



## From Director's Desk



Directorate of Weed Science Research is the only institute of its kind in the country and probably in the whole world dealing with all related aspects of weed management in a multi-disciplinary mode. The Directorate established originally as National Research Centre for Weed Science on 22<sup>nd</sup> April, 1989 was upgraded as Directorate on 23<sup>rd</sup> January, 2009. We have thus completed 24 years of our existence and entered into the Silver Jubilee Year on 23<sup>rd</sup> April, 2013. During this period, the Directorate has played a meaningful role in developing and disseminating weed management technologies all over the country. Nowadays weed management is the most important issue for the farmers in view of the acute labour shortages and high cost of production. There has been a growing awareness and demand for improved cost-effective weed management technologies in order to raise productivity and profitability.

I have completed one year of my tenure on 12<sup>th</sup> March, 2013. We have taken several initiatives to strengthen research activities and improve administrative functioning of the Directorate. New research programmes have been launched from 2012-13. On-farm research trials were undertaken on a large scale. Several training programmes were organized. Students' research was promoted in collaboration with universities. Attempts were made to modernize the experimental farm by improving drainage, laser land leveling, new farm machinery, crop diversification, crop/weed biomass composting, conservation agriculture, quality seed production, farm roads and pond renovation, etc. Laboratory facilities and other infrastructure in the net /polyhouses have been improved. Working of the PME Cell, IMC, IRC, administrative section and AICRP on Weed Control has been streamlined to achieve greater efficiency. Our scientists have won projects from NFBSFARA and ICAR awards for the first time since the establishment of the Directorate. All this has helped in improving visibility and image of our Directorate at the national level. During the Silver Jubilee Year (2013-14), we need to do self-introspection and analyze our contributions for achieving higher goals in the coming years so as to make DWSR a truly world class institute.

## Research notes

### Effect of elevated CO<sub>2</sub> on mungbean and associated weeds

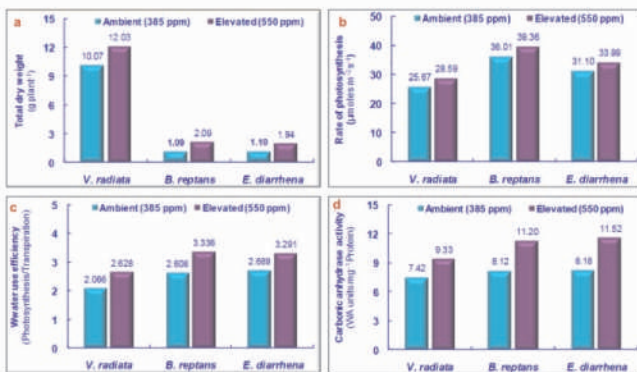
Effect of elevated CO<sub>2</sub> on summer mungbean (*Vigna radiata*) and weed species (*Brachiaria reptans* and *Eragrostis diarrhena*) was studied in Free Air CO<sub>2</sub> Enrichment (FACE) facility. Plants of the above three species were exposed to ambient CO<sub>2</sub> (385±5 ppm) and elevated CO<sub>2</sub> (550±50 ppm) from emergence to maturity of mungbean. Results showed that enrichment of atmospheric CO<sub>2</sub> had a positive effect on overall growth of mungbean plants as well as weed species.

Promotion in growth at elevated CO<sub>2</sub> could be attributed to the higher dry matter accumulation to above ground parts (Figure a), rate of photosynthesis (Figure b), and instantaneous water-use efficiency, while stomatal conductance and rate of transpiration decreased in all three plant species. Similarly, elevated

CO<sub>2</sub> had a positive effect on activity of carbonic anhydrase (Figure c) in all the three species. However, the increase was more in the two weeds as compared to mungbean and may be a contributing factor to the observed higher rates of photosynthesis at elevated CO<sub>2</sub>. Activity of catalase, superoxide dismutase, ascorbate peroxidase and glutathione reductase (Figure d) decreased in mungbean but increased in *B. reptans* and *E. diarrhena* at elevated CO<sub>2</sub> as compared to that at ambient CO<sub>2</sub>. As a small variation, activity of glutathione peroxidase decreased at elevated CO<sub>2</sub> as compared to that at ambient CO<sub>2</sub> level in mungbean, while no such decrease was observed in *B. reptans* and *Eragrostis diarrhena*.

