



WEED news



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From Director's Desk

In 1963, in his book *Little Science, Big Science* (Columbia University Press, New York) D. J. de Solla Price presented data from Chemical Abstracts for the period 1910-1960 which showed that the number of multiple-author papers increased from under 20 percent in 1910 to over 60 percent in 1960. It was his speculation in his own words: "Since that time the proportion of multi-author papers has accelerated steadily and powerfully, and it is now so large that if it continues at the present rate, by 1980 the single-author paper will be extinct." Here lies the importance of collaboration in research. Modern research is increasingly complex and demands an ever widening range of skills. Often, no single individual possesses all the knowledge, skills, and techniques required. If two or more researchers collaborate, there is a greater probability that among them they will possess the necessary range of skills. And we realise it easily in the recently published paper "Crystal structure of a monomeric retroviral protease solved by protein folding game players" published in "nature structural and molecular biology", where a group of players of different disciplines have deciphered the structure of an enzyme of an AIDS-like virus that had thwarted scientists for a decade. They have achieved it while playing Foldit, a multiplayer online game on protein-structure prediction. The collectiveness and ingenuity of game players was a formidable force to resolve a long standing scientific problem.

After taking the charge of this institute I feel the necessity of collective work. It certainly will define the dimension of the scattered elements in flurry. The unified dimension of the intellectual elements will shape the institute to contribute for farmers.

Research Notes

Herbicides in DSR-wheat system: influence on weed dynamics

With the availability of broad spectrum herbicides to control weeds and the associated technology, it is possible to raise productivity of direct seeded rice with low production cost. Number of herbicides is widely used in both these cropping systems. The nature and behaviour of the chemicals has a great influence on the weed flora association and their growth and behaviour in a specific environment. Due to the continuous use of herbicides, the development of resistant biotypes of weeds may cause problem in the crop production system. Continuous monitoring of weed flora in the system will enable to find out the weed flora succession, and development of

resistant biotype and accumulation of applied herbicides, if any.

A long term field trial in DSR-wheat cropping system consisting of bispyribac-sodium 25 g/ha PO, cyhalofop-butyl 90 g/ha and one hand weeding at 30 DAS along with weedy check in DSR as a main plot treatments and isoproturon 1.0 kg/ha, sulfosulfuron 25 g/ha, clodinafop 60 g/ha + 2,4-D 0.5 kg/ha, one hand weeding at 30 DAS and weedy check in wheat was conducted.

Rice

Experimental field was infested mainly with *Echinochloa colona*, *Alternanthera* sp., *Commelina*, *Physalis minima*, *Caesulia axillaris*, *Corchorus* sp. and *Cyperus iria*. All the weed control treatments significantly influenced the density and distribution of *Echinochloa colona*, *Alternanthera* sp., *Commelina* sp., *Cyperus iria* and

Caesulia sp. Application of bispyribac-sodium 25 g/ha significantly reduced the population of *Cyprus iria*, *Alternanthera*, *Commelina* and *Physalis minima* over cyhalofop-butyl 90 g/ha and weedy check. Similar effect was also observed in respect to total weed density and weed biomass production. Lowest weed population and its dry biomass production were recorded with bispyribac-sodium 25 g/ha over other treatments. All weed control treatments also influenced the crop growth, yield attributes and grain yield of rice. Bispyribac-sodium 25 g/ha being *at par* with one hand weeding showed higher tillers, yield attributes and grain yield of rice over others. Presence of weeds throughout growing season caused 48 per cent reduction in grain yield of rice.

Wheat

Phalaris minor and *Avena ludoviciana* among grassy, *Chenopodium album*, *Medicago hispida*, *Physalis minima* and *Cichorium intybus* among broad leaved weeds were dominant weed flora. Both sulphasulfuron 25g/ha and clodinafop 60g/ha + 2,4-D 0.5 kg/ha were effective in reducing population of almost all weed species, total weed density and weed biomass production. Among herbicides, isoproturon 1.5kg/ha was least effective. Presence of weeds throughout the growing season caused 14 per cent reduction in grain yield of wheat. Higher yield attributes and grain yield were recorded with the application of sulphasulfuron 25 g/ha. Lowest grain yield was recorded with isoproturon 1.5 kg/ha. Preceded treatments applied in rice did not influence the crop growth, yield attributes and grain yield of wheat.

- VP Singh, KK Barman and C Sarathambal

Premix of penoxsulum and cyhalofop: Bioefficacy in transplanted rice

Crops are at risk of infestation of invasive, competitive weeds that can diminish the yield of crop harvest. Application of single herbicide with a specific site of action may help control weeds. The repetitive use of herbicides with the same mode of action may be counterproductive; herbicide resistant weed populations develop,

thereby rendering the previously effective herbicides useless. To avoid this situation in future a premix of two herbicides, penoxsulum and cyhalofop with different modes of action was tried in rice.

A field study was conducted with premix-combination of penoxsulum and cyhalofop at 105,120,135 and 150 g/ha along with penoxsulum 22.5g/ha, cyhalofop-butyl 80g/ha, bispyribac-sodium 20g/ha and pretilachlor 750g/ha, two hand weeding and weedy check. All the herbicides were applied as a post-emergence herbicide at 20 DAS. The herbicides were applied through 500 liters of water per hectare using high volume knap sack sprayer with flat fan nozzle. The weed population and weed biomass was noted by quadrat (0.5 m X 0.5 m) method at 45 DAS. The data on weed population was subjected to square root transformation for statistical analysis. A loss of 57% in yield due to weeds has been recorded under this trial. Grain yield differed significantly due to application of different treatments over weedy check. The grain yield obtained under penoxsulum + cyhalofop at 150 g/ha was superior over other treatments of premix combinations at 135,120 and 105 g/ha and significantly increased the yield of rice by 48% over weedy check due to lower weed competition.

