Proceedings of Biennial Conference of the Indian Society of Weed Science held at Directorate of Weed Science Research (DWSR), Jabalpur (Madhya Pradesh)

Theme: EMERGING CHALLENGES IN WEED MANAGEMENT

Research work on weed management is going on in our country for the past 60 years since the initiation of a coordinated scheme in principal crops like rice, wheat and sugarcane in 1952. Indian Society of Weed Science was established in 1968 and All India Coordinated Research Project on Weed Control was launched in 1978. The establishment of National Research Centre for Weed Science in 1989 at Jabalpur and its upgradation as Directorate of Weed Science Research (DWSR) in 2009 was a major step forward to undertake systematic research and development programmes on weed management in a holistic manner by adopting multi-disciplinary approach.

The greatest challenge of the 21st century is to meet the rising food demand while maintaining the sustainability of the natural resource base. Weeds adversely affect humans in both agricultural and non-agricultural environments. Despite development and adoption of weed management technologies, the weed infestations are virtually increasing. This is due to adoption of high-input and intensive cropping systems; neglect and discontinuation of some of the traditional practices like intercropping, mulching and crop rotations involving legumes; shift in weed flora due to adoption of fixed cropping systems and management practices including herbicides; development of herbicide resistance in weeds e.g. *Phalaris minor* in the 1990s; growing menace of weedy rice, *Parthenium*, *Orobanche* and other alien invasive weeds in many parts of the country, and impending climate change. This suggests that weeds problems are dynamic in nature, requiring continuous monitoring and refinement of management strategies for alleviating their adverse effects on agricultural productivity and environmental health. Management of weeds is a challenging task in context of increased cost of cultivation, reduced man power availability and increased concern about soil and water conservation.

DWSR, Jabalpur is completed 25 years of its establishment on 22nd April 2014 and celebrating Silver Jubilee Year in 2014. To commemorate this event and address the emerging challenges in weed management, the biennial conference of the Indian Society of Weed Science was organized at the Directorate for the first time with the following sub-themes:

- Weed biology and ecophysiology
- Sustainable weed management in diversified cropping systems
- Weed management in conservation agriculture systems
- Crop-weed interactions under changing climate
- Herbicide resistance and herbicide tolerant crops
- Biological weed management and allelopathic interactions
- Herbicide residues and their mitigation
- Invasive, parasitic and aquatic weed management
- On-farm research and impact assessment

The Conference was organized from 15-17 February, 2014. The major highlights of the conference included: (i) About 250 delegates from all over India attended the Conference, (ii) One key note lecture session and 11 technical sessions on various themes, (iii) There was General Body Meeting of ISWS on 16 February 2014, (iv) There was Scientist-Farmer-Student Interface meeting on 16 February 2014, (v) One Keynote lecture, 19 lead papers and 26 oral papers were presented in 12 sessions, (vi) Total 203 poster presentations were made, (vii) Cultural programme on 16 February 2014, (viii) Field visit of the delegates to On-Station and On-Farm trials on 17 February 2014.

The date wise various activities held during the conference were as follows:

15-02-2014

Inaugural function was graced with the presence of Dr. V.S. Tomar, Vice Chancellor, JNKVV as Chief Guest; Dr. N.T. Yaduraju, President, ISWS; Dr. T.V. Muniyappa, Immediate Past President, ISWS; Dr. R.K. Malik, Former President, ISWS; and Dr. A.R. Sharma, Secretary, ISWS. Dr. Sharma welcomed the participants representing almost every state of India. He expressed his thanks to Dr. Nimal Chandrasena, Dr. Megh Singh and Dr. Bhagirath Chauhan representing Australia, USA and Philippines, respectively. He explained the challenges posed by weeds and the importance of their management. Dr. N.T. Yaduraju, President ISWS highlighted the current scenerio of weed problems in the country and the world. He informed the gathereing about the current mangement practices being adopted in India as well. Dr. T.V. Muniayappa hightlighted the role and work carried

out by the past Executive Committee under his leadership. He stressed the need to strenthen ISWS more vigorously.

Dr. V.S. Toamr, Vice Chancellor, JNKVV, Jabalpur and Chief Guest of the function emphasized the need of their integrated management instead of relying only on chemicals. He desired that weed scientists should formulate strategies for weed management which are especially suitable for the country. He informed about the extent of losses caused by weeds in the state of Madhya Pradesh.

