ISWS News Letter
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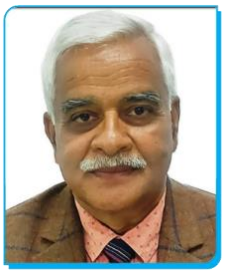
Message from President

Dear Colleagues

Greetings!



Rainy season is ever green, and in this greenery weeds contribute a lot. Frequent rains, high humidity with moderate temperature, limitations in field operations, *etc*., make very congenial environment for weed seeds germination in several flushes and grow profusely. Farmers are striving hard to get rid of with weeds in rainy season crops especially in direct-seeded rice. Although imazethapyr-tolerant non-transgenic rice varieties Pusa Basmati 1979 and Pusa Basmati 1985 from ICAR-IARI, and SAVA 134 (FullPage) from Savana Seeds have been developed and released, there is a need to develop proper stewardship guidelines to maximize its potential benefits and reduce environmental risks. *Parthenium*, the green weed of non-cropped areas (now in crops also) grows very profusely in rainy season and causes enormous damage to agricultural productivity, human and animal health and biodiversity. To contain this weed, the ICAR-Directorate of Weed Research, Jabalpur is organizing XIX Parthenium Awareness Week from 16-22 August 2024 throughout the country. I appeal to all to participate in this activity as a component of "Swachh Bharat Abhiyan" and to ensure a Parthenium-free environment around you.

It's a happy sign that many new members are joining ISWS family, but with a slow rate. I sincerely request all especially the Councilors and the University Professors to encourage the research fellows and post-graduate students to become the life member of the Society. In past, the ISWS has initiated a fund of Rs. 10,000/- for all the State Councilors to organize various activities related to weed science such as one-day workshop for students, special lectures of eminent weed scientists, etc. However, our experiences show that the progress so far is not very encouraging. Only few Councilors took interest in this area. I appeal all the Councilors to make the full use of this fund efficiently for the benefit of the students and research scholars. Publication of our journal the *Indian Journal of Weed Science* is well in time, and 2nd issue of 2024 (Vol. 56, No. 2; April-June) has already been uploaded on the website. One of our major concerns is the current downfall in the NAAS rating (from 5.84 to 5.42) of the IJWS. All of us have to think and rethink seriously as to how we can contribute in improving the NAAS rating of our journal. Submitting high quality research papers and review articles and standard review process would be the only way to achieve this.

You all know that Indian Society of Weed Science is organizing its **Biennial Conference on '*Climate-smart Weed Management for Global Food Security*' during 28-30 November, 2024** at Banaras Hindu University, Varanasi. I request you to encourage the scientists, research fellows and students to participate in a large number and make the conference success. Leading weed scientists from overseas like Dr. Robert L. Zimdahl USA, Dr. Nimal Chandrasena, Australia, Dr. Mithila Jugulam, USA, and Dr. Virender Kumar, Philippines have also consented to attend the Conference. Various committees have been formulated for its successful organization. Dr. M.K. Singh, Professor (Agronomy) & Vice President of the Society, BHU, Varanasi and the local Organizing Secretary of the Conference is doing an excellent job to ensure a great event. Registration and Abstract submission portal is already open for the participants. Several sponsors are being requested to support the event in a big way. The second circular has already been uploaded on the ISWS website (https://www.isws.org.in/Conference_2024).

The ISWS in collaboration with ICAR-DWR, Jabalpur is organizing a **National Training programme on '*Integrated Weed Management Strategies under Changing Agricultural Scenario*' during 28th August to 6th September, 2024** in Virtual mode. I request you all to encourage young weed scientists and students to participate in this training programme.

Thanks for your consideration

Regards

J.S. Mishra
President, ISWS

RESEARCH HIGHLIGHTS

Crop protective herbicide applicator

Sheeja K. Raj, Jacob D., Shalini Pillai P., Dhanu Unnikrishnan, Anitrosa Innozent, Krishnasree Radhakrishnan and Seethal Rose Chacko, Agronomy Department, College of Agriculture, Vellayani

Kerala Agricultural University has been awarded a patent for the invention **crop protective herbicide applicator**. Crop protective herbicide applicator is a machine for directed application of herbicides towards weeds, minimising herbicide spray drift and the subsequent harm to crop due to phytotoxicity.

Crop protective herbicide applicator is a machinery for directed application of herbicides, simultaneously minimizing herbicide spray drift and the subsequent phytotoxicity to crops. This invention benefits farmers who use pre-emergence and post emergence herbicides in crops as it allows them to control weed plants with the minimal crop damage. While spraying, the crop is drawn inside the crop protective hood, where it is shielded from the spray droplets emanating from the nozzle outside. Weed plants are drawn inside the spray hood and are wetted by the spray droplets from nozzle inside the spray hood. Spray drift and the consequent harm to crop brought on by phytotoxicity are significantly reduced by the use of crop protective hood in conjunction with spray hood in the machinery.

