



NIBSM

NEWSLETTER

राष्ट्रीय जैविक स्ट्रेस प्रबंधन संस्थान

NATIONAL INSTITUTE OF BIOTIC STRESS MANAGEMENT

Baronda, Raipur - 493 225, Chhattisgarh



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Director's desk

Zoonotic diseases are transmitted by rats in rural settings. The Institute has launched a programme, 'Rodent Control and Zoonotic disease management' in animals and humans in agricultural farms of Chhattisgarh state. Rodent-originated disease complex in livestock and humans of rural India is given special attention. The extent and intensity of disease burden on humans and farm animals have been poorly recorded in the national health / disease epidemiology data base across states. While we know that coastal districts suffer maximum

during monsoon months due to the zoonotic diseases, the clinical records in clinics / hospitals are very meagre. Pyrexia of unknown origin (PUO) as diagnosis and treatment is common in the absence of typical diagnostic kits to detect such zoonoses in both animals and humans. Affordable and simple kits need to be made available to doctors in both veterinary and medical primary health centres / clinics. Database requirement also directs towards accurate treatment profile of infected population of animals and humans in farms. NIBSM takes strong interest in taking up the community management system for rat-population containment. As is known widely, these k-selection animals have bursts of population growth in the wake of ample food and lower mortality factors. 3-5 yearly cycles occur in various parts of the country. The institute propose to take up a Pilot programme in Chhattisgarh state during 2014 crop season. This aspect received acclaim and admiration from the Chhattisgarh state when the then Hon'ble Governor, Shri Shekhar Dutt launched the programme, 'Rodent Control and zoonotic disease management in Chhattisgarh on 12th May 2014 at the Veterinary College campus, Anjora, Durg. The Secretary, DARE & Director General, Indian Council of Agricultural Research presided over the function. The Additional Chief Secretary and Agricultural Production Commissioner, Shri Ajay Singh, IAS along with Deputy Directors General of ICAR graced the occasion along with Vice Chancellors of Chhattisgarh Kamdhenu Vishwavidyalaya and Indira Gandhi Krishi Vishwavidyalaya. NIBSM has strongly tied up with All India Network Project (AINP) on Rodent Control (rechristened in 12th plan as AINP on Vertebrate Pest Management).

The economic loss measurement of zoonotic diseases in rural population of animals, humans and crops needs attention. National research network of ICAR, ICMR and DG HS can be set up under the aegis of NIBSM. The beginning is made by a planning meeting with stake holders of the state in the month of May and capacity enhancement programme (CEP) for senior officials / doctors of the departments of Animal Husbandry, Agriculture, Horticulture, *Krishi Vigyan Kendras*, Agricultural Universities and Veterinary Universities, Central IPM centres of the Ministry of Agriculture. These officials would be resource persons for rodent control campaign during the year in identified villages of those districts in the state. The model that is expected to be developed could be replicated in the region with the other states such as Maharashtra, Goa and Madhya Pradesh.

The institute commenced the process of appointing Project Management Consultant (PMC) for developing and executing the Master Plan. The institute has to develop its campus township in its 50.179 ha at Baronda, Raipur on Baloda Bazar state highway.


T.P. Rajendran

Performance evaluation of post-emergence herbicides on weed infestation and productivity of wheat in Chhattisgarh (V.K. Choudhary and Anil Dixit)

