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की XXVII वार्षिक समीक्षा बैठक

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

वीडियो कॉन्फ्रेंसिंग

8-10 जून, 2020

Video Conferencing

8-10 June, 2020



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**Proceedings of
XXVII Annual Review Meeting
All India Coordinated Research Project on Weed Management
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INAUGURAL SESSION

The inaugural session was started with the welcome and opening remarks of Dr Shobha Sondhia, In-Charge AICRP-WM which was followed by welcome address given by Dr P K Singh, Director, ICAR-DWR. In the welcome address Dr Singh has welcomed all the stalwart in the field of weed science, distinguished and eminent scientists from ICAR Headquarters, other ICAR Institutes, Universities and Private Agencies, all the participants, PIs and scientists of different AICRP centres, ICAR-DWR and other institutions. In his address Dr Singh has highlighted the importance of weed management in agriculture with special reference to doubling of farmers' income by 2022. He has also mentioned the emerging weed problems like parasitic weeds, weeds in aquatic system, alien invasive weeds etc. and highlighted the coordinated efforts of Directorate and different AICRP centres for managing these weeds. Dr Singh has also specified the need of focused future research project on development of climate smart weed management technology, risk associated with herbicide resistant weeds, weed dynamics and shift in weed flora under changing climatic condition. At the end he has again welcomed all the participants for attending the review meeting and has shown his confidence on active deliberation and fruitful discussion on present and future research projects of different AICRP centres. After the welcome address several eminent scientists, Chief Guest, Guest of Honour have delivered their address and those have been presented as under:

Dr A K Gogoi, Ex-Asstt. Director General (Agronomy & Agroforestry), ICAR, New Delhi said that ICAR-DWR is doing commendable work and it also cater the need of weed management in different crops of the country. Hence, the Directorate may be upgraded as Institute as weed science research involves multi-disciplinary approach. There is also a need on ethno-biological research on utilization of weeds.

Dr N. T. Yaduraju, Ex-Director, ICAR-DWR said that weed science is a multi-disciplinary approach and development of weed management technology involves multi-disciplinary work having greater potential to fulfil the objectives of doubling farmers income as control of weeds for successful crop husbandry in farmers' field incurs huge input cost. It incurs 20% input cost for *Rabi* crops and 30% for *Kharif* crops. Reducing denominator by cutting input cost through successful weed management can enhance productivity and net returns which can finally lead towards doubling farmers income by 2020. Non-availability of manual labourer for weeding and high expenditure involved in hand weeding usually creates the option for farmers to rely on herbicide use for controlling weeds. However, over reliance only on herbicide use can exert several negative effects on environment. This issue needs to be addressed properly and farmers should be sensitised on judicious use of herbicides and adoption of integrated weed management (IWM) practices. This can also facilitate to reduce the load of herbicide in the environment. IWM is a knowledge intensive approach and there is a need to revisit the cultural and mechanical approaches for controlling weeds. He also said that prioritization should be given on mechanical weed control through mechanization and modernization of tools and implements. AICRP centres should play a key role in identifying the problems and disseminating the information to Directorate. Synergistic coordination between AICRP centres and Directorate on cross learning,

technology development based on problems identified and dissemination of technology is the ultimate goal of the linkage.

In his address, Dr. S. Bhaskar, ADG (AAF & CC), ICAR, New Delhi made following observation and comments:

- Concentrated efforts need to be given to control aquatic weeds and clean up aquatic bodies. Similarly focussed research project can be taken up on parasitic weeds as these weeds are changing host under changing climatic condition.
- Emphasis can be given to prepare a comprehensive policy document on control of *Parthenium* in order to satisfy the query usually raised during Parliament session.
- Focussed research project can be taken up on weed management in organic farming and special emphasis should be given on seed contamination, weed seed bank and manure contamination by the weed seeds.
- Emphasis should be given to develop collaborative linkages between AICRP centres and ICAR commodity Institutes in order to avoid duplication of research activities and advisory. Duplication of advisory may create confusion among the farmers.
- Exchange and import of planting materials may lead to the possibilities of entering alien invasive weeds and herbicide resistant weeds into Indian Agriculture. Continuous surveillance, establishment of strong network and documentation of these weeds are highly important.
- Efforts should be given to develop mobile Apps for weed identification especially at early developmental stages of weeds.
- Research project can be taken up on use of selective herbicides for controlling weeds in close growing crop. Special emphasis can be given on weed management in onion and carrot as weeds are causing greatest menace in these crops.
- Weed problems are location specific and weeds are season bound. Hence, focussed research project can be taken up on development of IWM protocol through cropping system approach for assuring minimum weed problem in succeeding crop.
- Advisory should be generated to eliminate weed seeds from the crop seeds after harvesting and also in post-harvest condition.
- Awareness programme can be taken up to empower the farmers on judicious use of herbicides and its use in IWM module while considering the fact of low consumption of herbicides.
- ICAR-DWR has made commendable work on weed management in different crops and the technologies generated by Directorate are being used not only by small land holders but also large elite farmers.