Main parts of the Crop Protective Herbicide Applicator are:

1. Crop hood with attached skirt: to protect crop from herbicide spray drift. Hood protects the top of crop canopy while the skirt glides along the field protecting the base of crop.
2. Cubicle curtain: to protect the herbicide spray coming out of nozzles from wind in order to minimize herbicide spray drift.
3. Movable nozzle holder: capable of adjusting the nozzle position horizontally anywhere in between crop rows and also capable of adjusting the nozzle position vertically anywhere from the ground level below.
4. Twin wheels along with single hood on either side of the machinery: can be together as a single unit extended away or towards the main body of the machinery to position the hood exactly over the crop rows in field situations where the inter row spacing of crop varies from one row to another.
5. Foldable handles with lockable position: Single operator can use the handle to pull the machinery across field. Handle can be fold into a stand to hold the machinery upside down so that the operator can easily attach suitably sized crop hood as per the requirement of the type and stage of crop. Handle can also lock into position so that by pushing down on handle the machinery can be turned around on its twin back wheels located below handle, thus achieving a small turning radius.
6. Spray tank with inbuilt rechargeable battery and pump: A regulator is provided to adjust rotational speed of pump as per the specification of attached nozzles.

Crop protective hoods are longitudinally attached beneath a rigid frame with ground engaging wheels. Spray nozzle is placed outside the crop protective hood directed at weeds present between crop rows. Spray hood covers the nozzle and is transversely attached on the rigid frame. When the machinery is in operation, the crop is drawn inside the crop protective hood, where it is shielded from the spray droplets emanating from the nozzle outside. Weeds are drawn inside the spray hood and are wetted by the spray droplets from nozzle inside the spray hood. Spray hood confine the airborne spray droplets within. Spray drift and the consequent harm to crop brought on by phytotoxicity are significantly reduced by the use of crop protective hood in conjunction with spray hood in the machinery.

Weed management in herbicide (imidazolinone) tolerant dry direct seeded rice

Dharam Bir Yadav[1], Ankur Chaudhary[1], Suresh Kumar[1], Virender Kumar[2] and Sudhanshu Singh[3]
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The rice-wheat system spans 13.5 million hectares in the Indo-Gangetic Plains of South Asia, with 10.3 million hectares in India. Traditional rice cultivation involves puddling, manual transplanting of 25-30 days old seedlings, and continuous ponding of water for over a month. This practice leads to groundwater depletion, greenhouse gas emissions, residue burning, soil compaction, rising cultivation costs, and labour shortages, threatening sustainability. Labour-intensive operations like puddling and transplanting require over 25 person-days per hectare. Future water scarcity, climate change, and inefficient practices necessitate a strategic shift to water-efficient rice cultivation techniques for better productivity and reduced global warming.

Direct-seeded rice (DSR) is proposed as an alternative to conventional puddled transplanted rice to address groundwater depletion, labour scarcity, and profitability. DSR eliminates

puddling, reduces water use by 200 mm, requires less labour, and facilitates early maturity and timely sowing of subsequent crops. However, diverse weed infestation is a major challenge. Pre-emergence (PE) herbicides like oxadiargyl and pendimethalin are used within three days of sowing, but inconsistent moisture affects weed control. Post-emergence (PoE) herbicides such as bispyribac-sodium, fenoxaprop, ethoxysulfuron, and azimsulfuron target specific weeds but require precise timing. Effective, season-long weed control is crucial for high DSR production.

Imazethapyr EPoE (100 g/ha) *fb* PoE (100 g/ha)

New non-GM imazethapyr herbicide-tolerant (HT) genotypes, Pusa Basmati 1979 and Pusa Basmati 1985, address weed challenges in DSR in India. A field experiment at CCS Haryana Agricultural University optimized imazethapyr doses and spray timing for season-long weed control in imidazolinone-tolerant rice. Sequential application of imazethapyr (EPoE *fb* PoE) significantly reduced weed density and dry weight of *Echinochloa crus-galli, Dactyloctenium aegyptium* and *Leptochloa chinensis*, especially at higher doses (100-150 g/ha) as compared to alone application of imazethapyr (EPoE). This approach yielded grain yields (5.80-6.74 t/ha) similar to weed-free checks. Post-emergence application was more effective than PE or EPoE. Faster canopy development from timely sowing also helped restrict later weed emergence. Further research is needed to optimize imazethapyr doses and scheduling under different conditions and its residual effect on succeeding crops.

Atrazine loaded hydrogel formulations on maize crop

Jakku Prasanna, S. Marimuthu and G. Gowtham
Tamil Nadu Agricultural University, Coimbatore

Research conducted at the Department of Agronomy, Tamil Nadu Agricultural University (TNAU), Coimbatore, included an innovative pot culture experiment to evaluate the effects of atrazine-loaded hydrogels on maize. The aim was to assess potential phytotoxicity when using these biopolymer-based hydrogels, prepared with a crosslinker, in varying doses compared to a commercial atrazine formulation. The finding suggested that neither the commercial formulation of atrazine applied at 1.5 kg/ha nor the different encapsulated hydrogel formulations displayed any phytotoxic symptoms in maize. This lack of phytotoxicity is attributed to atrazine's selective action on maize, which is well-documented for its differential metabolism and reduced translocation within the plant. These results underscore the potential of atrazine-loaded hydrogels as a safe and effective herbicide delivery method for maize cultivation, offering an exciting avenue for agricultural innovation and sustainability.

