Indian Grassland and Fodder Research Institute celebrated its 48th foundation day on 1st November 2009. On this occasion Dr Bhag Mal, Honorary Research Fellow, Biodiversity International, CGIAR, New Delhi graced the foundation day celebration as the chief guest. He delivered a lecture on “Forage research: Current status and future prospects”. He emphasized that in view of climate change, emerging scenario of intensive and diversified cropping systems and changing food habits towards more livestock products, there is need to develop varieties with high physiological efficiency, responsive to fertilizer, better plant types with competitive vigour, short duration, photo-thermo insensitive characteristics of high forage yield and resistance to biotic and abiotic stresses. The strategies to achieve these traits would include extensive exploration of germplasm, exploitation of genetic diversity, identification of genes for apomixes, genes for insect and pest resistance, salt, drought and cold resistance. To deal with increasing demand of seeds of cultivated forage, range grasses and legumes, the chief guest highlighted the need to prepare an atlas of commercial seed production and marketing for the entire country. Dr Bhag Mal visited the farm and laboratories and appreciated the efforts made for registration of novel germplasm to the Novel Germplasm Registration Committee, NBPG, breakthrough made in the apomixis research and farm development activities. He urged the scientists to optimise the resources through suitable crop management strategies, enhance the productivity and livelihood through integrated crop-livestock management and modeling feeding regimes to address the environmental concerns right from forage production to utilization by ruminants. Dr KA Singh, Director IGFRI, presided over the function and presented the research and developmental activities “Year at a Glance”, of IGFRI. A Kisan Mela was also organised to demonstrate the improved forage varieties suitable to the region, fodder cultivation, conservation and utilization, and the technologies developed by the Institute. Visiting farmers also joined farmer-scientist meet with subject matter specialist of the IGFRI. The chief guest distributed the seeds of improved forage crop varieties to the farmers. Best worker awards in different categories were also conferred on the IGFRI staff members for their contribution during the year.
Investment and administrative reforms for accelerated fodder development

The livestock sector provides an important source of income and livelihood to a large number of people. For a long time it has remained as a subsidiary to agriculture. Recently, livestock keeping has emerged as a profitable enterprise. Livestock keeping has been taken up not only by the poor and landless for livelihood but on commercial scale by large farmers. Allocating about 7% of the agricultural outlay, livestock sector has contributed 24.72% (Rs. 1239 billion, 2004-05) to total GDP of agriculture and allied sector. In the low budgetary support to livestock sector, only 0.77% of the budget is spent on feed and fodder development. In spite of the low budgetary support, the livestock sector has shown impressive growth and inbuilt resilience and sustainability during abnormal weather resulting into drought and flood in different parts of the country over the years. It is proven fact that its own momentum propels the growth in livestock sector but the lack of investment and proper linkage and policy change has restricted in realizing its potential.

Feed and fodder constitute about 60% of the cost of animal production. Economical livestock production can be achieved by lowering the cost of feeding, encouraging feeding of balanced green forage and processed forage products. It has been demonstrated that 6-7 litres of milk can be obtained from bovine by green fodder alone and feeding based on green fodder is most economical by reducing the cost of feeding and eco-friendly by reducing emission of green house gases. However, the area under fodder production has remained stagnant. There is ample scope for extending fodder production within the available farmland, CPRs and beyond. Various categories of unutilized lands such as problem soils, along railway tracks and highways, wastelands, along bunds and canals etc. can be put to forage resource development with due support of local institutional mechanism and required policy changes. Planting fodder trees, shrubs and other perennials under afforestation programmes under social forestry and other schemes can also enhance availability of fodder. Such lands could be given on lease to people residing in the vicinity and easy credit may be provided to purchase quality fodder seeds and other inputs. The states generally do not have the trained manpower to look after the fodder production activities and there are few farms to cater to the needs of quality seeds of fodder crops. It has been estimated that about 1.64 million tonnes of certified fodder seeds would be required during 2010-2015. But the total fodder seed produced by the Central farms was meagre 1627 tonnes. Fodder seed production programmes are nonexistent in most of the states and the farmers are forced to depend on the private vendors whose quality is often unreliable. Therefore, there is an urgent need to take up fodder seed programme on
a large scale involving National Seed Corporation. Simultaneously, more funds need to be allocated to the programmes like grassland improvement and increasing the productivity of common property resources of villages. Investment in common property resources to improve their productivity should be seen as lending a helping hand to resource poor livestock farmers who graze their animals along roadsides, bunds and common property resources.

