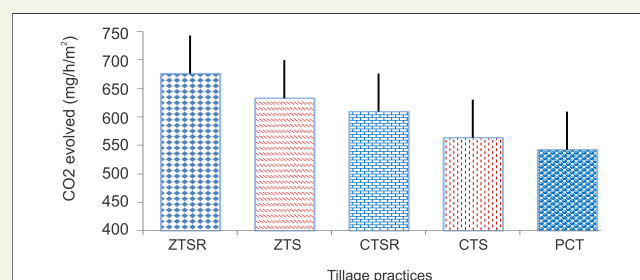


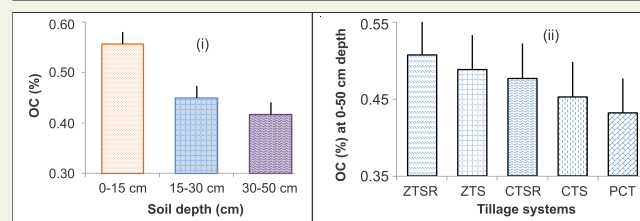
## RESEARCH

### Weed Management in Rice-Based Cropping System under Conservation Agriculture

Reduction in tillage intensity or frequency under conservation agriculture may influence soil physico-chemical properties apart from affecting weed dynamics, crop production, etc. under rice-based and non-rice-based cropping systems. Total eight treatments consisting of five establishment methods viz., (i) CT(DSR)+S-CT(wheat)-ZT(greengram), (ii) CT(DSR)+S+R-CT(wheat)+R-ZT(greengram) + R, (iii) ZR(DSR)+S-ZT(wheat)-ZT(greengram), (iv) ZT(DSR)+S+R-ZT(wheat)+R-ZT(greengram) + R, (v) CT(TPR)-CT(wheat) and three weed control measures viz. continuous use of bispyribac-sodium + pre-sowing non-selective herbicides in ZT, rotational use of herbicides + pre-sowing non-selective herbicides in ZT, and unweeded (control) as sub plots were laid out in split plot design with three replications. The effect of tillage practices, crop residue recycling and weed control measures were studied in terms of soil respiration rate during *Rabi* (wheat). It was noted that in absence of crop residue recycling, the rate of soil respiration was significantly higher in ZT-ZT than in CT-CT and puddle-CT systems (Figure). There was no effect of weed control measures on rate of soil respiration. It was found that organic content decreased significantly with increasing soil depth. The highest organic carbon (OC) content value of 0.56% was recorded in 0-15 cm



Effect of crop residues and tillage practices on soil respiration under wheat (CT: conventional tillage, ZT: zero tillage, S: *Sesbania* brown manuring, R: crop residue recycling and PCT: puddled/conventional tillage).



The organic carbon content in the soil as influenced by (i) soil depth, and (ii) tillage and residue recycling practices (CT: conventional tillage, ZT: zero tillage, S: *Sesbania* brown manuring, R: crop residue recycling, PCT: puddled/conventional tillage)

layer, followed by 0.45 and 0.42% in 15-30 and 30-50 cm soil layers, respectively. Tillage and crop residue management practices significantly affected the OC content of soil profile. The highest value of the mean OC content at 0-50 cm soil profile was 0.51% under ZTSR followed by 0.49, 0.48, 0.45 and 0.43% under ZTS, CTSR, CTS and PCT treatments, respectively.

### Domestication Traits in *Echinochloa* species

A study on 112 accessions of *Echinochloa* spp. collected from different locations of India revealed immense variation in morphological traits as well as yield attributes including degree of shattering. Variations in plant height, panicle length, number of panicles and yield per plant permit ample scope for improvement in the available germplasm by selection approach.