A field experiment was conducted to compare biological efficacy of ready and tank - mix post emergent herbicides against two and three hand weedings in wheat. The wheat crop in the experimental plot was mainly infested with grasses like *Phalaris minor*, *Avena ludoviciana*, *Cynodon dactylon*; broad leaved weeds viz. *Chenopodium album*, *Alternanthera triandra*, *Medicago denticulata*, *Melilotus alba*, *Melilotus indica*, *Anagelis arvensis*, *Fumaria parviflora*, *Vicia hirsuta*, *Euphorbia geniculata*, *Vicia sativa*, and sedges like *Cyperus iria* and *C. deformis*. Among the different weed species, broad leaved weeds had 42.4% higher relative weed density followed by grasses (37.9%) and least density of sedges (19.7%). All the herbicide treatments along with two and three hand weedings significantly reduced the dry weed biomass of all the weed species as compared to control. Application of Pinoxaden 5% EC + Chlorimuron 25% WP (50 + 4 g ai/ha) elicited yellowing of leaf tips in wheat crop, however, recovery of phytotoxicity was seen within 25 days after spray. Three hand weedings (at 20, 40 and 60 DAS) had 88.9% weed control efficiency followed by two hand weedings (20 and 40 DAS, but economically these two practices were not viable, because of higher production cost. It was noticed that tank mix of Pinoxaden 5% EC + 2, 4-D 38 EC (50 + 500 g ai/ha) and Sulfosulfuron ethyl 75% + Metsulfuron methyl 5% WG (32 + 4 g ai/ha) had registered higher B: C ratio with 1.67 and 1.51, respectively. Though, higher grain yield was noticed with three hand weeding (3.25 t/ha) it was statistically comparable ($P < 0.05$) with Pinoxaden 5% EC + 2, 4-D 38 EC (50 + 500 g ai/ha) and Sulfosulfuron ethyl 75% + Metsulfuron methyl 5% WG (32 + 4 g ai/ha). These indicated that grain yield was directly related to weed infestation and severely reduced by weed competition. With the present experiment, it may be concluded that with three hand weedings, density and dry biomass of weeds was lower than the herbicide applied plots. But, it was also noticed that the combination of herbicide either tank or ready mix were superior to all other herbicide with respect to weed suppression. However, the use of tank-mix application of Pinoxaden 5% EC + 2, 4-D 38 EC (50 + 500 g ai/ha) and ready-mix formulation of Sulfosulfuron ethyl 75% + Metsulfuron methyl 5% WG (32 + 4 g ai/ha) were statistically comparable and profitable in terms of yield and economics.

Pilot research project on rodent control and zoonotic disease management in the state of Chhattisgarh

(TP Rajendran, J Mallikarjuna & SB Barbuddhe)

National Institute of Biotic Stress Management (NIBSM), Raipur has initiated a pilot research project on rodent control and zoonotic disease management in the state of Chhattisgarh. The project was launched by Shri Shekhar Dutt, Hon'ble Governor of Chhattisgarh in presence of Dr. S. Ayyappan, Hon'ble Secretary, DARE and DG, ICAR in a function organized at Chhattisgarh Kamdhenu Vishwavidyalaya, Durg on 12th May, 2014. The function was witnessed with gracious presence of Shri Ajay Singh, IAS, Additional Chief Secretary and Agricultural Production Commissioner, Dr. K.M.L. Pathak, DDG (Animal Sciences), Dr. Arvind Kumar, DDG (Education), Dr. Meena Kumari, DDG

(Fisheries), ICAR, Dr. UK Mishra, Vice Chancellor, Chhattisgarh Kamdhenu Vishwavidyalaya, Durg and Dr. SK Patil, Vice Chancellor, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Assistant Directors General and Directors of ICAR Institutes.

The project will be implemented through community participation under social engineering and with the collaboration of Chhattisgarh state's line departments, Indira Gandhi Krishi Vishwavidyalaya, Chhattisgarh Kamdhenu Vishwavidyalaya as well as with the support of administration at Panchayat / village level as also more importantly with the association of farm families. In order to catalogue the extent of rodent-driven damage to crops as well as ailments to animals and humans in the villages, NIBSM could take up survey of identified districts.

The *Bandicoota* rats and other rodent species are seen to build up population during rice harvesting stage of *Kharif* and then spill over to damage the wheat crop that is devastated totally. The threat to wheat crop from rodents has made farmers to leave this crop in *rabi* season, leaving the land fallow or plant less risky crops. This has affected cropping intensity in certain districts of Chhattisgarh. This appears to affect the area under wheat crop, thus drastically cutting through the area, production and productivity of the crop in the state. The rodents are also responsible for transmission of zoonotic infections such as leptospirosis, plague, Q fever, bartonellosis.

Large quantity of food in the form of grains in both seasons stimulate their breeding and multiplication. The result is their widespread movement in dwellings where animals and humans are housed. The food, feed and fodder are contaminated with their urine and droppings that contain billions of pathogenic bacteria such as *Leptospira*. These cause fever and debilitation and often death in animals and humans. The institute is in the process of systematic study of the biology and impact assessment of change of breeding behaviour of key species such as field rats and *bandicoots*.