-Anil Dixit

Characterization of important weed seed of central and southern India

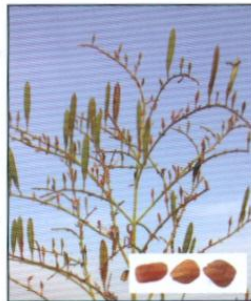
Seed of some plants are so distinctive that they are not easily confused with those of other kind and their identification poses no problem. However, there are many groups of plants, especially weeds, in which seed of one species closely resemble those of another species. The task of identifying weed seed is difficult due to smaller size of many seed, loss of certain parts, differences in maturity, changes in surface appearance, etc. Seed illustrations with description of the morphological characters are useful in identifying important weed seeds. Some of the weed seed characters along with the seed and plant images are given below.

1. *Oxalis latifolia*



Propagates mostly by rhizomes. Rhizomes reddish and scaly, resembling small sized garlic

2. *Andrographis paniculata*



Seed 3-5 mm yellowish brown, subquadrate

9. *Themeda triandra*



Oblong, 7-9 mm long, dark brown, pointed at apex, grooved ventrally

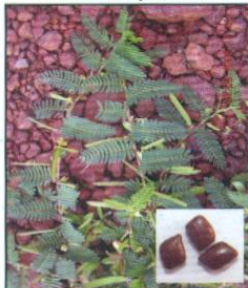
10. *Spergula arvensis*



Seed 0.5-1.5 mm, black with white papery outer margin

-V.S.G.R. Naidu

3. *Cassia pumila*



Seed, 7-10 mm long, rectangular, brown to dark brown, polished.

4. *Convolvulus prostratus*



Seed brown, 5-7 mm, oval, flat to slightly concave on one side and convex on the other side, minutely puberulous

5. *Cyanotis axillaris*



Seed oblong, 3-5 mm, dull black with slight reddish tinge at apex, faintly rugose

6. *Euphorbia dracunculoides*



Capsule glabrous, 3-lobed, 3-seeded, pale yellow. Seed 5-7 mm, rough, black, mottled with brown patches

7. *Oxperculina turpethum*



Seed round, dull black, glabrous, 5-6 mm diameter. Enclosed in the enlarged papery sepals

8. *Martynia annua*



Fruit: Capsule 20-35 mm long, hard, woody with two sharp curved horns/ hooks, 3-5 mm long, viscid-pubescent, splitting into two valves.

News

XVth Research Advisory Committee meeting

The XVth Research Advisory Committee meeting of the Directorate was held on April 7-8, 2011 under the Chairmanship of Dr. D. P. Singh. The Director, Dr. J.G. Varshney welcomed the Chairman and other members of RAC and Dr. J. C. Dagar, ADG, NRM Division. He informed the RAC about the developments made at the Directorate after the last RAC meeting. RAC members



appreciated the steps taken in the Directorate. Scientists of different sections presented research works conducted in the last year. After the detailed discussion on each sectional presentation, RAC made some important recommendations. RAC also outlined the future thrust areas for DWSR, viz., developing and up scaling economic and eco-friendly weed management technologies, aquatic and parasitic weed management, management of alien invasive weed species, mitigating the emerging threat of bio-similars through molecular and other approaches, identification of herbicide metabolites, climate change on crop-weed interaction and productivity, strengthening of advisory services and impact assessment, creating awareness among policy planners, administrators and stakeholders about utility and losses by weeds. Dr. K. K. Barman, Member Secretary finally proposed vote of thanks.

Joint training programme: DWSR and IFFCO

A one day training programme on weed management was organized on 26th May, 2011 for the technical officers of IFFCO. The programme was organized jointly by DWSR and IFFCO and chaired by Dr. J.G. Varshney, Director, DWSR. Mr. Dhingra, State Manager, Marketing Division, West Zone, IFFCO elaborated the future programme of IFFCO and stated the importance of DWSR for their programme. Dr. V.P. Singh, Principal Scientist, Agronomy delivered a lecture on non-chemical approaches of weed management in crop production. Dr. Anil Dixit, Principal Scientist, Agronomy elaborated the herbicide application



techniques. Er. H.S. Bishen, Principal Scientist, threw light on farm mechanisation in weed control discussing the use of different tools. Dr. P. K. Singh, Principal Scientist, discussed about the positive attitude of the local farmers towards technologies disseminated from this directorate. Finally, the Chairman of the meeting Dr. J.G. Varshney narrated the importance of weed management in agriculture.

Dr. A.R.G. Ranganatha has taken the charge of DWSR

Dr. A.R.G. Ranganatha, Project Coordinator (Sesame), Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur has assumed the charge of the post of Director, DWSR on the 22nd June, 2011. Dr. J.G. Varshney, former Director, DWSR, has been transferred to ICAR Research Complex for NEH Region, Sikkim Centre, Gangtok.

Personalia

International training

Dr. VSGR Naidu, Sr. Scientist, received NAIP sponsored advance training for three months to get advance training on "Carbon trading, carbon sequestration and climate change" at Natural Resource Ecology Lab and Department of Soil and Crop Sciences, Colorado State University, USA, 2011.

New recruitment



Dr. Meenal Rathore, from Defence Institute for Bio-energy Research, DRDO, Haldwani joined DWSR on 01.04.2011 as Sr. Scientist (Biotechnology) on direct selection.

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