Maize crop in pot culture experiment exhibiting no phytotoxicity symptoms

Drone-based herbicides application in Direct-Seeded Rice

Arockia Infant Paul and P. Murali Arthanari
Tamil Nadu Agricultural University, Coimbatore

Adoption of drone-based herbicide application (pretilachlor followed by bispyribac sodium) significantly improved weed control efficiency, maximizing energy and cost returns in direct-seeded rice. This method resulted in a 23% reduction in herbicide application cost with better weed control efficiency and reduced application time, labour intensity and labour drudgery compared to the conventional method of herbicide application. The spray fluid used was 40 L/ha for pre-emergence herbicide application and 30 L/ha for post-emergence herbicide application. Consequently, developed a technology recommendation for the farming community.

Assessment of *Parthenium hysterophorus* infestation in Karaikal, U. T. of Puducherry

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Karaikal, Puducherry 609603

A survey assessed *Parthenium hysterophorus* infestation in Karaikal, U.T. of Puducherry. This annual herb poses threats to agriculture, biodiversity, and human health. Conducted in April-May 2024 across five communes with 27 villages, the survey used quadrat method for accuracy. Indices like prevalence, density, frequency, Important Value Index (IVI), and Summed Dominance Ratio (SDR) were calculated. Results showed a diverse weed flora with 22 species from 12 families. *Cynodon dactylon* dominated all communes, thriving in disturbed, moist habitats, while other species varied in prevalence and density. In Thirunallar commune of Karaikal, phytosociological parameters for Parthenium were notably higher due to urban development and human activities, despite limited impact on agriculture. 80% of Parthenium was prevalent in Thirunallar alone, spanning 9 villages, while the remaining 20% was scattered across four communes comprising 18 villages in Karaikal. Effective management strategies, including public awareness campaigns and targeted herbicide applications via UAVs, are crucial to mitigate its impact on agriculture and ecosystems.

Sampling of *Parthenium hysterophorus* in Karaikal communes

Brown manuring a reliable method in direct-seeded rice

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Brown manuring is a 'no-till' version of green manuring, using a selective herbicide to desiccate green manure crops before flowering. In this technique, green manure crops are grown with the main crop and then killing using herbicide, leaving the plant residues standing in the field. This residue decomposes naturally, adding organic matter and suppressing weeds through shading. The process results in loss of chlorophyll, turning the leaves brown, hence the term "brown manuring" coined. For rice cultivation, rice and *Sesbania spp.* are grown together, and when Sesbania overtakes rice in height, 2,4-D herbicide is applied to kill the Sesbania. This turns Sesbania plants brown, causing them to die and form mulch, which suppresses weeds without harming the rice. This technique is recommended for direct-seeded rice, as it retain Sesbania residues in surface or incorporates into the soil with beusaning, enriching it with nutrients.

Crops suitable for brown manuring

Non-leguminous crops, such as Niger and Wild Indigo, provide organic matter to the soil but are used sparingly. Leguminous crops, like Sun-hemp, Dhaincha, Mung, Cowpea, and Lentil, add organic matter and nitrogen, as nodule bacteria that fix atmospheric nitrogen. Sesbania initially interferes with weeds and later, as mulch, adds organic matter. Brown manure crops, grown densely, minimize weed spread. Knocking down Sesbania with 2,4-D speeds decomposition and nutrient release, enriching the soil with carbon and nitrogen, promoting microbial activity, and releasing organic acids that suppress weed seed banks. This practice enhances soil fertility and crop productivity.

Qualities of an ideal brown manure crops

- Seeds should be readily available and cost-effective.
- It should be easy to cultivate and exhibit vigorous growth.
- They should produce high dry matter in a short growth period
- The crops should effectively compete with target weeds.
- They should provide high ground cover to reduce wind erosion and conserve moisture.
- They must not compete with the main crop

Social feasibility of the technology

- The technology is well-suited for risk-prone agro-ecosystems where rice is directly seeded.
- As many Indian rice growers have limited resources, this technology offers significant benefits with minimal input costs.

Benefits of brown manuring

Brown manuring increases soil organic carbon, supplying necessary nitrogen for rice and allowing up to 25% reduction in nitrogenous fertilizers. It boosts crop yield and conserves moisture through green manure biomass. It enhances soil health, including organic carbon content and earthworm population, and improves the soil's physicochemical and biological properties. Brown manuring reduces weed populations early on due to its rapid growth and competition with weeds. Additionally, it increases soil organic matter, decreasing soil bulk density and acting as a buffer to prevent or lessen soil compaction from external loads.

Green manuring v/s brown manuring

Green manuring	Brown manuring
It involves tilling a cover crop into the soil usually around flowering.	It is a no-till version of green manuring, wherein herbicides are employed to eliminate both the cover crop and weeds
Risk of soil erosion	The plants are left standing to protect lighter soil from the risks of erosion
Moisture is necessary for incorporation and decomposition.	Moisture is conserved during the practice
The microbial population is necessary for decomposition	Chemical desiccation will take place

Conclusion

Given rising chemical fertilizer costs, brown manuring offers an alternative path to boost crop production and farmer income. It effectively manages nutrients, enhances soil quality, and promotes environmental sustainability, minimizing herbicide use. Extension agencies should actively promote this method to benefit farming communities.

HONOURS AND AWARDS

Ms. **G. Pavithra**, a Ph.D. Scholar in Agronomy at Tamil Nadu Agricultural University (TNAU), has been awarded the prestigious **INSPIRE** fellowship during April, 2024 for the period of five years by the DST, Govt. of India for research on "**Harnessing the Potential of Sorgoleone for Eco-Friendly Weed Management through Bioherbicide Development**" under the expert guidance of Dr. P. Murali Arthanari, Professor of Agronomy at TNAU.