Since the livestock keeping has emerged as an important livelihood option for a large number of people as well as taken a shape of commercial venture in peri-urban areas, they need to be insured against the vagaries of nature affecting the availability of quality fodder at economical price. For this, a chain of fodder banks may be established in the vulnerable regions on the lines of Food Corporation of India. The key to success of any programme depend on the quality of human resource. There are few institutions, which run specialized course in fodder production and utilization. Accelerated growth of livestock sector can be achieved only if feed and fodder can be made available at economical price to the livestock farmers for which greater investment and administrative support is urgently required with a mission mode approach as in other sectors of agriculture.

(K A A Singh)
Director

Chaya (Cnidoscolus aconitifolius) a nutritious fodder introduced in India

Chaya is a perennial shrub (family Euphorbeaceae) which grows to a height of 3 to 4 m. It is a drought tolerant and disease resistant plant which was domesticated by the Maya people about 2500 years ago in Central America. It is classified as an underutilized vegetable whose leaves are eaten by the indigenous Maya people. A number of medicinal properties are also associated with this plant. Chaya was introduced in India in 2006 at ICFRI (through NBPGGR) to evaluate its use as fodder plant. Nutritional evaluation of chaya revealed that it is a rich source of protein containing 29% CP in leaves and 18% in fodder (leaves + soft stems). The fodder contains 5.0% soluble protein, 21.2% ADF, 27.9% NDF, 4.1% lignin, 3.6% ether extract and 9.8% ash. The mineral and amino acid profile is also very encouraging. The chaya leaves also contain 58.9% Polyunsaturated fatty acids, of which 50.0% is omega-3 fatty acid. Feeding livestock ration rich in omega-3 fatty acid may improve the quality of milk and meat. In spite of the exceptional nutrient content, it has remained obscured from the world at a large because its potential yield was not realized in the poor soil in its native region. Upon introduction in India at ICFRI, the plant has been multiplied and over 1500 plants are now growing. Chaya is propagated by stem cuttings only. Depending on the fertility status of the soil and the growth conditions, fodder can be harvested every 60–90 days by cutting at 50 cm above the ground. It is estimated that chaya can produce about 1500 q/ha of green fodder. The plant grows vigorously during summer months and hence can be an excellent source of fodder during scarcity period. Feeding trial on growing goats indicated that it can replace upto 75% of the concentrate mixture in the ration of goats.

Anil Kumar and KK Singh
Clover Red Leaf of Berseem: an emerging disease

The climate change in the recent years is expected to have a wide range of impact on plant diseases in terms of geographical shift of pathogen and its host, emergence of new diseases, increase in severity of pre-existing diseases etc. In the past leaf reddening of berseem was considered to be due to some physiological disorder or mineral deficiency and was largely neglected. But in the recent years, the severity of red leaf disease of berseem is gradually increasing in several parts of the country, causing substantial loss in green forage yield. This disease has similarity with the clover red leaf disease observed in temperate countries. The disease of clovers is caused by mycoplasma (MOL) present in the phloem elements of infected plants. Deep feeding leaf hoppers acquire these MOL from infected plants and multiply in the body of the vector. After a latent period of several weeks, it becomes infective and transmit the disease during the whole of its life and many pass the infection to its offspring also.

The stolber type of disease of clovers commonly referred to as ‘red leaf’ is widely distributed in white clover (T. repense) and not in red clover (T. pratense) in European countries. However, in India it has been frequently observed in Persian clover or shaftal (T. resupinatum) and berseem (T. alexandrinum). The disease causes an initial marginal leaf chlorosis followed by extreme bronzing/reddening of the foliage. Finally, the leaf become light brown and curly and the whole plant gets increasingly stunted and eventually die. Some auxiliary proliferation occurs but it is subdued. Flowering is often reduced but the inflorescence, although small are normal in appearance and seed set. In berseem the disease progression appears to be temperature related and the intensity is reduced after each cut. Clover red leaf is reported to be transmitted by Euscelis plebejus and Aphrodes bicinctus in Europe. Stolber type of infections are also well known, causing serious damage to crops such as potatoes, tomatoes and tobacco. At present no method of control is known for the disease. In India this disease is gradually spreading causing substantial loss in green forage yield. Attempts are being made to study the disease and its transmission and come up with a possible preventive measure.

