

कार्यवृत्त

Proceedings

अखिल भारतीय समन्वित खरपतवार प्रबंधन परियोजना की इकतीसवीं वार्षिक समीक्षा बैठक

XXXI Annual Review Meeting of All India Coordinated Research Project
on Weed Management

स्थान
ओडिशा कृषि एवं प्रौद्योगिकी विश्वविद्यालय
भुवनेश्वर, ओडिशा
19-21 जून, 2024

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Proceedings of XXXI Annual Review Meeting
All India Coordinated Research Project on Weed Management
19-21 June, 2024 held at
Odisha University of Agriculture & Technology, Bhubaneswar, Odisha

19 June, 2024

INAUGURAL SESSION

The Inaugural Session of the XXXI Annual Review Meeting (ARM) of AICRP-Weed Management was held at Biju Patnaik Hall, OUAT, Bhubaneswar

The meeting was inaugurated (virtually) by the Chief Guest Dr. S.K. Chaudhari, DDG (NRM), ICAR; Prof. P.K. Roul, Honourable Vice-Chancellor, OUAT presided over the function. Dr. Rajbir Singh, ADG (Agronomy, AF, and CC, virtually); Dr. A.K. Naik, Director, ICAR-NRRI, Cuttack; Dr. S.K. Panda, Dean of Research, OUAT were the Guest of Honors accompanied by Dr. J.S. Mishra, Director, ICAR-DWR, Dr. R.P. Dubey, Project In-charge, AICRP-WM, ICAR-DWR and Dr R. Dash, Principal Investigator of OUAT centre. Dr. Basudev Behera, Former Head, Department of Agronomy, OUAT attended the meeting as a resource person The event was also attended by Deans and Directors of the university, representatives from various ICAR institutes, Heads of Departments (HoDs) of OUAT, Principal Investigators (PIs) and Co-PIs from AICRP-Weed Management centres across 24 states, students, and media personnel.

Dr. S.K. Panda, warmly welcomed the Chief Guest, President of the function and other dignitaries and participants to the meeting.

Dr. J.S. Mishra delivered the inaugural remarks, providing an overview of the status of weed management, focusing on key issues and challenges. He discussed the losses caused by weeds, the increasing use of herbicides, and the development of herbicide-resistant weeds due to indiscriminate use. He stressed the need for proper stewardship, integration of different weed management methods, and the development of small machines and implements suitable for both small and large farmers. Additionally, he emphasized using emerging technologies like drones, developing SoPs for herbicide application through drones, and herbicide-tolerant crops.

Dr. R.P. Dubey presented the achievements of AICRP-Weed Management during 2023-24, highlighting location-specific technologies that address farmers' problems. He covered the '*Tar-vattar*' technology developed by PAU, weed management for wet DSR and DDSR, conservation agriculture, non-chemical weed management in organic agriculture, herbicide residue studies, parasitic and aquatic weed management, and Weeds of National Importance (WoNI). He also discussed the dissemination of weed management technologies and publications by different centres.

Dr. A.K. Nayak highlighted the progress of research on herbicide-tolerant rice varieties, particularly those with imazethapyr resistance developed by IARI, New Delhi, and NRRI, Cuttack. He emphasized the importance of incorporating herbicide-tolerant genes into major rice varieties.

Later, the president of the session, along with the honoured guests, released several publications from various AICRP-WM centres and ICAR-DWR. These included the Weed Atlas of Odisha from OUAT, the ICAR-DWR annual report, and other extension publications from KAU, Udaipur, and Puducherry. A weed management App developed by the Jobner centre was also launched.

AICRP-WM centres received awards for their significant contributions. The KAU centre was named the "Best Responsive Centre." The MPUAT centre was awarded for the "Best Annual Report." The PAU centre was recognized as the "Centre with Best Publications." The PJTSAU, Hyderabad centre received the award for the highest overall performance ranking among all the AICRP-WM centres for the year 2023-24.

Dr. Rajbir Singh addressed the participants virtually, emphasizing the importance of emerging technologies like AI& ML, and mechanization in solving weed management issues due to labor shortages. He also discussed integrating weed control and nutrient management, the need for awareness about invasive weeds, and collaborating at the ministry level for a favourable policy environment.

Dr. S.K. Chaudhari in his virtual address highlighted progress in bio-herbicides, non-transgenic crop improvement, and gene-editing technologies for sustainable weed management. He emphasized priority

research areas such as crop-weed interactions under climate change, weed risk assessment protocols, herbicide resistance, weed management in conservation agriculture, and weed ecology. He stressed developing sustainable techniques to mitigate weed-related losses.

Dr. P.K. Roul in his presidential address, emphasized adopting unconventional approaches to address farmers' weed problems and developing low-cost or no-cost technologies to enhance farm profitability. He informed participants about the cluster approach among AICRP research centres for greater visibility and impact, and proposed the concept of a 'model village' to showcase successful technologies.

The inaugural session concluded with a vote of thanks by Dr. R. Dash.

TECHNICAL SESSION-I (Presentation of research achievements by the coordinating centres)

Chairman:	Dr. J.S. Mishra, Director, ICAR-DWR, Jabalpur
Co-Chairman:	Dr. Rakesh Kumar, Principal Scientist, NRM Division, ICAR
Resource person:	Dr. Basudev Behera, Former Head of Department, Agronomy, OUAT
Rapporteur:	Dr. V.K. Choudhary, Pr. Scientist (Agronomy), ICAR-DWR, Jabalpur Dr. V.V. Goud, PI, AICRP-WM, PDKV, Akola

In this session, there were 13 presentations and all the PIs of the centres presented the major findings:

PAU, Ludhiana (PI, Dr. Pervinder Kaur)