Mr. **Pankaj Bhaskarrao Ghodke**, a PhD scholar in Agronomy at Punjab Agriculture University (PAU), Ludhiana, has been selected as a visiting research student at the Queensland Alliance for Agriculture and Food Innovation (QAAFI), University of Queensland (UQ), Australia. He will focus on weed biology and management, working under the mentorship of Professor Bhagirath Singh Chauhan, UQ, Gatton, Australia. Presently, pursuing his PhD under the guidance of Dr. Tarundeep Kaur, Principal Scientist (Agronomy), PAU, Ludhiana.

M.Sc. theses in Weed Science

Name	Name of chairmanship	Thesis title	University
M.Sc.			
Mahammad Kaif	Dr. Anupam Mukherjee	Predominant weed flora with their morphological and phyto-sociological characteristics in crop fields under Sonarpur block of West Bengal, India	Ramakrishna Mission Vivekananda Educational and Research Institute, Narendrapur, Kolkata
Prianty Chakraborty	Dr. B. Duary	Chemical weed management in transplanted fingermillet [*Eleusine coracana* (L.) Gaertn.] in lateritic soil of West Bengal	Institute of Agriculture, Visva-Bharati (Central University), Sriniketan, Birbhum West Bengal
Subhra Das	Dr. B. Duary	Effect of nano urea and herbicides on weed growth and productivity of transplanted rice in West Bengal	Institute of Agriculture, Visva-Bharati (Central University), Sriniketan, Birbhum West Bengal
Karthickraja A.	Dr. P. Saravanane	Optimization of spray fluid for weed management through drones in dry direct-seeded rice	PAJANCOA & RI, Karaikal, Puducherry UT

Recently published articles in Indian Journal of Weed Science

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R. Puniya, B.R. Bazaya, Tanjot Kour, S.N. Kumawat and Supneet Kaur. 2023. Sequential application of herbicides for weed management in direct-seeded basmati rice. *Indian Journal of Weed Science* 55(4): 359-363.

Simerjeet Kaur, Tarundeep Kaur and Makhan Singh Bhullar. 2023. Pendimethalin plus pyrazosulfuron for pre-emergence control of complex weed flora in dry-seeded rice. *Indian Journal of Weed Science:* 55(4): 364–368.

M.C. Dwivedi, R. Puniya, Kanik Kumar Bansal and Rakesh Kumar. 2023. Broad-leaved weed management in wheat through herbicide mixture in sub-tropical Shivalik Himalayan foothills. *Indian Journal of Weed Science:* 55(4): 369–373.

Dibakar Ghosh, K. Brahmachari, A. Das, S. Sarkar, N. Kumar Dinda, D. Moulick, M.K. Datta and S. Bandyopadhyay. 2023. Residual effect of organic manure on weed population and nitrogen uptake in greengram under rice-maize-greengram system. *Indian Journal of Weed Science:* 55(4): 374–379.

Suman Sen, T.K. Das, A. Dass, D. Kumar, A. Bhatia, R. Bhattacharyya, Rishi Raj, P. Govindasamy, A. Roy, Alekhya Gunturi, P. Saha and R. Sharma. 2023. Tillage, residue, nitrogen and herbicides effects on weeds and greengram productivity and profitability in conservation agriculture-based maize-wheat-greengram system. *Indian Journal of Weed Science:* 55(4): 380–387.

Narendra Kumar, V.K. Choudhary, D.S. Sasode, Mrinali Gajbhiye, M.P. Sahu, Vikash Singh, Alpana Kumhare and Sonali Singh. 2023. Tillage and weed management practice influences on weed dynamics and yield of greengram in maize-wheat-greengram cropping system. *Indian Journal of Weed Science:* 55(4): 388–395.

Renu Sethi, Navjyot Kaur and Makhan Singh Bhullar. 2023. Seed production potential of Medicago denticulata in relation to growth stage at the time of herbicide application. *Indian Journal of Weed Science:* 55(4): 396–402.

Sathishkumar, E. Subramanian, G. Selvarani and P. Rajesh. 2023. Productivity and economics of cotton under different weed management practices and intercropping systems. *Indian Journal of Weed Science:* 55(4): 403–409.

Fiseha Baraki, Zenawi Gebregergis, Zerabruk Gebremedhin, Ferdu Azerefegn. 2023. Efficacy of diuron on the management of broad-leaf weeds in sesame (Sesamum indicum L.) fields in Tigray, Ethiopia. *Indian Journal of Weed Science:* 55(4): 410–419.

B.R. Bazaya, R. Puniya, S.N. Kumawat, Tanjot Kour and Supneet Kaur. 2023. Efficacy of pre–and post-emergence herbicides in vegetable pea. *Indian Journal of Weed Science:* 55(4): 420–424.

Ummaisa Rehman, A.A. Saad, Mohammad Anwar Bhat, Amjad Masood, Raihana Habib Kanth, Amal Saxena, Aamir Hassan Mir, Fehim Jeelani Wani and Mohamad Ayub Bhat. 2023. Imazethapyr as post-emergent herbicide in common-bean (Phaseolus vulgaris L.) under rainfed temperate condition of Kashmir, India. *Indian Journal of Weed Science:* 55(4): 425–430.