N Hasan and RB Bhaskar

Research Advisory Committee meeting at IGFRI

The 16th meeting of RAC was held on December 21-23, 2009 at IGFRI, Jhansi. The meeting was presided over by the Chairman, RAC Dr RM Singh, Professor Emeritus, Institute of Agricultural Sciences, BHU, Varanasi. Dr SD Rai, Dr AK Misra, Dr VK Mishra, Shri Sharma Puran, Shri Zafar Akhtar, Dr KA Singh, Dr SK Dhyani and Shri KC Pandey members of RAC also participated in the meeting. The chairman emphasized the importance of basic and strategic research for wide adaptation of grasses and fodder legumes to improve nutritional value livestock. Dr KA Singh, Director IGFRI presented an overview of the infrastructure development, germplasm enrichment, varieties released, registration of novel germplasm with NBPGR, maintenance breeding, breeder seed production, strengthening of marketing activities of the seed and the capacity building activities under HRD for all categories of institute staff and officials from various state government.

The Members also visited the outreach programmes of IGFRI on December 23, 2009 and appreciated the research and development efforts, and transfer of technologies to farmers’ field in five villages in Tikamgarh district under Farming System Research Project. The RAC took the note of the excellent work done on genetic control of apomixis in Guinea grass and recommended the establishment of a centre of excellence at the Institute.

KC Pandey and GP Nigam

IGFRI Newsletter
Resource economization through scientific cultivation and introduction of ideotype wheat in Bundelkhand region

In the four villages under Farming system project, in Bundelkhand region farmers were using old wheat varieties, with very high seed rates (250 kg/ha) and 6-8 irrigation during the crop period resulting in high input cost and wastage of resources. To initiate the farmers in scientific cultivation practices and resource economization, in the rabi season of 2008, 11 varieties of wheat suitable for normal, late sown and limited moisture conditions developed at IARI, New Delhi and its regional station, Indore were introduced at 16 farmers' field. Line sowing was done at 25 cm with seed-cum-fertilizer drill using 75-100 kg/ha seed and 80:60:20, N:P:K as basal dose and 60 kg N through urea was top dressed in two equal splits. In the initial growth period (45-60 days), the farmers were apprehensive that the low seed rate and wider spacing used will severely reduce the wheat yield. But introduced varieties tillered profusely, producing 8-10 healthy tillers per clump and covered the field. Thus 150-175 kg/ha seed could be saved by scientific cultivation. The farmers learnt an important lesson that very high seed rates restricted the tillering due to dense plant population. The usual practice of the farmers was to irrigate 6-8 times the wheat crop. In the demonstration plots, the introduced variety ‘Harshita’ produced 20 q/grains/ha with 2 irrigations (recommended for the variety), thus saved 4-6 irrigations (30 ha cm irrigation water/ha). However, the other introduced varieties required maximum four irrigation in the entire crop season. The line sowing of wheat facilitated the operation of peg/weeder cum mulcher which saved Rs. 1032 per hectare on weeding. The average yield of all introduced wheat varieties under limited irrigation and late sown condition increased to 31.6 q/ha (80.7% higher than local average yield of 17.5 q/ha under existing situations). The highest yield of 53.3 q/ha was recorded with Vidisha variety. (Shri Kamlesh Kushwaha, village Radhapur). Secondly, the farmers of the region were applying the basal dose of fertilizers at 6-7 day crop stage with first irrigation. This practice caused major loss of nitrogen through leaching. The farmers discontinued the practice of applying fertilizers with first irrigation and started applying at sowing time. These demonstration plots were an eye opener for the farmers of the region who promised to take up scientific cultivation of wheat to increase their profitability. The farmers also saved the seeds of the introduced wheat varieties to be used in the next season on a larger scale.

