IGFRI Newsletter

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Director's Desk

Common property resource (CPR) includes village pastures or grazing grounds, *Gochar* land, revenue common lands, common wastelands, community forests, etc. More than 84 % of poor households gather food, fuel, fodder and fibre items from the CPRs. The CPRs also supplement income and employment along with social gains to the villagers. In the arid and semi arid regions of India, one important component of CPRs is the common pasture land which supply fodder and serves as grazing land for livestock and thus helps in sustaining a number of livestock based rural households. The landless farmers graze their animals as well as collect fodder from the CPRs. According to an estimate, nearly 12.15 million ha of land in country is classified as permanent pasture/grazing land. Common property resources, particularly forests and pastures are rapidly decreasing and deteriorating in developing countries resulting in many unintended and unanticipated environmental problems. The other types of common lands, such as, barren and uncultivable land, continuous fallow, cultivable waste land, etc are usually owned by the government, except where the ownership is otherwise defined. A number of studies have been undertaken by scholars to assess the size, contribution and nature of these resources and the institutional arrangements for their management.

The average use of green fodders per households for rearing livestock is much higher in CPRs-rich region than CPRs-poor region. Seeing the importance of CPRs in national perspective, ICAR-IGFRI is involved in developing pasture land in parts of Rajasthan, Madhya Pradesh, Uttar Pradesh, Leh & Ladakh, Kangeyam region of Tamil Nadu, high hills in Himachal Pradesh (Lahaul & Spiti), North Mangam district of Sikkim, Twang district of Arunanchal Pradesh and Kachchh region of Gujarat to cater the needs of livestock based farmers and help in improving their livelihood and employment opportunities.

Unnat Krishi Takneeki avam Kisan Sammelan

An "Unnat Krushi Takneeki avam Kisan Sammelan" held at ICAI-IGFRI on 27th February 2018 was inaugurated by Sh. Parshottam Rupala, Union Minister of State for Agriculture & Farmers Welfare and Panchayati Raj, Government of India. In his address he appreciated institute technologies and urged farmers to adopt them. He explained several farmer welfare schemes (soil health card, crop insurance, women empowerment, good governance, DBTL, enhanced MSP etc.) run by the government and asked the farmers to take their benefit. He requested farmers to take benefit of irrigation schemes and adopt soil and water conservation technologies in consultation with scientists. He also inaugurated an exhibition of technologies, farm machinery and feed products of Institute (Fig. 1), KVKs, line department and banks of Bundelkhand. About 400 farmers were beneficiary of Mera Gaon Mera Gaurav, Adarsh Chara Gram, Farmers FIRST schemes of ICAR-IGFRI, ICAR-CAFRI, ICAR-IISWC

and IFFCO participated in this event. Director, IGFRI, welcomed guests and farmers and explained the activities and achievements of institute. He has also interacted with staff of ICAR-IGFRI, ICAR-CAFRI and RLBCAU, Jhansi. He advised scientists and media to spread the new advances in agricultural research amongst the farmers.


Fig. 1. Hon'ble minister addressing staff and farmers and appraising feed product

Fodder technology and machinery demonstration meet and *Kisan Mela*

Institute organized a 'Fodder technology and machinery demonstration meet cum Kisan Mela' on 16th February, 2018 to exhibit institute's technology and suitable farm machinery (Fig. 2) to Bundelkhand farmers. Officials from KVK Bharari and Datia, Dept. of Agriculture, IFFCO, Indian Institute of Soil and Water Conservation, Datia, entrepreneurs, tractor companies & NGOs participated and demonstrated their technologies. About 500 farmers from 18 adopted villages of *Mera Gaon Mera Gaurav, Adarsh Chara Gram* and *Farmer First* programmes participated in this event. Prof. Arvind Kumar, Vice Chancellor, RLB Central Agricultural University, Jhansi was the chief guest of the occasion, stressed to raise the state productivity to national level. Dr. R. V. Kumar, Director, explained about institute fodder technologies and outreach programmes and requested farmers to take maximum benefits of these technologies.