### Characteristics of different accessions of *Echinochloa* species

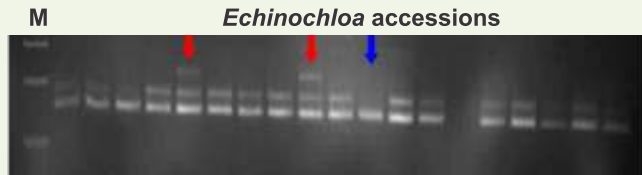
Parameter	Plant height (cm)	Tillers/plant	Panicles/plant	Seed yield (g/plant)
	38 DAS	38 DAS	52 DAS	Maturity
Min.	54.6	2.20	2.60	1.06
Max.	125.0	22.7	25.8	9.60
Mean	99.6	5.58	3.7	5.00
SEm ±	2.2	0.61	0.4	0.451
SEd ±	3.2	0.86	0.64	0.638



*Echinochloa* accessions (50 days after sowing) in the field

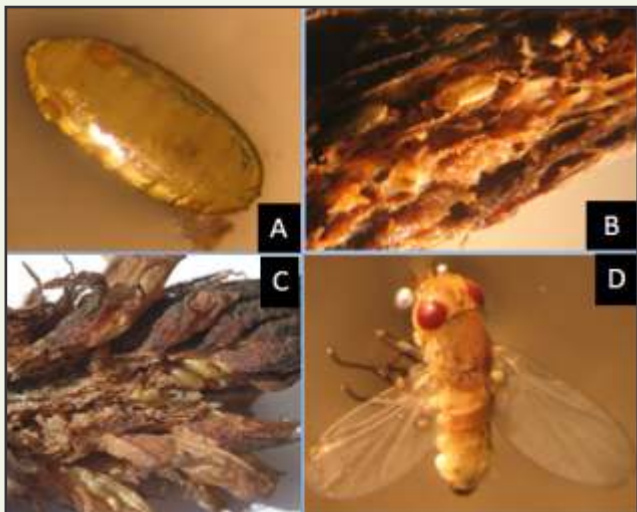
A promising line of short stature, good yield and with no shattering and dormancy has been identified which matures within 55-56 days. Such accessions may gain importance as a crop contingent plan in case of failure of main *Kharif* crop (rice) due to less/delayed/ excess rainfall. In addition, a dual purpose accession has also been selected which can be utilized first as fodder (first cut) and then for grains (final harvest), however, it's performance is yet to be tested.

Phenotypic variations are an extension of genotypic diversity hence, molecular diversity of the accessions was assessed using rice SSR markers. Strong polymorphism was detected amongst accessions studied indicating a rich gene pool amongst the accessions.



### Phytomyza orobanchia Infestation in Orobanche

*Orobanche crenata* was found attacked by insects in a brinjal field in Billua village (26°02'59,32"N; 78°17'00.03"E) of Gwalior district in Madhya Pradesh. Morphological and molecular studies [sequences of cytochrome c oxidase subunit 1 (cox1) gene] characterized them to be *Phytomyza orobanchia*. Observations under stereo binocular microscope of the collected specimens revealed that the maggots were white in colour, without legs and did not have a head capsule. The adults emerged out at various periods depending upon the stage of the larvae or pupae. Proportion of emergence of adults was more from the soft and succulent flowering stalks (28/43) when compared to the hard tubercles (15/43).



Different stages of the *Phytomyza orobanchia* on *Orobanche crenata*: A. Maggot, B. Maggot feeding on the flowering stalk of *O. crenata*, C. Dried stalk of *O. crenata* with pupae, D. Mature fly.

### Herbicide Residues in Soil and Plant Samples from Farmers Field

Studies were conducted in the farmers field at five different locations to evaluate terminal residues of imazethapyr in soil and soybean plant samples on application at 100 g/ha, as post-emergence herbicide in soybean field. Mature soybean plant and soil were collected at harvest and processed for extraction of terminal residues of imazethapyr using standard protocols and analyzed by HPLC. Imazethapyr residues were found in the range of 6 to 18 ng/g in the grain samples in all five fields. However, in soil, residues were found to be below 1 ng/g in four locations and in one location residues were 1.5 ng/g. The overall

amount of residue was less in soil as compared to the plant samples. Terminal residues of imazethapyr in soybean plant and soil were found below maximum residue level (MRL) limits. Based on this study, a pre-harvest interval of 90-102 days for soybean crop after imazethapyr application was suggested at farmer's field.