DWSR  
Celebrating

25 years  
1989-2014



Effect of elevated CO<sub>2</sub> on dry matter (a), photosynthesis (b), activity of carbonic anhydrase (c) and glutathione reductase (d) in *Vigna radiata* and associated weeds (*B. reptans* and *E. diarrhena*) 42 days after treatment

### Weed management in bottle gourd

An experiment was carried out on summer bottle gourd with eight treatments, viz. halosulfuron at 60 and 120 g/ha compared with imazethapyr at 60 and 75 g/ha, pendimethalin (38.7% CS) at 700 g/ha as pre-emergence along with 2 hand weedings and weedy check. There was a significant reduction in weed count due to application of herbicides compared with untreated control. Application of halosulfuron at 120 g/ha reduced the population of *Cyperus iria* to a greater extent as compared to other treatments. However, pendimethalin at 700 g/ha reduced the overall weed population compared to other treatments.

#### Effect of treatments on weed growth and yield of bottle gourd

Treatment	Dose (kg/ha)	*Weed count (no./m <sup>2</sup> )	Weed dry weight (g/m <sup>2</sup> )	Fruit yield (t/ha)
Halosulfuron	60	13.22 (175)*	225	9.90
Halosulfuron	120	11.21 (127)	166	16.60
Halosulfuron	240	10.30 (108)	128	10.60
Imazethapyr	60	13.37 (178)	223	3.70
Imazethapyr	75	12.55 (160)	172	5.02
Pendimethalin 38.7% CS	700	4.80 (24)	38	20.03
2 HWs	-	4.70 (22)	33	20.80
Weedy check	-	14.62 (215)	237	8.01
<b>LSD (P=0.05)</b>		<b>2.12</b>	<b>14</b>	<b>3.72</b>

\*Data were subjected to  $\sqrt{x + 0.5}$  transformation. Original values are shown in parentheses.

The reduction in weed population under pendimethalin was superior to imazethapyr and halosulfuron. A similar trend was observed in weed dry weight. Loss in fruit yield of bottle gourd due to weeds was estimated to be 40%. The yield obtained with pendimethalin at 700 g/ha was 40% more than unweeded control, and at par with 2 hand weedings. No visual symptoms of injury or phytotoxicity were observed under halosulfuron at 60 and 120 g/ha but at 240 g/ha, slight phytotoxicity was observed. Imazethapyr was phytotoxic at 75 g/ha. It was concluded that halosulfuron at 120 g/ha controlled *Cyperus iria* effectively in bottle gourd. However, pendimethalin at

700 g/ha resulted in the lowest weed infestation and registered the highest fruit yield.

### Weed management in cotton

Bt cotton was sown in May and the herbicides, viz. pendimethalin at 1.0 kg/ha as pre-emergence, quizalofop at 50 g/ha and fenoxaprop at 60 g/ha at 45 DAS, and directed spray of glyphosate were tried. Dominant weed species were: *Echinochloa colona*, *Cyperus rotundus*, *Cyperus tenuispica*, *Cyperus iria*, *Alternanthera* spp., *Commelina benghalensis* and *Abutilon indicum*. The number of bolls per plant ranged from 12-35, seed cotton weight per boll from 3.5-5.2 g and seed per boll from 25-36. Seed cotton yield was up to 2.9 t/ha. Application of pendimethalin resulted in efficient control of all weed species during early stages except *Commelina benghalensis*. Post-emergence application of quizalofop and fenoxaprop also controlled grassy weeds effectively without any adverse effect on cotton. Directed spray of glyphosate with hood was better than wick applicator.



Cotton at early stage



Harvesting of seed cotton

## News

### Silver Jubilee Foundation Day

The Directorate celebrated its Silver Jubilee Foundation Day on 23<sup>rd</sup> April, 2013 in presence of Chief Guest Dr. D.P. Singh, Chairman of Kisan Kalyan Board,



Haryana and former Vice Chancellor, JNKVV. Special guests were Dr. S.K. Rao, Dean, Faculty of Agriculture Science, JNKVV; Dr. Jay G. Varshney, former Director, DWSR and wife of Late Dr. V.M. Bhan, first Director, DWSR. Dr. D.P. Singh emphasized the need of connecting with farmers directly and developing low cost technology to control weeds. Dr. A.R. Sharma, Director, DWSR enlightened the audience with the extensive research and extension activities done by the Directorate in context of weed management. Invitees appreciated work being carried out at the institute and advised to keep in mind the economic viability of technologies being developed. Some of the scientists, officials and employees of the Directorate were felicitated for their outstanding work on this occasion.