- A shift towards grassy weeds has been observed under conservation agriculture experiments.
- The adoption of zero-tillage with residue retention (ZT+R), combined with integrated weed management, has resulted in lower weed dynamics, higher yields, and better economic outcomes in the maize-mustard-greengram system. However, some phytotoxicity of pinoxaden in mustard has been noted.
- In sugarcane ratoon, mechanical weeding has increased the infestation of *Cyperus rotundus*, whereas intercropping with greengram has led to lower weed densities.
- In Weeds of National Importance (WoNI), two districts have been covered, identifying *Dactyloctenium aegyptium* as a major weed in the *Kharif* season and *Phalaris minor* and *Medicago denticulata* in the *Rabi* season.
- A total of 97 biotypes of *Phalaris minor* have been collected and evaluated for herbicide resistance. Clodinafop was identified as the most resistant herbicide in *P. minor*.
- The centre has also conducted residue analysis of herbicides in long-term experiments and from farmer's field samples, finding no detectable herbicide residues in harvested samples.
- GIS-based mapping of aquatic weeds was conducted, achieving 13.3% accuracy in the first year, which improved to 36.7% in the second year.
- The centre has demonstrated *Tar-Vattar* direct-seeded rice (DSR) and surface seeding in wheat, providing surface seeding technology (Lucky seed drill) to 31 machine manufacturers.
- The centre has declared the village of Mansuran as *Parthenium*-free and is currently working towards achieving the same status for the village Rurka Kalan.

Comments/Suggestions:

- Only two out of 23 districts have been covered under Weeds of National Importance (WoNI); it is recommended to expedite the process and compile the information at the earliest.
- Mapping herbicide resistance in *Phalaris minor* should be prioritized.
- Conduct impact assessments of surface seeding and *Tar-Vattar* DSR.

CSKHPKV, Palampur (PI, Dr. Sandeep Manuja)

- In DSR, the application of pendimethalin followed by a tank mix application of bispyribac sodium + chlorimuron + metsulfuron provided better weed control, higher yield, and higher economic returns.

- In soybean, the pre-emergent application of pendimethalin + imazethapyr and sulfentrazone + clomazone was found to be effective for weed control and yield.
- In rajmash, oxyfluorfen 100 g/ha followed by hand weeding resulted in lower weed presence, higher yield, and better economic outcomes.
- In pea, the application of pendimethalin + imazethapyr 800 g/ha followed by quizalofop 50 g/ha, and pendimethalin + imazethapyr 750 g/ha followed by hand weeding, achieved higher yields.
- In an organic maize-wheat system, *Cyperus rotundus*, *Ageratum*, and *Echinochloa* were the dominant weeds.
- For controlling *Lantana camara*, the application of glyphosate + metsulfuron with surfactant provided excellent results.
- In Weeds of National Importance (WoNI), *Parthenium* and *Lantana* were the major weeds, with only 7 out of 12 districts covered so far.

Comments/Suggestions:

- Review the yield data of wheat under the conservation agriculture experiment.
- Information on Weeds of National Importance (WoNI) needs to be completed within six months, followed by the publication of a Weed Map of the state.
- The post of Junior Residue Chemist needs to be filled urgently.

CCSHAU, Hisar (PI, Dr. Todarmal Poonia)

- In *Tar-Vattar* DSR, no yield difference has been observed among different schedules of the first irrigation.
- In the conservation agriculture (CA) experiment under the rice-wheat-greengram system, tillage and residue management had no significant effect on yield, but integrated weed management (IWM) was found to be effective.
- Lesser lodging of wheat was recorded under the Zero Tillage (ZT) system.
- The penetration resistance was higher in ZT up to a depth of 22 cm, while at deeper depths, it was lower compared to conventional tillage (CT).
- In the maize-mustard-greengram system, integrated weed management (IWM) proved to be better in terms of weed control, yield, and economics. Higher microbial biomass was recorded in ZT with residue retention (ZT+R), though *Cyperus rotundus* was more prevalent.
- In greengram, the application of pendimethalin + imazethapyr at 1.0 kg/ha followed by propaquizafop + imazethapyr at 125 g/ha provided over 90% weed control.
- Under WoNI, major weeds identified were *Phalaris minor*, *Leptochloa chinensis*, *Dactyloctenium aegyptium*, *Eleusine indica*, and *Digitaria sanguinalis*.
- The centre has mapped *Phalaris minor* resistance and *Orobanche* infestation in the state.
- Under Weeds of National Importance (WoNI), only seven out of 22 districts have been completed.

Comments/Suggestions:

- Complete the Weeds of National Importance (WoNI) survey for the entire state.
- Publish the information on *Phalaris minor* resistance and extent of *Orobanche* infestation in a small bulletin at the earliest.

GBPUAT, Pantnagar (PI, Dr. S.P. Singh)

- No effect was observed from the scheduling of the first irrigation in *Tar-Vattar* DSR.
- In the rice-wheat-legume system under conservation agriculture (CA), conventional tillage with residue management combined with integrated weed management provided better weed control, higher yield, and improved economic returns.

- In the organically grown rice-vegetable pea-sweetcorn system, using a stale seedbed followed by sesbania live mulch in pea, cono-weeder followed by hand weeding in sweetcorn, and a stale seedbed with sesbania in rice resulted in better weed suppression and higher yields.
- Conventional farming was more effective than natural farming practices.
- Pyroxasulfone 127.5 g/ha followed by metribuzin 175 g/ha provided good control of *Phalaris minor*.
- Under Weeds of National Importance (WoNI), major weeds identified were *Medicago*, *Echinochloa*, *Amaranthus* and *Lantana*.

Comments/Suggestions:

- Publish the information related to Weeds of National Importance (WoNI) on or before September 2024.
- Extrapolate the data to include area coverage of the weed management technologies, the associated costs, and the savings achieved by adopting these technologies.

SKUAST, Jammu (PI, Dr. B.R. Bazaya)

- In *Tar Vattar* DSR, no effect was observed from the scheduling of the first irrigation, while the application of pendimethalin followed by bispyribac sodium + metsulfuron + chlorimuron provided better weed control, higher yield, and improved economic returns.
- In the rice-wheat-legume system under conservation agriculture (CA), integrated weed management (IWM) provided better weed control and yield.
- In the organically grown basmati rice-vegetable pea-sweetcorn system, two hand weedings in vegetable pea and rice, intercropping with radish in pea, and the live mulch of sesbania in sweetcorn effectively suppressed weeds.
- Resistance of *Phalaris minor* to clodinafop has been confirmed, and applying pyroxasulfone at 100 g/ha + pendimethalin at 800 g/ha provided better control.
- *Neochetina* species were found not effective in controlling water hyacinth.
- Under Weeds of National Importance (WoNI), the centre has covered only 4 out of 10 districts in Jammu.