## NEWS

### Research Advisory Committee Meeting

The XVII RAC meeting was conducted on 18-19 April, 2014 under the chairmanship of Dr. R.K. Malik, Co-ordinator, CIMMYT- India,



New Delhi and in presence of Dr. R.S. Balyan, Ex-Professor, Agronomy, CCS HAU, Hisar, Dr. B.L. Jalali, Ex-Director Research, CCS HAU, Hisar (Haryana), Dr. B.S. Parmar, Ex-Joint Director (Research), IARI, Dr. A.R. Sharma, Director, DWSR and Dr. V.P. Singh, Member Secretary, RAC, DWSR. Director made a brief presentation on the salient achievements of the Directorate and major initiatives undertaken during 2013-14. Dr. R.K. Malik in his opening remarks emphasized on priority setting based on past. Dr. B.L. Jalali remarked that performance indicators must be developed for impact assessment. Dr. B.S. Parmar opined that problem-solving research work should be undertaken on priority basis. Dr. R.S. Balyan emphasized on development of mechanical tools for row crops. Dr. V.P. Singh presented the action taken report on the recommendations made in the XVI RAC meeting. Dr. R.P. Dubey, Member Secretary QRT, and Dr. Bhumesh Kumar, Member Secretary IRC, presented the action taken report (ATRs) on the recommendations made by respective committees last year. Research work carried out under different programmes was presented by the programme leaders. At the end, RAC committee appreciated a visible change during the year.

### 26<sup>th</sup> Foundation Day Celebrated

The Directorate celebrated its 26<sup>th</sup> Foundation Day (Silver Jubilee year 1989-2014) on 22<sup>nd</sup> April 2014 in the presence of Dr. A.K. Sikka, Deputy



Director General (NRM), ICAR and Dr. V.S. Tomar, Vice Chancellor, Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur. Dr. A.R. Sharma, in his welcome address, briefed the dignitaries about research and development activities at the Directorate. Dr. V.N. Saraswat and Dr. Jay G. Varshney informed about the gradual establishment of the Directorate and its face lifting in terms of

infrastructure development and prioritization of research programmes. Dr. V.S. Tomar emphasized the indispensable need of continuous research on weed science for the farmer community. Chief Guest of the function and DDG, NRM Dr. A.K. Sikka emphasized the need of efficient weed management technologies for sustainable production. On this occasion, 'Best Worker Awards' in the category of skilled supporting staff, administrative staff, technical officers and scientists were conferred upon Shri S.L.Koshta, Shri Sandeep Dhagat, Smt. Nidhi and Dr. Sushil Kumar, respectively. Extension bulletins on "Weedy rice and their management" and "Biology and management of parasitic weeds" were also released by dignitaries during the event.

### Institute Research Council Meeting

The IRC meeting were conducted on 2-3 May, 2014 under the chairmanship of Dr. A.R. Sharma, Director, DWSR. Dr. N.T. Yaduraju, President, ISWS and Dr. A.N.



Rao, Visiting Scientist, IRRI/ICRISAT, Hyderabad were invited as resource persons. Dr. Sharma briefed about Directorate's mandate, objectives, available infrastructure, ongoing research programmes and new initiatives taken during the year. Dr. Yaduraju, remarked that DWSR is the only institute in the world which is solely devoted to research aspects related to weed management and hence outputs should be visible in terms of impactful technologies. Dr. Rao emphasized on need to strengthen basic research in weed biology and ecology based on realistic problems like weed shift and herbicide resistance. Dr. Bhumesh Kumar, Member Secretary, IRC presented the action taken report on general recommendations of last IRC-2013. Research work carried out by scientists during 2013-14 was reviewed in the meeting.

### Interface Meeting of Progressive Farmers and Agriculture Officers

Interface meeting of progressive farmers with State Department officers and scientists was organized on 29 April, 2014 to discuss various aspects of weed



management and problems faced by stakeholders. In this meeting 120 achiever/ progressive farmers, 40 officers of State departments from 13 districts of Jabalpur, Rewa and Satna Divisions of Madhya Pradesh and 16 scientists from DWSR participated. Dr A.R. Sharma Director, DWSR presided over the function, Dr P.K. Singh Principal Scientist (Agril. Extension) coordinated the programme. Visits to experimental farm were organized to show encouraging

results under conservation agriculture with use of improved farm machinery. DWSR provided packets of *Sesbania* seeds to the representatives of different districts.



