The world agricultural production should increase by 70% by 2050 to meet the rising food demands of a world population of over 9 billion. Small holders farming systems produce over half of the world’s food and they have the potential to produce more. Therefore, apart from other agricultural interventions, we also need to realize the productive potential of family farming. Farming systems popularly known as family farming is already a key factor in the UN’s Zero Hunger Challenge and Sustainable Development Goals. Farming system approach has been recognized for its multiple social, economic, environmental and cultural functions. Farming system approach is inextricably linked to world food security, preservation of traditional knowledge, nutritional security, agro-biodiversity conservation and the sustainable use of natural resources. Moreover, it offers an opportunity to boost local economies, especially when combined with specific policies aimed at social protection and well-being of communities.

Integrated farming systems are practiced in all continents but overwhelmingly in developing nations and especially under fragile agro-ecosystems. In India, nearly 85% land holdings are small and marginal and are practicing one or other kind of farming system as per their resources and prevailing agro-climatic conditions. IGFRI is helping in enhancing the productivity, sustainability and profitability of existing farming systems in Bundelkhand region through its outreach programmes and projects by incorporating crop, fodder (both conventional and non-conventional), trees, livestock (improvement, management and feeding strategies), post-harvest management and farm machinery related interventions. It is also involve in capacity building of farmers and trainers. Based on the most common livestock based prevailing farming situation in semi-arid central India, IGFRI is developing five integrated farming system (IFS) models at its central research farm and simultaneously taking them to farmer’s field. These five models are rain-fed crop dominated IFS, rain-fed livestock dominated IFS, irrigated intensive IFS with balanced enterprises, high value IFS near cities and irrigated dairy based IFS. This not only will help in our basic understanding of farming system intricacies but also act as site of learning and scaling up. Farming system approach is expected to be in forefronts of agricultural and rural development programmes and policies in coming years. Therefore, more innovative farmer participatory farming system research and development programmes need to be explored and planned for upliftment of the farming community.
First report of yellow mosaic virus in Bankulthi (*Atylosia scarabaeoides* L. Benth) from India

*Atylosia scarabaeoides* (L.) Benth (2n=22), locally known as Bankulthi is slender twining herb. It is a wild relative of pigeon pea hence also called as *Cajanus scarabaeoides*. It is commonly found in open grassland, dry scrub and deciduous monsoon forests. It is widespread throughout Asia, especially in southern India. In India, *A. scarabaeoides* has been studied as a potential green manure and also considered to be among the most suitable legumes for permanent pastures. It is also used in the treatment of diarrhoea in cattle and as a medicine for improving digestion. It is reported that *A. scarabaeoides* possesses several useful genes which are resistant against insects (Pod fly and Lepidopteron), diseases (*Furasisium* wilt, *Phytophthora* blight, sterility mosaic and cyst nematode) of pigeon pea.

Till date, there is no report of begomovirus infection in *Atylosia* from India. But, 100 % yellow mosaic virus incidence was observed in *Atylosia* at IGFRI farm, Jhansi for the first time (Fig. 1). The infected plants showed yellow discoloration on the leaves that resulted to small greenish yellow mosaic symptoms (Fig. 2). The severely infected plants showed stunted bushy growth with reduced leaf size. Based on symptomatology this report contributes first record of begomo virus on *Atylosia scarabaeoides* from India.

![Fig. 1: Yellow mosaic virus incidence observed in *Atylosia scarabaeoides* at IGFRI research plot, Jhansi](image1)

![Fig. 2: Healthy (a) and yellow mosaic virus infected leaves (b) of *Atylosia scarabaeoides*](image2)

*(N. Manjunatha, D. Vijay, Sanjay Kumar, Rahul Gajghate and A. Maity)*

\[2\]
In-vitro plant regeneration of oat (Avena sativa) variety JHO-822

A highly efficient plant regeneration system via somatic embryogenesis has been achieved in oat variety JHO-822 using germinating seeds. We tested different media supplements effect on callus induction, somatic embryogenesis, shoot induction and root formation on JHO-822. The mature embryo (seeds) of oat were cultured on MS medium supplemented with different concentrations and combinations of 2, 4-dichlorophenoxyacetic acid (2, 4-D) and kinetin for callus induction. Embryogenic calli were incubated at 25°C under an alternative photoperiod scheme (16h light/ 8h dark) on MS medium supplemented with BAP and kinetin for plant regeneration and rooting. The rooted plantlets were hardened and transplanted to pots, where they exhibited morphologically normal growth (Fig.3). The developed in-vitro plant regeneration system for variety JHO-822 could facilitate physiological and molecular biology studies as well as the production of transgenic cultivars for higher productivity and quality of oat.