Dr. S.K. Choudhuri, DDG (NRM), ICAR, New Delhi made the following remarks:

- Weed management sector holds the key to achieve objectives of doubling farmers' income.
- Reshape and revisit of IWM protocol under changing climatic condition. Basic and strategic research project can be taken up on weed shift, weed-crop interference, weed dynamics in major cropping systems under climatic change scenario.
- There is need to work out the mechanism for tying up AICRP centres with ICAR commodity Institutes.
- Research decision process can be focusses on weed biology, weed utilization, herbicide resistant weeds and issues related to transgenic plant.

- He said that there is need to do risk assessment of herbicide resistant weeds as globally 404 resistant weeds emerged against ALS inhibitor among them 133 are found in rice; 71 weeds as triazine resistant; 43 resistant grasses against ACCase inhibitor affecting 25 million hectares of cereal crops globally resulting in significant reduction on cereal production. Glyphosate resistant weeds are also numerous- hence new molecules to be explored to control resistant weeds.
- Efforts should be given to develop mechanism of synergistic coordination among public sectors, private sectors and farmers to combat weed problems in agriculture.
- Farmers are still using old molecules and very limited impactful new molecules are available in the hand of the farmers for controlling weeds.
- Use of remote sensing tools for new weed identification and assessment of losses caused by weeds.
- There is a need to intensify efforts to integrate AICRP centres with ICAR-DWR, Jabalpur to attract funds from private and other agencies.
- Focussed multi-disciplinary research project can be taken up on future weed problems.
- Documentation on seaweeds and aquatic weeds

In the end of inaugural session, vote of thanks was proposed by Dr Shobha Sondhia, I/C AICRP-WM

TECHNICAL SESSION - I

Presentation of salient findings of AICRP-WM Centres

- Chairman** : Dr. S. Bhaskar, ADG (Agro., AF & CC), ICAR, New Delhi
Co-Chairman : Dr. V.P. Singh, Principal Scientist, ICAR-IISR, Lucknow
Rapporteurs : Dr. P. Murali Arthanari, Associate Professor, TNAU, Coimbatore
 Dr. Dibakar Ghosh, Scientist, ICAR-DWR, Jabalpur

Dr. Shobha Sondhia, Incharge AICRP-WM, ICAR-DWR, Jabalpur presented the research highlights of the AICRP-WM network experiments of the year 2019-20 and showed continuous progress in research and extension activities and number of publications. She also presented Action Taken Report (ATR) on various recommendation and comments made in the XXVI Annual Review Meeting of AICRP-WM organized at AAU, Jorhat during 15-16 October, 2019 and informed that all the comments are duly undertaken by all the centres.

Afterwards as per schedule presentation were made by PIs of AICRP-WM coordinated centres. During this session PIs of six AICRP- WM centres presented their salient findings.

PJTSAU, Hyderabad

The salient findings of this centre was presented by Dr. M. Madhavi, Principal Investigator

- Weed management in rice-maize-green manure cropping system under conservation agriculture – conventional tillage followed by conventional tillage along with integrated weed management treated plot performed better.
- Conducted experiment on weed management practices in okra- carrot under organic cropping system
- Centre has identified *Spirodela polyrhiza* a new weed infestation in Northern Telanga region
- Results of two station trials on bioefficacy trials were presented.
- Collaborative work done with IIMR on mechanization in maize cultivation was also presented.

- Significant increase in soil organic carbon content (0-15 cm) and soil aggregation was noticed in ZT-DSR compared to CT-TPR, CT-DSR treatments, after 5 years of adoption CA.
- Residues of bispyribac-sodium, bensulfuron methyl and pretilachlor (in transplanted rice) and pendimethalin (aerobic rice) in the soil samples, rice grain and rice straw samples collected at the time of harvest were below the detectable limit.
- Rice straw mulch at (5 t/ha) followed by intra-row weeding at 30 DAS or rice-husk mulch (3 t/ha) was found effective and economical weed management options for carrot under non-chemical weed management practices.

Comments

- Check, why conventional tillage alone performing better than zero tillage operations in the long term experiment?
- During demonstration of herbicide take care of all the protective measures
- Efforts should be made to take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non-chemical weed management.

Comments on Technical Program

- NEWS paper treatment should be deleted and some other treatment may be proposed.
- Mention weed management treatment in greengram under CA experiment.
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

UAS, Bengaluru

Dr. K.N. Geetha, Principal investigator of the centre presented the salient findings of the centre.

