/centers by 15.10. 2015.
- Trial sowing report to PC (FC): within 7 days of sowing.
- Information on trials failure, etc. is communicated immediately to PC (FC) through the Director of Research/Director ICAR institute.
- Rabi trial's data are to be submitted by testing centres to PC (FC) Jhansi up to May 10, 2016. In case of seed yield and quality traits up to 20 May, 2016.
- Reporting of Breeder seed (BSP-IV): May 20, 2016.

## Important and Urgent

For breeding trials, seed of the check varieties are to be supplied by the concerned scientist to PC (FC&U) by September 30, 2015. It includes Agronomical trials for AVT-2

S. N.	Crop & Variety	Quantity Required (in Kg)	Seed Source
1.	<b>Berseem</b>		
	Wardan	3.5	Dr. RV Kumar, Head GSM, IGFRI, Jhansi
	Bundel Berseem-2	3.0	
	Bundel Berseem-3	0.5	Dr D Vijay, Nodal Officer, MSP/NSP, IGFRI, Jhansi
	Mescavi	3.5	Dr. Yogesh Jindal, CCS HAU, Hisar
	BL-22	0.5	Dr. US Tiwana, PAU, Ludhiana
2.	<b>Oat</b>		
	Kent	97	Dr. RV Kumar, Head GSM, IGFRI, Jhansi
	JHO-99-2	10	
	JHO-822	19	
	JHO-2000-4	10	Dr D Vijay, Nodal Officer, MSP/NSP, IGFRI, Jhansi
	OS-6	55	Dr. Yogesh Jindal, CCS HAU, Hisar
	OS-377	4	
	OL-125	16	Dr. US Tiwana, PAU, Ludhiana
	SKO-90	9	Dr. NS Khuroo, SKUAST, Srinagar
	UPO-212	51	Dr. JS Verma, GBPUA&T, Pantnagar
	RO-19	51	Dr. AH Sonone, MPKV, Rahuri

**FORAGE CROP PRODUCTION (AGRONOMY): Rabi 2015-16**  
**Forage Crop Production Technical Programme Rabi 2014-15**

**A. Ongoing**

Current Trial	Title of trial	Centres
PS-13-AST-2	Performance of perennial fodder sorghum ( <i>Sorghum bicolor</i> cv. COFS 29) as influenced by planting geometry and cutting intervals under irrigated conditions	Dharwad, Raipur and Bikaner
PS-14-AST-1	Effect of straw mulch on the water requirement, weeds and productivity of BN hybrid	Ludhiana, Bikaner and Raipur
PS-14-AST-2	Impact of Mg and B on nutrient uptake, quality and yield of BN hybrid	Vellayani
PS-14-AST-3	Response of Congo-signal grass ( <i>Brachiaria ruziziensis</i> (var. DBRS 1)) to planting geometry and N levels	Dharwad and Mandya
PS-14-AST-4	Studies on the effect of planting geometry of tall fescue grass and seed rates of white clover in wet temperate conditions	Palampur and Srinagar
CS-13-AST-1	Study on different models for year round green fodder production under irrigated condition	Rahuri, Anand, Bikaner & Urulikanchan,
CS-13-AST-2	Evaluation of fodder crops under different rice fallow system	Ranchi, Jabalpur & Bhubaneswar
CS-13-AST-3	Evaluation of different varieties of grasspea ( <i>Lathyrus sativus</i> L.) as forage crop under different sowing methods in rice based cropping system	Raipur and Jorhat
CS-13-AST-4	Residual effect of P applied to wheat on the succeeding summer fodders in sorghum-wheat-summer fodders cropping system	Ludhiana
CS-14-AST-1	Studies on intensive fodder cropping systems for yield maximization	Raipur
CS-14-AST-2	Study of intensive annual fodder crop based cropping system	Raipur
R-13-AST-1	Yield potential of cereals with forage legumes under pure stand and mixtures	Srinagar
R-14-AST-1	Studies on the production potential feasibility of annual rye grass with berseem in hill zone	Palampur & Srinagar
R-14-AST-2	Effect of cutting and nutrient management on growth, yield and quality of Oat	Imphal
R-14-AST-3	Studies on the effect of additives on silage quality of different grasses	Vellayani

R-Rabi CS: Cropping sequence PS: Perennial system AST: Agronomy & Soil Trial

**B. New trials**

Trial code	Title of trial	Centres
R-15-AST-1	Productivity of oat-lathyrus intercropping system as influenced by integrated nutrient management	Kalyani, Ranchi, Imphal & Bhubaneswar
R-15-AST-2	Productivity of oat - pea intercropping system as influenced by integrated nutrient management	Jorhat
R-15-AST-3	Response of phosphogypsum to various cultivars of fodder oat in sodic soil.	NDUA&T, Faizabad
R-15-AST-4	Study on lucerne + oats /sarson fodder production system at variable seed rates of mixed crop under irrigated condition	Bikaner
R-15-AST-5	Effect of Zinc and Boron on seed production potentiality of oat under red and lateritic soil of West Bengal	Sriniketan, West Bengal
R-15-AST-6	Evaluation of sowing window suitable for forage oats cultivation in the coastal region of Puducherry	Puducherry
R-15-AST-7	Standardization of seed rate of berseem with rye grass under mixed cropping system	NDRI, Karnal
R-15-AST-8	Study on berseem + oats /sarson fodder production system at variable seed rates of mixed crop under irrigated condition	IVRI, Mukteshwar

**C. AVT based trials**

<b>R-15-AST -9</b>	R-15-AST -8: Effect of N levels on forage yield of promising entries of oat (AVT-2 SC)	NWZ: Hisar, Ludhiana, Pantnagar NEZ: Pusa, Jorhat, Kalyani, CZ: Anand, Jabalpur, Rahuri SZ-Hyderabad, Mandya, Coimbatore
<b>R-15-AST -10</b>	Effect of N levels on forage yield of promising entries of oat (AVT-2 MC)	HZ: Palampur, Srinagar NWZ: Hisar, Ludhiana NEZ: Ranchi, Pusa CZ: Anand, Jabalpur, Rahuri

**D. Exploratory trial**

<b>Exploratory trial</b>	Screening for suitable combination of sowing and pre seed setting harvesting time of berseem for enhancing seed productivity in different regions.	Rahuri, Anand, Jabalpur and Mandya
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**FORAGE CROP PRODUCTION (AGRONOMY) RABI-2015-16**  
**ON-GOING COORDINATED TRIALS:**

**CS-13-AST-1: Study on different models for year round green fodder production under irrigated condition**

**Objectives**

1. To study the different combinations of perennial and seasonal fodder crops for productivity and identify suitable crop combination
2. To study economics of different models
3. To study effect of different models on soil chemical properties

**Treatments:**

**Crop combinations-models**

- T1 - Maize+cowpea – oat + berseem – bajra+cowpea
- T2 – Sorghum+ cowpea – maize+berseem – bajra+cowpea
- T3 – Hybrid napier+cowpea - hybrid napier+berseem - hybrid napier+cowpea
- T4 – Hybrid napier + lucerne
- T5 – Hybrid napier + *Desmanthus*

**Design:** RBD                      **Replications:** 4                      **Plot size:** 6 x 5 m

**Duration:** 3 years (Starting from Kharif 2013)

**Observations to be recorded:**

**Growth:** Plant height, Leaf stem ratio, Plant population per m row length

**Yield and quality:**

Green fodder yield,              Dry matter yield,              Crude protein yield, CP (%), CF (%)

**Economics:** Net monetary returns, benefit cost ratio

**Soil studies:** Initial soil status and after completion of sequence for pH, EC, OC, N, P & K

**Note: Recommended package of practices will be followed for each crop.**

The ratio of cereal to legume will be 2:1 for seasonal crops. In hybrid napier + lucerne and hybrid napier + *Desmanthus*: Two rows of hybrid napier spaced at 4.8 meter (60 cm from boarder) and in between two lines of hybrid napier 12 lines of legumes at 30 cm spacing.

**Locations: (4):** Urulikanchan, Anand, Rahuri, and Bikaner

**(Data reporting: Rabi)**

**PS-13-AST-2: Performance of perennial fodder sorghum (*Sorghum bicolor* cv. COFS 29) as influenced by planting geometry and cutting intervals under irrigated conditions**

**Objectives:**

- To study the effect of planting geometry on growth and yield.
- To study the effect of cutting intervals on growth and yield.
- To study the interactive effect of planting geometry and cutting intervals on growth and yield.

**Treatments:**

**A. Planting geometry:**

1. 30 cm inter-row spacing,
2. 45 cm inter-row spacing,
3. 60 cm inter-row spacing

**B. Cutting interval:** 45 days, 2. 60 days, 3. 75 days, 4. 90 days

**Year:** Rabi 2013-14

**Design:** FRBD

**Replications:** Three

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

**Seed rate:** 10 kg/ha

**Spacing:** As per treatment

**Observations to be recorded:** All observations will be recorded at each cut

Plant height,              Number of tillers/m row length,              Leaf: stem ratio,              Dry matter /m row length,              Green  
fodder yield/ha,              DFY/ha              Crude protein (%),              Crude fibre (%),              HCN content at each harvest

**Location (3):** Dharwad, Raipur and Bikaner

**(Data will be reported in Rabi)**

### **CS-13-AST-2: Evaluation of fodder crops under different rice fallow system**

#### **Objectives:**

1. To assess the effect of different methods of rice cultivation on fodder establishment, yield and economics.
2. To study the physio-chemical properties of soil before and after cropping system.

#### **No. of Treatments: 12**

**Design:** Split plot    **Replications:** 3    **Plot size:** 6 x 5 m

**Duration of the experiment:** 3 years (Starting from Kharif 2013)

#### **Main plot- Systems of rice establishment methods (4)**

**M1-** Conventional method    **M2-** SRI (raised bed)    **M3-** SRI (flat bed)    **M4-** Aerobic rice

#### **Sub Plot: Forage crops (3)**

**C1-** Oat    **C2-** Berseem    **C3-** Lathyrus

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

- Biometrics, yield attributes and yield studies of rice and fodder crops
- Physiochemical properties of soil
- Net monetary returns, benefit cost ratio

**Note:** Package of practices: IPNM to rice crop: FYM @ 5t/ha + RD@ 80-40-40 kg M, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O/ha

#### **Water management in rice:**

- Conventional method- puddled and transplanted standing water throughout the season.
- SRI (raised bed)- puddled and transplanted water only in channel
- SRI (flat bed)- puddled and transplanted, beds to be kept from moist to saturated condition
- Aerobic- non-puddled, direct sown, irrigation as and when required

**Locations (3):** Ranchi, Jabalpur and Bhubaneswar

**(Data reporting: Rabi)**

### **CS-13-AST-3: Evaluation of different varieties of grasspea (*Lathyrus sativus* L.) as forage crop under different sowing methods in rice based cropping system**

#### **Objective:**

- To compare the biomass and grain yield production among different variety of grass pea under different sowing methods.

#### **Treatment details:**

#### **Main plot: Methods (4)**

- Recommended practices with 125% more seed rate
- Recommended practices with 150% more seed rate (Planting 20x10)
- Zero seed Drill with 125% more seed rate
- Zero seed Drill with 150% more seed rate (Planting 20x10)

#### **Sub plot: Varieties (6)**

- Pusa-24
- Mahateora
- Prateek
- Ratan
- Nirmal
- One line of Chhattisgarh i.e. RLS which is already in IVT mode of AICRP on MuLLaRP

**Fertilizer:** Recommended dose of nutrient and spray 2% urea as foliar application at 60 DAS

**Seed treatment:** Rhizobium and PSB    **No. of cutting:** Single (50 DAS)    **Design:** Split Plot Design

**Replication:** 3

**No. of treatment:** 24

**Date of sowing:** Before 15 Nov.

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

Plant height, leaf stem ratio, Green forage yield, dry matter yield, Crude protein content, Crude protein yield and seed and stover yield

**Location (2):** Raipur and Jorhat

**(Data reporting: Rabi)**

## PS-14-AST-1: Effect of straw mulch on the water requirement, weeds and productivity of BN hybrid

### Objectives:

1. To study the effect of mulch on water requirement and weed density in BN hybrid
2. To study the effect of mulch on forage yield, and quality of BN hybrid
3. To study the effect of mulch on physico – chemical properties of soil

### Treatments

**Main-plot: Irrigations (3):** 0.8, 1.0 and 1.2 IW/CPE  
**Sub-plot: Straw mulch (4):** Control, 5.0, 7.5 and 10 t/ha  
**Variety:** PBN 233 **Seed rate:** 27500 root slips/stem cutting/ha **Fertilizers:** 50 t FYM + 75 kg N/ha/cut  
**Design:** Split-plot **Replication(s):** Three **Year of start:** Summer 2014  
**Duration:** Three years **Spacing:** 60 cm x 60 cm

### Observations:

- Crop growth: Plant population, Plant height, L:S
- Yield (q/ha): Green fodder, dry matter
- Quality: Crude protein content & yield
- Economics: Cost of cultivation, Gross monetary return, Net returns, Benefit : cost ratio
- Weed density, weed dry weight and WCE
- Soil studies: Soil fertility status before and after completion of the sequence, i.e., pH, OC (%), EC, available NPK before and after the completion of experiment.