## Annual Group Meeting of AICRP-Weed Control

Annual group meeting of AICRP on Weed Control was held on 26-27 April, 2013 at Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishvavidyalaya, Palampur (Himachal Pradesh). Dr. S.K. Sharma, Vice Chancellor, CSKHPKV, Palampur inaugurated the meeting in presence of other dignitaries and delegates from different centers, university staff, industry and media persons. Dr. Sharma stated that both crops and weeds are evolving subject to climate change and emphasized on need of stringent quarantine laws in the country to check spread of weeds. Dr. A.R. Sharma, Director, DWSR remarked that weed management technology is the fastest adopted technology on farmers' fields and stressed on weed management for conservation agriculture systems for sustainable food production.



Following technical bulletins were released during inaugural session of the meeting:

- “*Dhan, Gehun evam Makka ke pramukh kharpatwar evam unka niyantran*” by Dr. S. K. Gautam and Dr. S.S. Rana of CSKHPKV, Palampur.
- “*Kharpatwar Niyanttran*” by Dr. R.R. Upasani of BAU, Ranchi.
- “Sustainable weed management options” and “Major Weeds of Tamil Nadu” by Dr. C. Chinnusamy *et al.* of TNAU, Coimbatore.

Dr. N.N. Angiras, former Head, Agronomy and PI, AICRP-WC at CSKHPKV, Palampur was felicitated for his valuable contributions in weed management. The meeting was scheduled in six technical sessions to review work progress done by AICRP-Weed Control centres from North, South, East, West and Central India, with the last technical session devoted for discussion on technical programme, financial issues, interaction with herbicide industry etc. The meeting ended with a plenary session chaired by Dr. S.P. Sharma, Director of Research, wherein summary/recommendations of different sessions were presented. Eminent scientists emphasized on non-chemical weed control, need to reduce efforts on routine testing of herbicides doses and studying weed management in organic farming systems.

## Institute Research Council Meetings

Meetings of IRC were conducted on 6-7 May and 17-18 June, 2013 under the chairmanship of Director, DWSR. Dr. K.R. Koundal, Emeritus Scientist, CSIR and former Director NRC on Plant Biotechnology, and Joint Director (Research), IARI, New Delhi; and Dr. V.N. Saraswat, Former Director, DWSR were invited as the resource persons. Dr. A.R. Sharma presented brief information about the Directorate mandate /objectives, infrastructure, staff strength, and research programmes undertaken during 2012-13. He highlighted the importance of IRC review process, and outlined the broad guidelines to be followed by the scientists during presentations. Dr. K.R. Koundal, in his initial remarks, stressed on the importance of weed management and challenges ahead to meet the ever-increasing food demand globally and more so in India. He also emphasized on integration of weed management tools and practices with the modern technology of weed management like herbicide tolerant crops.



Dr. V.N. Saraswat emphasized the need of weed management in the era of climate change and suggested integrated weed management to avoid excess load of herbicides in the environment. Research work carried out by scientists during 2012 was reviewed in the meeting and new experiments for 2013-14 were decided.

## Training on Advanced Weed Management Technology

A three-day training programme entitled “Advanced Weed Management Technology” was conducted for progressive farmers and ATMA officials from Parbhani, Maharashtra from June 13-15, 2013. Training was imparted on mechanical, chemical and organic methods of weed management with introduction to conservation agriculture, climate change and its influence on agriculture production. Participants were benefited by visit to field demonstrations on no-till mungbean cultivation at farmers' fields in Panagar and Singaud villages.



## Kisan Goshti-cum-Field Day

To acquaint and show the performance, practicability and profitability of wheat cultivation under zero-till conditions with the help of Happy Seeder and improved weed management techniques, "Kisan Goshti-cum-field day" was organized on 9<sup>th</sup> April, 2013 at adopted village Babhanauda, Panagar. Farmers from nearby villages, state agricultural officials and scientists from DWSR participated in the programme, discussed the benefits of technology demonstrated and clarified doubts. Dr. A.R. Sharma, Director, DWSR emphasized the need to adopt zero-till techniques on larger areas for enhancing production of crops, improving soil conditions and managing weeds in a better way.