Comments/Suggestions:

- Ensure the impact assessment is thoroughly refined and present the data appropriately.
- Conduct pooled data analysis from long-term experiments.
- Finalize the Weeds of National Importance (WoNI) data related to the Jammu region.

RVSKVV, Gwalior (PI, Dr. N. Hada)

- In sorghum, atrazine at 500 g/ha followed by mechanical weeding at 30 days after sowing (DAS) was effective.
- In the maize-chickpea system, two rounds of hand weeding and application of atrazine at 750 g/ha + topramezone at 25.2 g/ha were found to be effective.
- Pendimethalin applied at 10 DAS followed by imazethapyr at 40 g/ha was effective against *Cuscuta* in berseem.
- Effective control of water hyacinth by *Neochetina* has been demonstrated.
- Regarding Weeds of National Importance (WoNI), only 3 out of 55 districts have been covered so far.

Comments/Suggestions:

- Expedite the compilation of the Weeds of National Importance (WoNI) data for Madhya Pradesh.

PJTSAU, Hyderabad (PI, Dr. T. Ramprakash)

- In the cotton-maize-sesbania system under conservation agriculture (CA), conventional tillage (CT) with pendimethalin followed by pyriithobac + quizalofop and directed spray of glufosinate ammonium was effective. However, the Zero Tillage with Residue Retention (ZT+R) system coupled with integrated weed management (IWM) showed lower weed levels, higher yields, higher

benefit-cost ratio, increased fungal diversity, better soil aggregates, and improved soil quality index.

- In the organic tomato-beetroot-watermelon system, the combination of polythene mulch and inter-row weeding proved effective.
- In the maize-chickpea system, mesotrione + atrazine at 875 g/ha and pendimethalin + imazethapyr at 750 g/ha followed by mechanical weeding at 30 days after sowing (DAS) were found to be effective.
- In sorghum, atrazine at 500 g/ha followed by 2, 4-D ethyl ester at 750 g/ha was effective, while topramezone showed phytotoxicity to the sorghum crop.
- Under Weeds of National Importance (WoNI), the major weeds identified were *Parthenium* and *Cynodon*.
- Most herbicide residues were below detectable limits in the maize-chickpea system, sorghum, tomato, and beetroot.
- The application of herbicides via drone at 2 meters height, using 40-60 L/ha, and with the addition of adjuvants to minimize drift has been standardized for various herbicides across different crops.
- The herbicide consumption for the state has been worked out.

Comments/Suggestions:

- Publish the impact assessment of weed management technologies in the form of a bulletin.
- Integrate weed management technologies with the soil map of the state.

UAS, Bengaluru (PI, Dr. K.N. Geetha)

- In dry -DSR, pendimethalin followed by bispyribac + chlorimuron + metsulfuron and pendimethalin followed by cyhalofop + penoxsulam provided effective weed control and higher yields.
- In drill-sown finger millet, atrazine at 500 g/ha initially showed phytotoxicity but later recovered. Combinations such as atrazine followed by 2, 4 D sodium salt, atrazine followed by metsulfuron + chlorimuron, or pyrazosulfuron with metsulfuron + chlorimuron were effective.
- In soybean, sulfentrazone + clomazone at 725 g/ha initially showed phytotoxic effects but later recovered, while fluazifop + fomesafen were effective herbicides.
- In sesame, pendimethalin at 750-1000 g/ha and alachlor at 1 kg/ha were effective for weed control.
- In conservation agriculture (CA) maize-based systems, zero tillage with residue retention (ZT+R) and herbicide rotation provided superior weed control, higher yields, and increased economic returns.
- In organic/natural farming approaches, methods such as stale seedbed followed by hand weeding (HW) and crop residue mulch at 6 t/ha followed by HW were found effective.
- Under Weeds of National Importance (WoNI), *Parthenium* is identified as a major weed.

Comments/Suggestions:

- Complete the Weeds of National Importance (WoNI) survey for the 10 districts under UAS Bengaluru's jurisdiction and prepare a bulletin.

KAU, Thrissur (Dr. Prameela P.)

- *Pyrrosia* is a hemiparasite that affects nutmeg.
- 2,4-D was found to be effective against *Syngonium*.
- In wetland rice cultivation, florpyrauxifen benzyl + cyhalofop provided effective weed control.
- Broadcasting fresh lime at 900 g/m² is effective for controlling aquatic weeds.
- Fenoxaprop at 120 g/ha effectively controls certain aquatic grasses in rice fields, while cyhalofop + penoxsulam at 135 g/ha is effective against other aquatic weeds in rice fields.
- Under Weeds of National Importance (WoNI), major weeds identified were water hyacinth, *Mikania*, *Salvinia*, *Echinochloa*, and *Alternanthera*.

Comments/Suggestions:

- Follow the provided format for conducting impact assessments.

- Complete the information on WoNI and publish the weed map of Kerala.

TNAU, Coimbatore (Dr. S. Radhamani)

- In the lowland rice-blackgram system, bensulfuron + pretilachlor at 660 g/ha followed by bispyribac sodium at 25 g/ha in rice, and clodinafop + sodium acifluorfen at 185 g/ha in blackgram were found effective.
- In the cotton-babycorn system under conservation agriculture, conventional tillage (CT) with atrazine followed by brush cutting in babycorn, and zero tillage with residue retention (ZT+R) and herbicide rotation in cotton provided superior weed control.
- Weed mulching at 5 t/ha was found effective in brinjal cultivation.
- For *Striga* management in sugarcane, the UASD-AMF consortium at 20 kg/ha was found effective.
- In Weeds of National Importance (WoNI), surveys were conducted across all 37 districts, identifying *Parthenium*, *Cyperus*, *Prosopis*, and *Cynodon dactylon* as major weeds.
- In aquatic systems, major weeds identified were *Prosopis*, *Ipomoea*, *Eichhornia*, and *Cyperus distans*.
- Half-life studies of most herbicides used in the experiments were conducted.
- Except for atrazine at 1.0 kg/ha, all other herbicides, including samples from farmers' fields, were found below detectable limits at harvest.