**Locations (4):** Ludhiana, Bikaner and Raipur

**(Data reporting – Kharif)**

## PS-14-AST-3: Response of congo-signal grass (*Brachiaria ruziziensis* (var. DBRS 1)) to planting geometry and N levels under variable soil moisture conditions

### Objectives:

- To evaluate performance of *Brachiaria ruziziensis* (var. DBRS 1) under irrigated and rainfed conditions
- To study the effect of planting geometry and nitrogen nutrition on the performance of *Brachiaria spp.*
- To study the interactive effect of growing systems, planting geometry and nitrogen nutrition on the performance of *Brachiaria spp.*

### Technical details

**Design:** Split-split plot design **Replications:** Three **Plot size:** 3.6 m x 3.6 m  
**Start:** Kharif 2014 **Duration:** Three year

### Treatments:

**Growing systems:** 2 (Main plot)

- (i) Rainfed (G<sub>1</sub>) (ii) Irrigated (Based on available soil moisture regime) (G<sub>2</sub>)

**Planting geometry:** 2 (Sub plot)

- (i) 45 cm x 45 cm (8 rows plot) (P<sub>1</sub>) (ii) 60 cm x 60 cm (6 rows plot) (P<sub>2</sub>)

**Nitrogen nutrition:** 4 (sub-sub plot)

- Control
- 10 kg N/ha (Basal and after each cut) (N<sub>2</sub>)
- 20 kg N/ha (Basal and after each cut) (N<sub>3</sub>)
- 30 kg N/ha (Basal and after each cut) (N<sub>4</sub>)

### Observations:

#### Plant observations:

Plant height at each cut No. of tillers at each cut  
Dry matter per /tiller at each cut Light interception at 30 days interval  
GFY and DFY/ha /cut & year CP content (%) and yield (q/ha) at each cut

#### Soil observation:

OC (%), available N, P and K initial and at one year interval

**Location:** Dharwad and Mandya

**(Data will be reported in Kharif season)**

## PS-14-AST-4: Studies on the effect of planting geometry of tall fescue grass and seed rates of white clover in wet temperate conditions

### Objectives:

- To evaluate the productivity, quality and compatibility of tall fescue grass + white clover mixture
- To estimate soil NPK and soil organic carbon (SOC) storage under different treatments

### Technical details:

**Design:** Randomized block design

**Year of start:** Rabi 2014-15

**Duration:** Three years

**Replications:** Three

**Plot size:** 3.60 m x 3.60 m

**Treatments** (11 including sole stand of tall fescue and white clover):

#### (A) Spacing of tall fescue grass -3\*

(a) 20 cm x 30 cm

(b) 30 cm x 30 cm

(c) 40 cm x 40 cm

#### (B) White clover seed rate (Kg/ha)-3\*\*

(a) 1.0

(b) 2.0

(c) 3.0

All possible combination of A and B plus sole stand of Tall fescue grass at 30 cm x 30 cm spacing, and white clover @ 6 kg/ha sowing by broadcast.

**Note:** (\*Tall fescue seedling will be established through transplanting; \*\* Seed of white clover will be over sown by broadcast after transplanting of tall fescue grass)

### Observations to be recorded:

- Plant height (cm); L/S ratio; Per cent proportion of each species (on dry weight basis)
- GFY, DMY, CPY (q/ha) CP Content
- Competition functions net returns (Rs/ha) and benefit cost ratio
- Soil NPK, pH, total soil organic carbon storage (Tonnes carbon/ha) before start of the experiment and after completion of the experiment in each season

**Locations:** Palampur and Srinagar

(Data will be reported in Rabi)

## R-14-AST-1-: Studies on the production potential feasibility of annual rye grass with berseem in hill zone

### Objectives:

- To explore the possibilities of rye grass cultivation with or without berseem in the hill region.
- To evaluate the effect of different seeding ratio of rye grass with berseem on productivity and quality of forage
- To estimate the effect on soil NPK and soil organic carbon (SOC) storage under different treatments.

### Technical details:

**Design:** Randomized block design

**Replications:** Three

**Year of start:** Rabi 2014-15

**Plot size:** 3.0 m x 3.0 m

**Duration:** Three years

### Treatment (13)

#### (a) Rye grass genotypes \* (3)

(i) Punjab Rye grass-1

(ii) Kashmir collection

(iii) Seed from 'ATMA' (HP)

#### (b) Seed rate of ratio of rye grass: Berseem

(i) 100:0

(ii) 75:25

(iii) 50:50

(iv) 25:75

All possible combination of A and B plus sole stand of berseem sown by broadcast.

(Crops will be sown by broadcast)

### Observations:

- Plant height (cm); L:S ratio; Per cent proportion of each species (on dry weight basis)
- GFY, DMY and CPY (q/ha) and CP content (%)
- Competition functions (Sole berseem and Punjab Rye grass will be considered as standard check for computation of competition functions)
- Net returns (Rs/ha) and benefit cost ratio
- Soil NPK , pH, Total soil organic carbon storage (Tonnes carbon /ha) before start of the experiment and after completion of the experiment in each season

**Locations:** Palampur and Srinagar

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



## C-ONGOING LOCATION SPECIFIC TRIALS

### CS-13-AST-4: Residual effect of P applied to wheat on the succeeding summer fodders in sorghum-wheat-summer fodders cropping system

#### Objectives:

- To identify suitable summer fodder crop in sorghum-wheat-summer fodder cropping systems and
- To study the residual effect of phosphorus applied to wheat on succeeding summer fodder crops

#### Technical details:

##### Treatments

(A) Summer fodder crops (3): Cowpea, maize and bajra

(B) P - levels to summer fodder crops (5):

0, 25, 50, 75 and 100 % of recommended fertilizers: 100 kg N + 20 kg P<sub>2</sub>O<sub>5</sub>/ha

Year of start: Kharif 2013

Design : FRBD

Replications: 3

Variety: PSC 1

Seed rate: 37.5 kg/ha

Row spacing: 30 cm

#### Observations to be recorded:

- **Crop growth:** Plant population, Plant height, L:S
- **Yield (q/ha):** Green fodder, Dry matter
- **Quality:** Crude protein content & yield
- **Economics:** Cost of cultivation, Gross monetary return, Net returns, Benefit : cost ratio
- N and P uptake
- **Soil studies:** Soil fertility status before and after completion of the sequence, i.e., pH, OC (%), EC, available NPK.

Location: Ludhiana

(Data reporting: Kharif)

### R-13-AST-1: Yield potential of cereals with forage legumes under pure stand and mixtures

#### Objective:

- To evaluate fodder yield potential and quality of cereals and legumes in mono as well as in mixed cropping.

#### Treatments:-

T1 - Sole Oat

T2 - Sole Barley

T3 - Sole ryegrass

T4 - Sole Vetch (*Vicia sativa*)

T5 - Sole Field pea

T6 - Oat+ Vetch (1:1)

T7 - Oat + Field pea (1:1)

T8 - Barley +Vetch (1:1)

T9 - Barley +Field pea (1:1)

T10 - Ryegrass +Vetch (1:1)

T11- Ryegrass + Field pea (1:1)

Year: Rabi 2013-14

Design: RBD

Replications: Three

Plot size: 4.0 m x 3.0 m

Duration: Three years

#### Observation to be recorded:-

- **Crop Growth:** Plant population at harvest/m<sup>2</sup>, Plant height at harvest, Leaf stem ratio
- **Yield (q/ha):** Fresh & Dry weight weight at harvest, Forage equivalent yield, Land equivalent ratio
- **Quality Parameters:** Crude protein content (%), Crude protein yield (q/ha)
- **Nutrient studies:** Nitrogen content and uptake by each crop, Soil fertility status before and after harvest.

Note: **Nutrient management: N: P<sub>2</sub>O<sub>5</sub> : K<sub>2</sub>O kg/ha**

**Vetch (*Vicia sativa*) and field pea = 30:60:40 Oat/Barley/Wheat= 120:60:40**

The fertilizers will be applied as per recommended package for sole crops however, in case of intercropping the fertilizers will be applied as per row proportion

Location: Srinagar

(Data will be reported in Rabi)

## CS-14-AST-1: Studies on intensive fodder cropping systems for yield maximization

### Objectives:

- To find out the appropriate cropping system for maximum fodder production
- To study the effect of cropping systems on soil fertility, nutrient use and water use efficiency

### Treatments:

1. BN Hybrid + Lucerne
2. Setaria + Lucerne
3. BN Hybrid + Cowpea (summer) / Lucerne (winter)
4. Setaria + Cowpea (summer)/ Lucerne (winter)
5. BN Hybrid + Berseem (winter)
6. Setaria + Berseem (winter)
7. BN Hybrid + Cowpea (summer)/ Berseem (winter)
8. Setaria + Cowpea (summer)/ Berseem (winter)

Year: Summer/Kharif 2014

Design : RBD

Replications: Three

Plot size (Gross): 6.0 m x 5.0 m

Duration: Three years

### Observations to be recorded:

- **Growth attributes:** Plant height, Leaf: stem ratio
- **Yield:** GFY, DMY and CPY
- **Economics:** Cost of cultivation, Net returns and BC ratio
- **System productivity:** Equivalent yields
- **Other yearly observations:** WUE, NUE, soil fertility after crop cycle

Location: Raipur

(Data reporting in Rabi)

## PS-14-AST-2: Impact of Mg and B on nutrient uptake, quality and yield of bajra napier hybrid

**Objective:** to assess the influence of Mg and B nutrition on the performance of bajra napier hybrid

### Treatments:-

#### A. Field condition (2)

1. Open situation
2. Coconut garden

#### B. Nutrient levels (5)

1. POP recommendation + MgSO<sub>4</sub> 80 kg/ha+ Borax 10 kg/ha
2. POP recommendation + MgSO<sub>4</sub> 80kg/ha
3. POP recommendation +Borax 10 kg/ha
4. POP recommendation alone
5. POP without FYM (200:50:50 kg NPK/ha)

**POP- Package of practices recommendation, Kerala (200:50:50 kg NPK/ha and 25 t/ha of FYM**

General recommendation for deficient soils in Kerala is 80 kg/ha of Mg SO<sub>4</sub> and 10 kg/ha of Borax.

### Technical details:

Design: Factorial RBD

Number of replication: Three

Plot size: 4 m x 4 m

Duration of study: 3 years

### Observations

**A. Biometric characters:** Plant height at harvest (cm), Leaf /stem ratio

**B. Yield characters:** Green fodder yield (q/ha), Dry fodder yield (q/ha)

**C. Quality characters:** Crude protein content (%) Crude fibre content (%)

#### D. Nutrient studies

1. Soil analysis:- pH, EC, organic carbon, Mg, B and NPK status before and after conduct of the experiment

2. Plant analysis- N, P, K, Mg and B.

#### E. Light intensity studies

Location: Vellayani

(Data will be reported in kharif)

## CS-14-AST-2: Study of intensive annual fodder crop based cropping system

### Objectives

- To find out the appropriate system for maximum fodder production
- To study effect of maximum forage production on soil fertility, nutrient use efficiency, and water use efficiency.

### Treatment details

1. Sorghum multi cut + Cowpea (2:1) - Lucerne
2. Maize + Cowpea (2:1) - Lucerne
3. Pearl millet multi cut + Cowpea (2:1) - Lucerne
4. Maize + Rice bean (2:1) – Berseem – Sorghum multi cut + Cowpea (2:1)
5. Maize + Rice bean (2:1) – Oat multi cut - Sorghum multi cut + Cowpea (2:1)
6. Pearl millet multi cut + Rice bean (2:1) –Oat multi cut – Maize + Cowpea (2:1)
7. Pearl millet multi cut + Rice bean (2:1) – Berseem – Maize + Cowpea (2:1)
8. Pearl millet multi cut + Rice bean (2:1) – Berseem – Sorghum multi cut + Cowpea (2:1)
9. Pearl millet multi cut + Rice bean (2:1) – Oat multi cut – Sorghum multi cut + Cowpea (2:1)

### Technical details:

**Year of start:** Kharif 2014

**Design:** Randomized block design

**Replication:** Three

**Plot size:** Gross plot size- 6m x 5m = 30m<sup>2</sup>

**Duration:** Three years

**Note-** The recommended package of practices for all crops or according to main crop will be adopted.

### Observations

- |                                        |                                 |
|----------------------------------------|---------------------------------|
| ➤ Green fodder yield (q/ha)            | ➤ Crude protein yield           |
| ➤ Dry fodder production (q/ha)         | ➤ Plant height (cm)             |
| ➤ Green fodder yield per day (q/ha)    | ➤ Leaf : stem ratio             |
| ➤ Dry fodder production per day (q/ha) | ➤ Economics Cost of cultivation |
| ➤ Crude protein content                | ➤ Net return, B:C ratio         |

### Other related yearly observation

## R-14-AST-2-: Effect of cutting and nutrient management on growth, yield and quality of oat

### Objectives:

1. To study the effect of cutting management on green fodder and grain yield
2. To study the economics of the system

### Experimental details

**Design:** FRBD

**Replication:** 3

**Duration:** Three year

**Year of start:** Rabi 2014-15

**Plot Size:** 4x3 m<sup>2</sup>

**Variety:** JHO-822

### Treatment details:

#### (A) Cutting Management: 3

- (i) C1: No cutting (Seed)      (ii) C2: Single cut (60 DAS) + Seed      (iii) C3: Three cut (60, 90 & 120 DAS)

#### (B) Nutrient Levels: 04

- (i) N<sub>1</sub>: RDF (N, P<sub>2</sub>O<sub>5</sub> & K<sub>2</sub>O @ 80: 40:40)      (ii) N<sub>2</sub>: 75% NPK of RDF + 5 t FYM/ha  
(iii) N<sub>3</sub>: 50% NPK of RDF + 7.5t FYM/ha      (iv) N<sub>4</sub>: 25% NPK of RDF + 10t FYM/ha

\* N will be given in four splits doses (40% as basal, 20% at 30 DAS, 20% at 60 DAS and 20% at 90 DAS).