RK Agrawal, CS Sahai, RN Dwivedi, KA Singh, Satyapriya, JL Singh and RK Sharma

Rehabilitation of Lantana and Ageratum infested grazing land for improved fodder production in mid Himalayas

Livestock plays an important role in the livelihood of people in the Himalayan region. Natural grasslands and meadows are the primary source of fodder for livestock. Overgrazing and lack of management has reduced the productivity of these grasslands and the native grass species have been overtaken by obnoxious weeds like Lantana and Ageratum. The reduced in grass productivity has resulted in declining carrying capacity (1.05 adult cattle unit) of these grasslands. A study was conducted to rejuvenate such weed infested grasslands in the mid-Himalayas of Himachal Pradesh at farmers' field under participatory mode. The weed infested grasslands initially had weed density of Lantana - 2.1 plants/sq m (dry biomass of 17.74 g/plant) and Ageratum - 4.2 plants/sq m (dry biomass of 7.46 g/plant). The weeds were uprooted from the ground in the month of November and three months later the regenerated shoots were again uprooted. There was almost a complete kill of the weeds. In the month of June a nursery of perennial grass (Brachiaria decumbens) was raised at the farmers' field. The seed was sown @ 5 kg/ha at a depth of 1-2 cm. The root slips of sown grass were transplanted (40 x 20 cm) in the already cleared grassland. The first harvest of transplanted grass was taken after 50 days of transplanting and subsequent cuts were taken at 45 days interval. The height of the plant ranged from 72-85 cm while the tillers/plant ranged from 38 to 62. The yield of the green grass was 42 t/ha. The dense cover of perennial grass resulted in smothering effects on weeds and weeds could not get re-established. Thus, the rejuvenation of weed infested grassland provided the fodder for improved livestock production in the mid-Himalayas.


October–December 2009
Anomalous weather condition during pre-monsoon season in 2009 at Jhansi

Weather parameters (maximum and minimum temperature, relative humidity and evaporation) were analyzed for the period of April to June 2009 and it was compared with long period average. During April, the maximum temperature was higher by 1.6-2.9°C from its normal value for almost three weeks. An unusual phenomenon was noticed in the month of June, when the maximum temperature became more intense and it was as high as 5.7°C from its normal. Night time temperature during first and third week of April was significantly higher (2.7-3.8°C) from its normal value. In the remaining months it oscillated near to its normal value. Morning relative humidity showed a typical behaviour and it was lower than its normal during April and June. Two weeks of April and three weeks of June had shown lower humidity by 33.3-50.8 and 27.4-45.7%, respectively from its normal value. Similarly, evening relative humidity also displayed increased and the region experienced 5 drought years (2002, 2004, 2005, 2006 and 2007) out of eight years. The rainfall during drought years was less by 41-59% from its long period average. The year 2007 was characterized as the worst drought year since the instrumental recording (1939) was started.

SK Rai, Pradeep Behari and JB Singh

Establishment of hortipastoral system in drought through soil and water conservation measures

Hortipastoral system is an integration of fruit trees with pastures and is an economically viable option in semi-arid class (V and VI type) land which are not suitable for arable farming. Establishment of such system is quite difficult in rainfed semi-arid regions because of moisture stress. But shaping the surface in the immediate vicinity of the trees for collecting runoff in the root zone can mitigate the moisture stress and enhance survival of the plants. In the year of 2007, a severe drought year (488 mm rainfall 33 rainy days during monsoon June-September), aonla and guava based hortipastoral system was established through adopting soil and water conservation measures. Aonla based hortipastoral system was intercropped with Cenchrus ciliaris + Stylosantes hamata. Among treatments, staggered contour trenches was most effective and resulted in maximum plant growth (176.6 cm height, 3.69 cm collar diameter), forage yield (4.70 t DM/ha) and available moisture percentage. Similarly, the guava base cv. Shweta and Lalit, showed 100 per cent survival. The variety Lalit showed better growth performance than Shweta. In the second year Cenchrus ciliaris + Stylosantes hamata were intercropped. Staggered trenches were effective in improving plant growth and produced maximum forage (6.6 t DM/ha). In staggered trenches the average soil moisture content was 6.63 and 7.7 at 0-15 cm and 15-30 cm soil layers, respectively from October 2008 to February 2009, whereas in sole pasture without staggered trenches the moisture content was only 5.5 and 5.8 percent in 0-15 and 15-30 cm soil layers, respectively. In the first year of pasture establishment, the sole pasture produced maximum forage (4.7 t DM/ha) as compared to intercropped pasture (4.6 t DM/ha).