- This centre has conducted experiments in WP1 (4), WP 2(2), WP 3 (2), WP 4 (2) and WP 5 (2)
- Conducted experiment on maize based cropping system in conservation agriculture.
- Among tillage practices, adopting permanent bed tillage practices recorded significantly higher maize yield (3.04 t/ha) and lower weed emergence *fb* conventional tillage (2.98 t/ha) in maize-greengram cropping system under CA.
- In *Rabi*-greengram, stale seed bed technique followed by intercultivation at 25 & 45 DAS gave higher seed yield (983 kg/ha) in non - chemical methods of weed management.
- New weed, *Ethulia gracilis*: belongs to Astraceae family was first noticed at Nippani, Belgavi district in maize and groundnut crop and fallow land.
- Application of bensulfuron-methyl + pretilachlor at 0.165 kg/ha recorded significantly higher kodomillet grain and straw yield (2.59 and 4.84 t/ha, respectively).

Comments

- Continue maize-greengram-maize cropping system under CA
- Do not apply herbicide in coriander due to residual problem as it is using as leafy vegetable
- During presentation the herbicide should be presented as per technical programme (like topramezone in greengram- wrongly mentioned)

Comments on Technical Program

- Mention all the inputs either fertilizer or other plat protection practice in the organic experiment
- Specify intercropping of horse gram

- Check herbicide dose in ginger, whether it is 0.5 or 07 kg/ha?
- Organic experiment will be taken at organic block in collaboration with other institution
- Efforts should be made to take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non chemical weed management.
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

KAU, Thirissur

Findings of this centre has presented by Dr. Meena V. Menon, Principal Investigator

- Conducted experiment on biology of *Sacciolepis interrupta* and observed high level of dormancy. Management of this weed with different pre-& post-emergence herbicides was also studied.
- Highest rhizome yield of turmeric (45.8 t/ha) was obtained with polythene mulch followed by jack leaves mulch (34.7 t/ha) and coconut fronds mulch (33.9 t/ha) under turmeric-cowpea organic cropping system.
- Among the different treatments, concentrated sulphuric acid treatment resulted in 80% germination in fresh seeds of *Sacciolepis interrupta*, and perchloric acid (1%) recorded highest germination percentage of 64 % in old seeds compared to untreated seeds.
- Lower weed dry matter production (348 and 340 kg/ha) and significantly higher grain yield of rice (3.11 and 2.94 t/ha) were observed under pretilachlor + bensulfuron methyl *fb* cyhalofop butyl + penoxsulam *fb* HW.

Comments

- Start work on weed management in spices and high value crops and submit experimental details after through discussion with Dr RP Dubey, Pr Scientist (Agronomy) DWR, Jabalpur.
- There is lot of potential in weed management in organic agriculture and aquatic body in the Kerala state, focus and work in these areas.
- Take experiments on rice crop in proper field to avoid submergence of crop and total failure of experiment.
- Efforts should be made to take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non-chemical weed management.
- Annual report was not prepared according to guidelines.
- Less numbers of experiments were conducted.
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

Comments on Technical Program

- Take care and modify experiment as per suggestions.
- Linkup with other national schemes in organic farming and high value crops specially spices crops.
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

TNAU, Coimbatore

Dr. P. Murali Arthanari, Principal investigator of the centre has presented the salient findings of the centre

- This centre has conducted fifteen numbers of experiments during last year apart from one Scheduled Caste Sub plan programme.

- The result of weed management maize-sunflower – daincha cropping system found that, ZT-ZT+R for maize and ZT+R-ZT+R for sunflower along with integrated weed management reduced the weed density and increased the system productivity.
- Long term rice-rice cropping system experiment PE bensulfuron methyl + pretilachlor + HW in *Rabi 2018-19* and *Kharif 2019* PE pyrazosulfuron-ethyl + HW recorded lower weed infestation and higher productivity of the cropping system
- Presented two station trials on effect of elevated temperature and different moisture regimes of *Parthenium hysterophorus* and *Trianthema Portulacastrum* and found increased temperature leads to early flowering of the weeds and in another trials POE *Terminalia chebula* pod with 50% acid lime extract effectively controls *Parthenium*.
- Biology of two weeds (*Corchorus olitorius* and *Trianthema Portulacastrum*) was studied and monitored weed shift in long term rice –rice cropping system.
- Monitoring of residues in high value crops (onion), different herbicides used by the farmers field (Quizalafop-ethyl, oxyflourfen, atrazine, pendimethalin and imazethapyr) and degradation and mitigation studies of herbicides (Pendimethalin and oxyflourfen) were conducted.
- Conducted five OFR in onion and five FLD in Tomato

Comments

- Reinfestation of water hyacinth may also be mentioned in the presentation.
- *Dhaincha* may be mentioned as *Sesbania* in the long-term maize-sunflower trial
- Need to recheck dose of pyrazosulfuron.
- Resource saving, energy, water, man-power saving, resource use efficiency need to be established under CA.