### Observation to be recorded:

Plant height (cm)	Leaf stem ratio	GFY & DMY (q/ha)
Grain or seed and straw yield (q/ha)	Crude protein content (%)	Crude protein yield (q/ha)
Gross and net return (Rs./ha)	Benefit cost ratio.	

Soil fertility status before and after cropping season.

**Location:** Imphal

**(Data will be reported in Rabi)**

### R-14-AST-3: Studies on the effect of additives on silage quality of different grasses

**Objective:** To select ingredients with a view to get nutritive and palatable silage

**Technical details**

**Design:** CRD    **Replication:** Three    **Year of start:** 2014-15    **Duration:** One year

**Treatments:-**

**(a) Fodder crops-2**

1. Hybrid Napier
2. Guinea grass

**(b) Silage Additives-5**

1. Urea 1%.
2. Urea 2%
3. Urea 1% + Jaggery 1%.
4. Tapioca flour 1%.
5. Jaggery 2%.

**Observations to be recorded:**

- Fresh silage/pit, dry matter content (%)
- Palatability, pH, silage colour,
- **Nutrient analysis.**- Total digestible nitrogen content, Digestible crude protein, fibre, micronutrients
- Economics

Note: The experiment will be carried out in pits of 0.83m<sup>3</sup> size. The pits will be insulated from climatic factors and the trial will to be carried out in two seasons in a year.

**Location: Vellayani**

**(Data will be reported in Rabi)**

## NEW PROGRAMME FOR RABI-2015-16

### R-15-AST-1: Productivity of oat - lathyrus intercropping system as influenced by integrated nutrient management.

#### Objectives

1. To assess the productivity of food-forage intercropping system on rice fallows
2. To study the profitability of food-forage intercropping system influenced by INM

#### TECHNICAL DETAILS

##### Treatment details

##### A. Intercropping system (*Rabi* season) (Main plot)

T<sub>1</sub> = Sole oat      T<sub>2</sub> = Lathyrus      T<sub>3</sub> = Oat + Lathyrus (3:2)      T<sub>4</sub> = Oat + Lathyrus (3:3)

##### B. Integrated Nutrient Management (sub plot)

F<sub>1</sub> = RDF (inorganic)      F<sub>2</sub> = 50% N of RDF + 50% N through FYM

F<sub>3</sub> = 50 % N of RDF + 50% N through Vermicompost

**Year of start:** Rabi 2015-16      **Design :** Split Plot Design (SPD)

**No of replications :** 3      **Total treatment :** 12

**Seeds will be treated with Rhizobium and PSB culture in all the treatments.**

#### Observations to be recorded

**Soil physico- chemical properties before sowing and after harvest of crop**

#### Growth and yield attributes and yield of oat

- (i) Plant height and plant population
- (ii) Green forage and dry matter yield

#### Growth and yield attributes and yield of legume

- (i) Plant height and plant population
- (ii) Stover yield, Green Forage and Dry Matter Yield

#### Productivity of cropping system:-

Land Equivalent Ratio (LER)      Green Forage Equivalent Yield      Harvest Index

**Quality Parameters:** Crude protein content and crude protein yield

**Economic analysis:** Gross return, Net return and B: C ratio

**Location:** Kalyani, Ranchi, Imphal & Bhubaneswar

**Data reporting:** Rabi

### R-15-AST-2: Productivity of oat - pea intercropping system as influenced by integrated nutrient management.

#### Objectives

1. To assess the productivity of food-forage intercropping system on rice fallows
2. To study the profitability of food-forage intercropping system influenced by INM

#### TECHNICAL DETAILS

##### A. Intercropping system (*Rabi* season) (Main plot)

T<sub>1</sub> = Sole oat      T<sub>2</sub> = Sole pea      T<sub>3</sub> = Oat + pea (3:2)      T<sub>4</sub> = Oat + pea (3:3)

##### B. Integrated Nutrient Management (sub plot)

F<sub>1</sub> = RDF (inorganic)      F<sub>2</sub> = 50% N of RDF+50%N through FYM      F<sub>3</sub> = 50% N of RDF+50%N through Vermicompost

**Year of start:** Rabi 2015-16      **Design:** Split Plot Design (SPD)

**No of replications:** 3      **Total treatment:** 12

Seeds will be treated with Rhizobium and PSB culture in all the treatments.

#### Observations to be recorded

**Soil physico- chemical properties before sowing and after harvest of crop**

#### Growth and yield attributes and yield of oat

1. Plant height and plant population
2. Green forage and dry matter yield

#### Growth and yield attributes and yield of pea

1. Plant height and plant population
2. Stover yield, Green Forage and Dry Matter Yield

#### Productivity of cropping system:-

1. Land Equivalent Ratio (LER)
2. Green Forage Equivalent Yield
3. Harvest Index

**Quality Parameters:** Crude protein content and crude protein yield

**Economic analysis:** Gross return, Net return and B: C ratio

**Location:** Jorhat

**Data reporting:** Rabi

### R-15-AST-3: Response of phosphogypsum to various cultivars of fodder oat in sodic soil.

#### Objectives

1. To workout impact of different levels of phosphogypsum on growth and yield parameters of fodder oat.
2. To study the effect of phosphogypsum on soil properties.
3. To workout the economics of each treatment.

#### TECHNICAL DETAILS

Treatments : 12

Oat cultivars: 3 (NDO-1, NDO-2 & NDO-711)

Levels of phosphogypsum (sulphur): 4

1- Control, 2- 125 kg/ha (20kg S /ha) 3- 250 kg/ha (40kg S /ha) 4- 375kg/ha (60kg S /ha)

Design: RBD

Replications: Three

Plot size:4x3m

#### Observations to be recorded

- Days to 50%flowering, Plant height, Plant population m<sup>-2</sup>.
- Leaf stem ratio, Green forage yield, Dry matter yield, DM%,
- Crude protein yield, CP%, per day Productivity (q/ha/day)
- Soil physico-chemical properties before and after harvest of crop.

Location: NDU&T, Faizabad

Data reporting: Rabi

### R-15-AST-4: Study on lucerne + oats /sarson fodder production system at variable seed rates of mixed crop under irrigated condition

#### Objectives

1. To find out optimum seed rate of oats/ sarson mixed cropping for long term stable green fodder.
2. To work out the economics of different treatments.

#### TECHNICAL DETAILS

Treatment as per treatments

- 100 % Seed rate lucerne (20kg/ha) = T1
- 100 % Seed rate oats (100 kg/ha)
- T1+10 kg/ha oats
- T1+20 kg/ha oats
- T1+30 kg/ha oats
- T1+40 kg/ha oats
- T1+0.625 kg/ha Sarson
- T1+1.250 kg/ha Sarson
- T1+1.880 kg/ha Sarson
- T1+2.50kg/ha Sarson

Design : RBD

Replications : Three

Plot size : 5.0m x 3.5 m, Net 4.0 m x 2.5 m

Varieties : Oats- Kent/UPO-212, Lucerne- T-9/Anand Lucerne-2,

Fertilizer:

- 20 kg N, 40kg P<sub>2</sub>O<sub>5</sub>, 20 kg K<sub>2</sub>O, 12.5 kg ZnSO<sub>4</sub> as basal, and
- 20 kg N in two equal splits at 30 DAS and after first cut for GF
- Foliar sprays of 0.5% ZnSO<sub>4</sub> 10 days after first cut and 10 days thereafter.

Cutting management: first cut at 50-55DAS and next cut 35-40 days intervals.

Location: Bikaner

Data reporting: Rabi

## R-15-AST-5: Effect of Zinc and Boron on seed production potentiality of oat under red and lateritic soil of West Bengal

### Objectives

- (i) To study the seed production potentiality of oats as influenced by Zn and B application
- (ii) To study the seed quality of oats as influenced by Zn and B
- (iii) To study economics of oats seed production as influenced by Zn and B application

### TECHNICAL DETAILS

#### Treatments

T1- Control (No Zn and No B)	T2- ZnSO <sub>4</sub> @ 15 kg/ha
T3- ZnSO <sub>4</sub> @ 20 kg/ha	T4- ZnSO <sub>4</sub> @ 25 kg/ha
T5- Borax@5 kg/ha	T6- Borax@10 kg/ha
T7- Borax@15 kg/ha	T8- ZnSO <sub>4</sub> @ 15 kg/ha + Borax@5 kg/ha
T9- ZnSO <sub>4</sub> @ 15 kg/ha+ Borax @10 kg/ha	T10- ZnSO <sub>4</sub> @ 15 kg/ha + Borax @15 kg/ha
T11- ZnSO <sub>4</sub> @ 20 kg/ha+ Borax @5 kg/ha	T12- ZnSO <sub>4</sub> @ 20 kg/ha + Borax @ 10 kg/ha
T13- ZnSO <sub>4</sub> @ 20 kg/ha + Borax @ 15 kg/ha	T14- ZnSO <sub>4</sub> @ 25 kg/ha + Borax @ 5 kg/ha
T15- ZnSO <sub>4</sub> @ 25 kg/ha + Borax @ 10 kg/ha	T16- ZnSO <sub>4</sub> @ 25 kg/ha + Borax @ 15 kg/ha

**Oats variety:** JHO-822

**Year:** Rabi 2015-16

**Design:** RBD

**Replications:** Three

**Plot size:** 4.0 m x 3.0 m

**Duration:** Three years

#### Observations to be recorded

Plant height (cm)

Plant population/m length

Leaf: stem ratio

Seed yield (t/ha)

Straw yield (t/ha)

Seed quality: Test wt., seed viability, L:S ratio, seed germination, crude protein % and crude protein yield.

Economics: Gross return, net return, B:C ratio

**Location:** Visva-Bharati, Sriniketan, West Bengal

**Data reporting:** Rabi

## R-15-AST-6: Evaluation of sowing window suitable for forage oats cultivation in the coastal region of Puducherry

### Objectives

- (i) To introduce a new forage crop during *Rabi* season in the coastal region of Puducherry
- (ii) To find out the sowing window suitable for forage oats cultivation during *Rabi* season in the coastal region of Puducherry

### TECHNICAL DETAILS

#### Treatment Combinations (8)

1. Sowing of Kent on October Second Fortnight
2. Sowing of Kent on November First Fortnight
3. Sowing of Kent on November Second Fortnight
4. Sowing of Kent on December First Fortnight
5. Sowing of JHO- 2000-4 on October Second Fortnight
6. Sowing of JHO- 2000-4 on November First Fortnight
7. Sowing of JHO- 2000-4 on November Second Fortnight
8. Sowing of JHO- 2000-4 on December First Fortnight

**Design:** RBD

**Replications:** 3

#### Biometric Observations

1. Plant height (cm)

2. Leaf stem ratio

3. Days to harvesting

4. Dry fodder yield (q/ha)

5. Green fodder yield (q/ha)

6. Per day productivity (q/ha/day)

**Location:** Puducherry

**Data reporting:** Rabi

## R-15-AST-7: Standardization of seed rate of berseem with rye grass under mixed cropping system

### Objectives

1. To study the effect of different seed rate on growth and yield of berseem and ryegrass
2. To estimate the quality of berseem and rye grass fodder
3. To work out the economics of berseem and rye grass as mixed crops

### TECHNICAL DETAILS

#### Treatments

1. Sole Berseem (seed rate@25 kg/ha)
2. Sole Ryegrass (seed rate @8kg/ha)
3. Mixed crops with 50 % seed rate (B+RG)
4. With 100%+25% (B+RG)
5. With 75%+25% (B+RG)
6. With 50%+25% (B+RG)
7. With 100%+25% (RG+B)
8. With 75%+25% (RG+B)
9. With 50%+25% (RG+B)

Replications: 3

Design: RBD

Gross plot Size: 5.0m x 3.5m

#### Observations to be recorded

1. Plant height (cm)
2. Leaf: Stem ratio
3. Green fodder yield (q/ha)
4. Dry matter yield (q/ha)
5. Crude protein (q/ha)
6. Economics of both crops

Location: NDRI, Karnal

Data reporting: Rabi

## R-15-AST-8: Study on berseem + oats /sarson fodder production system at variable seed rates of mixed crop under irrigated condition

### Objective

1. To find out optimum seed rate of oats/ sarson mixed cropping for long term stable green fodder.
2. To work out the economics of different treatments.