Sunil Kumar, AK Shukla, Ramesh Singh, Sunil Tiwari and AK Rai
Winter school organized

Considering the importance of post harvest management of crop residues, grasses and fodder crops, a winter school on 'Post harvest management of crop residues/grasses/fodder crops and their value addition for sustaining livestock' was organized at IGFRI, Jhansi from November 4 to 24, 2009. Twenty five candidates from the states of Gujarat, J&K, MP, Tamil Nadu, UP and Uttarakhand participated in this programme. Dr Bangali Baboo, Director, National Institute of Natural Gums and Resins, Ranchi inaugurated the school and delivered the inaugural address. He explained that location specific fodder bank in each district of the country will serve the livestock during lean period and natural calamities. The entire curriculum of the winter school contained 39 lectures, 11 practical and 2 group discussions. The candidates were exposed through field visits to farmers' field, industry and research farm of NRCAF Jhansi and Regional Research Station of Central Soil and Water Research and Training Institute, Datia (MP). Dr SK Dhyani, Director NRCAF, Jhansi was the chief guest at the valedictory function on 24th November, 2009. He addressed the gathering and distributed certificates to the participants. Dr PK Pathak was the Course Director and Dr PN Dwivedi, Dr CS Sahay, Dr Anil Kumar and Shri KC Pandey were the course co-Directors.

Visit abroad

Dr JP Singh, Senior Scientist (Geography), IGFRI visited Nepal to attend a five day training programme from 26 to 30 October, 2009, organized by International Centre for Mountain Development (ICIMOD) which focused on harmonization and standardization of mapping of the rangeland of Hindu-Kush-Himalayan Region (HKH). Participants from India, Nepal, China, Pakistan, Afghanistan and Bhutan attended this programme. GIS, RS and LCCS etc. were the main attraction of this programme. Exposure to this training and the experience gained during the training programme will be applied in the on-going outreach programme of IGFRI focusing on Alpine Pasture.

Dr Ajoy Kumar Roy, Head, Grassland and Silvipasture Management Division, visited China under exchange visit of regional Rangeland Programme (RRP III) partners from 27th October to 3rd November 2009 which was organized by International Centre for Integrated Mountain Development. He visited the Sichuan Province, a major pastoral region of China. He also visited the Sichuan Grassland Sciences Academy (Chengdu), Yak Breeding Farm (Hongyuan) Highland Fodder Development Centre, herd me groups and field sites for rangeland restoration.

Dr SPS Ahlawat, Vice Chancellor, Vikram University, Ujjain visits IGFRI

A training programme for progressive farmers on Fodder Production and Utilization sponsored by ATMA, Gopalganj, Bihar, was conducted from December 14 to 19, 2009 at IGFRI, Jhansi. Dr SPS Ahlawat, Vice Chancellor, Vikram University, Ujjain (MP) graced the occasion as chief guest in the valedictory function.

Visit of Prof. Harry B Krishnan

Prof. Harry B Krishnan, USDA-ARS, Borlaug Fellow Programme University of Missouri, Columbia, USA visited IGFRI, Jhansi under follow up programme of Borlaug Fellows from October 6 to 10, 2009

New appointments

Shri Suresh Chandra, Senior Finance & Accounts Officer joined on 20.07.2009

Dr (Ms) Archana Singh, Senior Scientist (Economic Botany) joined on 18.06.2009

Dr Satya Priya, Senior Scientist (Agriculture Extension) joined on 01.07.2009

Dr Harsh Vardhan Singh, Senior Scientist (Plant Pathology) joined on 08.07.2009

Dr Manoj Kumar Srivastava, Senior Scientist (Plant Biochemistry) joined on 29.07.2009