It was observed that wheat crop during *rabi*, 2013-14 was affected by rodents to the maximum extent in Baronda campus, NIBSM. Hence, we undertook integrated rodent management practices in wheat fields using two types of baiting materials. NIBSM farm was surveyed and identified the live burrows around the crop fields. Semi-solid bait was prepared using of *maida* flour (250 g) + mustard oil to wet + sugar (250 g). Zinc phosphide, an acute rodenticide was added to bait mixture at the rate of 150g / 500g additive materials. Two bait materials, paddy and potato were tried. The rodenticide formulation was mixed with paddy grains (20g each) and chopped potato pieces (20g each). Final bait mixture was charged in paddy and potato baits. The live burrows were baited and closed with mud. Two weeks after the baiting, the dead rats were counted. Fresh burrows were identified and treated with bromodiolone was put into the live burrow. Further, observations were recorded on number of rats killed and number of live burrows, on daily basis.

It is observed that bait material charged with paddy grains performed well when compared to bait material charged with potato. The rat population and the number of live burrows were decreased by 60% after baiting with rodenticides.

Institute Outreach Programme

Transfer of technology of weed management in Paddy cultivation

(Anil Dixit and V.K. Choudhary)

Rice-wheat cropping system is popular in the villages of Kawardha district of Chhattisgarh. Twelve farmers' fields in Dharampura, Kairjinti, Kairjinti Kala and Patharra villages of Kawardha district of Chhattisgarh were studied for weed intensity and crop loss in wheat. Their fields were infested with eleven weed species, viz., *Phalaris minor*, *Euphorbia geniculata*, *Avena ludoviciana*, *Chenopodium album*, *Medicago denticulata*, *Melilotus alba*, *Melilotus indica*, *Fumaria parviflora*, *Vicia hirsuta*, *Vicia sativa* and *Coronopus didymus*. Manual weeding led to increased production cost. Timely non-availability of labourers limit timely weed suppression in wheat crop (GW 273), resulting in many of the wheat growers (about 40%) leaving their fields unweeded. Discussions with farmers and analyses of cropping techniques of the villages revealed that 1) the farmers were misguided to use narrow spectrum herbicides such as Isoproturon, 2,4-D controlling the weeds and targeted only some species of either broadleaved weeds, sedges or grasses; and 2) some of them resorted to continuous use of such herbicides, causing upsurge of certain flora such as *Phalaris minor* with continuous use of 2,4-D and *Chenopodium album* with continuous use of Isoproturon.

Knowledge on precision techniques of herbicides use was limiting in these villages. Transfer of weed management technology through farmer-participatory demonstration was hence planned to provide successful weed suppression in wheat crop. In order to develop convincing weed suppression with the use of registered herbicide formulations that have dual modes of action against both dicot and monocot weed species in wheat crop, ready-to-mix mixture of chemistries were used for the demonstrations.

(a) Farmer participatory evaluation using two formulations containing two chemistries namely, Clodinafop propargyl 15% + Metsulfuron methyl 1% and the other formulation containing Sulfosulfuron 75% + Metsulfuron methyl 5% WG was undertaken in 8 and 10 farmers' fields, respectively.

Clodinafop propargyl 15% + Metsulfuron methyl 1%, ready mix herbicide formulation was used in 6 locations viz., two sites of each Dharampura, Kairjinti, Kairjinti Kala and Patharra. This was applied at 400 ml/ha with 1.25 litre surfactant using flat fan nozzle using knapsac sprayer at tank pressure of 200 kPa after diluting with 375 L water/ha to achieve 1.06 per cent concentration of the mixture that in effect would provide 0.16 per cent of Clodinafop propargyl and 0.01 per cent of Metsulfuron methyl at the nozzle delivery falling on the weed species. The molecule had the weed control efficiency of 72-85%, to avoid competition among weeds at 60 DAS growth stage of wheat crop. It was noticed that there was yield advantage of 43.7% than the traditional practices existing at the farmers' fields.