### TECHNICAL DETAILS

#### Treatment

1. Berseem
  2. Oats & Sarson
- 100 % Seed rate Berseem (20kg/ha) = T1
  - 100 % Seed rate oats (100 kg/ha)
  - T1+10 kg/ha oats
  - T1+20 kg/ha oats
  - T1+30 kg/ha oats
  - T1+40 kg/ha oats
  - T1+0.625 kg/ha Sarson
  - T1+1.250 kg/ha Sarson
  - T1+1.880 kg/ha Sarson
  - T1+2.50kg/ha Sarson

Design: RBD

Replications: Three

Plot size: 5.0m x 3.5 m, Net 4.0 m x 2.5 m

Varieties: Oats- Kent/UPO-212, Berseem-BB-3/ Wardan

#### Fertilizer:

- 20 kg N, 40kg P<sub>2</sub>O<sub>5</sub>, 20 kg K<sub>2</sub>O, 12.5 kg ZnSO<sub>4</sub> as basal, and
- 20 kg N in two equal splits at 30DAS and after first cut for GF
- Foliar sprays of 0.5% ZnSO<sub>4</sub> 10 days after first cut and 10 days thereafter.

Cutting management: first cut at 50-55DAS and next cut 35-40 days intervals.

#### Observations to be recorded

- Yield parameters- green fodder and dry matter yield
- Quality studies- CP content and CP yield.
- Economics- Net returns and BC ratio.

Locations: Mukteshwar (IVRI)

Data Reporting: Rabi



## Advanced varietal trials

### R-15-AST -9: Effect of N levels on forage yield of promising entries of oat (AVT-2 SC)

**Objective:** To study the effect of nitrogen levels and promising entries on yield and quality of oat

<b>Number of entries</b>	9+ 2 NC +1 ZC	
<b>Name of entries</b>	RO-11-1, OL-1804, OS-406, JO-04-18, RSO-8, SKO-196, SKO-198, SKO-199, OL-1689	
<b>National checks</b>	Kent and OS-6	
<b>Zonal check</b>	OL-125 (NWZ), JHO-99-2 (NEZ), JHO-822 (CZ), JHO-2000-4 (SZ)	
<b>Nitrogen levels</b>	40,80,120 (kg/ha)	
<b>replications</b>	three	
<b>Total plots</b>	108	
<b>Design</b>	Split plot with 3 replications	
<b>Plot size</b>	4.0 x 3.0 m	
<b>Spacing</b>	Row to row-25 cm (each plot having 12 rows of 4.0 m length)	
<b>Seed rate</b>	120 g per plot (approx. 100 Kg/ha)	
<b>Seed requirement</b>	15.0 Kg/entry from each contributor & 15.0 Kg for each national check (1.1 kg/centre/entry)	
<b>Year</b>	Rabi 2015-16	
<b>Locations (11)</b>	<b>NWZ:</b> Hisar, Ludhiana, Pantnagar <b>CZ:</b> Anand, Jabalpur, Rahuri	<b>NEZ:</b> Pusa, Jorhat, Kalyani, <b>SZ:</b> Hyderabad, Mandya

**Data Reporting:** Rabi

### R-14-AST -10: Effect of N levels on forage yield of promising entries of oat (AVT-2 MC)

**Objective:** To study the effect of nitrogen levels and promising entries on yield and quality of oat

<b>Number of entries</b>	2 + 3 NC	
<b>Name of entries</b>	JO-4-317 & OL-1802	
<b>National checks</b>	Kent, UPO-212 and RO-19	
<b>Nitrogen levels</b>	40,80,120 (kg/ha)	
<b>replications</b>	Four	
<b>Total plots</b>	60	
<b>Design</b>	Split plot with 4 replications	
<b>Plot size</b>	4.0 x 3.0 m	
<b>Spacing</b>	Row to row-25 cm (each plot having 12 rows of 4.0 m length)	
<b>Seed rate</b>	120 g per plot (approx. 100 Kg/ha)	
<b>Seed requirement</b>	15.0 Kg/entry from each contributor & 15 Kg for each national check (1.5 kg/centre/entry)	
<b>Locations (9)</b>	<b>HZ:</b> Palampur, Srinagar <b>NEZ:</b> Ranchi, Pusa	<b>NWZ:</b> Hisar, Ludhiana <b>CZ:</b> Anand, Jabalpur, Rahuri
<b>Year</b>	Rabi 2015-16	

**Data Reporting:** Rabi

**Exploratory trial: Screening for suitable combination of sowing and pre seed setting harvesting time of berseem for enhancing seed productivity in different regions.**

**Objective:**

- To screen ideal sowing and harvesting time of berseem for increasing the seed productivity in different regions.

**Treatment details:**

**Plot size:** 5 m x 4 m

**Treatments:** 9

**Replications:** Three

**Design:** RBD

**Duration:** Two years

**Year of start:** Rabi 2015-16

**A. Sowing Date:**

(a) 10, January, 2016

(b) 20 January, 2016

**B. Cutting Date:**

(a) 20 February, 2016

(b) 28 February, 2016

(c) 06 March, 2016

**Observations to be recorded:**

Plant height (cm)

Plant population/m length

Leaf: stem ratio

Seed yield (t/ha)

Straw yield (t/ha)

**Seed quality:** Test wt., seed viability, seed germination, crude protein % and crude protein yield.

**Economics:** Gross return, net return, B:C ratio

**Locations:** Rahuri, Anand, Jabalpur and Mandya

**Data Reporting:** Rabi

## 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 2003 and also through E-mail must be provided to the Project Coordinator (FC) as well as uploading on web site. **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.
- **Submission of Rabi trials analyzed data before 30<sup>th</sup> April, 2016**

### AICRP ON FORAGE CROPS AGRONOMY TRIALS AT A GLANCE

Year: Rabi 2015-16      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)

**AICRP ON FORAGE CROPS & UTILIZATION  
FINALIZED TECHNICAL PROGRAMME OF  
FORAGE PLANT PROTECTION TRIALS RABI 2015-16**

**PPT1: MONITORING OF PATHOGENS AND INSECT-PESTS ASSOCIATED WITH BERSEEM, LUCERNE AND OAT ECOSYSTEM**

**Locations:** Jhansi, Hyderabad, Ludhiana, Rahuri, Dharwad and Palampur

**Observation:** Occurrence of pathogens and insect pests should be recorded at weekly intervals after the appearance of the pests. The data on disease and insect pest incidence/severity should be correlated with the weather parameters.

**PPT2 A: FIELD SCREENING OF RABI BREEDING TRIALS FOR RESISTANCE TO DISEASES AND INSECT-PESTS**

**Locations:** Jhansi, Ludhiana, Bhubaneswar, Rahuri, Hyderabad, Palampur and Dharwad

**PPT2 B: EVALUATION OF BERSEEM ENTRIES FOR RESISTANCE TO ROOT AND STEM ROT DISEASE UNDER SICK PLOT**

**Locations:** Jhansi and Ludhiana

**PPT 17A: TO STUDY THE PATHOGENIC VARIABILITY OF *Bulmeria graminis* f. sp. *avenae* on oat**

**Location:** Palampur

**3<sup>rd</sup> year:** (i) Characterization of pathogenic virulence.

**4<sup>th</sup> year:** (i) Characterization of pathogenic virulence.

**PPT 17B: TO STUDY THE PATHOGENIC VARIABILITY OF *Helminthosporium avenae* on oat**

**Locations:** Palampur, Ludhiana and Jhansi

**3<sup>rd</sup> year:** Collection and maintenance of germplasm

**4<sup>th</sup> year:** Evaluation of germplasm against different isolates of *Helminthosporium* and resistant/tolerant entries will be identified and used in breeding programs

\* The leaf blight samples will be supplied by centers having leaf blight problem in oats

**PPT19: MANAGEMENT OF SOIL BONE DISEASES IN CLOVER SEED CROPS**

**Location:** Ludhiana

**Design:** RBD

**Replication:** 3

**Plot size:** 2 x 2 m<sup>2</sup>

T1 = Soil application of *Trichoderma* @ 5kg per hectare

T2 = Soil application of *Pseudomonas fluorescens* @ 5kg per hectare

T3 = Seed treatment with carbendazim @ 2 g/kg seed

T4 = Apply FYM @ 60 kg/ha to the plots

T5 = Apply neem seed powder @ 50 kg/hectare

T6 = Spray of NSK@ 5 % before disease appearance

T7 = Spray of carbendazim @ 1.0 kg/ha

T8 = Untreated control

**Observations:**

- Disease incidence of soil bone diseases
- Seed yield (q/ha)

## PPT20: MANAGEMENT OF SOIL BONE AND POWDERY MILDEW DISEASES IN REDCLOVER SEED CROP

**Location:** Palampur

**Design:** RBD

**Replication:** 3

**Plot size:** 2 x 2 m<sup>2</sup>

### Treatments:

- T<sub>1</sub> = Seed treatment with *Trichoderma* @ 5g/kg seed
- T<sub>2</sub> = Seed treatment with carbendazim @ 2 g/kg seed
- T<sub>3</sub> = T<sub>1</sub> + Three foliar spray of *Trichoderma* @ 0.5%
- T<sub>4</sub> = T<sub>2</sub> + Three foliar spray of *Trichoderma* @ 0.5%
- T<sub>5</sub> = T<sub>1</sub> + Three foliar spray of wettable sulphur@ 0.3%
- T<sub>6</sub> = T<sub>2</sub> + Three foliar spray of wettable sulphur@ 0.3%
- T<sub>7</sub> = T<sub>1</sub> + Three foliar spray of hexaconazole @ 0.1 %
- T<sub>8</sub> = T<sub>2</sub> + Three foliar spray of hexaconazole @ 0.1 %
- T<sub>9</sub> = T<sub>1</sub> + One spray each of *Trichoderma*, wettable sulphur and hexaconazole
- T<sub>10</sub> = T<sub>2</sub> + One spray each of *Trichoderma*, wettable sulphur and hexaconazole
- T<sub>11</sub> = Control

### Observations:

- Disease severity of powdery mildew
- Disease incidence of soil bone diseases
- Seed yield (q/ha)

## PPT 21: MANAGEMENT OF FOLIAR DISEASES OF OAT.

**Locations:** Jhansi and Ludhiana

**Design:** RBD

**Replication:** 3

**Treatment:** 7

### Treatments:

- T1: Seed Treatment with Carbendazim 50 WP @ 2.0 g /kg of seed
- T2: Seed Treatment with *Trichoderma viride* (CFU 10<sup>6</sup> / gm of formulation) 5 g /kg of seed
- T3: Seed Treatment with *T. viride* (CFU 10<sup>6</sup> / gm of formulation) 5 g /kg of seed + foliar sprays of *T. viride* @ 0.5% at 21 DAS
- T4: T<sub>1</sub> + Foliar application of Carbendazim 12 % + Mancozeb 63 % WP @ 1 g / lit after 21 DAS
- T5: T<sub>2</sub> + Foliar application of Carbendazim 12 % + Mancozeb 63 % WP @ 1 g / lit after 21 DAS
- T6: T<sub>1</sub> + Foliar application of Propiconazole 25 EC @ 1 ml / lit after 21 DAS
- T7: T<sub>2</sub> + Foliar application of Propiconazole 25 EC @ 1 ml / lit after 21 DAS
- T8: Untreated

### Observations:

- Incidence and severity of diseases will be recorded.
- Yield at 50 % flowering

**PPT 22: STUDIES ON BIOLOGICAL MANAGEMENT OF *SPODOPTERA LITURA* IN RELATION WITH DIFFERENT TIME OF APPLICATION ON LUCERNE UNDER FIELD CONDITION**

**Locations:** Rahuri and Hyderabad

**Objective:** 1. To find out effectiveness of different entomopathogenic fungi in combination with *SINPV* against *S. litura* on Lucerne 2. To study the efficacy of biopesticides against *S. litura* at different time of Application

**Crop:** Lucerne/Berseem **Variety:** RL-88/BL 42 **Plot size:** 3 x 4 m<sup>2</sup>

**Replication:** 03 **Design:** Split plot design

**Treatments:**

**A) Main treatments (Biopesticides)**

T1- Foliar application of *B. bassiana* @ 1X10<sup>8</sup> CFU/g (5 g/lit)

T2- Foliar application of *N. releyi* @ 1X10<sup>8</sup> CFU/g (5 g/lit)