Following booklets on weed science were also released by the Chief guest and dignitaries on the dais:

- *Trin Sandesh* - a publication in Hindi giving information on weed problems and management – DWSR, Jabalpur
- *Parasitic Weeds: Biology and Management* - Dr. VSGR. Naidu and Dr. J.S. Mishra, CTRI, Rajamundri @ DSR, Hyderabad
- *Weed Management in Vegetable Crops* - V.P. Singh, S.K. Guru, S.P. Singh, T.P. singh, A. Kumar and N. Tripathi – GBPUAT, Pantnagar
- *Dhan Ki Sidhi Boai Utpadan Tachniq evam kharpatwar prabandhan* (In Hindi) (Bulletin No. 192) - V.P. Singh, T.P Singh, S.P. Singh, S.K. Guru and A. Kumar – GBPUAT, Pantnagar

Fig. Dr. A.R. Sharma, Secretary ISWS Welcoming the delegates

Awards and Fellowships: During inaugural function, the following scientists were honoured for their outstanding contributions to weed science.

Life Time Achievement Award: Dr. R.K. Malik (Hisar, Haryana)
Special Appreciation Award: Dr. T.V. Muniyappa (Bengaluru, Karnataka)
ISWS Gold Medal
Dr. V.P. Singh (Pantnagar, Uttrakhand) for 2012
Dr. (Mrs.) Sashi Bala Singh (New Delhi) for 2013
ISWS Fellowship:

1. Dr. Guriqbal Singh, (Ludhiana, Punjab) for 2012
2. Dr. Sanjoy Saha (Cuttack, Odisha) for 2012
3. Dr. Anil Dixit (Raipur, Chhattisgarh) for 2012
4. Dr. Gulshan Mahajan ((Ludhiana, Punjab) for 2013
5. Dr. Suresh Kumar (Palampur, Himachal Pradesh) for 2013
6. Dr. R. Devendra (Bengaluru, Karnataka) for 2013
7. Dr. R.S. Chhokar (Karnal, Haryana) for 2013

Fig. All awardee with Chief guest

Young Scientist Award
Dr. Amit Kumar Jha (Jabalpur, Madhya Pradesh)
ISWS Best M.Sc. Thesis Award

1. Dr. (Mrs.) K. Sivagamy (Kalavai, Tamil Nadu) for 2012 on "Weed management effects on non-target toxicity and weed bank dynamics in soybean (*Glycine max*)-wheat (*Triticum aestivum*) cropping system"
2. Dr. (Mrs.) Masoume Yonnesabadi (IARI, New Delhi) for 2013 on ""Evaluation of weed management options in transgenic stacked and non-transgenic maize hybrids"

ISWS Best Book Awards:
Dr. V.S.G.R. Naidu (Rajmundari, Andhra Pradesh) for the "Hand Book on Weed Identification"

After inaugural session, 4 Technical Sessions were held besides Keynote Lecture by Dr. R.K. Malik on conservation agriculture and poster session. On 16 February, 4 Technical Sessions were held besides Keynote Lecture by Dr. Nimal Chandrasena from Australia on weed utilization and poster session. Interaction with herbicide industry and scientist was undertaken at length in technical Session V and interaction with farmers and students was undertaken in technical session VIII.

Proceeding of Technical sessions

Date; 15.2.2014
Keynote Lecture

Dr. R.K. Malik from, CMMYT, Patna presented the Keynote lecture on 'Conservation agriculture and weed management in South-Asia region: proceedings and development. The keynote lecture session was chaired by Dr. V.S. Tomar, VC, JNKVV, Jabalpur and co-chaired by Dr. L.S. Brar, Ex-Prof & Head (Agronomy) PAU, Ludhiana

Technical Session - I: Weed management in conservation agriculture systems

Theme: ***Weed Management in Conservation Agriculture Systems***

Chairman:

This session was chaired by Dr. L.S. Brar from Ludhiana (Punjab). Dr. Guriqbal Singh and Dr. I.C. Barua were

In this session one lead paper and three contributory papers were presented. The lead paper was presented by Dr. A.R. Sharma, Director, DWSR, Jabalpur, on "Integrated weed management in conservation agricultural systems". Dr. Sharma discussed the concept and key elements of transformation from conventional to conservation agriculture in Agro-ecological context. He also highlighted the possibilities of productive utilizations of rice fallows particularly in eastern and coastal regions of India showing the needs and benefits of no tillage Conservation Agriculture. He pointed out that Happy Seeder technology is very good in weed suppression, mitigation of terminal heat stress and getting high yield, and emphasized on the need to study herbicide degradation pathways and effect of herbicides on rhizosphere.