(b) Sulfosulfuron 75% + Metsulfuron methyl 5% WG, a ready mix

each Dharampura, Kairjinti, Kairjinti Kala and Patharra and the chemistry had significantly increased the growth and yield attributing characters of wheat, resulted weed control efficiency of 78-88% and provided yield increment of 56.4% over the hand weeding practice followed by farmers.

Education and Training

The maiden, 5-day long training programme on "**Biotic Stress Management on Crops**" was organized by National Institute of Biotic Stress Management, Raipur from 27th February to 3rd March 2014 at Raipur. Altogether 31 trainees (progressive farmers) from different Tehsils of Nanded district (Maharashtra) were benefitted from the programme, that was sponsored by Project Directorate, Agricultural Technology Management Agency, Nanded (Maharashtra). Speaking at the valedictory occasion, Dr. S.K. Patil, Vice-Chancellor, Indira Gandhi Krishi Vishwavidyalaya, Raipur emphasized upon biotic stress management of field crops, vegetables and fruit crops and also suggested the farmers to take up horticultural crops for higher profit and sustainable production. Dr. C.L. Jain, Director, State Agricultural Management, Education and Training Institute highlighted the importance of this training programme. He highlighted the importance of different biotic stresses like insects, weeds, pathogens, nematodes and other vertebrate pests in agriculture and encouraged the farmers to get more benefit from this training. He also congratulated the staff of NIBSM for conducting its first ever training programme for farmers.

Dr. Anil Dixit, Principal Scientist (Agronomy), the Course Director of this training programme along with Dr. V.K. Choudhary as training coordinator emphasized that biotic factors were causing damage to the crops to reduce crop yield. He emphasized the importance of integrated weed management in various crops and safe use of chemicals in agriculture to attain sustainable production. Training was scheduled with lectures, farm visit and visit to seed industries, through qualified and experienced resource persons from National Institute of Biotic Stress Management (Raipur), Directorate of Weed Science Research (Jabalpur) and Indira Gandhi Krishi Vishwavidyalaya, Raipur.

The trainees were exposed with integrated weed/insect/disease management on cereals, pulses, oilseeds and vegetable crops, apart from these they were further briefed about precision farming, technical know how about use of chemicals/pesticides, low cost hands-on production technology of biocontrol agent, *Trichoderma* and mushroom, *Plurotus* spp. The feed-back from participants showed that they were satisfied with the knowledge and level of understanding of the course content of training.

Krishi Vasant 2014

The institute participated in the Farmers' Fair - Krishi Vasant that was organized on 9-13 February 2014 at Central Institute of Cotton Research, Nagpur. NIBSM put up a stall depicting technical advisory on weed management in crops and about the institute's proposed activities for biotic stress management in agriculture. Over 5 lakhs progressive farmers of the area visited the stall. Farmers were keen in knowing the latest techniques to keep biological stresses away from crops to attain profitable harvest.

Awards and Recognition

Dr. Anil Dixit, Principal Scientist (Agronomy), was awarded with the Fellow of the Indian Society of Weed Science for his outstanding contributions in weed science conference to mark the silver jubilee of the Directorate of Weed Science Research, Jabalpur.

Publications

i) Presentations in seminar / symposia

Dixit, A. and Choudhary, V.K. 2014. Weed - a biotic constraint in soybean productivity. International soybean research conference on mitigating productivity constraint in soyea for sustainable agriculture. 22-24 Feb 2014, Indore, pp 205-206.

ii) Book Chapter

Anil Dixit 2014. Weed Management In: Solving the pulses crises New India publishing agency New Delhi P157-166.