T3- Foliar application of *SINPV* @ 1ml/lit

T4- T1+T3

T5- T2+T3

T6- T1+T2+T3

T7- Untreated control

**B) Sub treatments (Time of application)**

1. Foliar application at 8 am

2. Foliar application at 4 pm

3. Foliar application at 8 pm

**Observations:**

1. Pre count and post treatment count of *S.litura* larvae at 5 & 7 DAS
2. GFY and DMY (q/ha)
3. Economics

**PPT23: BIOLOGICAL CONTROL OF *HELICOVERPA ARMIGERA* ON LUCERNE/ BERSEEM SEED CROP**

**Locations:** Rahuri, Ludhiana and Hyderabad

**Objective:** To find out effectiveness of different entomopathogenic fungi in combination with *HaNPV* against *H. armigera* on Lucerne seed crop

**Crop:** Lucerne **Variety:** RL-88 **Plot size:** 3 x 4 m<sup>2</sup>

**Replication:** 03 **Design:** RBD

**Treatments:**

T1: Foliar application of *B. bassiana* @ 1X10<sup>8</sup> CFU/g (5 g/lit)

T2: Foliar application of *N. rileyi* @ 1X10<sup>8</sup> CFU/g (5 g/lit)

T3: Foliar application of *HaNPV* @ 1ml/lit

T4: T1+T3

T5: T2+T3

T6: T1+T2+T3

T7: Untreated control

**Observations:**

- Precount and post treatment count of larvae will be taken at 5 & 7 DAS
- Honey bee activities will be monitored 12 hrs after treatment
- Seed yield (q/ha)
- Economics

**\*Bioagents will be supplied by Rahuri centre**

## PPT 24: VALIDATION OF DISEASE MANAGEMENT IN WHITE CLOVER

**Location:** Palampur

**Design:** RBD

**Plot size:** 200 m<sup>2</sup>

### **Treatments:**

**T<sub>1</sub>**= Seed treatment with *T. viride* @ 5g/kg + Foliar spray of carbendazim @ 0.1 % + Foliar spray of hexaconazole @ 0.05 %

**T<sub>2</sub>**= Seed treatment with carbendazim @ 2 g/kg seed + Seed treatment with *T. viride* @ 5g/kg + Foliar spray of carbendazim @ 0.1 % + Foliar spray of hexaconazole @ 0.05 %

**T<sub>3</sub>**= Control

### **Observations:**

- Disease severity of powdery mildew
- Disease incidence of clover rot
- Seed yield (q/ha)

## PPT 25: VALIDATION OF ENTAMOPATHOGENIC FUNGI ON INSECT PESTS OF LUCERNE

**Locations:** Rahuri, Hyderabad, Jhansi and Dharwad

**Design:** RBD

**Plot size:** 250 m<sup>2</sup>

### **Treatments**

#### **A. Aphid management**

**T1:** Foliar application of *V. lecani* @ 4x10<sup>6</sup> cfu/ml ( 5g/l)

**T2:** Foliar application of *V. lecani* @ 4x10<sup>6</sup> cfu/ml ( 5g/l) + Foliar application of *M. anisopliae* 4x10<sup>6</sup> cfu/ml ( 5g/l)

#### **B. Lepidopterous pests**

**T3:** Foliar application of *N. releyi* 4x10<sup>6</sup> cfu/ml ( 5g/l)

**T4:** Foliar application of *B. bassiana* @ 4x10<sup>6</sup> cfu/ml ( 5g/l) + Foliar application of *N. releyi* 4x10<sup>6</sup> cfu/ml ( 5g/l)

**T5:** Untreated control

### **Observations:**

- Pre count and post treatment count of insect pests, natural enemies and pollinators at 7 DAS
- GFY and DMY (q/ha)
- Seed yield (q/ha)

### **Guidelines for recording of Pests and diseases**

- Please don't change technical program without intimation and approval of PI & PC.
- Sample size should not be less than 20 leaves or tillers/plants for small plots (10m<sup>2</sup>)
- For large plot size (more than 10 m<sup>2</sup>) sample should be 50 leaves or tillers/plants or more
- For virus, wilt and rots whole plant to be considered as one unit
- During recording of data crop growth stage should be noted
- Data should be recorded periodically (10 days interval)
- All Insect and Pests (mention in Table below) should be reported. If any Insect or Pest/disease not appeared at the center, please do not leave blank, clearly mention "Not Appeared"
- At the end of crop season information should be reported

#### ***For plant diseases:***

- Plant disease index (PDI)
- Area under disease progress curve (AUDPC)
- Disease Reaction

#### ***For Insect Pests:***

- Average Counts /leaf or tillers or plant or meter row and their reaction

#### **On the basis of PDI**

- If disease intensity (PDI) is up to 5% entry should be promoted
- If disease intensity (PDI) is in between 6-25 % , entry may be promoted considering other traits and circumstances
- If disease intensity (PDI) is more than 25 % the entry should be rejected

#### **(a) Data should be taken on following pests and diseases**

SN	Crop	Insect pests & Diseases
1	Berseem	Root rot complex ( <i>Rhizoctonia solani</i> , <i>Fusarium semitactum</i> and <i>Tylenchorhynchus vulgaris</i> ), Stem rot ( <i>Sclerotinia trifoliorum</i> ), Pod borer ( <i>Helicoverpa armigera</i> )
2	Lucerne	Downy mildew ( <i>Peronospora trifoliorum</i> ), Rust ( <i>Uromyces striatus</i> ), Common leaf spot ( <i>Pseudopeziza medicagenis</i> ), Lucerne weevil ( <i>Hypera postica</i> ), Pea aphids ( <i>Acyrtosiphon pisum</i> ), Spotted alfalfa aphid ( <i>Therioaphis trifolii</i> f. <i>maculata</i> )
3	Oats	Crown rust ( <i>Puccinia coronata</i> ), Stem rust ( <i>Puccinia graminis</i> f. sp. <i>avenae</i> ), Powdery mildew ( <i>Erysiphe</i> (= <i>Blumeria</i> ) <i>graminis</i> f. sp. <i>avenae</i> ), Leaf spot or blotch ( <i>Helminthosporium</i> spp.), Bird cherry aphid ( <i>Rhaphalosiphum maidis</i> )



**(b) How to record data in case of Diseases (A general scale for evaluating diseases).**

Index value	Desirability	Judgment	For stress expanded code	Severity or incidence
<b>Blank</b>	No data or missing point	--	--	--
0	--	--	<b>HR</b>	Immune Reactions
1	Trait expression is satisfactory, from the Plant Breeder's point of view and the parent of variety can be used as a donor	Equal to best resistant	<b>R</b>	Less than 1%
<b>2 Good</b>				
3			<b>MR</b>	1-5%
4	Trait expression is not as good as it should be but may be acceptable under some circumstances	Between resistant & susceptible	<b>MS</b>	6-25%
<b>5 Fair</b>				
6				
7	Trait expression is unsatisfactory in terms of commercial acceptability or genetic improvement program	Equal to most susceptible	<b>S</b>	26-50%
<b>8 Poor</b>				
9			<b>HS</b>	51-100%

**HR** = Highly Resistant, **R** = Resistant, **MR** = Moderately Resistant, **MS** = Moderately Susceptible, **S** = Susceptible, **HS** = Highly Susceptible

**(c) ET Level for Insect Pest Data**

Insect	ETL
Pea Aphid	20 Aphids/tiller
Cowpea aphid	15 aphid/twig
Spotted aphid	30 aphid/leaf
Spodoptera	2 larvae/running meter
Army worm	2 larvae/running meter
Lucerne weevil	2-3 grubs/plant
Bird cherry Aphids	50 Aphids/tillers

R = Below ET level; MR= equal to ET level; S= More than ET level

## Action plan of Brain storming session

### Berseem

#### Major Objectives

1. Stem rot and root rot resistance
2. High dry matter
3. High seed set

#### Partners

- IGFRI, Jhansi
- PAU, Ludhiana
- CCS HAU, Hisar
- JNKVV Jabalpur
- SVPUA&T, Meerut

#### Work Plan

##### Screening of germplasm in hot spot – sick plot

- 50 promising germplasm from each of 5 centres will be provided to AICRP coordinating unit. It will be coded and sent to PAU, Ludhiana for screening in hot spot/sick plot.
- Tolerant lines to be distributed among 5 centres for further use in breeding
- ( Minimum benchmark to be fixed by plant protection group)

##### Germplasm enrichment

- Introduction from other countries – gene bank (**Action IGFRI, HAU**)
- Maintenance and multiplication by tripping and net enclosure
- Distribution of seeds among centres for further use.

### Lucerne

#### Major Objectives

1. Multicut, quick regeneration and persistence, perennial lines
2. Weevil tolerant lines

#### Partners

- MPKV, Rahuri
- TNAU, Coimbatore
- BAIF, Uralikanchan
- AAU, Anand
- SKRAU, Bikaner

#### Work plan (AAU, Anand to coordinate)

The existing Polycross to be continued

The programme will be revisited by e-mail interaction

**Germplasm collection from high hills & Kutch (HPKV to coordinate for hill region and AAU, Anand for kutch region.**

- Exploration by IGFRI, HPKV, SKUAST, AAU
- For hilly material, screening to be done by
- HPKV Palampur
- SKUAST Srinagar

## Oat

### Major Objectives

1. Powdery mildew and rust resistance for sub-temperate and temperate zone
2. Aphids and blight resistance for tropical zone.
3. Dual purpose lines
4. Multicut lines
5. Stress tolerance (salinity/ sodicity)

### Partners

- IGFRI, Jhansi
- PAU, Ludhiana
- CCS HAU, Hisar
- JNKVV Jabalpur
- MPKV, Rahuri
- HPKVV, Palampur

### Work plan

#### Screening germplasm / advance breeding lines

- Screening at Palampur and Ludhiana (for Powdery Mildew and Rust)
- Screening at Rahuri (for aphids, blight)

(Minimum benchmark to be fixed by plant protection group)

#### For multicut lines

- progenies of *A. sativa* x *A. sterilis* lines available at IGFRI, Jhansi, HPKVV, Palampur, HAU, Hisar and other places should be evaluated
- Selection for quick regeneration and tiller number production potential after 10 days (Minimum benchmark to be fixed)

#### For dual purpose lines

- Straw yield and grain yield both should be considered (benchmark should be at 10% higher or lower in each character)

#### For stress tolerance (Salinity/ sodicity)

- Faizabad lines to be screened and use in hybridization

## Bajra

### Major Objectives

- Dual purpose types with good grain and stover yield
- Lines with good stover quality
- Lines with high fodder yield along with good quality

### Partners

- AICRP Pearl Millet, Jodhpur
- BAIF, Uralikanchan
- PJTSAU, Hyderabad
- SKRAU, Bikaner
- AAU, Anand
- UAS, Bangalore, ZARS Mandya

### Work Plan

- AICRP Pearl Millet, Jodhpur to collaborate for material/ germplasm
- Exploration to southern plateau, Rajasthan, Gujarat for collection of diversity and landraces
- Inter varietal hybridization and evaluation.

## Maize

### Major Objectives

- Maize lines with high yield, dry matter, high per day productivity, stay green type

### Partners

- PJTSAU, Hyderabad
- MPUAT, Udaipur
- BAIF, Urulikanchan
- MPKV, Rahuri

### Work plan (PJTSAU, Hyderabad to coordinate)

- Collaboration with IIMR, Ludhiana for material / germplasm
- Polycross programme for composites
- Selective crosses involving African Tall, J 1006, PMC 6 & grain type for dual purpose
- Advancement of generation at Hyderabad and other places during Rabi and Summer (3 generations in one year)

## Rice bean

### Major Objectives

- Lines with high fodder yield along with good quality
- Good seed yield

### Partners (AAU, Jorhat to coordinate)

- AAU, Jorhat
- BCKV, Kalyani
- JNKVV Jabalpur
- OUAT, Bhubaneswar
- IGKV, Raipur

### Work plan

- Interspecific hybridization with *Vigna unguiculata* and other species, PAU, Ludhiana to also participate in hybridization programme.
- Intervarietal hybridization and sharing of germplasm
- Evaluation in multilocation station trial

## Lathyrus

### Major Objectives

- Lines with high fodder yield along with good quality
- Good seed yield
- Low ODAP content lines

### Partners (IGKV, Raipur to coordinate)

- AAU, Jorhat
- BCKV, Kalyani
- OUAT, Bhubaneswar
- IGKV, Raipur

### Work plan

- Collection of germplasm
- IGKV to provide germplasm for multilocation testing
- Intervarietal hybridization and sharing of germplasm
- Evaluation in multilocation station trial

## Hill Pasture

### Major Objectives

- Lines with high yield, nutritive quality and persistence to grazing, perenniality

### Partners

- Setaria - Palampur
- Tall Fescue – Palampur
- White clover- Palampur, Srinagar
- Red clover - Srinagar
- perennial Lolium - Palampur, Srinagar

### Work plan

- Introduction, collection, evaluation and selection

## Tropical Range Pasture

### Major Objectives

- Lines with high yield, nutritive quality and persistence to grazing, perenniality