Comments/Suggestions:

- Prepare and publish a bulletin on Weeds of National Importance (WoNI) and weed map of Tamilnadu by September 2024.
- Prepare a bulletin covering 20 districts for aquatic weeds.
- Compile the findings from residue analysis work conducted and publish a comprehensive bulletin.

PDKV, Akola (PI, Dr. V. Goud)

- Efforts are underway to eradicate *Parthenium* in Village Digras.
- In soybean, sulfentrazone + clomazone (despite some phytotoxicity under adverse conditions), diclosulam, and imazethapyr + propaquizafop were effective herbicide treatments.
- In groundnut, diclosulam followed by propaquizafop + imazethapyr showed effectiveness.
- Applying organic mulch from soybean at 5 t/ha was effective in organic cotton cultivation.
- In transplanted onion, oxyfluorfen followed by propaquizafop + oxyfluorfen was effective for weed control.

Comments/Suggestions:

- Five more districts need to be covered under Weeds of National Importance (WoNI).
- The post of Junior Agronomist needs to be filled urgently.

MPUAT, Udaipur (PI, Dr. A. Verma)

- In the maize-chickpea system, topamezone at 25.2 g/ha and pendimethalin + imazethapyr at 750 g/ha in chickpea, and atrazine + topamezone (500 + 25.2 g/ha) or atrazine + tembotrione (500 + 120 g/ha) provided superior weed control, higher yields, and improved economics.
- In soybean-based cropping systems, zero tillage with residue retention (ZT+R) combined with integrated weed management (IWM) and herbicide rotation (sulfentrazone + clomazone followed by propaquizafop + imazethapyr) showed comparable results. In wheat, conventional tillage with residue retention (CT+R) and IWM were effective.
- ZT+R after 6 crop cycles recorded better soil parameters and lower weed seed banks.
- In sorghum, atrazine + topamezone (500 + 18.9 g/ha) was effective for weed control.
- In soybean, sulfentrazone + clomazone and diclosulam + pendimethalin were effective, while fomesafen + fluzifop showed phytotoxicity to soybean.
- Under non-chemical weed management in the babycorn-fenugreek system, a stale seedbed followed by plastic mulch provided effective weed control.
- In clusterbean, pyrazosulfuron at 127.5 g/ha was found effective.

- In Weeds of National Importance (WoNI), the major weeds identified were *Echinochloa*, *Commelina benghalensis*, *Trianthema*, *Asphodelus*, and *Chenopodium*.
- The release of *Neochetina* resulted in less than 10% clearance in water bodies.

Comments/Suggestions:

- Expedite the compilation of the Weeds of National Importance (WoNI) data for Rajasthan.
- The post of Junior Agronomist needs to be filled urgently.

AAU, Jorhat (PI, Dr. K. Kurmi)

- In wet-DSR, pyrazosulfuron at 20 g/ha followed by bispyribac sodium at 25 g/ha, and pretilachlor at 750 g/ha followed by bispyribac sodium at 25 g/ha were found effective.
- Organic aromatic rice benefited from paddy straw mulch followed by hand weeding at 45 days after transplanting (DAT), providing effective weed control.
- Pyrazosulfuron at 15 g/ha was effective in transplanted finger millets.
- For *Loranthus* management, 1% application of 2, 4-D as trunk paste followed by application at the host plant was effective.
- A biological study of *Chromolaena odorata* was conducted.
- In non-crop situations with *Panicum repens*, twice-application of glyphosate 71% at 2 g/m² was effective.
- Weeds of National Importance (WoNI) surveys covered 31 districts.

Comments/Suggestions:

- Conduct awareness campaigns among local communities regarding the invasiveness of *Chromolaena odorata*.
- Publish a bulletin on Weeds of National Importance (WoNI) by October 2024.

20 June, 2024

TECHNICAL SESSION-II (Presentation of research achievements by the coordinating centres)

Chairman:	Dr. J.S. Mishra, Director, ICAR-DWR, Jabalpur
Co-Chairman:	Dr. Narendra Kumar, Head, ICAR-IIPR, Kanpur
Resource person:	Dr. Basudev Behera, Former Head, Department of Agronomy, OUAT
Rapporteur:	Dr. Yogita Gharde, Sr. Scientist, ICAR-DWR, Jabalpur Dr. B.R. Bajaya, PI, SKUAST, Jammu

OUAT, Bhubaneswar (PI, Dr. Rabiratna Dash)

- Weed management in DSR: penoxsulam + pendimethalin (RM) 625 g/ha as PE *fb* fenoxaprop-ethyl 67 g/ha + ethoxysulfuron 18 g/ha as PoE 25 DAS is recommended in state package of practices.
- Integration of the CT method and IWM obtained the maximum B: C in the *Kharif* rice.
- Neem cake 200 kg/ha *fb* ethoxysulfuron 25 g/ha each at 25 and 50 DAT was found the best weed control Practice in managing the *Orobanche* infestation in brinjal.
- 2,4-D Na salt 0.5 kg/ha and metsulfuron methyl+chloromuron ethyl 4 g/ha were found to be the best screened-out chemical in managing *Salvinia molesta*, the aquatic fern in the low land /deep water rice field.

Comments/Suggestions:

- The centre has published the Weed Atlas of Odisha state which was highly appreciated.
- Expedite the compilation of the Weeds of National Importance (WoNI) data

BCKV, Kalyani (PI, Dr. Bikash Mandal)

- Pendimethalin 1000 g/ha (30 EC) or 678 g/ha (38.7 CS) as PE *fb* bispyribac-sodium 25 g/ha + [(metsulfuron-ethyl + chlorimuron-ethyl) (RM)] 4 g/ha (Tank-mix) as PoE (25-30 DAS) recorded highest grain yield and economics in rice.
- Imazethapyr + propaquizafop (RM) 125 g/ha PoE (20 DAS) was an effective treatment with higher yield and better economy in Soybean
- In onion, oxyfluorfen 100 g/ha as PE (0-5 DAT) *fb* quizalofop-ethyl + oxyfluorfen (RM) 100 g/ha (25 DAT) has been found the best performing treatment with respect to better weed control, yield and economics.
- In chickpea fluazifop-p-butyl + fomesafen (RM) 100 g/ha as PoE (20 DAS) *fb* HW at 40 DAS recorded the highest seed yield and economics in maize-chickpea cropping system.