Fig. 2. Fodder technology & machinery demonstration meet and *Kisan Mela*

Screening and evaluation of maize lines to water logging stress under field condition

More than one-third of the world's irrigated areas suffer occasional or frequent water logging. In Southeast Asia alone, 18% of maize growing areas are significantly affected by waterlogging causing 25-30% losses in maize production annually. Systematic information on the excessive water stress tolerance in maize is not yet established which necessarily required for genetic enhancement of tropical maize germplasm. Water logging causes a serious stress in maize from vegetative to reproductive stage. Four elite maize composites IGML-15-259 (R-5), IGML-15-261(R-7), IGML-15-258 (R-18),IGML-15260 (R-20), one cultivar (African tall) and one wild type Teosinte (JHT-04-3) were sown in field in 4 m x 3 m x 0.5 m (length, width and depth, respectively) polythene lined soil covered plots during *Rabi* 2017-18. The water logging stress was created at 30 DAS (V6-V7 stage of crop) keeping 15 cm continuous submergence for 30 days (Fig.1). Plant height, leaf area per plant and biomass per plant were recorded at 10 days after stress release. The results indicated that water logging significantly reduced the plant height, leaf area per plant and biomass per plant. The

maize line IGML-15-261(R-7) and Teosinte (JHT-04-3) were found more tolerant to water logging than others and control (Table 1).

Table 1. Effect of water logging on leaf area and biomass

Genotypes /Lines	Leaf area/plant (cm^2)			Shoot fresh weight (g/plant)		
	Control	Stress	% Reduction	Control	Stress	% Reduction
IGML-15-259 (R-5)	249	210	15.7	144	115	20.1
IGML-15-261 (R-7)	220	188	14.6	179	149	16.8
IGML-15-258 (R-18)	365	274	24.9	159	115	27.7
IGML-15-260(R-20)	365	271	25.8	136	102	25.0
African Tall (AT)	448	357	20.3	336	273	18.8
Teosinte (JHT-04-3)	160	145	9.4	85	67	21.2

(SN Dheeravathu, R Gajghate, Reetu, N Manjunath, VK Yadav, KK Dwivedi and S Ahmed)

Control of grassy weeds in Berseem

Berseem is a prominent fodder legume grown in *Rabi* season for fodder and seed production. The commonly found grassy weeds in berseem are *Poa annua, Cynodon dactylon, Phalaris minor, Digitaria sanguinalis* and *Cyperus rotundus*. These weeds influence/affect berseem seed production by competing with crop for light, moisture and nutrients. The weeds reduces both the green fodder and seed yield of berseem. Manual weed control is becoming difficult due to farm labour shortage. Chemical weed control is one of the best alternatives available under these circumstances. Experimentation with different doses of two new herbicide molecules (Quizalofop-ethyl and Fenoxaprop-p-ethyl) in berseem showed encouraging results. The herbicides were applied at 20 days after sowing. Fenoxaprop-p-ethyl @ 100 g a.i./ha resulted in the highest weed control efficiency of 93 % at 55 days after sowing with reduced grass weed density (3 no/m^2) and weed dry weight (1.8 g/m^2) compared to weedy check (54 no/m^2 and 26.51 g/m^2 respectively). Thus, Fenoxaprop-p-ethyl @ 100 g a.i./ha can be recommended as the post emergence herbicide in berseem to control the grassy weeds.

Fig. 6. Grassy weedy berseem at 55 DAS

Fig. 7. Fenoxaprop-p-ethyl 100 g a.i./ha sprayed on berseem at 55 DAS

(VK Wasnik, D Vijay, A Maity N Manjunatha and S Kumar)

Evaluation of micronutrient and protein enriched lines of forage oat

Mineral deficiency/or nutritional imbalances are well-known problems in livestock feeds and forages, which often limits the animals performance. Several successful technologies have

been developed to meet the dietary requirement of minerals from grain which are mostly consumed by human beings. Therefore, efforts to improve the nutritionally rich feed and fodder for sustaining livestock nutritional security in India will be the upmost priority. The practical way to solve such problem is to identify and develop high micronutrient and protein enriched lines which could directly be utilized as feed/fodder for animals. Efforts were made at institute where 150 oat germplasm lines along with four varieties as check were evaluated for micronutrient and protein content in soil condition of 0.71 ppm Zn. Among these oat germplasm lines, 26 high promising lines having Zn content >30 ppm were selected (Table 2). Quality analysis revealed that the range for crude protein is 7.99 to 15.07 %; NDF 57.66 to 71.58 %; ADF 31.78 to 43.00 % at 50% flowering stage of harvesting. Micronutrient analysis revealed that the range for Zn varied from 32 to 48ppm; Cu is 2 to 20ppm; Fe is 50 to 385ppm and Mn is 24-121ppm at 50% flowering stage of harvesting in selected lines.