### Partners

- MPKV, Rahuri
- SKRAU, Bikaner
- BAU, Ranchi
- IGKV, Raipur
- AAU, Anand

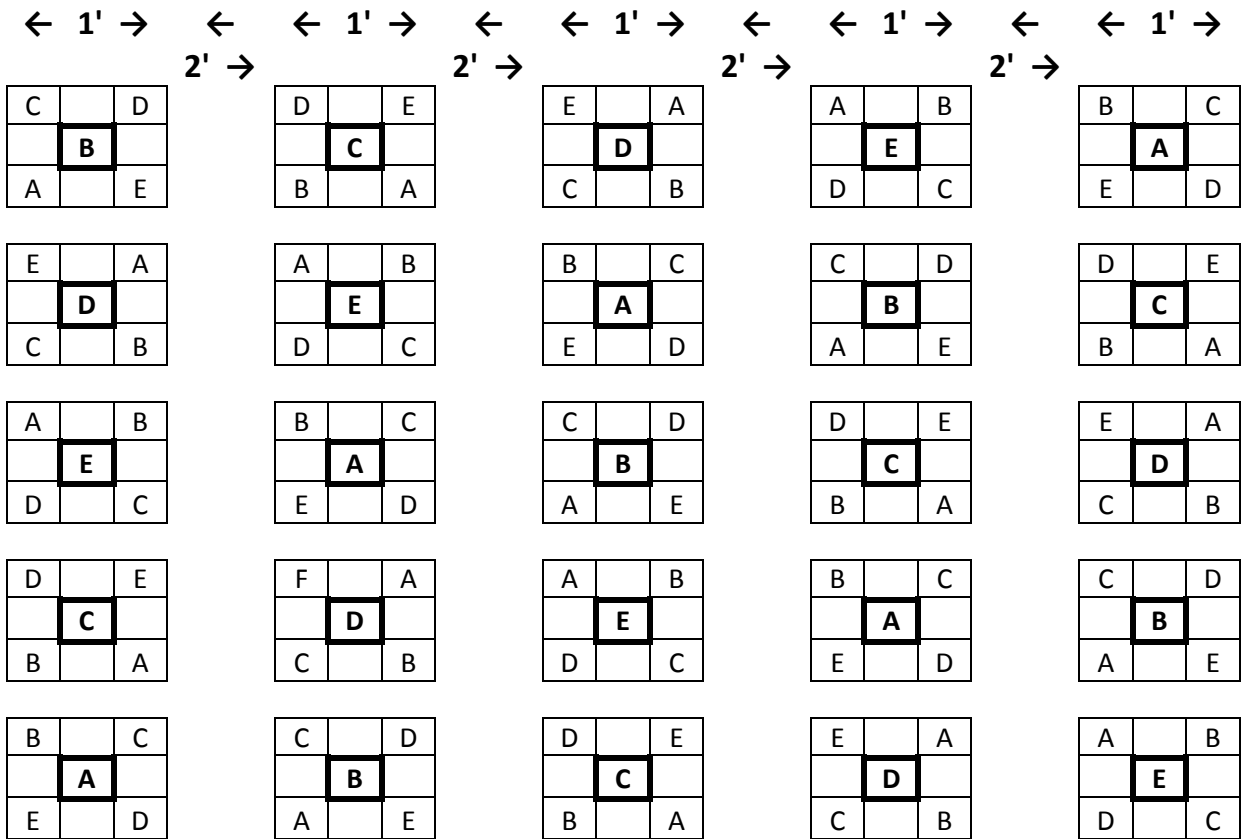
### Work plan

- Introduction, collection, evaluation and selection

## LUCERNE POLYCROSS PROGRAMME (2015-16)

Season	Activity
<i>Rabi 2015-16</i>	▶ Sowing of Lucerne Polycross Programme
Summer 2016	▶ Polycross Seed Production Programme under net. ▶ The seed obtained from 125 plants in polycross programme at each location will be harvested individually, numbered and shared among the participating centers by October, 2016.
<i>Rabi 2016-17</i>	▶ The seed obtained from 125 plants (25 x 5 centers) will be sown in single row of 4 m length spaced at 30 cm along with checks in an augmented block design (November, 2016). ▶ The 125 progenies will be evaluated for GFY, DMY and pest/disease resistance.
<i>Rabi 2017-18</i>	▶ Out of 125 progenies the best 20-25 progenies will be identified at each centre on the basis of one year data on GFY, DMY and pest/disease resistance. ▶ From selected progenies, most promising individual plants (40-50) will be identified, tagged and numbered by the monitoring team at each centre (November, 2017).
Summer 2018	▶ The promising plants in selected progenies will be allowed to random mate by open pollination. ▶ The OP seed of selected promising plants (40-50) will be harvested individually at each location. The same will be shared between participating centers for progeny test.
<i>Rabi 2018-19</i>	▶ The OP seed of 200-250 (40-50 x 5) IPS will be sown in a single row of 4 m length spaced at 30 cm for progeny test (November, 2018). ▶ The 200-250 progenies will be evaluated for GFY, DMY and pest/disease resistance.
<i>Rabi 2019-20</i>	▶ The best 20-25 progenies at each location will be selected during August-September by the monitoring team on the basis of GFY, DMY, pest/disease resistance data. ▶ The mother plants of selected progenies will be vegetatively propagated and shared as per the need of all the centers during September. ▶ The selected clones will be planted in isolation and allowed to random mate for development of synthetic population at each center during summer 2020.
<i>Rabi 2020-21</i>	▶ The new synthetic populations so developed at each center will be tested in VTL.

**PLAN OF LAYOUT FOR LUCERNE POLYCROSS  
RABI 2015-16**



**ALL INDIA COORDINATED RESEARCH PROJECT  
ON FORAGE CROPS & UTILIZATION  
(Indian Council of Agricultural Research)  
NATIONAL GROUP MEET: Rabi-2015-16**

Date: September, 2-4, 2015

Venue: MPKV, Rahuri

## PROGRAMME

September 2, 2015

<b>08:00-10:00</b>	<b>REGISTRATION</b>
<b>10:00-11:00</b>	<b>INAUGURATION</b>
Chairman	Dr. I. S. Solanki, ADG (FFC), ICAR, New Delhi
Guest of Honour	Dr. T. G. Nageshwar Rao, Director, IIMR, Hyderabad
Welcome Address	Dr. R. W. Bharud, Head, Department of Botany, MPKV, Rahuri
Project Coordinator's Report	Dr. A. K. Roy, Project Coordinator
Remarks	Dr. T. G. Nageshwar Rao, Director, IIMR, Hyderabad
Remarks & overview	Dr. R. S. Patil, Director of Research, MPKV, Rahuri
Chairman's Address	Dr. I. S. Solanki, ADG (FFC), ICAR, New Delhi
Vote of Thanks	Dr. R. W. Bharud, Head, Department of Botany, MPKV, Rahuri
<b>11:00-11:15</b>	<b>High Tea</b>

**11:15-12:45 TECHNICAL SESSION-I: INTERACTIVE SESSION WITH STAKEHOLDERS**

Chairman	Dr. I. S. Solanki, ADG (FFC), ICAR, New Delhi
The session will be interaction meeting on technical aspects and ready to share technologies by SAU/ICAR. Different stakeholders like Animal husbandry group, livestock keepers, dairy personnel, fodder growers, forage seed growers will present their expectations and problems	
Rapporteurs	Drs. A. K. Mehta, P. S. Takawale and M. S. Pal

**12:45-13:30 TECHNICAL SESSION-II: BREEDER SEED PRODUCTION**

Chairman	Dr. T. G. Nageshwar Rao, Director, IIMR, Hyderabad
Co-Chairman	Dr. Dinesh Kumar, ICAR, New Delhi
BSP Report & Allocation	Dr. A. K. Mall
Rapporteurs	Drs. T. Shashikala and Yogesh Jindal
<b>13:30-14:00</b>	<b>LUNCH</b>

**14:00-15:00 TECHNICAL SESSION-III: DISCIPLINEWISE REPORT**

Chairman	Dr. I. S. Solanki, ADG (FFC), ICAR, New Delhi
Co Chairman	Dr. A. K. Roy, Project Coordinator
Forage crop Improvement	Dr. A. K. Mall
Forage crop Production	Dr. R. K. Agrawal
Forage crop Protection	Dr. Pradeep Saxena
Rapporteurs	Drs. K. K. Sharma and U. S. Tiwana

**15:00-16:30 TECHNICAL SESSION-IV (concurrent sessions)****FORMULATION OF TECHNICAL PROGRAMME****TECHNICAL SESSION-IV (Concurrent)-FORAGE CROP IMPROVEMENT**

Chairman	Dr. I. S. Solanki, ADG (FFC), ICAR, New Delhi
Co-Chairman	Dr. P. Kaushal, IGFRI, Jhansi
Co-Chairman	Dr. R. W. Bharud, Head, Department of Botany, MPKV, Rahuri
Rapporteurs	Drs. Rahul Kapoor and H. P. Parmar
Finalization of varietal trials	Dr. A. K. Mall

**TECHNICAL SESSION-IV (Concurrent)-FORAGE CROP PRODUCTION**

Chairman	Dr. M. B. Dhonde, Head, Department of Agronomy
Rapporteurs	Drs. C. K. Kundu and R. Joseph Koireng
Finalization of trials	Drs. U. S. Tiwana and R. K. Agrawal



<b>TECHNICAL SESSION-IV (Concurrent)–FORAGE CROP PROTECTION</b>	
Chairman	Dr. S. G. Borkar, Head, Department of Plant Pathology, MPKV, Rahuri
Rapporteurs	Drs. D. K. Banyal and M. Anuradha
Finalization of trials	Dr. Pradeep Saxena
<b>16:30-16:45</b>	<b>Tea</b>

<b>16:45-19:30 TECHNICAL SESSION V: REVIEW OF CENTRE-WISE ACTIVITIES</b>	
Chairman	Dr. I. S. Solanki, ADG (FFC), ICAR, New Delhi
Co-Chairman	Dr. T. G. Nageshwar Rao, Director, IIMR, Hyderabad
Convener	Dr. A. K. Roy, Project Coordinator (FCU)
Rapporteurs	Drs. M. R. Krishnappa and C. Babu
Hill Zone	CSK HPKV Palampur ; SKUAT (K) Srinagar; VPKAS Almora
North West Zone	PAU Ludhiana, CCS HAU Hisar, GBPUAT Pantnagar, SKRAU, Bikaner, IGFRI-RRS Avikanagar, CAZRI Jodhpur, SKRAU-RRS Jalore, MPUAT Udaipur, DWR (dual purpose barley) Karnal
North East Zone	NDUAT, Faizabad ; BAU Ranchi ; BCKV Kalyani; OUAT Bhubaneswar ; AAU Jorhat ; CAU Imphal ; RAU Pusa
Central Zone	AAU Anand ; JNKVV Jabalpur ; IGFRI Jhansi ; MPKV Rahuri ; BAIF Urulikanchan ; IGKV Raipur ; CSAUAT Kanpur ; Dhari/ Dapoli
South Zone	PJTSAU Hyderabad ; UAS (B) ZRC Mandya ; TNAU Coimbatore ; KAU Vellayani ; IGFRI-RRS; Dharwad

**September 3, 2015**

<b>09:00-10:00 TECHNICAL SESSION-VI: FTD &amp; TSP FORMULATION</b>	
Chairman	Dr. A. K. Roy, Project Coordinator
Rapporteurs	Drs. P. Saxena & Rajeev Agrawal

<b>10:00 - 11:00 VARIETAL IDENTIFICATION COMMITTEE MEETING</b>	
<b>11:00 - 11:15</b>	<b>Tea</b>

<b>11:15-13:00 TECHNICAL SESSION VII: Scientific, Administrative and financial issues</b>	
Chairman	Dr. A. K. Roy, Project Coordinator (FCU)
Co-Chairman	Dr. Dinesh Kumar, ICAR, New Delhi
Rapporteurs	Drs. M. Abraham and S. Bora Neog
13:00-14:00	Lunch

<b>15:00-17:00 TECHNICAL SESSION-VIII: PLENARY SESSION</b>	
Chairman	Dr. K. D. Kokate, Director, Extn & Education, MPKV, Rahuri
Co-Chairman	Dr. I. S. Solanki, ADG (FFC), ICAR, New Delhi
Rapporteurs	Drs. Rajeev Agrawal & P. Saxena

**Presentation of the recommendations:**

Technical session – I	Dr. P. S. Takawale
Technical session – II	Dr. T. Shashikala
Technical session – III	Dr. K. K. Sharma
Technical session - IV Forage Crop Improvement	Dr. Rahul Kapoor
Technical session - IV Forage Crop Production	Dr. C. K. Kundu
Technical session – IV Forage Crop Protection	Dr. D. K. Banyal
Technical session – V	Dr. C. Babu
Technical session – VI	Dr. Rajeev Agrawal
Technical session-VII	Dr. M. Abraham
Varietal Identification Committee Meeting Report	Dr. A. K. Roy, Project Coordinator (FCU)
Co chairman's remarks	Dr. R. S. Patil, DOR, MPKV, Rahuri
Chairman's Remarks	Dr. I. S. Solanki, ADG (FFC)
Vote of Thanks	Prof. A. H. Sonone, OIC, MPKV, Rahuri