## निदेशालय में ऑन-लाइन छुट्टी प्रबंधन प्रणाली

निदेशालय के छुट्टी संबंधी कार्यों के सुचारु संचालन के लिए खरपतवार विज्ञान अनुसंधान निदेशालय, जबलपुर ने मैत्रिपूर्ण साफ्टवेयर "ऑन-लाइन लीव मैनेजमेंट सिस्टम" लागू किया है। इस प्रणाली के अंतर्गत निदेशालय में कार्यरत कर्मचारियों के छुट्टी (आकस्मिक छुट्टी, अर्जित छुट्टी, प्रतिबंधित छुट्टी, परिवर्तित छुट्टी आदि) से संबंधित ऑकड़े (डाटाबेस) संचित किए जाते हैं। इस प्रणाली में छुट्टी हेतु आवेदन होता है, जिसमें छुट्टी का प्रकार, अवधि, कारण आदि बताने की सुविधा उपलब्ध रहती है। कर्मचारी को जब छुट्टी पर जाना होता है वे छुट्टी हेतु ऑन-लाइन आवेदन कर देते हैं। यह आवेदन डाटाबेस में सुरक्षित हो जाता है।

## Personalia

### Awards and Recognitions

Dr. P.K. Singh, Dr. Sushil Kumar, Dr. R.P. Dubey, Dr. Shobha Sondhia, Dr. Bhumes Kumar, Dr. P.J. Khankhane, Dr. M.S. Raghuvanshi, Sh. Sandeep Dhagat, Sh. S.K. Bose, Sh. Bhagwante Prasad and Sh. Veer Singh received Certificate of Appreciation-2013 for their outstanding contributions on the occasion of Silver Jubilee Foundation Day of the Directorate.



### Externally-funded projects

Two projects funded by National Fund for Basic, Strategic and Frontier Application of Research in

Agriculture (NFBSFARA) were approved and sanctioned:

1. Study of domestication traits of two weed species. (Budget: ₹ 120 lakhs) [April 2013- March 2016]
2. Bioremediation of contaminants in polluted sites: use of weedy plants. (Budget : ₹ 206 lakhs) [April 2013- March 2017]

### Participation in Seminars/Symposia

1. Training-cum-workshop on Hindi at Central Hindi Training Institute, New Delhi was attended by the following scientists and staff:
  - Dr. Sushil Kumar - 20-24 May, 2013
  - Dr. Anil Dixit - 20-24 May, 2013
  - Dr. P.P. Choudhary - 01-06 June, 2013
  - Dr. Bhumes Kumar - 01-06 June, 2013
  - Mr. Dibakar Ghosh - 15-23 June, 2013
  - Sh. G.R. Dongre - 15-23 June, 2013
  - Sh. S.K. Parey - 15-23 June, 2013
2. Dr. A.R. Sharma, Director attended the *Ambrosia* Weed Eradication meeting held at NIPHM, Hyderabad on 1<sup>st</sup> June, 2013.
3. Dr. A.R. Sharma attended the General Body meeting and Foundation Day programme of NAAS, New Delhi during 4-5<sup>th</sup> June, 2013.

### Technical Seminars

1. Dr. Raghwendra Singh: "Greenhouse Technology for Future Agriculture" on 31.05.2013
2. Dr. R.P. Dubey: "Indigenous Technical Knowledge in Weed Management" on 29.06.2013

### Radio Talk

1. Dr. Meenal Rathore delivered a radio talk on AIR, Jabalpur on "Gramin vikas ke liye krishi jaiyo prodyogikee" on 18<sup>th</sup> June, 2013.

### Distinguished Visitors

- Dr. D.P. Singh, Chairman of Kisan Kalyan Board, Haryana and former Vice Chancellor, JNKVV on 23.04.2013
- Dr. S.K. Rao, Dean, Faculty of Agriculture Science, JNKVV on 23.04.2013
- Dr. Jay G. Varshney, former Director, DWSR on 23.04.2013
- Dr. K.R. Koundal, Emeritus Scientist-CSIR and former Director, NRC on Plant Biotechnology, and Joint Director (Research), IARI, New Delhi on 06.05.2013
- Dr. V.N. Saraswat, former Director, DWSR on 07.05.2013

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

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

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>