Dr. U.P. Singh, BHU, Varanashi, presented the first contributory paper entitling "Conservation agriculture – potential way for weed management" where he elaborately discussed the possible challenges for weed management in maintaining the food security, emphasizing on proper and profitable crop rotation. Dr. M.T. Sanjay, UAS Bangalore, presented contributory paper on "Productivity of sunflower-maize sequence as influenced by long term tillage and weed management practices" based on the work done during 2005 to 2012 in sandy-loam soil with 6.1 pH and highlighted the weed flora shift during the cropping. He mentioned that population of *Cynodon dactylon* has spread up under tillage comparing to zero tillage. The last contributory paper "Effect of conservation agriculture based systems and weed management practices on weeds and yield of rice" was presented by Dr. V.P. Singh, GBPUAT, Pantnagar, emphasizing on resource conservation Technology (RCT).

In his presidential remarks, Chairman Dr. L.S. Brar thanked all the speakers for their excellent presentations and opined for need of situation specific management in conservation agriculture

Technical Session – II: Sustainable weed management in diversified cropping systems– I
Chairman : Dr. N.N. Angiras, Ex-Professor& Head, CSKHPV, Palampur
Rapporteurs : Dr. J. Deka and Dr. N.K. Prabhakaran

There were two papers each in lead and contributory presentations. Dr. Gulshan Mahajan, Punjab Agricultural University, Ludhiana made a lead presentation on 'Dry-seeded rice in north-west India: rationale and approaches'. In north-west India, rice is primarily grown as transplanted rice. The production system is labour and energy intensive requiring large amount of water (150cm). Water and labour became increasingly scarce and threatens the environment sustainability. Dr. Mahajan discussed various issues related to DWSR and suggested various methods of wed management.

The second lead presentation on 'Potentials of direct seeded rice with efficient weed management to improve and sustain productivity and profitability of rice-wheat cropping system in India' was made by Dr. Ashok Yadav, CIMMYT, Patna. Experience of atleast 12 years in direct seeded rice in Punjab and Haryana indicates, redefining establishment methods like laser levelling, time of sowing etc., are of prime importance. In DSR, water saving is to the tune to 10-20 %. There is no yield gap between TPR & DSR but net income from DSR is much higher than TPR. In DSR, weed management is a big challenge due to aerobic environment. Weedy rice, *Leptochloa chinensis* management pose big challenge. Weed and water management should be done meticulously.

Dr. A.N. Rao, ICRISAT, Hyderabad made a contributory presentation on 'Weeds and weed management in Karnataka state - a review'. In this presentation, he mentioned that Karnataka rice area is 14,000 hectare which

is 3.6 % of area with the production of 4.6 % in India. TPR is a major establishment method of rice. However, 1,00,000 acres area are under DSR. In DSR, aerobic weeds are dominating. Weed shift has occurred. *Parthenium hystrophorous* was predominant in dry seeded rice. He emphasized the need for development of location specific sustainable integrated weed management strategies and extension of technologies to farming community.

Comparative efficiency of new herbicides for weed control in dry seeded rice was presented by Dr. C.T.Abraham, KAU, Thrissur. Dry-seeded rice has most severe weed competition compared to wet-seeded or TPR. Grass weeds are most difficult to manage. Many new herbicides have come in Kerala. Efficiency of these herbicides have to be evaluated in a field with complex weed flora. Cyhalofop, metamifop and fenoxaprop-p-ethyl effective against grasses. Bispyribic sodium was effective against all weeds except *Leptochloa chinensis*. Azimsulfuron and penozulam controlled all the weeds reasonably. None of the herbicides control all the weeds effectively.