Comments/Suggestions:

- Prepare and publish a bulletin on Weeds of National Importance (WoNI) by October 2024.
- Ensure the impact assessment is thoroughly refined and present the data appropriately.

AAU, Anand (PI, Dr. V.J. Patel)

- Weed management in *Kharif* blackgram, quizalofop + imazethapyr 112.5 g/ha PoE gave higher yield and B:C ratio as compared to other treatments.
- Impact of technology *i.e.*, application of clodinafop propargyl (15%) + metsulfuron-methyl (1%) WP 64 g/ha or sulfosulfuron (75%) + metsulfuron-methyl (5%) WG 32 g/ha as post-emergence (25-30 DAS) in wheat. Calculated total monetary benefit to Gujarat by adoption of this technology as Rs. 24.13 crores.
- Combination of ZT+Pyriithiobac sodium 3.1% w/w + pendimethalin 34% w/w ZC 742 g/ha (2 DAS) *fb* pyriithiobac sodium 6% EC + quizalofop ethyl 4% EC w/w MEC 125 g/ha (4-6 weed leaf stage) *fb* directed spray (inter-row) of glufosinate ammonium 13.5% SL 450 g/ha at 50-55 DAS were effective control in weed density, improve yield and economics in Cotton.

Comments/Suggestions

- Prepare and publish a bulletin on Weeds of National Importance (WoNI) by October 2024.
- Ensure the impact assessment is thoroughly refined and present the data appropriately.

IGKV, Raipur (PI, Dr. Shrikant Chitale)

- Under WoNI, 280 farmers were surveyed to have relevant information as per questionnaire developed.
- Atrazine 50 % WP 500 g/ha PE *fb* 2, 4-D Na salt 800 g/ha PoE gave highest control of weeds and suitable for direct-seeded finger millet.
- Pendimethalin 1000 g/ha (30EC) as PE *fb* bispyribac sodium 25g/ha + (metsulfuron methyl + chlorimuron ethyl) (RM) 4g/ha tank mix PoE (25-30 DAS) found very effective in rice.
- In organically-grown aromatic, the highest grain yield was recorded in Motorized weeder twice (single row type) + one intra-row HW.
- In tomato, the maximum B:C (5.4) was recorded under paddy straw mulch 5 t/ha.

Comments/Suggestions:

- Prepare and publish a bulletin on Weeds of National Importance (WoNI) by October 2024.

SKUAST, Srinagar (PI, Dr. A.A. Saad)

- In vegetable pea, imazethapyr with 0.125 kg/ha was comparable to weed-free treatment with respect to pod yield along with 87% weed control efficiency.

Comments/Suggestions:

- Expedite the process and compile the information on WoNI as soon as possible.
- Follow the provided format for conducting impact assessment studies.

BAU, Sabour (PI, Dr. Virendra Kumar)

- In direct-seeded finger millet, pyrazosulfuron-ethyl 15 g/ha as PE *fb* metsulfuron-methyl + chlorimuron-ethyl 4 g/ha PoE recorded lowest weed density, dry weight and provided highest yield.

Comments/Suggestions:

- Prepare and publish a bulletin on Weeds of National Importance (WoNI)
- Follow the provided format for conducting impact assessment.

PAJNCOA&RI, Puducherry (PI, Dr. P. Saravanane)

- New weed *Echinochloa muricata* was observed and species was confirmed.
- In case of direct-seeded rice, pendimethalin 678 g/ha as PE *fb* bispyribac-sodium 25 g/ha + (metsulfuron- methyl +chlorimuron-ethyl) 4 g/ha as PoE was found to be effective in controlling weeds.

Comments/Suggestions:

- Ensure the impact assessment is thoroughly refined and present the data appropriately.
- Finalize the Weeds of National Importance (WoNI) data related to the Puducherry region.

UAS, Dharwad (PI, Dr. P. Jones Nirmalnath)

- In soybean, sodium acifluorfen + clodinafop-propargyl (PoE) recorded lowest weed density, dry weight and highest mycorrhizal colonization. In the experiment namely development of herbicide tolerant, mycorrhizal and plant growth promoting phylloplane bacterial biofertilizers, they screened 58 isolates and 3 were found as herbicide tolerant.

Comments/Suggestions:

- Prepare and publish a bulletin on Weeds of National Importance (WoNI).

BUAT, Banda (PI, Dr. Dinesh Sah)

- Pendimethalin 1000 g/ha (30 EC) as PE *fb* bispyribac-sodium 25 g/ha + [(metsulfuron-methyl + chlorimuron-ethyl) (RM)] 4 g/ha (Tank-mix) as PoE (25-30 DAS) recorded highest yield and economics in rice.
- Pendimethalin 30 EC 750 g/ha as PE *fb* propaquizafop 5 + oxyfluorfen 12 w/w EC (RM) 43.75g + 105 g/ha as PoE reduced the weed dry weight and recorded maximum weed control efficiency in mustard.

Comments/Suggestions:

- Prepare and publish a bulletin on Weeds of National Importance (WoNI).

ANGRAU, Guntur (PI, Dr. M. Sunil Kumar)

- Application of bispyribac sodium 25 g/ha PoE at 20 DAS was found more effective for controlling weeds in proso millet and kodo millet.

Comments/Suggestions:

- Prepare and publish a bulletin on Weeds of National Importance (WoNI)

SKNAU, Jobner (PI, Dr. Shweta Gupta)

- Weed management in mustard, pendimethalin 30 EC 750 g/ha PE *fb* 1 hand weeding at 30-35 DAS and pyroxasulfone 85% WG 100 g/ha at 30-35 DAS, both the treatments found better for weed management in mustard.

Comments/Suggestions:

- Prepare and publish a bulletin on Weeds of National Importance (WoNI) by October 2024.
- Ensure the impact assessment is thoroughly refined and present the data appropriately.