K.P. Saha, D. Singh, A.K. Verma and C.R. Chethan. 2023. Impact assessment of manually operated Ambika rice weeder on the economy of Chhattisgarh, India. *Indian Journal of Weed Science:* 55(4): 431–436.

Aayoush Raj Regmi Him Lal Shrestha Dipak Mahatara and Bipin Bhattarai. 2023. Mapping of invasive plant species in Jalthal forest of Nepal using high resolution remote sensing data. *Indian Journal of Weed Science:* 55(4): 437–443.

V.K. Choudhary and Santosh Kumar. 2023. Farmers' knowledge and herbicide application adoption in rice production systems in Chhattisgarh Plains of India. *Indian Journal of Weed Science:* 55(4): 444–447.

J.P. Deshmukh, S.U. Kakade and V.V. Goud. 2023. Tillage and weed management effect on wheat in inceptisols grown under soybean-wheat cropping sequence. *Indian Journal of Weed Science:* 55(4): 448–452.

Parmeswar Dayal, Arun Kumar, Ravikesh Kumar Pal, Sumit Sow, Shivani Ranjan, Shashank Tyagi and Pradeep Kumar. 2023. Weed dynamics, productivity and profitability of wheat as influenced by tillage and weed management practices in Eastern Indo-Gangetic Plains. *Indian Journal of Weed Science:* 55(4): 453–460.

N. Ram Mohan Reddy, D. Subramanyam, V Sumathi and G. Karuna Sagar. 2023. Weed management in blackgram with pre-and post-emergence herbicides. *Indian Journal of Weed Science:* 55(4): 461–463.

Poornima Sahu, Vinod Kumar Wasnik, H.M. Halli, H.S. Mahesha and V.K. Yadav. 2023. Effect of weed management practices on seed yield of berseem (*Trifolium alexandrinum* L.). *Indian Journal of Weed Science:* 55(4): 464–467.

Harmanjot Singh, Yogesh Khokhar and J.S. Brar. 2023. Weed management in kinnow mandarin (Citrus nobilis × Citrus deliciosa) orchards using various orchard floor management practices in sub-mountainous region of Punjab, India. *Indian Journal of Weed Science:* 55(4): 468–472.

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Kalyan Jana, Saikat Biswas, Arup Sarkar, Ramyajit Mondal and Krishnendu Mondal. 2024. Chemical weed management in transplanted rice and its residual effect on follow up lathyrus (Lathyrus sativus L.). *Indian Journal of Weed Science:* 56(1) 1–7.

Koushik Sar, Gayatree Mishra, Sweta Rath and Ipsita Padhi. 2024. Weed growth and productivity of direct-seeded rice under different weed management practices. *Indian Journal of Weed Science:* 56(1) 8–11.

Kanhaiya Lal, Vikram Bharati, Mukesh Kumar, Biswajit Pramanick, Raj Kumar Jat, S.S. Prasad and Jyostnarani Pradhan. 2024. Impact of crop establishment on major weeds and their vertical distribution in rice. *Indian Journal of Weed Science:* 56(1): 12–18.

M.S. Bhagavathi, M. Ajithkumar and R. Sandhiya. 2024. Management of jungle rice (Echinochloa colona) through herbicides in transplanted rice. *Indian Journal of Weed Science:* 56(1): 19–23.

Ramanpreet Kaur, JS Deol, Navjyot Kaur and Simerjeet Kaur. 2024. Weed seed bank and dynamics in wheat as affected by sowing time and rice residue management methods. *Indian Journal of Weed Science:* 56(1): 24–29.

P. Janaki, Goalla Sri Priyaa, R. Sathiya Priya and R. Karthikeyan. 2024. Synergistic effects of herbicide safener on tembotrione behavior in irrigated Inceptisols, weed obstruction and maize productivity. *Indian Journal of Weed Science:* 56(1): 30–38.

Pabitra Adhikary and Partha Sarathi Patra. 2024. Effect of integrated weed management on summer greengram under alluvial soil of West Bengal. *Indian Journal of Weed Science:* 56(1): 39–45.

Tej Pratap, Vishal Vikram Singh and Neeta Tripathi. 2024. Evaluation of post-emergence herbicides for weed management in greengram. *Indian Journal of Weed Science:* 56(1): 46–51.

D.D. Chaudhari, V.J. Patel, H.K. Patel and B.D. Patel. 2024. Complex weed flora management through herbicides in nursery and transplanted onion. *Indian Journal of Weed Science:* 56(1): 52–58.

P.S. Panchal, V.J. Patel, B.D. Patel and D.D. Chaudhari. 2024. Weed management in Bt. Cotton through sequential and tank mix application of different herbicides. *Indian Journal of Weed Science:* 56(1): 59–62.

Aditi Singh, Yogita Gharde and P.K. Singh. 2024. Explaining distributional patterns of Trianthema portulacastrum and Ageratum conyzoides in India under future climatic scenarios using Ensemble modelling approach. *Indian Journal of Weed Science:* 56(1): 63–72.

Tanu Bansal, Buta Singh Dhillon, Virender Kumar, Pardeep Sagwal and Dharminder Bhatia. 2024. Assessing weed competitive abilities of rice genotypes in direct-seeded rice using purple rice as model weed. *Indian Journal of Weed Science:* 56(1): 73–79

Kirtika Garkhal, Suprava Nath and Rohitashav Singh. 2024. Weed dynamics and maize productivity as influenced by sole and tank mix application of herbicides. *Indian Journal of Weed Science:* 56(1): 80–83.