Chairman remarks:

- Integration of inter-cultural operation is a must in DSR
- Herbicidal rotation to avoid herbicide resistance by weeds,
- In TPR, if there is continuous rainfall so land preparation is difficult. Paraquat application to kill initial weed density (state seed bed) to take up transplanting (Himachal Pradesh)
- In DSR, seeds are broadcasted and there will not be uniformity in population, so intercultural operation can be done to maintain population.
- Wild rice problem needs to be addressed. Purple colour rice in cultivated in Himachal Pradesh to differentiate from wild rice.
- Balanced use of fertilizer with split application is essential.

Technical Session III: Sustainable weed management in diversified cropping system II

Chairman: Dr. Nimal Chandrasena, Australia
Rapporteur: Dr.M.L Kewat; Dr. Gulsan Mahajan

In the concurrent Technical Session III, Two Lead Presentation were made by Dr. Bhagirath S. Chouhan, IRRI, Philippines and Dr. Sanjay Saha, CRRI, Cuttack as well as three Contributory Presentation were made by Dr. R.K. Ghosh , BCKV, Mohanpur, Dr. B. Gangaiah, DRR, Hyderabad and Dr. V.M. Bhale, PDKV,Akola.

During course of presentation it was felt that, weedy rice is going to be a great threat in the days to come as problem of this weed is increasing in different parts of country at the alarming rate because there is no effective ways to control this weed. Hence there is need, distinguishing characters of different species of weedy rice and development of integrated approach for effective control of Weed Rice. The botanical could also play important role in weed management in rice. Therefore, possibilities of different botanicals to be explored to control weeds in rice fields besides new rice herbicides. Brown managing is also a useful tool in suppressing weed growth and N nutrition in wet seeded rice. So, there is need to have some studies in future for quantification of their potential in reducing weed problem and N contribution in rice and succeeding rabi crops also. Crop-weed association in rice in eastern Maharashtra varies according to location, soil type and crop/varieties grown. Hence, weed strategies to be developed according to existing weed flora (monocot on dicots) in different districts of eastern Vidharva region of Maharashtra.

Technical Session IV: Sustainable weed management in diversified cropping systems -III

Chairman : Dr. L. S. Brar, Ex. Prof. and Head (Agronomy), PAU, Ludhiana
Rapporteur: Dr. Sanjoy Saha and Dr. Amit Jha

Dr. V.S.G. R. Naidu presented the lead paper on crop- weed interactions under climate change. In his presentation he informed that the CO_2concentration may cross the limit of 400 ppm threshold limit by 2015 or 2016. He cautioned about the direct effect of climate change on crop and weed physiology. The elevated CO_2 may prolonged the duration of *Kharif* crop and may reduce the duration of *Rabi* crops. There may be chance of minor weed to become invasive of certain native plants to become weed. Dr Naidu also informed that the herbicide response more in ambient CO_2 than elevated CO_2. Dr. Bhumesh Kumar briefed the advantages of biotechnological tools over conventional breeding. The traits of certain weeds can be exploited for abiotic stress management as well as for enrichment of nutrient in crops through gene incorporation. Dr. A.S. Rajput briefed about the utilization of certain weeds as green manuring and also exploitation some of them as green leafy vegetables and for medicine industry.

Technical Session– V: Herbicide tolerant crops and interaction with herbicide industries

Chairman: Dr. A. N. Rao

Co-Chairman: Dr. Dev Raj Arya
Rapporteurs: Dr. R.K.Singh and Dr. T.K.Das

Dr. C. Chinnusamy presented the challenges and strategies for GM crops in India. Dr. Chinnusamy presented his experimental findings and concluded that GM crops like corn and cotton can benefit the b farmers in our country. Dr Ashok from Monsanto Ltd highlighted the basic facts related to economic benefit from GM crops to the farmers. Dr. MayankYadav from Dow Agrobios, highlighted that herbicide granite TM is of dual action and controls complex weed flora in different rice cultures . Representative from Indofil Dr. S. K. Biswas gave the overall picture of pesticide industries in India and highlighted the ever increasing demand of herbicides in the country which is likely to grow by about 12.0 % in 2015. Dr. Virendra Kumar, CIMMYT India, enlighten the house about computers based imaging in precise herbicide application. He presented the work done by one of the students at USA who developed the robotic sprayers that can spray the herbicides by sensing the weeds present in patches under field conditions.