**September 4, 2015**

**Brain Storming Session on “Breeding strategies for selected forage crops”**

**Inaugural session 9:30- 10.00 AM**

Chairman	Dr. T. A. More, Hon. Vice Chancellor, MPKV, Rahuri
Co-Chairman	Dr. I. S. Solanki, ADG (FFC)
Co-Chairman	Dr. Rajendra Prasad, Director, DSR, Mau.
Convener	Dr. A. K. Roy, IGFRI, Jhansi

**Technical session I - Kharif Forage Crops Time 10:30-11:30**

<b>Crop</b>	<b>Speaker</b>
Seed	Dr. Rajendra Prasad, Director, DSR, Mau.
Pearl millet	Dr. H. P. Yadav, Project Coordinator, Pearl Millet
Range Grasses	Dr. Pankaj Kaushal, Head, CI Division, IGFRI, Jhansi
Barley	Project Director, Directorate of Wheat Research (DWR)

**Technical session II - Rabi Forage Crops Time 11:30-1:00**

Oat	Project Coordinator, AICRP on Forage Crops & Utilization
Berseem	Dr. Tejveer Singh, IGFRI, Jhansi
Germplasm resources	Dr. V. K. Yadav, IGFRI, Jhansi

**Lunch – 1:00 to 2:00 PM**

**Plenary session Time 2:00-5:00 PM**

Finalization of recommendations	Dr. A. K. Roy
Co-Chairman's remarks	Dr. I. S. Solanki, ADG (FFC)
Chairman's remarks	Dr. K. D. Kokate, Director, Extn & Education, MPKV, Rahuri

### List of participants

Sr. No.	Name	Designation	Address
1	Dr. T. A. More	Vice Chancellor	MPKV, Rahuri-413 722 (Maharashtra)
2	Dr. I. S. Solanki	ADG (FFC)	ICAR, New Delhi
3	Dr. Dinesh Kumar	Principal Scientist (FFC)	ICAR, New Delhi
4	Dr. K. D. Kokate	Director, Extension Education	MPKV, Rahuri-413 722 (Maharashtra)
5	Dr. R. S. Patil	Director of Research	MPKV, Rahuri-413 722 (Maharashtra)
6	Dr. T. G. Nageshwar Rao	Director, IIMR, Hyderabad	IIMR, Hyderabad
7	Dr. A. K. Roy	Project Coordinator	AICRP on FC & U, IGFR, Jhansi
8	Dr. R. W. Bharud	Head, Deptt. Of Botany	MPKV, Rahuri-413 722 (Maharashtra)
9	Dr. Rajendra Prasad	Project Director	ICAR-Dir. of Seed Research, Kaithau, Mau
10	Dr. H. P. Yadav	Project Coordinator	AICPMIP, ARS, Mandore, Jodhpur-342 304
11	Dr. Pankaj Kaushal	Head, Crop Imp. Division	IGFR, Jhansi
12	Dr. Jogendra Singh	Principal Scientist	ICAR- IIWBR, Karnal-132 001 (Haryana)
13	Dr. Magan Singh	Sr. Scientist (Agronomy)	ICAR-N. D. R. I., Karnal-132 001 (Haryana)
14	Dr. P. K. Mukherjee	Sr. Scientist (Agronomy)	ICAR- Ind. Vet. Res. Institute, Bareilly-243122
15	Dr. A. K. Mall	P. I. (P. B.)	IGFR, Jhansi
16	Dr. Rajeev Agrawal	P. I. (Agronomy)	IGFR, Jhansi
17	Dr. V. K. Yadav	P. Scientist (P. B.)	IGFR, Jhansi
18	Dr. P. Saxena	P. Scientist (Pl. Pathology)	IGFR, Jhansi
19	Dr. Tejveer Singh	Scientist	IGFR, Jhansi
20	Dr. Sita Ram Kantwa	Sr. Scientist	IGFR, Jhansi
21	Dr. Sultan Singh	P.S.	IGFR, Jhansi
22	Dr. S. Ahmed	P. Scientist (Plant Breeding)	C. I. Division, IGFR, Jhansi
23	Dr. K. Shridhar	Principal Scientist	IGFR, Regional Station, Dharwad
24	Mr. O. N. Arya	CTO	IGFR, Jhansi
25	Dr. Yogesh Jindal	Asstt. Scientist (GPB)	CCS HAU, Hisar-125 004 (Haryana)
26	Dr. R. S. Sheoran	Asstt. Scientist (Agronomy)	---do---
27	Dr. D. S. Phogat	Sr. Scientist (GPB)	---do---
28	Dr. S. S. Shekhawat	Prof. & OIC	SK Rajasthan Agril. University, Bikaner-334 002
29	Dr. S. M. Kumawat	Prof. (Agronomy)	---do---
30	Dr. Ramesh Yadav	Agronomist	N D UA&T, Kumarganj, Faizabad-224 001 (UP)
31	Dr. M. S. Pal	Sr. Agronomist & OIC	G.B. P. U. A. & T., Pantnagar-263 145
32	Dr. Ashisan Tuti	Jr. Scientist & OIC	Birsa Agricultural University, Ranchi-834 007
33	Dr. K. K. Sharma	Sr. Scientist (Agronomy)	Assam Agril. University, Jorhat-785 013 (Assam)
34	Dr. Mrs. S. Bora-Neog	Sr. Scientist (P. B.)	---do---
35	Dr. V. K. Sood	Principal Scientist (P. B.)	CSK H. P. K. V., Palampur-176 062
36	Dr. R. Katoch	Scientist (Biochemistry)	---do---
37	Dr. D. K. Banyal	Principal Scientist (Pl. Path.)	---do---
38	Dr. A. K. Mehta	Sr. Forage Breeder & OIC	J. N. K. V. V., Jabalpur-482 004 (MP)
39	Dr. Amit Jha	Jr. Scientist (Agronomy)	---do---
40	Dr. S. K. Bilaiya	Forage Breeder	---do---
41	Dr. T. Shasikala	Sr. Scientist (P. B.) & OIC	PJTSAU, Hyderabad-500 030 (Telangana)
42	Dr. M. Shanti	Sr. Scientist (Soil Sci.)	---do---
43	Dr. R. Sushila	Scientist (Agronomy)	---do---
44	Dr. M. Anuradha	Sr. Scientist (Entomology)	---do---
45	Dr. Mareen Abraham	Assoc. Prof. (P. B.) & OIC	KAU, Thiruvananthapuram-695 522 (Kerala)
46	Dr. Usha Thomas	Asstt. Prof. (Agronomy)	---do---
47	Dr. M. R. Krishnappa	Sr. Breeder & OIC	UAS Mandya- 572 202 (Karnataka)
48	Dr. B. G. Shekara	Scientist (Agronomy)	---do---
49	Prof. A. H. Sonone	Sr. Forage Breeder & OIC	MPKV, Rahuri-413 722 (Maharashtra)
50	Dr. A. B. Tambe	Scientist (Entomology)	---do---
51	Dr. S. V. Damame	Scientist (Biochemistry)	---do---
52	Dr. B. T. Sinare	Scientist (Agronomy)	---do---
53	Dr. H. P. Parmar	Res. Scientist (P. B.) & OIC	Anand Agril. University, Anand-388 110 (Gujarat)
54	Dr. P. M. Patel	Asstt. Res. Scientist	---do---
55	Dr. D. H. Desai	Scientist (Biochemistry)	---do---
56	Dr. U. S. Tiwana	Sr. Forage Agronomist & OIC	PAU, Ludhiana- 414 004 (Punjab)
57	Dr. Rahul Kapoor	Asstt. Forage Breeder	---do---
58	Dr. Upasana Rani	Plant Pathologist	---do---
59	Dr. Meenakshi Goyal	Asstt. Biochemist	---do---
60	Dr. Ravindrakumar	Asstt. Entomologist	---do---
61	Dr. Devinderpal Singh	Asstt. Breeder	---do---
62	Dr. C. Babu	Assoc. Prof. (P. B.) & OIC	TNAU, Coimbatore-641 003 (Tamil Nadu)
63	Dr. V. Vasuki	Asstt. Prof. (Agronomy)	---do---
64	Dr. Kalyan Jana	Agronomist & OIC	BC KV Kalyani-741 235 (West Bengal)
65	Dr. Champakkumar Kundu	Scientist	---do---
66	Prof. P. S. Takawale	Forage Breeder & OIC	BAIF, Urulikanchan-412 202, Pune (M.S.)
67	Prof. S. D. Patil	Sr. Scientist (Agronomy)	---do---
68	Dr. Mayori Sahu	Scientist (P. B.)	I. G. K.V., Raipur-492 012 (Chhattisgarh)