Comments by Chairman and Resource person:

- During the finalization of technical programme, the centre should select crops as per their region preference.
- It was suggested to keep the uniform treatment structure for all centres in networking trials
- The expert suggested that system-based recommendations should come up with best treatments in the system from the experimentation.
- It was suggested to design the experiments in such a manner that they should be statistically sound.

TECHNICAL SESSION- III**(Formulation of network technical programme for 2024-25 & 2025-26)**

Chairman:	Dr. J. S. Mishra, Director, ICAR – DWR, Jabalpur
Co-Chairman:	Dr. Narendra Kumar, Head, IIPR, Kanpur
External Expert:	Dr. Basudev Behera, Former Head, Department of Agronomy, OUAT, Bhubaneswar
Rapporteurs :	Dr. Geetha K. N., Principal Investigator, UAS, Bengaluru Dr. S. P. Singh, Principal Investigator, GBPUAT, Pantnagar

Presentation of the new technical programme

There were 06 presentations under different thematic areas during the session III and in this session the new technical programme/new experiments for 2024-26 were discussed and finalized. All the new technical programmes have been accepted by the house except WP 1.1.3, Hisar Centre and ST 1.1.1.19 Gwalior Centre which were withdrawn.

Sl. No.	Trials proposed/Presented under different thematic areas	Scientist
WP-1 Development of location-specific sustainable weed management practices		
1.	Weed management in major crops and cropping systems and station trials specific to the state	Dr. V. K. Choudhary
2.	Weed management under conservation tillage-based cropping system	
3.	Weed management strategies in organic agriculture/natural farming	Dr. R. P. Dubey
4.	Management of herbicide resistance in weeds	
5.	Management of parasitic weeds	
WP-2/ WP-3 Management of weeds in non-cropped and aquatic areas & Fate of herbicides in different agroecosystems		
6.	Management of weeds in non-cropped and aquatic areas	Dr. Arachana Anokhe

7.	Fate of herbicide residues in different agroecosystems	Dr. V. K. Choudhary (in place of Dr. S. Sondhia)
<i>WP-4 Demonstration and impact assessment of weed management technology</i>		
8.	OFR, FLD and impact assessment of weed management technology	Dr. P. K. Singh
9.	SCSP, WoNI, Digitization of Aquatic weed Map On-line AICRP-WM data management system	Dr. Yogita Gharde

The concerned scientists were asked to incorporate the suggestions made and submit the final technical programme to the PC unit.

PLENARY SESSION

Plenary session of 31st ARM of AICRP on WM was chaired by Dr JS Mishra, Director, ICAR DWR and Co-chaired by Dr SK Panda, Dean Research OUAT. The Chief Guest of the function was Dr HK Patra, Dean, CoA Bhubaneswar, OUAT and the Guest of Honour was Dr Rakesh Kumar, Pr. Scientist, NRM Division, ICAR.

The session started with the presentation of rapporteur reports of various sessions.

Dr Behera, former HoD, Agronomy OUAT and the resource person, at the outset appreciated the scientist for conducting the trials systematically and advised the group to come with results of crop equivalent and system yield when conducting the system trials. Similarly, he emphasized to focus on interactive effects, while comparing two factors. He also profusely appreciated the scientist for initiating weed management in natural and organic farming. Further, suggested to include work on allelopathy in organic agriculture.

Dr IC Baruah, Principal Scientist, AAU, Jorhat was felicitated, who will be superannuating in January, 2025. During the ceremony, The Director DWSR immensely appreciated Dr IC Baruah for his major contribution in weed taxonomy of India.

The Chief Guest, urged the weed scientists to work on reducing the dose of herbicides and increase the effectiveness on the other hand, while taking care of herbicide resistance in weeds. Dr Patra also pointed out the market and herbicide company mood towards products as well as perseverance of the farmers on new chemicals. He further insisted to have a collaborative mode of research proposals in joining hands with Plant Physiology, Agricultural Engineering, Plant Breeding and Agricultural Microbiology, while planning for a new proposal with special emphasis on climate change.

Dr JS Mishra, Director DWR presiding over the session, expressed his satisfaction on implementation of technical programme as finalized during the previous ARM at Jammu. Dr Mishra felt happy to reach a concrete formulation of future technical programme. He again reiterated to complete the weed mapping and survey of WoNI as well as initiation of weed management strategies under natural farming as it is a national important initiative.

At the end of the session, Dr R. Dash, PI proposed the vote of thanks.

Recommendations:

1. In factorial weed management experiments involving two or three factors, interaction effects on various parameters (at least yield) should be reported and presented.
2. In weed management experiments for cropping systems, crop-wise data should be reported in chronological order(rainy-winter-summer). System yield in terms of base/main crop equivalent yield should be reported, besides absolute yields of component crops.

3. In case of long-term concluded experiments, pooled analysis should be done. In case of long-term continuing experiments, current year and cumulative results should be reported.
4. The crop yields should be reported in terms of kg/ha or t/ha instead of q/ha.
5. Extremely low yield data which does not represent standard crop, should not be reported.
6. Choice of design, factors and levels in each factor in factorial experiments should be statistically sound.
7. In herbicide resistance study, recommended and higher doses of the herbicide resisted should be tried along with new herbicides.
8. Use of plant extracts with allelopathic potential may be considered as a mean of weed management in organic farming.
9. Standard protocols on use of inputs for nutrient management and plant protection should be followed in experiments on organic/natural farming.*
10. The assessment of weed biomass/weight and timing of post emergent herbicides/ intercultural operations may be assessed/ modified from the practical point of crop growth and operational perspective.
11. Crop residue incorporation should be quantified and analyze soil for initial fertility to monitor uptake and balance.
12. In the trials/experiments herbicidal dosages may be modified based on the response and regional relevance.
13. Treatment-wise residual analysis to be made for the trials/treatments that have direct bearing/effect on soil and plant parts.
14. The Proposed water volume for drone spraying was 40 L/ha hence, the house suggested to reduce the water volume in consultation with TNAU and suggested to go for 25 L/ha.
15. In knapsack sprayer both the pre and post-emergence herbicides water volume was also decided, 500 L/ha and 375 L/ha respectively, precautions should be taken while spraying herbicides (i.e. Directed spray on weeds).
16. In Drone experiments, the house suggested to go for strip plot design.
17. The results are to be reported in the format provided online.
18. Proper documentation of the field (Geotagging) may be made and all the centres have to give the location details of front-line demonstrations and communicate to DWR.