Rajan Shukla, Amit Bhatnagar, Virendra Pratap Singh, N. Tony Manoj Kumar, Anjali Rawat, Sk Asraful Ali and Satyam Rawat. 2024. Effects of tank-mix herbicides on weed growth and maize productivity. *Indian Journal of Weed Science:* 56(1): 84–86.

Chinnali Das, Ramanjit Kaur and T.K. Das. 2024. Integrated weed management minimizing crop yield reduction in vegetable peas. *Indian Journal of Weed Science:* 56(1): 87–90.

Priyanka Bijalwan, Shilpa and Y.R. Shukla. 2024. Bell pepper (Capsicum annuum) productivity and economics as influenced by different weed management strategies. *Indian Journal of Weed Science:* 56(1): 91–94.

Chris John, Vishram Ram and Ngangbam Pusparani. 2024. Modelling rice-weed competition under transplanted ecosystem. *Indian Journal of Weed Science:* 56(1): 95–97.

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Shanmugam Vijayakumar. 2024. Emerging weed management techniques in agriculture: Harvest weed seed control, weed-tolerant cultivars and foam weed control. *Indian Journal of Weed Science* 56(2): 98–111.

V.J. Patel, D.D. Chaudhari, A.S. Bhanvadia, H.K. Patel, B.D. Patel and N.N. Chaudhary. 2024. Efficacy of herbicide mixtures on weed dynamics in direct-dry-seeded rice under irrigated condition. *Indian Journal of Weed Science* 56(2): 112–116.

V.K. Choudhary and Anil Dixit. 2024. Herbicide-based weed management on weed prevalence, crop productivity and profitability in transplanted rice. *Indian Journal of Weed Science* 56(2): 117–123.

D. Sivasakthi, P. Saravanane, V. Sridevi and K. Coumaravel. 2024. Effect of 2,4-D dose and formulation for brown manuring on weed dynamics, yield and economics in wet seeded rice. *Indian Journal of Weed Science* 56(2): 124–127.

Subhra Sahoo, Dhirendra Kumar Roy, Sumit Sow, Shivani Ranjan, Souvik Sadhu and Parmeswar Dayal. 2024. Weed suppression and productivity influenced under conservation agriculture and organic weed management practices in rice-maize rotation. *Indian Journal of Weed Science* 56(2): 128–135.

Lekshmi Sekhar, M. Ameena, Nimmy Jose, R. Beena, V.S. Susha and Fathima Umkhulzum. 2024. Differential response of grass weeds to ALS inhibiting broad-spectrum herbicide bispyribac-sodium. *Indian Journal of Weed Science* 56(2): 136–141.

Jeetendra Kumar Soni, Amarjeet Nibhoria, S.S. Punia and Surabhi Hota. 2024. Assessment of herbicide resistance in Phalaris minor and managing clodinafop-resistance with alternative herbicides. *Indian Journal of Weed Science* 56(2): 142–150.

Kumar D. Lamani, Nagesh Rathod and Uday G. Reddy. 2024. Efficacy of pre-emergent herbicides against diverse weed flora in wheat crop in Northern Transition Zone of Karnataka in South India. *Indian Journal of Weed Science* 56(2): 151–158.

Dhiman Mukherjee. 2024. Integrated nutrient and weed management effect on greengram under new alluvial zone of West Bengal. *Indian Journal of Weed Science* 56(2): 159–166.

Tushar Patel, M.S. Dudhat, Divyesh Patel and J.D. Thanki. 2024. Comparative evaluation of agronomical, mechanical and chemical management of weeds and their impact on sugarcane productivity. *Indian Journal of Weed Science* 56(2): 167–175.

P. Bhasker, P.K. Gupta and S.S. Borade. 2024. Herbicides for weed management in onion and analysis of herbicide residues using liquid chromatography tandem mass spectrometry. *Indian Journal of Weed Science* 56(2): 176–185.

Pabitra Adhikary and Subhra Shil. 2024. Integrated weed management in onion. *Indian Journal of Weed Science* 56(2): 186–190.

Dhirendra Kumar Roy, Shivani Ranjan and Sumit Sow. 2024. Efficiency and economics of broomrape (Orobanche spp.) control by different management practices in tobacco. *Indian Journal of Weed Science* 56(2): 191–193.

Sandip Sonawane and Nitin N. Patil. 2024. Deep learning-based weed detection in sesame crops using modified YOLOv5 model. *Indian Journal of Weed Science* 56(2): 194–199.

Achugatla Kesav Kumar, Rayavarapu Jhansi, Shaik Haneefa Begum, Govind Kumar Maurya. 2024. Mould board weeder for dryland field crops. *Indian Journal of Weed Science* 56(2): 200–203.

Gauthami Kayarga N.E. Naveen, F.C. Rudragouda, H.S. Chaitanya and S.M. Jayaprakash. 2024. Effect of varied levels of Salvinia molesta vermicompost on soil fertility and crop productivity of rice under coastal conditions of Udupi, Karnataka. *Indian Journal of Weed Science* 56(2): 204–207.