Figure 3: In-vitro tissue culture of oat variety JHO-822. A. Callus induction; B. Shoot induction; C. Root initiation; D. Mature plant in pot

(K.K. Dwivedi, Rajeev Ranjan, R. P. Sah, Manoj Chaudhary & K. K. Singh)
First report of internal seed borne nature of *Alternaria alternata* in *Cenchrus ciliaris*

Seeds of many crop species are known to carry various types of pathogenic and non-pathogenic fungi, commonly known as seed mycoflora or seed-borne fungi. Seed-borne fungi are of considerable importance due to their influence on the seed quality in terms of germination, initial vigour, establishment and final crop stand in the field. Among different seed borne mycoflora, *Alternaria* sp. is a common seed mycoflora in graminaceous seeds and is mostly confined to outer seed coat. This is the first report of internal seed borne nature of *Alternaria alternata* in *Cenchrus ciliaris*, the popular tropical fodder crop of arid and semi-arid regions.

The field observation of *Cenchrus* experimental plot during anthesis showed severe incidence of *Alternaria alternate* during January, 2016. The crop was severely infected with aphids, resulting in *Alternaria* incidence. The aphid infestation is the predisposal factor for *Altneratia* attack. The brownish to black coloured fungus growth was observed on infected inflorescence (Fig.4). Further, through morphological characterization and pathogenicity test, the etiological agent was confirmed as *Alternaria alternata*. The microscopic observation of spikelets at 22 days after anthesis through ovule clearing method revealed the internally seed borne nature of *Alteranria alternate* (Fig. 5a). The *Alternaria* conidium having both vertical and horizontal septation was found below the seed coat (Fig. 5b). This clearly indicated the possibility of internally seed borne nature of *Alternaria alternata* in *Cenchrus ciliaris*. These results suggested that the said fungus is associated with seeds of *Cenchrus* grass and infected seeds act as primary source of inoculum.

*(N. Manjunatha, D. Vijay, A. Maity, S.S.Parmar and Neelesh Agarwal)*
एक दिवसीय हिन्दी कार्यशाला

भारतीय कृषि अनुसंधान परिषद्-भारतीय चरागाह एवं चारा अनुसंधान संस्थान, झांसी में दिनांक 28 मई, 2016 को एक दिवसीय हिन्दी कार्यशाला का आयोजन डा. जगदीश खरे, पूर्व प्राचार्य, जी.एस.पी.जी. कालेज, सुल्तानपुर के मुख्य अतिथि, श्री भगवानदास मंडल रेल प्रबंधक कार्यालय के विशेष अतिथि एवं संस्थान निदेशक डा. पी.के.पोप की अध्यक्षता में किया गया। डा. जगदीश खरे, ने अपने उद्वॉधन में कहा कि हिन्दी भाषा राष्ट्रीयता के मूल को सींचती है। हिन्दी भाषा, हिमालय से लेकर कन्याकुमारी तक कृता को दूड़ करती है और अनेकांकों एकता में बदलती है अपितु हिन्दी भाषा का ही प्रतिभत के साथ हिन्दी का प्रयोग किया जाये। डा. पी.के.पोप ने अध्यक्षीय उद्वॉधन में राजभाषा के विकास में कार्यशाला की उपयोगिता बंगत करते हुए अधिकरण कार्य करने का आव्रजन किया जिससे निर्धारित लक्ष्य पूर्ण हो सके। श्री भगवानदास ने तिमाही प्रत्येक भरने नियमों एवं उपनियमों, संवैधानिक व्यवस्था के संबंध में बताया। कार्यक्रम के प्रारंभ में निदेशक ने अतिथियों का स्वागत किया। कार्यक्रम के पूर्व में मुख्य अतिथि डा. जगदीश खरे, संस्थान निदेशक डा. पी.के.पोप, डा. सुनील कुमार, नौरज कुमार ददे ने संयुक्त रूप से दीपप्रज्ञे रक्षन किया। इसके पश्चा प्रभारी राजभाषा डा. सुनील कुमार ने सभी का स्वागत किया। नौरज कुमार ददे कार्यवाहक राजभाषा अनुभाग ने कार्यशाला के कार्यक्रमों के संबंध में विस्तर जानकारी दी। कार्यशाला में दुर्गावत डा. जगदीश खरे, पूर्व प्राचार्य, जी.एस.पी.जी. कालेज, भगवानदास, वरिष्ठ अनुभावक मंडल रेल प्रबंधक कार्यालय तथा डा. नूदेन्द्र सिंह, प्रबंधक, सुनिलखंड महाविद्यालय, झांसी ने व्याख्यान दिये। कार्यक्रम अवसर पर विभागाध्यक्ष, सहायक प्रशासनिक अधिकारियों एवं प्रतिभागियों की उपस्थिति रही।
Swachha Bharat Mission