(RP Dubey)

In-charge, AICRP-WM



(JS Mishra)

Director, ICAR-DWR

**XXXI ANNUAL REVIEW MEETING OF
ALL INDIA COORDINATED RESEARCH PROJECT ON WEED MANAGEMENT
ICAR - DIRECTORATE OF WEED RESEARCH, JABALPUR**

Venue

Odisha University of Agriculture and Technology, Bhubaneswar, Odisha

19-21 June, 2024

PROGRAMME

19th June, 2024 (Wednesday)

Registration: 8:45 AM

09:00-11:00 hrs	INAUGURAL SESSION
Lighting of lamp	
Welcome address	Prof. S.K. Panda, Dean of Research, OUAT, Bhubaneswar
Introductory remarks	Dr. J.S. Mishra, Director, ICAR – DWR, Jabalpur
Presentation on achievements and recommendations	Dr. R.P. Dubey, Pr. Scientist and In-charge, AICRP-WM
Remarks by Guests of Honour	1. Dr. Rajbir Singh, ADG (Agro., AF & CC), ICAR, New Delhi (Virtual Presence) 2. Dr. A.K. Nayak, Director, ICAR-NRRI Cuttack
Release of publications and Presentation of Awards	By the honorable dignitaries
Address by Chief Guest	Dr. S. K. Chaudhari, DDG (NRM), ICAR, New Delhi (Virtual Presence)
Address by Chairman	Prof. Pravat Kumar Roul, Vice -Chancellor, OUAT, Bhubaneswar
Vote of thanks	Dr. Rabiratna Dash, Principal Investigator, AICRP-WM, OUAT, Bhubaneswar
Rapporteurs	1. Dr. V.K. Choudhary, Pr. Scientist (Agronomy), ICAR-DWR, Jabalpur 2. Dr. T. Ram Prakash, Principal Investigator, AICRP-WM, PJTSAU, Hyderabad
11:00-11:15 hrs	High Tea
TECHNICAL SESSION – I	
Chairman	Dr. J.S. Mishra, Director, ICAR – DWR, Jabalpur
Co-Chairman	Dr. Rakesh Kumar, Principal Scientist, NRM Division, ICAR
Resource person	Dr. Basudev Behera, Former Head, Department of Agronomy, OUAT, Bhubaneswar
Rapporteurs	1. Dr. V. K. Choudhary, Pr. Scientist, ICAR-DWR, Jabalpur 2. Dr. V. K Gaud, Pr. Scientist, Principal Investigator, PDKV, Akola
11:15-13:30 hrs	Presentation of salient findings by Principal Investigators of AICRP-WM centres (10 min. for each centre)
	PAU, Ludhiana: Dr. Parvinder Kaur
	CSKHPKV, Palampur: Dr. Sandeep Manuja
	CCSHAU, Hisar: Dr. Todar Mal Poonia
	GBPUAT, Pantnagar: Dr. S.P. Singh
	SKUAST, Jammu: Dr. B.R. Bazaya
	RVSKVV, Gwalior: Dr. Neeraj Hada

	PJTSAU, Hyderabad: Dr. T. Ramprakash
	UAS, Bengaluru: Dr. K.N. Geetha
	KAU, Thrissur: Dr. P. Prameela
	TNAU, Coimbatore: Dr. (Mrs.) S. Radhamani
	PDKV, Akola: Dr. V.V. Gaud
	MPUAT, Udaipur: Dr. Arvind Verma
	AAU, Jorhat: Dr. Khagen Kurmi
	Remarks by Chairman, Co-Chairman and External Expert
13:30- 14:30 hrs	LUNCH BREAK
TECHNICAL SESSION – II	
Chairman	Dr. J.S. Mishra, Director, ICAR – DWR, Jabalpur
Co-Chairman	Dr. Narendra Kumar, Head, ICAR-IIPR, Kanpur
External Expert	Dr. Basudev Behera, Former Head of Department, Agronomy, OUAT, Bhubaneswar
Rapporteurs	1. Dr. Yogita Gharde, Sr. Scientist, ICAR-DWR, Jabalpur 2. Dr. B. R. Bazaya, Principal Investigator, SKUAST, Jammu
14:30-16:30 hrs	OUAT, Bhubaneswar: Dr. R. Dash
	BCKV, Kalyani: Dr. Bikash Mandal
	AAU, Anand: Dr. V. J. Patel
	IGKV, Raipur: Dr. Shrikant Chitale
	SKUAST, Srinagar: Dr. Ahmad Abdullah Saad
	BAU, Sabour: Dr. Birendra Kumar
	PAJNCOA&RI, Puducherry: Dr. P. Saravanane
	UAS, Dharwad: Dr. P. Jones Nirmalnath
	BUAT, Banda (U.P.): Dr. Dinesh Sah
	ANGRAU, Guntur: Dr. M. Sunil Kumar
	SKNAU, Jobner: Dr. Shweta Gupta
16:30-17:00 hrs	Remarks by Chairman, Co-Chairman and Resource person
20th June, 2024 (Thursday)	
09:30-17:00 hrs (9:30-13:30)	TECHNICAL SESSION – III -Formulation of Network Technical Programme for 2024-25 & 2025-26 <i>(WP-1 Development of location-specific sustainable weed management practices)</i>
Chairman	Dr. J.S. Mishra, Director, ICAR – DWR, Jabalpur
Co-Chairman	Dr. Narendra Kumar, Head, IIPR, Kanpur
Resource person	Dr. Basudev Behera, Former Head of Department, Agronomy, OUAT, Bhubaneswar
Rapporteurs	1. Dr. K.N. Geetha, Principal Investigator, UAS, Bengaluru 2. Dr. S. P. Singh, Principal Investigator, GBPUAT, Pantnagar
Dr. V. K. Choudhary	Weed management in major crops and cropping systems and Station trials specific to the state
Dr. V. K. Choudhary	Weed Management under conservation tillage-based cropping system
Dr. R. P. Dubey	Weed management strategies in organic agriculture/natural farming
	Management of herbicide resistance in weeds
	Management of parasitic weeds
Dr. Aarchana Anokhe	Management of weeds in non-cropped and aquatic areas
Dr. V. K. Choudhary	Fate of herbicide residues in different agroecosystems