### Training-cum-Workshop on Weed Management for KVK Scientists

DWSR and Zonal Project Directorate, Zone VII, Jabalpur jointly organized training-cum-workshop on Weed Management during 19-21<sup>st</sup> May, 2014 for



40 scientists of KVKs from Madhya Pradesh, Chhattisgarh and Odisha under the chairmanship of Dr. A.R. Sharma, Director, DWSR who gave an overview of the Directorate's activities for strengthening weed management through on farm research and organizing trainings/ workshops. Dr. Anupam Mishra, Director, ZPD, Zone VII explained the strength and opportunity of KVKs to disseminate technologies on weed management among farmers. Dr. P.K. Mishra, Director, Extension Services, JNKVV, Jabalpur emphasized the importance of weed management in present situation of labour scarcity.

### हिन्दी कार्यशाला

दिनांक 24 जून 2014 को खरपतवार विज्ञान अनुसंधान निदेशालय के सभागार में समस्त वैज्ञानिकों एवं तकनीकी वर्ग के अधिकारियों/ कर्मचारियों हेतु रा.का.समिति द्वारा हिन्दी कार्यशाला का आयोजन किया गया। कार्यक्रम के मुख्य अतिथि श्री आलोक दवे, मुख्य अभियंता (मैकेनिकल) भारतीय रेलवे, ने सभा में उपस्थित सभी अधिकारियों/ कर्मचारियों को "सकारात्मक विचार" विषय की जानकारी प्रदान की। जिसमें उन्होंने यह बताया कि सकारात्मक सोच नकारात्मक सोच से सौ गुना ज्यादा शक्तिशाली होती है।

## PERSONALIA

### Participation in Seminars/ Symposia/ Workshops

- Dr. V.P. Singh participated in regional workshop on "Strengthening partnerships between AICRP-WC, Jabalpur and AICRP on IFS, Modipuram" running in Assam, Meghalaya and West Bengal states held in AAU, Jorhat on 26 May, 2014.
- Dr. R.P. Dubey attended the workshop organized by NAIP-IFPRI on "PME in NARS: Status, Experiences and Way Forward" on 27 May, 2014.
- Dr. A.R.Sharma attended the NAAS Foundation Day on 5 June, 2014.
- Dr. Shobha Sondhia attended the workshop on "Impact of Capacity Building" under NAIP during 6-7 June, 2014.

- Dr. V.P. Singh participated in regional workshop on “Strengthening partnerships between AICRP-WC, Jabalpur and AICRP on IFS, Meerut” running in Bihar, Chhattisgarh, Odisha, Jharkhand and MP states held at ICAR Regional Complex for Eastern Region, Patna on 9 June, 2014.
- Dr. Bhumes Kumar attended workshop on “MAS-spectrophotometry based metabolomics” at Institute of Bioinformatics, Bengaluru during 17-18 June, 2014.

#### Technical Seminar

1. Dr. A.R. Sharma: Deputation seminar on “Training on Advanced Leadership/management Development Programme” on 15.04.2014
2. Dr. V. P. Singh: “Weed flora shift and crop rotation” on 28.06.2014

#### M.Sc./Ph.D. Thesis Seminar

1. Ms. Ankita Pathak, M.Sc. student of Dr. K.K. Barman presented her synopsis seminar on “Effect of pendimethalin on growth of *Azotobacter* in sesame (*Sesamum indicum* L.) rhizosphere” on 26 May, 2014
2. Mr. Abhishek Mishra, M.Sc. student of Dr. Meenal Rathore presented his thesis seminar on “Molecular fingerprinting of weedy rice using SSR markers” on 28 June, 2014

#### Distinguished visitors

- Dr. R.K. Malik, Co-ordinator, CIMMYT-India, New Delhi on 18-19 April, 2014.
- Dr. B.L. Jalali, Ex-Director Research, CCSHAU, Hisar (Haryana) on 18-19 April, 2014
- Dr. R.S. Balyan, Ex-Professor, Agronomy, CCSHAU, Hisar, on 18-19 April, 2014