It was recommended that herbicide tolerant crops, if used wisely, can be incorporated in to integrated weed management strategies in future for economical, effective, and sustainable weed management. The possibilities of computer image based spraying tools must also be explored under Indian conditions to increase the herbicide efficacy and manage weeds economically.

Technical Session-VI: Biological weed management and allelopathic interactions

Chairman : Dr. C. Chinnusamuy, TNAU, Madurai
Rapporteurs : Dr. S.S. Punia and Dr. C. Kannan

There were two lead and one contributory presentation in this technical session with the theme "Biological weed management and allelopathic interactions". The first presentation was Dr. Mahesh K. Upadhyaya lecture presented by Dr. A.K. Pandey, Prof. Biosciences, RDVV and Chairman, M.P. Private Universities Regulatory Commission, Bhopal on the topic "Microbial control of weeds: present scenario and prospects". Dr. Pandey in his lecture explained the importance of biocontrol, advantages of using microbes as bioherbicides and cited many successful examples. He stressed the importance of networking programmes in biological weed control and also the necessity for more focus on research and education in the field of biological control

The second presentation was by Dr. Sushil kumar, on the tropic "Spread, impact and management of Parthenium". He described the current scenario of *Pathenium* infestation in India, its spread and the health hazards it causes on humans and cattle. He explained the successful biocontrol of *Parthenium* using *Zygogramma* beetles. The third presentation was made by Dr. D.K. Pandey, from DWSR on the topic "Innovations in phytochemicals for weed management". Dr. Pandey explained the role of allelopathy in weed management and cited the example of the compound parthenin from *Parthenium* in controlling aquatic weeds. The session ended with the following recommendations

1. A network research group may be formed to work on the biological control of weeds
2. Biological control of weeds may be included as an important component in the integrated weed management practices

Technical Session–VII: Problem weeds and their management

The session was chaired by Dr Megh Singh, University of Florida, USA.

Dr. S.S. Punia from CSSHAU, presented *Orobanche* infestation in mustard, tobacco and tomato crops. The heavy infestation of *Orobanche* is mainly due to vigorous seed production capability (1 to 3 lakh/plant) and its microscopic seed size. He suggested to adopt preventive measures like avoiding its dispersal, preventing movement of infested soil, late sowing of mustard, (25 October to 10th of November), follow crop rotation by introducing gram, barley, wheat, in place of mustard. He also stressed for 120 kg N/ha for mustard and Ammonium sulphate as source of nitrogen. Neem or castor cakes @ 400kg/ha are other remedial sources. He also suggested application of glyphosate by mixing 0.1% ammonium sulphate.

Dr R.K. Singh from BHU stressed for availability of safe food and for that use of chemicals particularly herbicides should be minimized if not completely removed. Their over use are creating threat of weed resistance, water quality and human health. He warned that 2, 4-D, atrazine and paraquat are highly carcinogenic. He suggested for developing effective link between extensionists, scientists and farmer.

Dr M.T. Sanjay, UAS, Bangalore presented first occurrence of *Ambrosia psilostachya* in one of the district of Karnataka. He cautioned that if it is not managed properly, it may spread like *Parthenium* and latter on will be difficult to control. This plant has been declared domestic quarantine weed by National Institute of Plant Health

Management, Hyderabad and state department of agriculture. Among its control measures sodium salt of 2,4-D @ 2g/l or glyphosate 10ml/L ha has been found effective.

Dr N N Angiras, CSH HPKVV , Palampur presented a list of major perennial weeds of hill ecosystem. He highlighted the threat caused by these weeds. It was recommended that *Ambrosia psilostachya* can be controlled by sodium salt of 2,4-D @ 2 g/L or glyphosate 10 ml/L. Government agencies, scientists and farmers should work together for the cause of better environment and management of perennial weeds of non crop area.

Date: 16-02-2014

Technical Session VIII: Interaction with students and Farmers
Chairman: Dr. A. R. Sharma
Rapporteur: Dr. V.P. Singh and Dr. Anil Dixit

A Scientists-Farmers-Students interaction session was held on 16 February, 2014. The meeting was attended by about 40 farmers and 65 students. During the interaction, solutions were offered for the problems on weed management being faced by the farming community. A few farmers raised the issue of spurious herbicides in the market due to which they are unable to get desired control of the weeds. They urged the society to take some stringent steps to check the menace of spurious herbicides.