Dr Narendra S Kulkarni, Senior Scientist (Entomology) joined on 29.07.2009

Dr Mridul Chakraborti, Scientist (Plant Breeding) joined on 28.08.2009

Er. Boini Narsimlu, Senior Scientist (SWC) joined on 15.09.2009

Dr Vikas Kumar, Scientist (Agriculture Economics) joined on 31.10.2009

Dr Samrath Lal Meena, Senior Scientist (Agronomy) joined on 19.06.2009

Dr (Ms) Edna Entony, Senior Scientist (Plant Physiology) joined on 15.06.2009

Dr (Ms) Kollah Bhati, Senior Scientist (Microbiology Plant Science) joined on 29.10.2009

October–December 2009
भारतीय चरागाह एवं चारा अनुसंधान संस्थान, झारसी
कौमी एकता सप्ताह

राष्ट्रीय एकता सद्भाव प्रतिष्ठान, नई दिल्ली द्वारा जारी विश्वास-निर्देशांक, नवम्बर, 19.25ए नवंबर, 2009
के दौरान विभिन्न कार्यक्रम आयोजित किए गए, जिनके माध्यम से सामाजिक सीलाध बनाये रखने की आवश्यकता पर बल दिया गया। कार्यक्रम
के प्रशासन दिन 19 नवम्बर को संस्थान के निर्देशक डॉ. कुमार अमरनाथ सिंह ने संस्थान के सभी
वैज्ञानिक, तकनीकीय, प्रशासनिक एवं चरा से बने श्री कर्मचारियों को सामाजिक सीलाध बनाये रखने
की शपथ दियी। अपने सम्बोधन में उन्होंने सभी का आह्वान किया कि हम सब को जीवन के प्रत्येक क्षेत्र में सामाजिक
सीलाध बनाये रखने के लिए अनुशंसा प्रशासन की रहना चाहिए, जिससे राष्ट्र
की प्रगति हो जाए।

इस दौरान प्रत्येक दिन कार्यक्रम का आयोजन किया गया जिसके अन्तर्गत राष्ट्रीय प्रशासक एवं सुरक्षा में भारतीय शिक्षालोगों की भूमिका विविध पर भाषण
प्रतियोगिता आयोजित की गई जिसमें विभिन्न वर्गों के अधिभाषियों/कर्मचारियों


स्वामी परस्मान्त जी महाराज का संस्थान भ्रमण

स्वामी परस्मान्त जी महाराज ने दिनांक: 12 दिसम्बर, 2009
क्रमशः भ्रमण किया तथा संस्थान के यह-राला एवं
कुछ प्रस्तुति में चल रहे
गतिविधियों का अवलोकन
किया। स्वामी जी के मार्गदर्श
में दौरे पर 182 गाँवों
का सफल संस्थान चल रहा है
एवं अल्मुक्त जगत (प्लेट)
में एक नई गाँवों की व्यवस्था
को कार्यान्वयन जा रहा है।


विद्यमान हृदय उत्सव श्रीराम बीज

<table>
<thead>
<tr>
<th>चारा फलसली</th>
<th>प्रजनन</th>
<th>वर (1.50)</th>
<th>दो.एक.एल. (1.50)</th>
<th>दर (1.50)</th>
</tr>
</thead>
<tbody>
<tr>
<td>बालिसम:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>बदलाना</td>
<td>100</td>
<td>220</td>
<td>300</td>
<td>100</td>
</tr>
<tr>
<td>जो, पृथ्वी, -143</td>
<td>1,250</td>
<td>220</td>
<td>350</td>
<td>100</td>
</tr>
</tbody>
</table>

| बालिसम: |
| जो, पृथ्वी, -95 | 1,000 | 220 | 100 |
| जो, राज | 8,000 | 35 | 11,900 | 15 |
| जो, पृथ्वी, -82 | 3,000 | 35 | 15,000 | 15 |
| जो, पृथ्वी, -851 | 1,500 | 35 | 1,000 | 15 |
| जो, पृथ्वी, -99.2 | 50 | 250 | 15 |

| चारा: |
| गौती | - | 30 | 325 |
| राजसमण | - | 20 | 120 |
| रामपुर | - | 35 | 110 |
| भुसुल | - | 150 | 100 |
| गोप की गोपी: |
| (नेपाली/मूडी/प्रसंके) | 7 लाख | 750/1000 |

सम्पर्क करें: निदेशक
भारतीय चरागाह एवं चारा अनुसंधान संस्थान, झारसी
0510-2730866/2730833