Naidu, V.S.G.R., Dixit, A., Singh, P.K. and Ranganatha, A.R.G. 2014. Crop weed interactions and weed management under climatic condition. Edited book on Climate change and crop production. Avishakar publishers. pp157-165.

iii) Popular articles

दीक्षित, अनिल 2013. खरीफ दलहनी फसलों में खरपतवार नियंत्रण. तृण संदेश अंक 9 पृष्ठ 4-6

दीक्षित, अनिल एवं चौधरी, वी.के. 2013. निदान एक खरपतवार अनेक. कृषक जगत अंक 16(28 अक्टूबर - 3 नवंबर 2013). पृष्ठ 7-8

iv) Extension Folders

1. अनिल दीक्षित एवं व्ही.के. चौधरी 2014 धान के प्रमुख खरपतवार एवं उनका प्रबंधन विस्तार पत्रिका क्र.-1, राष्ट्रीय जैविक स्ट्रेस प्रबंधन संस्थान, रायपुर (छ.ग.) ।

2. अनिल दीक्षित एवं व्ही.के. चौधरी एवं मल्लिकार्जुन 2014 धान के कीटों का समेकित विस्तार पत्रिका क्र.-2, राष्ट्रीय जैविक स्ट्रेस प्रबंधन संस्थान, रायपुर (छ.ग.) ।

3. अनिल दीक्षित एवं व्ही.के. चौधरी 2014 गेहूं की उन्नत खेती एवं खरपतवार नियंत्रण विस्तार पत्रिका क्र.-3, राष्ट्रीय जैविक स्ट्रेस प्रबंधन संस्थान, रायपुर (छ.ग.) ।

4. अनिल दीक्षित एवं व्ही.के. चौधरी एवं मल्लिकार्जुन 2014 दलहनी फसलों में फलीछेदक कीट प्रबंधन विस्तार पत्रिका क्र.-4, राष्ट्रीय जैविक स्ट्रेस प्रबंधन संस्थान, रायपुर (छ.ग.) ।

5. अनिल दीक्षित एवं व्ही.के. चौधरी 2014 फसलों में खरपतवार प्रबंधन विस्तार पत्रिका क्र.-5, राष्ट्रीय जैविक स्ट्रेस प्रबंधन संस्थान, रायपुर (छ.ग.) ।

6. अनिल दीक्षित एवं व्ही.के. चौधरी 2014 सब्जियों में खरपतवार प्रबंधन विस्तार पत्रिका क्र.-6, राष्ट्रीय जैविक स्ट्रेस प्रबंधन संस्थान, रायपुर (छ.ग.) ।

गणतंत्र दिवस समारोह

संस्थान में गणतंत्र दिवस 26 जनवरी 2014 को बरोंदा में बड़ी धूमधाम से मनाया गया। विशेष कर्तव्यस्थ अधिकारी के करकमलों द्वारा झंडा फहराया गया। अपनी स्थापना के बाद एनआईबीएसएम द्वारा पहली बार यह समारोह सम्पन्न किया गया था। इस अवसर पर संस्थान के वैज्ञानिक, प्रशासनिक अधिकारी के अलावा इंदिरा गांधी कृषि विश्वविद्यालय के कर्मचारी और पड़ोसी गांव के किसानों और ग्रामीणों द्वारा सक्रिय रूप से भाग लिया गया।

Distinguished Visitors

Dr. S.K. Dutta, Deputy Director General (Crop Science) visited the institute on 9th May 2014.

The following dignitaries visited the institute on 10th May & 11th May 2014:

Dr. S. Ayyappan, Secretary, Department of Agriculture Research and Education and Director General, Indian Council of Agricultural Research

Dr. Arvind Kumar, Deputy Director General (Education)

Dr. K.M.L. Pathak, Deputy Director General (Animal Science)

Dr. Meenakumari, Deputy Director General (Fisheries)

Dr. Shiv Dhar Singh, Asst. Director General (Fisheries)

Dr. Gaya Prasad, Asst. Director General (Animal Health)

Dr. B.S. Prakash, Asst. Director General (Animal Nutrition & Physiology)

Dr. R.S. Gandhi, Asst. Director General (Animal Production & Breeding)

Prof. A.R. Sharma, Director, Central Inland Fisheries Research Institute, Barrackpore

Dr. P. Jayashankar, Director, Central Institute of Freshwater Aquaculture, Bhubaneswar

Dr. R. Ramani, Director, Indian Institute of Natural Resins & Gums & Officer on Special Duty, Indian Institute of Agricultural Biotechnology, Ranchi



Edited and compiled by :- **Dr. T.P. Rajendran, Dr. Anil Dixit and Dr. V.K. Choudhary.**

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