Interaction with students were started with a presentation on 'Research needs for improving weed management in rice' by Dr. B.S. Chauhan, IRRI, Philippines. He explained the weed problems associated with different rice eco-systems being faced by the farmers of Asian countries and also the challenges in weed management. Dr. Chauhan addressed most of the queries raised by the students. Dr. Chauhan gave tips for writing of quality papers to the students.

Technical Session IX: Herbicide residues and their mitigation

The session on 'Herbicide residues and their mitigation' was chaired by Dr. Gita Kulshrestha, former Head and Professor, Division of Agricultural Chemicals, IARI, during the last session of the day. In the lead lecture, Dr. Shobha Sondhia, Sr. Scientist, DWSR gave a detailed account of research on herbicide residues done at DWSR, AICRP-WC and country. She cited a number of examples on the persistence of herbicide in soil. Remarkably, pendimethalin persisted up to 200 days in soil of wheat field. Imazethapyr persisted up to 210-240 days in the soil of soybean. She found most of the herbicides were either below MRL or below the detectable limit in wheat grain. Traceable amount of residues of napropamide in made tea; pendimethalin in some vegetables; pyrazosulfuron, atrazine and sulfosulfuron in ground water; and atrazine in surface water were detected in different places of the country.

Dr. S.K. Guru from G.B. Pant University of Agriculture and Technology delivered the second lead lecture on 'Herbicide resistance: magnitude, mechanisms and management'. He elaborated on the mechanism of resistance development by *Phalaris minor* against isoproturon. He also explained the present status of herbicide resistance in India and the way to manage it at farmers' level through BMPs. Dr. Sashi Bala Singh, Principal Scientist, IARI, presented the scope of biosurfactant-releasing microbes in bioremediation of atrazine and alachlor by *Penicillium* spp.

Dr. K.M. Durgadevi, Kerala Agriculture University reported that metsulfuron-methyl and chlorimuron-ethyl persisted more than 15 days after spraying. During discussion, it was suggested to check the method of analysis by GLC-ECD as sulfonyl ureas get degraded to sulfonamide in GLC-column.

Dr. A.S. Rao from ANGRAU, Guntur presented compatibility of herbicides with insecticides, although it was in preliminary stage. It was advised to check the chemical compatibility through shelf- life study.

Technical Session - X: Weed management in pulses and oilseeds

Chairman: Dr. R.P. Singh, BHU, Varanasi
Rapporteaurs : Dr. Dinesh Badiyala and Dr. M. Madhavi

Following oral presentations were made in this session:

1. Dr. T.K. Das, IARI, New Delhi *Cyperus rotundus* interference, economic threshold and management in soybean
2. Dr. Raghwendra Singh, DWSR, Jabalpur, Effect of pre-emergence herbicides on weed flora and yield of sesame

3. Dr. Ashim C. Sinha, UBKV, West Bengal , Effect of integrated weed management practices on lentil-mustard intercropping system under rainfed condition in Terai region of Eastern India
4. Dr. Narendra Kumar, IIPR, Kanpur Weed management strategies through post-emergence herbicides in pulses

There was lively discussion after the presentations. Dr. Das determined the economic threshold of nut sedge in soybean by 200/m2 and recommended tank mix application of pendimethalin (0.75 kg/ha) and imazethapyr (0.1 kg/ha) as PE with GA (400 ppm) and KNO_3 (6%). Dr. Sinha suggested lentil and mustered intercropped in 3:2 row ration with hand weeding (twice) at 25 and 45 days. Dr. Narendra Kumar from IIPR Kanpur suggested the pendimethalin (1.25 kg/ha(PE) + quazilofop-ethyl 100g/ha(POE) for effective control of winter pulse like chickpea, lentil ad field pea

Technical Session–XI Theme : Weed management in commercial crops

Chairman : Dr. B.S. Chauhan, IRRI, Philippines
Rapporteaurs : Dr. U.P. Singh and Dr. M.S. Bhullar