Table 2. Protein, fiber (%DM) and micronutrient (ppm) in leaves of selected oat lines at flowering stage

Germplasm name	CP (%)	NDF (%)	ADF (%)	Zn (ppm)	Cu (ppm)	Fe (ppm)	Mn (ppm)
IG02156	10.20	63.07	38.23	48.1	5	211	94
IG02158	11.06	65.44	34.49	32.9	2	149	95
IG02149	15.07	62.33	34.15	40.0	4	249	82
IG02150	13.73	61.08	31.98	47.9	5	247	72
IG02141	11.74	58.66	32.23	32.5	3	390	38
IG02147	12.49	68.46	33.54	37.5	5	296	111
IG0280	10.65	64.07	39.23	36.9	6	167	114
IG02182	13.53	61.08	31.78	32.4	16	180	82
IG02115	7.99	68.70	41.96	33.8	16	92	45
IG02102	11.26	61.84	35.62	31.4	9	77	121
IG02105	8.60	63.32	36.14	38.0	15	120	59
IG03254	8.58	68.73	43.00	33.5	14	50	61
IG03231	11.46	60.84	33.62	31.4	7	154	40
IG02101	14.46	61.55	32.47	31.7	16	280	57
IG03209	11.82	64.50	34.86	38.0	12	165	29
IG03210	12.74	57.66	32.23	32.6	13	186	63
IG03211	12.27	60.29	34.33	33.6	17	220	91
IG03215	12.32	70.18	40.24	31.8	20	179	37
IG03205	9.26	60.96	37.60	31.7	14	189	41
IG03207	9.66	65.17	38.67	37.8	11	220	102
IG03276	8.59	62.64	36.57	33.4	15	200	54
IG03458	12.17	68.38	40.72	33.5	20	385	58
IG02162	10.33	71.58	37.42	32.0	15	234	40
IG02179	13.66	64.32	38.81	32.2	13	208	24
IG02146	12.24	68.43	39.70	32.7	14	250	6
IG02184	12.74	57.66	32.23	32.5	19	207	72
JHO-822	9.94	65.71	38.45	31.8	12	295	78
JHO-851	8.03	70.53	38.42	30.6	14	335	97
JHO-2000-4	9.66	66.64	36.26	29.5	15	375	76
Kent	8.57	69.84	40.21	32.8	13	280	83

(KK Dwivedi, R Ranjan, RP Sah, R Gajghate, M Chaudhary, KK Singh and S Ahmed)

Evaluation of chitosan as a potential biopesticide against berseem stem and root rot pathogens

Chitosan, a linear polysaccharide and deacetylated derivative of chitin mainly consists of glucosamine units, 2- amino-2 deoxy-β-D-glucose, and easily extracted from fungal cell wall and crustacean shells. In addition to its low cost of production, chitosan also possesses other biological properties such as non-toxicity, biocompatibility and biodegradability, which make chitosan a sustainable and eco-friendly molecule. Chitosan has some advantages over other biocontrol agent not only in its potential to control plant diseases but also its ability to induce resistance in the host plants and enhance biodiversity in the rhizosphere., Information on its use in protecting the berseem plants against stem and root rot pathogen is not available. Therefore, in a preliminary study, two types of chitosan differing in their molecular weight i. e, low (LMW) and medium (MMW), were tested *in vitro* for their efficacy against stem rot (*Sclerotinia* sp.) and dry root rot (*Macrophomina* sp.) pathogens of berseem in different concentrations (100-800ppm). Results in terms of Percent Growth Inhibition (GI %) over control revealed that both types of chitosan inhibited the mycelial growth of all the target pathogens with maximum inhibition occurring at 800 ppm (Fig. 8). Low molecular weight chitosan was more effective as it started inhibiting the mycelial growth even at a very low concentration of 100-200 ppm. This study opens up scope for chitosan use in berseem stem and root rot disease management.