- Dr. B.S. Parmar, Ex-Director Research, IARI on 18-19 April, 2014
- Dr. A.K. Sikka, Deputy Director General (NRM), ICAR on 21-22 April, 2014.
- Dr. V.S. Tomar, Vice Chancellor, Jawaharlal Nehru Krishi Vishwavidyalaya, Jabalpur on 22 April, 2014
- Dr. S.S. Tomar, Director Research, JNKVV on 22 April, 2014
- Dr. V.N. Saraswat, Former Director, DWSR, Jabalpur on 22 April, 2014.
- Sh. A.K. Khare, Joint Director Horticulture, Jabalpur Division, on 29 April, 2014.
- Sh. S.K. Chourasia, Divisional Agril. Engineer, Jabalpur, on 29 April, 2014.
- Dr. Jay G. Varshney, Former Director, DWSR, Jabalpur on 22<sup>nd</sup> April, 2014
- Sh. B.P. Tripathi, Joint Director Agriculture, Jabalpur Division, on 29<sup>th</sup> April, 2014.
- Sri Rajesh Tiwari, Divisional Agril. Engineer, Satna, on 29<sup>th</sup> April, 2014.
- Dr. N.T. Yaduraju, President, ISWS on 2-3 May, 2014
- Dr. A.N.Rao, Visiting Scientist, IRRI/ICRISAT, Hyderabad on 2-3 May, 2014.
- Dr. Anupam Mishra, Director, ZPD, Zone VII on 19 May, 2014.
- Dr. P.K. Mishra, Director, Extension Services, JNKVV, Jabalpur on 19 May, 2014.

#### Promotions

- Mr. M.P. Tiwari was promoted to Senior Technical officer (T-6) with effect from 01 January, 2011.
- Mr. R.S. Upadhyaya was promoted to Chief Technical officer (T-9) with effect from 03 February, 2012.

## From Director's Desk



It is my privilege to present this issue of 'Weed News', highlighting the activities undertaken by the Directorate during the period from April to June, 2014. This period coincided with the conclusion of Silver Jubilee celebrations which commenced last year on 22<sup>nd</sup> April, 2013. Dr. A.K. Sikka, Deputy Director General (Natural Resource Management) made his maiden visit to Jabalpur and also to the Directorate to grace the 26<sup>th</sup> Foundation Day Programme on 22<sup>nd</sup> April, 2014. This was a rare occasion when the two former Directors, Dr. V.N. Saraswat and Dr. Jay G. Varshney, and Mrs. V.M. Bhan were also present. 17<sup>th</sup> meeting of the RAC of the Directorate was held on 18-19<sup>th</sup> April, 2014 when the research programmes were reviewed under the chairmanship of Dr. R.K. Malik. We conducted the IRC meetings on 2-3 May, 2014 under the expert guidance of eminent weed scientists Dr. N.T. Yaduraju, former Director and Dr. A.N. Rao, Visiting Scientist, IRRI / ICRISAT. An

interface meeting of progressive farmers and agricultural officers of the M.P. state was organized on 29<sup>th</sup> April, 2014. A training-cum-workshop on weed management for KVK scientists was organized on 19-20 May, 2014 in collaboration with Zonal Project Directorate, Zone-VII, Jabalpur. Many eminent persons also visited the Directorate during the period.

We took further initiatives to develop our research farm including laser leveling of the remaining area, deepening of ponds, creating sick fields of *Orobanche* and weedy rice, and cultivation of summer moong and *Sesbania* under conservation agriculture. Deficit rainfall in June has been causing concern. Research work on zero-till soybean and rice in the low lying fields has been further strengthened.

**Editorial Team:** Dr. Sushil Kumar, Dr. Bhumes Kumar, Dr. Raghendra Singh, Dr. Meenal Rathore and Mr. Sandeep Dhagat

**Published by:** Dr. A.R. Sharma, Director

ICAR - Directorate of Weed Science Research, Jabalpur - 482 004 (M.P.)

**Phones:** +91-761-2353001, 2353101, 2353138, 2353934, **Fax:** +91-761-2353129

**E-mail:** dirdwsr@icar.org.in **Website:** <http://www.nrcws.org>