About seven oral presentation were made in this session. There was discussion over each topic about the effect of different doses of herbicides. Dr. Mukesh Kumar told that weed management practices in FYM applied field should be given the highest priority for the management of weeds in jute. Dr. J.S. Mishra recommended tank mixed pre-emergence application of atrazine + pendimethalin (0.25 +.50) kg/ha) followed by POE of 2,4,D at 0.50 kg/ha. Dr R.K. Singh recommended integrated weed management in spring harvested sugarcane ratoon by three hoeing at 15,45 and 75 DAR followed by trash mulching. Dr. Bodake from Rahauri emphasized the IWM in oat crop. Dr. Madhvi gtom ANGRAU, Hyderabad suggested topramezone and atrazine as tank mix. Dr. Barman from DWSR, Jabalpur showed the clear effect of weed management practice in different on-farm trials done at farmers filed. Dr. Lohit highlighted the weed management in rainfed rice in eastern Himalayan region.

Date: 17.2.2014

Plenary Session:
The 3-day Conference after successful deliberations concluded with the Plenary Session on 17 February, 2014 which was chaired and co-chaired by Dr. N.T. Yaduraju and Dr. A.R. Sharma, President and Secretary. Dr. Shobha Sondhia and Dr. J.S. Mishra acted as rapporteurs.

The Chairman invited rapporteures of various sessions to make very brief presentations and to give one or two important recommendation on the basis of presentations and deliberations. Dr. AR Sharma, the organizing secretary of the Conference, while summarizing the event said that this conference gave an international view due to the presence of Dr. Megh Singh (USA), Dr. Nimal Chandrasena (Australia) and Dr. B.S. Chauhan (IRRI, Philippines). He highlighted the quality of presentations made by the key speakers. He further informed the house that the Society is now very well shaped and its financial health is also good. He appreciated the efforts made by the executive committee and the DWSR staff in successful organization of this conference. Dr. Sharma also informed that organizing the 25th APWSSC in India by ISWS is very special occasion as it is the Silver Jubilee conference of APWSS and Golden Jubilee of APWSS. He urged the participants to participate in this mega event in large numbers and make it a grand success.

Dr. TV Muniappa appreciated the united efforts made by ISWS in successful organization of the Conference. He emphasized that younger generation should take active role in the society. He also announced to give Rs. 1.0 lakh to the ISWS for generating awards to young scientists. Dr. N.T. Yaduraju, Chairman, thanked Dr Muniappa for his support to the Society. Dr. Megh Singh emphasized that more students should be encouraged to participate in such conferences. He also suggested to generate separate funds in the society for the students. Dr. Nimal Chandrasena emphasized more on ecological weed management. He appreciated the conference and said that the India should take lead in weed science as they are rich in scientific human resources.

Fig. Plenary Session meeeting

Awards for the best 3 posters were also given to the participants in the .

Chairman, Dr. NT Yaduraju appreciated the efforts made by the Society and the DWSR in organizing this conference at Jabalpur. He thanked the EC and placed on the record the cooperation given DWSR. He further assured the house that Society will come up to the expectations of the members in future. He appreciated the efforts made by Dr. A.R. Sharma and his team at DWSR. He gave special thanks to Dr. Shushilkumar, Editor-in-Chief, IJWS and Dr. Shobha Sondhia, treasurer, ISWS for their hard work.

Recommendations

1. More extension efforts should be done by State and Central Government and also by the weed scientist in the country on conservation agriculture.
2. Government should fund more projects on weed utilization aspect which subsequently will enhance the income of poor farmers besides giving benefit of control.
3. Government should strengthen weed quarantine facilities by appointing more weed scientist at the assigned ports to minimize the influx of alien invasive weeds.
4. ISWS, DWSR and all the AICRPWC centers should create more public awareness on the menace and management of weeds. It was decided that councilors from each state will organize some events to create the awareness among farmers and general public. It was decided that an amount of Rs 10,000/- will be provided by ISWS to each councillor for this purpose.
5. There is a need to make more trials in transgenic technology for developing more crops under HTGM with all pros and cons of technology.
6. More emphasis should be given on to develop integrated package for weed management to reduce the chemical load in the environment and to overcome problems of weed shift. The presence of organic manure in soil decreases the persistence of soil applied herbicides. Therefore, it is recommended to apply organic manure at regular basis.
7. More funding from Government should be given to strengthen the research efforts for the management of problematic aquatic weeds.

Dr. Sushilkumar, Chief Editor, proposed the vote of thanks to all those involved in making this conference successful.

(A.R. Sharma)
Secretary