S.R. Sneha, Sheeja K Raj, D. Jacob, G.V. Kavitha, N.V. Radhakrishnan and Shalini P. Pillai. 2024. Influence of integrated weed management practices on weeds, physiology, quality and yield of direct sown ragi (Eleusine coracana L. Gaertn). *Indian Journal of Weed Science* 56(2): 208–213.

Bal Manohar, Puja Ray, Rajeev Singh, Sanjay Kumar, Mainak Ghosh and Seema. 2024. Efficacy of pre- and post-emergence herbicides on weed flora and nutrient uptake by weeds and blackgram. *Indian Journal of Weed Science* 56(2): 214–218.

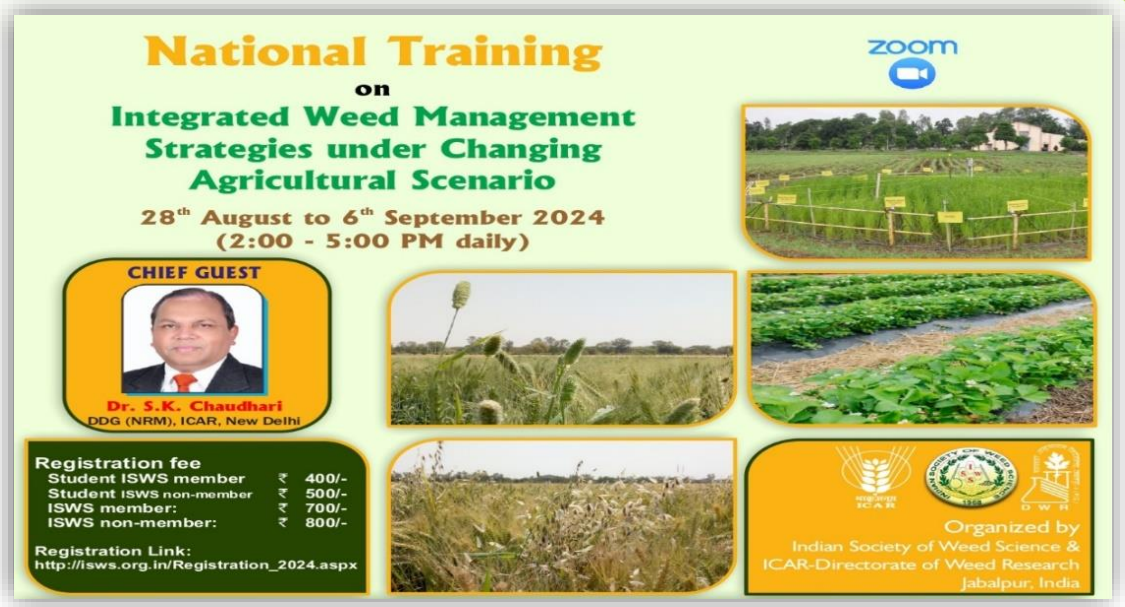
Arindam Deb and Vishram Ram. 2024. Mathematical modelling for pea-weed competition. *Indian Journal of Weed Science* 56(2): 219–222.

Welcome of new life members in Indian Society of Weed Science (Jan-June, 2024)

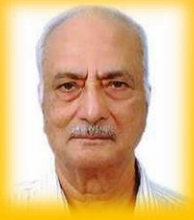
1. **Dr. Pratik Parmar** (LM-1552)
   Anand Agricultural University, Anand, Gujarat
2. **Miss. Rushita Kotadiya** (LM-1553)
   Anand Agricultural University, Anand, Gujarat
3. **Dr. Abhinandan Singh** (LM-1554)
   ANDUA&T, Kumarganj, Ayodhya, Uttar Pradesh
4. **Dr. Sahadeo Kuwardadra** (LM-1555)
   ICAR - Directorate of Weed Research, Jabalpur, MP
5. **Dr. Sreedhar Chemuturi** (LM-1556)
   Tagros Chemicals India Pvt. Ltd., Chennai, Tamil Nadu
6. **Dr. Ravindra Muchhadiya** (LM-1557)
   Junagadh Agricultural University, Junagadh, Gujarat
7. **Mr. Rathod Sridhar** (LM-1558)
   Nagaland University, Medziphema, Nagaland
8. **Miss. Kili V. Awomi** (LM-1559)
   Nagaland University, Medziphema, Nagaland
9. **Miss. Rinu Sakhong** (LM-1560)
   Nagaland University, Medziphema, Nagaland
10. **Miss. Kehokhunu** (LM-1561)
    Nagaland University, Medziphema, Nagaland
11. **Miss. Th. Nengparmoi** (LM-1562)
    Nagaland University, Medziphema, Nagaland
12. **Mr. Songthat William Haokip** (LM-1563)
    Central Agricultural University, Pasighat, Arunachal Pradesh
13. **Mr. Dhruvendra Singh Sachan** (LM-1564)
    C.S.A. University of Agriculture and Technology, Kanpur, UP
14. **Dr. Sivakumar Kaliyannan** (LM-1565)
    SRM College of Agri. Sciences, SRMIST, Chengalpattu, TN
15. **Miss. Kirti Kumud Binjha** (LM-1566)
    Birsa Agricultural University, Ranchi, Jharkhand
16. **Dr. Himansu Sekhar Gouda** (LM-1568)
    C.V. Raman Global University, Bhubaneswar, Odisha
17. **Dr. M.G. Deeksha** (LM-1569)
    ICAR - Directorate of Weed Research, Jabalpur, MP
18. **Dr. Archana Anokhe** (LM-1570)
    ICAR - Directorate of Weed Research, Jabalpur, MP
19. **Mr. Mahendra Wairagade** (LM-1571)
    Dr. BKKV, Dapoli, Ratnagiri, Maharashtra
20. **Dr. Manpreet Khiva** (LM-1572)
    Punjab Agricultural University, Ludhiana, Punjab
21. **Dr. V.P. Indulekha** (LM-1573)
    Vellanikkara Kerala Agricultural University, Thrissur, Kerala
22. **Dr. Akhila C. Thampi** (LM-1574)
    KV & Animal Sciences University, Palakkad, Kerala
23. **Mr. Lalchand Kumawat** (LM-1575)
    MPUAT, Udaipur, Rajasthan