69	Dr. R. Joseph Koireng	Jr. Agronomist	CAU, Imphal-795 004 (Manipur)
70	Dr. V. V. Ansodariya	Assoc. Res. Scientist	J. Agril. University, Dhari- 365 640
71	Dr. S. A. Kerkhi	Professor (P. B.)	SVBP UAT, Meerut-250 110 (UP)
72	Dr. M. P. Gavai	Agrostologist	Dr. BSKKV, ARS, Dapoli, Dist. Ratnagiri
73	Dr. Umesh Kudtarkar	Jr. Agrostologist	---do---
74	Mr. R. M. Kokate	Asstt. Breeder	V. N. M. K. V., Parbhani, Maharashtra
75	Dr. S. Mala	Assoc. Prof. (Agronomy)	Pandit JNCOA, & Res. Institute, Karaikeal-609 603
76	Dr. Suchismita Tripathi	Sr. Agronomist	OUAT, Bhubaneswar-751 003 (Orissa)
77	Dr. Prof. A. K. Barik	Professor of Agronomy	Vishwa Bharati, Shriniketan-731 236 (WB)
78	Dr. J. K. Bisht	Principal Scientist	VPKAS Almora-263 601 (Uttarakhand)
79	Dr. B. S. Raskar	Chief Agronomist	AICRP on IFS, MPKV, Rahuri
80	Dr. M. Venkataramana	Chief Agronomist	AICRP on IFS, PJTSAU, Hyderabad
81	Dr. Digvijay Singh	Manager	NDRI, Anand-388 001 (Gujarat)
82	Dr. Sanjay K. Mehta	Regional Manager	National Seeds Corporation, Pune
83	Mr. V. Satya Dev	Sr. G.M. R&D	Advanta India Ltd., Secunderabad-500 009
84	Mr. Shashikanth Kulkarni	T. D. Lead	---do---
85	Mr. Rakesh Jadhav	Deputy Manager	JK Agri. Genetics Ltd., Hyderabad-500 016
86	Mr. Prakash Shinde	University Librarian	MPKV, Rahuri-413 722 (Maharashtra)
87	Dr. D. Yadav	Head, Dept. Agri. Economics	MPKV, Rahuri-413 722 (Maharashtra)
88	Dr. S. Borkar	Head, Dept. Plant Pathology	MPKV, Rahuri-413 722 (Maharashtra)
89	Dr. S. Ranpise	Head, Dept. of Horticulture	MPKV, Rahuri-413 722 (Maharashtra)
90	Dr. M. Dhonde	Head, Dept. of Agronomy	MPKV, Rahuri-413 722 (Maharashtra)
91	Dr. R. M. Naik	Head, Dept. of Biochemistry	MPKV, Rahuri-413 722 (Maharashtra)
92	Dr. S. C. Shinde	Head, Dept. Agril. Extension	MPKV, Rahuri-413 722 (Maharashtra)
93	Dr. Y. G. Fulpagare	Head, Dept. of A.H.D.S.	MPKV, Rahuri-413 722 (Maharashtra)
94	Dr. S. Thorat	Head, Food Sci. & Tech.	MPKV, Rahuri-413 722 (Maharashtra)
95	Dr. S. Pharande	Head, Dept. of Soil Science	MPKV, Rahuri-413 722 (Maharashtra)
96	Dr. S. Jadhav	Head, Dept. of Entomology	MPKV, Rahuri-413 722 (Maharashtra)
97	Dr. Shivkumar Kareppa	Head, Dept. of Statistics	MPKV, Rahuri-413 722 (Maharashtra)
98	Dr. D. Pawar	Head, Dept. of IWM	MPKV, Rahuri-413 722 (Maharashtra)
99	Dr. V. D. Shende	ADR	MPKV, Rahuri-413 722 (Maharashtra)
100	Dr. S. R. Gadhakh	Sr. Sorghum Breeder	MPKV, Rahuri-413 722 (Maharashtra)
101	Dr. V. L. Amolik	Groundnut Breeder	MPKV, Rahuri-413 722 (Maharashtra)
102	Dr. V. R. Shelar	Seed Research Officer	MPKV, Rahuri-413 722 (Maharashtra)
103	Dr. S. S. Dodake	Assoc. Prof. (P. B.)	AICN on Potential Crops, MPKV, Rahuri-413 722
104	Dr. M. N. Bhalekar	Sr. Vegetable Breeder	MPKV, Rahuri-413 722 (Maharashtra)
105	Dr. G. K. Sasane	In charge,	Communication Center, MPKV, Rahuri-413 722
106	Dr. S. R. More	Jute Breeder	MPKV, Rahuri-413 722 (Maharashtra)
107	Dr. S. Mandakmale	Sr. Scientist (Goat Project)	MPKV, Rahuri-413 722 (Maharashtra)
108	Dr. S. Pachpute	OIC, Sheep Project	MPKV, Rahuri-413 722 (Maharashtra)
109	Dr. A. Gawali	DDR	MPKV, Rahuri-413 722 (Maharashtra)
110	Dr. Deodatta Hajare	DDR	MPKV, Rahuri-413 722 (Maharashtra)
111	Dr. S. B. Gawade	Asstt. Prof.	MPKV, Rahuri-413 722 (Maharashtra)
112	Dr. G. P. Deshmukh	Asstt. Prof. (Pulses)	MPKV, Rahuri-413 722 (Maharashtra)
113	Prof. P. P. Surana	Research Officer	GBS, MPKV, Rahuri-413 722 (Maharashtra)
114	Dr. D. B. Kshirsagar	OIC, Tomato Project	MPKV, Rahuri-413 722 (Maharashtra)
115	Dr. N. S. Kute	Assoc. Prof. (Botany)	Deptt. of Botany, MPKV, Rahuri-413 722
116	Dr. R. S. Wagh	Assoc. Prof. (Pl. Physiology)	Deptt. of Botany, MPKV, Rahuri-413 722
117	Dr. P. B. Kharde	Assoc. Prof. (Ag. Extension)	MPKV, Rahuri-413 722 (Maharashtra)
118	Dr. M. T. Bhingarde	Asstt. Prof. (Botany)	Deptt. of Botany, MPKV, Rahuri-413 722
119	Dr. H. K. Shirsath	Assoc. Prof. (Horticulture)	Deptt. of Horticulture, MPKV, Rahuri-413 722
120	Dr. L. N. Tagad	Sr. Res. Asstt. (Botany)	Deptt. of Botany, MPKV, Rahuri-413 722
121	Dr. R. S. Desale	Asstt. Prof. (Dairy Sci.)	Deptt. of A. H. D. S., MPKV, Rahuri-413 722
122	Mr. Babasaheb Nirmal	Comptroller	MPKV, Rahuri-413 722, (Maharashtra)
123	Mr. Vishwas Jadhav	AR (Admn)	MPKV, Rahuri-413 722, (Maharashtra)
124	Mr. R. Jondhale	PAO	MPKV, Rahuri-413 722 (Maharashtra)
125	Mr. O. K. Pawar	Asstt. Comptroller (1)	MPKV, Rahuri-413 722, (Maharashtra)
126	Mr. Rajendra Shinde	Asstt. Comptroller (3)	MPKV, Rahuri-413 722 (Maharashtra)
127	Dr. G. C. Shinde	Sr. Res. Asstt.	GBS, MPKV, Rahuri-413 722 (Maharashtra)
128	Mr. M. G. Gavitt	Sr. Res. Asstt.	AICRP on FC & U, MPKV, Rahuri-413 722
129	Mr. H. N. Shinde	Sr. Res. Asstt.	AICRP on FC & U, MPKV, Rahuri-413 722
130	Mr. B. D. Solanki	Sr. Res. Asstt.	Sorghum Project, MPKV, Rahuri-413 722
131	Dr. V. R. Awari	Sr. Res. Asstt.	Sorghum Project, MPKV, Rahuri-413 722
132	Dr. S. A. Anarase	Sr. Res. Asstt.	AICRP on Agroforestry, MPKV, Rahuri-413 722
133	Dr. A. R. Aher	Sr. Res. Asstt.	Cotton Project, MPKV, Rahuri-413 722
134	Dr. Y. B. Suryawanshi	Sr. Res. Asstt.	MPKV, Rahuri-413 722, (Maharashtra)
135	Dr. G. N. Deore	Sr. Res. Asstt.	MPKV, Rahuri-413 722, (Maharashtra)
136	Dr. Gagare	Sr. Res. Asstt.	MPKV, Rahuri-413 722, (Maharashtra)
137	Mr. D. C. Vanjare	Jr. Res. Asstt.	AICRP on FC & U, MPKV, Rahuri-413 722

138	Mr. H. P. Pardeshi	Jr. Res. Asstt. (Forage)	MPKV, Rahuri-413 722, (Maharashtra)
139	Miss. S. B. Gore	Jr. Res. Asstt. (Forage)	MPKV, Rahuri-413 722, (Maharashtra)
140	Dr. S. S. Sadaphal	Jr. Res. Asstt.	MPKV, Rahuri-413 722 (Maharashtra)
141	Shri. N. L. Dhamore	Agril. Asstt.	MPKV, Rahuri-413 722 (Maharashtra)
142	Shri. S. C. Deshmukh	Agril. Asstt..	MPKV, Rahuri-413 722 (Maharashtra)
143	Shri. A. A. Patil	Agril. Asstt.	MPKV, Rahuri-413 722 (Maharashtra)
144	Shri. S. S. Vetal	Agril. Asstt.	MPKV, Rahuri-413 722 (Maharashtra)
145	Shri. S. B. Pawar	Sr. Clerk (Forage)	MPKV, Rahuri-413 722 (Maharashtra)
146	Shri. R. R. Gade	Agril. Asstt. (Grasses)	MPKV, Rahuri-413 722 (Maharashtra)
147	Shri. S. B. Attar	Sr. Clerk (Grasses)	MPKV, Rahuri-413 722 (Maharashtra)
148	Shri. S. N. Borude	Agril. Asstt. (Grasses)	MPKV, Rahuri-413 722 (Maharashtra)
149	Shri. K. P. Pawar	Lab Attendant (Forage)	MPKV, Rahuri-413 722 (Maharashtra)
150	Shri. M. Bhusare	Lan Attendant (Grasses)	MPKV, Rahuri-413 722 (Maharashtra)
151	Shri. D. G. Kadam	Agril. Asstt. (Hort.)	MPKV, Rahuri-413 722 (Maharashtra)
152	Smt. A. A. Ghadge	Agril. Asstt. (Forage)	MPKV, Rahuri-413 722 (Maharashtra)
153	Smt. S. S. Raut	Agril. Asstt. (Grasses)	MPKV, Rahuri-413 722 (Maharashtra)
154	Shri. Vilas T. Kamble	Farmer	A/p, Pimpri Avghad, Tal. Rahata, Dist. Ahmednagar
155	Shri. Sayaji T. Bachkar	Farmer	A/p, Pimpri Avghad, Tal. Rahata, Ahmednagar
156	Sau. Prabhawati J. Ghogre	Farmer	A/p Loni (kd.) Tal. Rahata, Dist. Ahmednagar (MS)
157	Sau. Subhadra J. Harischandre	Farmer	A/p Khadambe (bk.), Tal. Rahuri, Dist. Ahmednagar
158	Shri. Parag R. Kamble	Farmer	A/p Wadala Bahiroba, Tal. Newasa, Dist. Ahmednagar
159	Shri. Subhas Namdev Karpe	Farmer	A/p Taklimiya, Tal. Rahuri, Dist. Ahmednagar (MS)
160	Shri. Jaywant Ramdas Takte	Farmer	A/p Khadambe (bk.), Tal. Rahuri, Dist. Ahmednagar
161	Shri. Rhushikesh R. Chavan	Farmer	A/p Devlali Pravara, Tal. Rahuri, Dist. Ahmednagar
162	Shri. Nitin Manjabapu Dhus	Farmer	A/p Devlali Pravara, Tal. Rahuri, Dist. Ahmednagar
163	Shri. Vilas Thaksen Kamble	Farmer	A/p Pimpri Awaghad Tal. Rahuri, Dist. Ahmednagar
164	Shri. Kailas S. Tambe	Farmer	A/p Chinchpur, Tal. Sangamner, Dist. Ahmednagar (
165	Shri. Gangadhar M. More	Farmer	A/p Wambori, Tal. Rahuri, Dist. Ahmednagar (MS)
166	Shri. Anwar M. Deshmukh	Farmer	A/p Bargaon Nandur Tal. Rahuri, Dist. Ahmednagar
167	Shri. D. M. Shirsath	Farmer	A/p Kolhar(kd.), Tal. Rahuri, Dist. Ahmednagar
168	Shri. Ashok Ramnath Shelar	Farmer	A/p Kolhar(kd.), Tal. Rahuri, Dist. Ahmednagar
169	Shri. Sachin V. Londhe	Farmer	A/p Kolhar (kd.), Tal. Rahuri, Dist. Ahmednagar
170	Shri. Ravindra K. Gagre	Farmer	A/p Kandgaon, Tal. Rahuri, Dist. Ahmednagar
171	Shri. Nanasheeb Bansi Pund	Farmer	A/p Mali Chinchora, Tal. Newasa, Dist. Ahmednagar
172	Shri. Vishnu R. Shende	Farmer	A/p Mali Chinchora, Tal. Newasa, Dist. Ahmednagar
173	Shri. S. N. Kahar	Farmer	A/p Dadh (kd.), Tal. Sangamner, Dist. A'Nagar
174	Shri. Prataprao B. Pawar	Farmer	A/p Sade, Tal. Rahuri, Dist. Ahmednagar
175	Shri. Sambhaji S. Kakade	Farmer	A/p Nipani Nimgaon, Tal. Newasa, Dist. Ahmednagar





वृत्तरत्न | शनिवार दि. ५ सप्टेंबर २०१५ | सामान्य जनांचा बुलंद आवाज

# महाराष्ट्र

## चारापिक संशोधनला चालना देणे गरजेचे - डॉ. आय.एस. सोळंकी

मुंबई दि. ४ (प्रतिनिधी) - देशातले चारापिकांचे संशोधन कमी आहे. चारापिकांचे क्षेत्र उपलब्ध असून त्यातून अनेक प्रकारचे चारापिकांचे संशोधन केलेले नाही. चारापिकांचे क्षेत्र वाढवणे गरजेचे आहे. चारापिकांचे क्षेत्र वाढवणे गरजेचे आहे. चारापिकांचे क्षेत्र वाढवणे गरजेचे आहे.

डॉ. आय.एस. सोळंकी यांनी याबाबतचे सविस्तर वृत्तरत्नमध्ये लेख लिहून द्यावा आहे. डॉ. आय.एस. सोळंकी यांनी याबाबतचे सविस्तर वृत्तरत्नमध्ये लेख लिहून द्यावा आहे.

# लोकमत

जयवन्तर, पुणे, दि. ३ सप्टेंबर २०१५

## कॅक्टस करेल जिरायत भागात क्रांती

साहू विद्यापीठात चारा पीक संशोधनाचा राष्ट्रीय कार्यशाळा

मुंबई (प्रतिनिधी) - साहू विद्यापीठात चारा पीक संशोधनाचा राष्ट्रीय कार्यशाळा आयोजित करण्यात आला आहे. या कार्यशाळेत चारा पीक संशोधनाबाबतचे सविस्तर चर्चा करण्यात येईल. या कार्यशाळेत चारा पीक संशोधनाबाबतचे सविस्तर चर्चा करण्यात येईल.

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# महाराष्ट्र टाइम्स

जयवन्तर, पुणे, दि. ३ सप्टेंबर २०१५

## 'चारापिकांचे नवीन वाण हवे'

डॉ. आय.एस. सोळंकी यांनी याबाबतचे सविस्तर वृत्तरत्नमध्ये लेख लिहून द्यावा आहे. डॉ. आय.एस. सोळंकी यांनी याबाबतचे सविस्तर वृत्तरत्नमध्ये लेख लिहून द्यावा आहे.

# प्रभात

जयवन्तर, पुणे, दि. ३ सप्टेंबर २०१५

## चारा पीक संशोधनला चालना देणे गरजेचे : डॉ. सोळंकी

साहू विद्यापीठात चारा पीक संशोधनाचा राष्ट्रीय कार्यशाळा

# स्काळ

पुणे, शुक्रवार, ४ सप्टेंबर २०१५ | किफत २३

## दुष्कालात चान्यासाठी ज्वारीचे वाण उपयोगी : पाटील

मुंबई दि. ३ (प्रतिनिधी) - देशातले चारापिकांचे संशोधन कमी आहे. चारापिकांचे क्षेत्र उपलब्ध असून त्यातून अनेक प्रकारचे चारापिकांचे संशोधन केलेले नाही. चारापिकांचे क्षेत्र वाढवणे गरजेचे आहे.

# साकळ

पुणे, शुक्रवार, ४ सप्टेंबर २०१५ | किफत २३

## नगदी पिकांप्रमाणेच चान्याचे क्षेत्र वाढविण्याची गरज