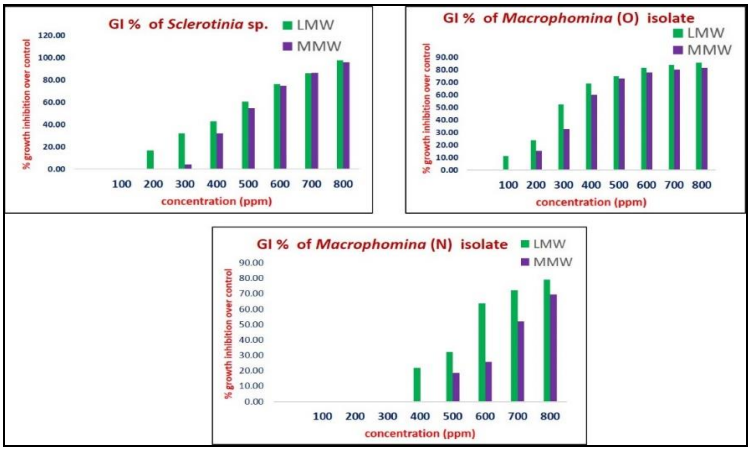


Fig 8. Effect of chitosan in terms of growth inhibition percentage (GI %) against *Sclerotinia* and *Macrophomina* isolates responsible for causing stem and dry root rot diseasein berseem.

(NR Bhardwaj, R Balodi, P Koli and M Rana)

Field day on spineless fodder cactus

A special field day and visit programme on spineless fodder cactus was organized during farmer's fair on 27 February, 2018 at ICAR-IGFRI, Jhansi in which nearly 500 farmers from various parts of Uttar Pradesh and Madhya Pradesh participated. Shri Purushottam Rupala, Minister of State, Agriculture and Farmers Welfare and Panchayati Raj, Government of India, was the chief guest on the occasion (Fig. 9). He visited the cactus research plots of ICAR-IGFRI and appreciated the spineless fodder cactus and urged farmers to adopt it. He emphasized that cactus can be a potential source of fodder especially during drought and lean period. The institute is promoting spine less fodder cactus in a big way through targeting

various stake holders like farmers including farm women, cow shelter owners (Gaushalas), state line departments, Village Panchayat Representatives, Common Property Resources, etc. The farmers also visited the cactus plots and showed keen interest in it.

Fig 9. Field day at farmer's field, village Dhobia, Datia (MP) and interaction meeting

(DR Palsaniya, S Kumar, S Ahmed, AK Mishra and Vikas Kumar)

Awareness and training programme on management of hortipastoral systems and modern aspects of temperate fruit production

One day "PGR/Farmer Rights Awareness Camp cum Biodiversity Fair" organized by ICAR-NBPGR Regional Station Srinagar on 28th March, 2018 at Kathalan Karewa Shadab, District Shopian in collaboration with ICAR-IGFRI, RRS, Srinagar.

International Day of Forests-2018 organized on 21st March, 2018

Fig. 10. Activities at RRS-IGFRI, Srinagar (J & K)

(S Ahmad, NH Mir and DK Verma)

Glimpses of IGFRI activities

ICAR Sports meet

ICAR sports meet, 2017 for western zone was organized at ICAR-CAZRI, Jodhpur during 16-20 January 2018. A contingent of 60 sport persons participated in different indoor and outdoor games (athletics and team events). ICAR-IGFRI kabaddi team finished *winner* of zonal sports tournament along with *Fair Play trophy*.


Fig. 11. Sports meet glimpses

Republic day celebration

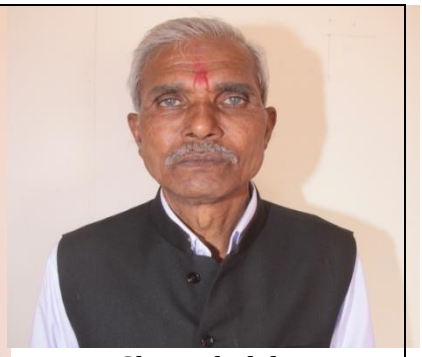

Fig. 12. Republic day glimpses

Retirements

(Saman Wetan Shramik)

NAME		
		
Shri Hardas 28.02.2018	Shri Bhaiyalal 31.03.2018	Shri Munna 31.03.2018

(Skilled Supporting Staff)

		
Shri Lalaram 31.01.2018	Shri Kalicharan 31.01.2018	Shri Babulal 28.02.2018

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