CALENDAR OF UPCOMING EVENTS

DATE	EVENT	LOCATION	Website
August 25 to 29, 2024	23rd Australasian Weeds Conference	Brisbane, Queensland	www.caws.org.nz
November 2024	Canadian Weed Science Society (CWSS) Annual Meeting	Virtual Meeting	www.weedscience.ca
28-30 November, 2024	ISWS Biennial Conference	BHU, Varanasi, India	www.isws.org.in
8–12 December, 2024	North Central Weed Science Society (NCWSS) Annual Meeting	Kansas City, Missouri	www.ncwss.org
22-24 January, 2025	California Weed Science Society Annual Conference	Sacramento, California	www.cwss.org
24–27 February, 2025	Weed Science Society of America (WSSA) Canadian Weed Science Society (CWSS) Joint Annual Meeting	Vancouver, BC, Canada	www.wssa.net www.weedscience.ca
10–13 March, 2025	Western Society of Weed Science (WSWS)	Seattle, Washington	www.wsweedscience.org



CONDOLENCE MESSAGE



With profound grief and sorrow, we came to know about the sudden demise of **Dr. Gajendra Bahadur Singh** on 28 February, 2024 at the age of 84. He is survived by two sons: Dr. Atul Kumar Singh, a retired Principal Scientist at ICAR-CSSRI RRS, Lucknow, and Dr. Virmani Singh, along with a daughter, Smt. Veena Singh, who is presently settled in the USA. ISWS family expresses its most sincere condolences to his family, colleagues and friends.

Born in Karmaha, Lucknow (U.P.), India on 1 July 1940. Educated at U.P. College, Varanasi 1949-55; Allahabad Agricultural Institute 1955-57; Government Agricultural College, Kanpur 1957-59; Punjab Agriculture University 1966-68; B.Sc. (Ag) 1957, M.Sc. (Ag) 1959, Ph.D. 1968. Asstt./Assoc. Prof. Agronomy, Punjab Agriculture University, Ludhiana 1963-70, Sr. Agronomist, Indian Institute of Sugarcane Research, Lucknow 1972-76, Joint Director/Director, ICAR Complex for NEH Region Gangtok/Shillong 1976-82, Assistant Director General (Agronomy), ICAR, 1982-91, Senior Visiting Scientist, International Council for Research in Agro-forestry, Nairobi, 1987-89; Director, Indian Institute of Sugarcane Research, Lucknow 1991-95; Deputy Director General (Natural Resource Management), ICAR, 1995-2000, Vice-Chancellor, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur 2000-2002; Director General, U.P. Council of Agricultural Research, Lucknow 2002-2005. He served the society as **President, ISWS** (1991-1994). He was awarded **ISWS Gold Medals** Year 1997.

In this tragic moment, the entire ISWS family stands together in offering heartfelt condolences to his family. His loss is irreplaceable and his memories shall always remain with us. We pray the Almighty to rest his soul in eternal peace and give strength to the bereaved family to bear this irreparable loss.

CONDOLENCE MESSAGE

With profound grief and sorrow, we came to know about the sudden demise of **Dr Surinder Singh Rana** on 2nd March, 2024 at the age of 58. He is survived by wife Mrs. Archna Rana and 2 sons: Mr. Brijesh Rana & Mr. Hitesh Rana. ISWS family expresses its most sincere condolences to his family, colleagues and friends.

Born in Palampur, Himachal Pradesh, India on 3rd June, 1966. Educated B.Sc., M.Sc. & PhD at CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur. Scientist, MAREC, Sangla, 1998 to 2004, Sr. Scientist (2005-2013), Principal Scientist (2013 to 2015), Principal Scientist, AICRP-Weed Management (2015-2024), Department of Agronomy, College of Agriculture, CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur. He served the society as Councillor Himachal Pradesh of ISWS (2017-2018 & 2023-2024). Guided several M.Sc. and PhD students by Dr. Rana and published more than 240 research articles in journals, 9 book chapters and 3 books published. Dr. Rana has wholeheartedly involved himself **Councillor** Himachal Pradesh of ISWS till the last breath.

In this tragic moment, the entire ISWS family stands together in offering heartfelt condolences to his family. His loss is irreplaceable and his memories shall always remain with us. We pray the Almighty to rest his soul in eternal peace and give strength to the bereaved family to bear this irreparable loss.

ISWS members are requested to contribute any major research finding as a news, awards obtained, Ph.D. obtained, forthcoming events on weed science *etc.* to:

Dr. V.K. Choudhary
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ISWS Newsletter Editor
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