	Remarks by Chairman, Co-Chairman and External Expert
13:30- 14:30 hrs	LUNCH BREAK
14:30-16:00 hrs	<i>(WP-4 Demonstration and impact assessment of weed management technologies & SCSP)</i>
Dr. P. K. Singh	OFR, FLD and impact assessment of weed management technology
Dr. Yogita Gharde	SCSP, WoNI, Digitization of Aquatic Weed Map On-line AICRP-WM data management system
Dr. RP Dubey	New initiatives as suggested by the QRT/RAC
	Remarks by Chairman, Co-Chairman and Resource person
16:00-17:30 hrs	PLENARY SESSION
Welcome Address	Prof. S.K. Panda, Dean of Research, OUAT, Bhubaneswar
Rapporteurs Report	INAUGURAL SESSION (Dr. T Ramprakash)
	TECHNICAL SESSION-I (Dr. V. K. Choudhary)
	TECHNICAL SESSION-II (Dr. Yogita Gharde)
	TECHNICAL SESSION-III (Dr. K. N. Geeta)
Remark by Resource person	Prof. B. Behera Former HOD Agronomy, OUAT, Bhubaneswar
Remarks by I/C, AICRP-WM	Dr. R. P. Dubey, In-charge, AICRP-WM, DWR, Jabalpur
Felicitation	Dr. I. C. Barua, PI & I/C AICRP-WM, AAU Jorhat Centre
	Rapporteurs
	Certificate of Appreciation Distribution
Address by Guest of Honour	Dr. Rakesh Kumar Pr. Scientist, NRM Division, ICAR
Address of Chief Guest	Prof. H. K. Patro, Dean Collage of Agriculture, OUAT, Bhubaneswar
Address of Chairman	Dr J S Mishra, Director ICAR DWR
Rapporteurs	Dr. P. Jones Nirmalnath and Dr. Shrikant Chitale
Vote of thanks	Dr. R. Dash, Principal Investigator, OUAT, Bhubaneswar
21st June, 2022 (Friday)	
09:30- 5:00 hrs	Visit to experimental fields and OFR/FLD at farmers' fields.

XXXI Annual Review Meeting
All India Coordinated Research Project on Weed Management
ICAR-Directorate of Weed Research, Jabalpur-482004

Venue: Odisha University of Agriculture & Technology, Bhubaneswar

Date : 19-21 June, 2024

LIST OF INVITEES

INDIAN COUNCIL OF AGRICULTURAL RESEARCH, NEW DELHI

1. Dr. Himanshu Pathak Secretary (DARE) & Director General
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2. Dr. S.K Chaudhari Deputy Director General (NRM)
Indian Council of Agricultural Research
Krishi Anusandhan Bhawan-II, Pusa
New Delhi – 110 012
3. Dr. Rajbir Singh Asstt. Director General (Agronomy, AF & CC)
Indian Council of Agricultural Research
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RESOURCE PERSON

1. Prof. Basudev Behera Former Head, Department of Agronomy, OUAT
Bhubaneswar

ICAR-DIRECTORATE OF WEED RESEARCH, JABALPUR

1. Dr. J. S. Mishra Director
2. Dr. R.P. Dubey Pr. Scientist (Agronomy) & I/C AICRP-WM
3. Dr. P.K Singh Pr. Scientist, (Agril Extension)
4. Dr. Shobha Sondhia Pr. Scientist (Organic Chemistry)
5. Dr. P. K. Mukherjee Pr. Scientist (Agronomy)
6. Dr. V.K. Choudhary Pr. Scientist (Agronomy)
7. Dr. Yogita Gharde Sr. Scientist (Agril. Statistics)
8. Dr. Archana Anokhe Scientist (Agril. Entomology)
9. Mr. Pankaj Shukla Asst. Chief Technical Officer
10. Dr. Pavan Kumar Para Young Professional-II

INVITEES FROM AICRP-WM CENTRES

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4. Mr. D.D Chaudhari Agronomist

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- 6 Dr. (Mrs.) C. Bharathi Jr. Residue Chemist

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- 7 Dr. Todar Mal Poonia Professor Agronomy & Principal Investigator
- 8 Dr. Ankur Chaudhary Assistant Agronomist

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- 12 Dr. Md. Abdul Alim Jr. Agronomist

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- 13 Dr (Mrs.) Parvinder Kaur Residue chemist & Principal Investigator
- 14 Dr. Jasvir Singh Gill Jr. Agronomist

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Sri Karan Narendra Agriculture University, Jobner

37 Dr. Shweta Gupta Asstt. Professor (Agronomy) & Principal Investigator

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2. Managing Director and CEO
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10. General Manager (Research Tech. Development)
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11. General Manager
ADAMA India Pvt. Ltd.
Located in IKP Knowledge Park, Plot No: DS -13, IKP Knowledge Park, Sy. No. 542/2,
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13. Tropical Agrosystem India Pvt. Ltd.
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Tamilnadu, India 600008
14. UPL Pvt. Ltd.
3-11, G.I.D.C., Vapi, Distt. Valsad, Gujarat 396195 India, Tel. No.: 0260-2432716
15. Manager- Company Secretarial
BASF Chemicals India Private Limited
The Capital, A Wing, 1204-C, 12th Floor, Plot No. C-70 G Block, Bandra Kurla Complex,
Bandra (East) Mumbai Mumbai City MH 400051 IN.
16. SWAL CORPORATION LTD.
UPL House, 4th Floor, CTS No. 610B/2, Bandra Village, Off Western Express Highway,
Behind Teachers Colony, Bandra (East), Mumbai 400 051.
17. CORTEVA Agri Science.
ATRIA Building, The V Park ASCENDAS IT Park, Plot # 17, Madhapur, Gate No.5, Software
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18. JU Agri Sciences Pvt. Ltd. Unit No.2302, Tower 2, Express Trade Tower II B 36, Sector
132, Noida, Gautam Buddha Nagar Uttar Pradesh 201301