IGFRI is continuing Swachha Bharat Mission in all its divisions and sections. A series of cleanliness drives including cleaning and sweeping of offices, corridors and premises and disposing of junk material is continuing under this programme. White washing of the Institute main building, administrative block II is completed to maintain cleanliness.

Labharthi Kisan Sammelan

Labharthi Kisan Sammelan was organized by ICAR - Indian Grassland and Fodder Research Institute Jhansi on 2nd June 2016. It was inaugurated by Union Minister of Agriculture & Farmers Welfare Shri Radha Mohan Singh. During the interaction with nearly 450 farmers of Bundelkhand region, he explained several farmer oriented schemes such as soil health card, Crop Insurance, Women Empowerment, Good Governance, Direct Benefit Transfer of LPG (DBTL) Scheme, enhanced Minimum Support Price (MSP) etc. by the government and asked the farmers to take the benefit of such schemes. He emphasized to make available irrigation to each and every field and also requested farmers to adopt soil and water conservation technologies. On this occasion, he inaugurated the exhibition of advances in agricultural technologies, fodder technologies, farm machinery and feed products displayed by KVKs, institutes, banks and line departments of Bundelkhand region. Sri Babul Supriyo, Hon’ble Union Minister of State Urban Development, Housing and Urban Poverty Alleviation (Special Guest), Sri Mahesh Giri, Hon’ble Member of Parliament and Sri Ravi Sharma, Hon’ble Member of Legislative Assembly along other distinguished guests were present to grace the occasion. Sri Babul Supriyo informed that government will leave no stone unturned for welfare of farmers. Sri Mahesh Giri hoped that government schemes will bring revolutionary development to the farmers. About 450 farmers from surrounding villages of Jhansi and nearby districts, who are the beneficiary of Mera Gaon Mera Gorav (MGMG), Adarsh Chara Gram, NICRA, IGFRI-CIWA collaborative project, ICARDA-Grasspea, DST sponsored project, Unnat Bharat Abhiyan and other farmer oriented schemes of the institute and CAFRI, participated in this programme. Dr. P.K. Ghosh, Director,
IGFRI, Jhansi welcomed all the guest and farmers and explained the activities and achievements of institute. A separate interaction session of one hour was organized, wherein Hon’ble minister interacted and reviewed with officials of all line departments, ICAR institutes and KVKs on Agriculture and farmers, welfare issues with special reference to Bundelkhand region specially RKVY, NFSM, MNREGA, Soil Health Card, Micro-irrigation, Oilseed mission etc. He discussed and emphasized for the ways to fast and efficient implementation of existing schemes for the benefit of farmers. He called for popularization of boundary tree plantation and integrating farming system. He urged for convergence of all the organizations for welfare of farmers. As a part of the event, Shri Radha Mohan Singh held a special session with the print and electronic media person of the region. He requested them to spread the message of development amongst the farmers for the development of country.
ICAR-IGFRI, Jhansi Celebrated International Yoga Day

The International Day of Yoga 2016 was celebrated in ICAR-IGFRI, Jhansi on 21 June 2016. The staff members of the Institute and their families attended these programme. The event was celebrated to propagate the benefits of practicing Yoga daily to the body and mind.

The event was concluded with Yog based Cultural Programme under the guidance and instruction of an eminent yoga expert of the Jhansi city Smt. Kanchan Ahuja. Dr. PK Ghosh, Director, ICAR-IGFRI, Jhansi thanked Smt. Kanchan Ahuja and his team and requested all staff members for practicing Yoga daily. Dr. Purushottam Sharma, NO, IYD and team arranged and coordinated this programme.
A two days training programme sponsored by Gramin Development Trust, Lalitpur on “Cultivation of perennial fodder and high value crops” was organized during 1-2 June, 2016 at IGFRI, Jhansi. During the training a group of 30 farmers and farmwomen participants were exposed to various improved package of practices related to production of perennial grasses specially Napier Bajra hybrid and Guinea varieties for income generation.
Cultivation of commercial vegetables like ginger, garlic and *Kharif* onion were demonstrated for entrepreneurship development through vegetable production. Along with this, awareness and knowledge level of farmers and farm women was also enhanced regarding the importance of vegetables in diet and profitability. In order to maintain nutritive value and soil health during vegetable cultivation, organic farming practices were also discussed and demonstrated to the participants.

*(Sadhna Pandey, Khem Chand, Sunil Kumar, Purushottam Sharma, Vikas Kumar)*

**Identification of suitable herbicide for berseem seed production**

Berseem is one of the important *rabi* fodder crop in the Northern parts of India. Weeds poses major problem in cultivation and contributes yield loss in berseem. The weed infestation in fodder crops not only reduces yield but also downgrades its quality as well as palatability. In berseem cultivation *Cichorium intybus*, *Coronopus didimus*, *Spergula arvensis*, *Chenopodium album*, *Rumex dentatus*, *Poa annua*, *Anagalis arvensis*, *Melilotus alba*, *Melilotus indica*, *Eclipta alba*, *Sonchus oleraceus*, *Sonchus asper*, *Medicago denticulata*, *Medicago auxalis*, *Trifolium resupinatum*, and *Physalis minima* weed infestation was observed in Jhansi region. The weed menace results in 20-35% green fodder and seed yield losses in berseem. The non-availability of agricultural labour and increased labour charges forced the utilization of herbicides in cultivated fodder crops. An experiment on various weedicide combinations helped in the identification of suitable herbicides for the berseem seed production. The experimental data showed that application of imazethapyr @ 0.1kg a.i./ha at 20 days after sowing suppressed weeds efficiently. The quantification studies resulted in lowest weed density (11 no./m²) and weed dry weight (2.50 g/m²) at 55 days after sowing, coupled with increased plant height (85.1cm) and no. of tiller (793 no./m²) at maturity. In berseem, imazethapyr application showed 91.7% weed control efficiency in controlling the weeds with green fodder yield (439.91 q/ha), seed yield (3.38 q/ha) and straw yield (19.45 q/ha) compare to weedy check treatment. Whereas, weedy check treatment recorded lowest green fodder yield (372.69 q/ha), seed yield (2.45 q/ha), straw yield (16.27q/ha) and highest weed density (329 no./m²) and weed dry weight (30.13 g/m²) at 55 days after sowing. The most driving factor for the utilization of any technology is benefit cost ratio which was 2.25 in imazethapyr applied treatment.

*(V. K. Wasnik, A. Maity, D. Vijay, S. R. Kantwa and Manjunatha N)*
Glimpses of other activities

IRC 2016

Inauguration of Farmer’s residence block by Dr. V.N. Sharda on 09/05/2016

Retirements

Smt. Shakun Baghela 31/05/2016

Sri Manohar Lal 30/06/2016

Sri Dayal 30/06/2016

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