Comments on Technical Program

- Add mechanical weeding also instead of only hand weeding.
- How experiment on long-term herbicide trial in transplanted lowland rice-rice cropping system will be conducted in RBD without replications.
- Follow all the suggestions made during Annual Review Meeting and in the technical programme.

MPUAT, Udaipur

Salient findings of this centre was presented by Dr. Arvind Verma, Principal Investigator

- All tillage and residue management practices have non significant effects on maize yield.
- Weed species *Echinochloa colona*, *Dinebra retroflexa* and *Corchorus olitorius* were not affected by different tillage and residues management practices. Whereas, emergence of *Digera arvensis* was statistically low under ZT maize with residues in comparison to conventional tillage in maize- wheat cropping system under conservation agriculture systems.
- Maximum WCE at 60 DAS, (98.8%) was observed with crop sown after stale seed bed technique with plastic mulch in organic weed management practices in sweet corn
- Plastic mulch in different combinations proved most effective and recorded 95-100% reduction in total weed dry matter at 60 DAS and at harvest, in comparison to weedy check in fennel.

- The seed yield was high with the pre-emergence application of oxadiargyl 100 g/ha (1901 kg/ha) in comparison to its POE application at same dose (956 kg/ha).
- In brinjal, application of ethoxysulfuron twice; 20 g/ha at 45 DAT followed by 15 g/ha at 90 DAT reduced *Orobanche* infestation and increasing brinjal yield by 11.1% over farmers practice.
- Follow the suggestions made on the Technical programme.

Comments on Technical Program

- Even though there is huge demand of residue for fodder, CA experiment may be continued to explore with the objective of soil moisture conservation under soil moisture stress condition.
- Specification and practices of CA should be strictly followed.
- Reorient the treatments (T4 and T5) in view of residue management and green manuring.
- Spacing of baby corn need to be checked and treatment number 4 need to be rechecked for weed management in organically grown corn (WP 1.2)
- Efforts should be made to take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non-chemical weed management.
- Follow all the suggestions made during Annual Review Meeting in the technical programme.

AAU, Jorhat

Dr. I.C. Barua, Principal Investigator presented the salient findings of the AAU, Jorhat

- Among different weed management treatments, pretilachlor 0.75 kg/ha pre-em + hand weeding 30 DAS and hand weeding 20 and 40 DAS resulted in higher grain and straw yield as compared to the application of pretilachlor 0.75 kg/ha alone.
- Significantly less persistence of pretilachlor and pendimethalin residue was resulted from the combination treatments of minimum tillage with residue incorporation over the conventional tillage practices in summer rice and Indian mustard.
- Green leaf yield of tea was found to be highest in case of bio-degradable film mulching at all the stages. In the 3rd, 4th, 7th and 8th plucking stage, citronella/ Lemongrass mulching and straw mulch yielded similarly with bio-degradable film mulching. But, Citronella/ Lemongrass lasts for rather longer period comparing to straw mulch
- In the long-term herbicidal trial in rice-rice cropping sequence, the highest grain yield in autumn and winter rice was resulted by pyrazosulfuron 25 g/ha + 2,4-D 0.5 kg/ha rotated with pretilachlor 0.75 kg/ha (75% nutrient through fertilizers + 25 % nutrient through organic source) because of this treatment was found best in managing weeds.
- Submerged weeds like *Ceratophyllum-Utricularia* complex and *Scirpus* spp. were not controlled by pyrazosulfuron-ethyl + 2, 4-D combination.
- *Acmella brachyglossa* and *A. oppositifolia* var. *oppositifolia* found as new report for the Country.

Comments

- Need more work on biology and management of weeds
- Sesame can explore as mulch for suppressing *P. repens*
- Necessary correction should be made in the treatment as green manuring instead of brown manuring.
- Efforts should be made to take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non-chemical weed management.

Comments on Technical Program

- Total residue load data need to be analysed in WP1.3
- Weed shift should be based on GPS mapping for newly emerging weed
- All the measures need to be taken care for developing drone based herbicide application
- Make a collaborative approach for weed management in onion, garlic, floriculture sector.
- In OFR and FLD carry over effect of herbicide need to be looked on succeeding crops
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

TECHNICAL SESSION - II

Presentation of salient findings of AICRP-WM Centres

- Chairman** : Dr. N.T. Yaduraju, Ex-Director, ICAR-DWR, Jabalpur
- Co-Chairman** : Dr. J.S. Mishra, Head, Division of Crop Research, ICAR Research Complex for Eastern Region, Patna
- Rapporteurs** : Dr. Rabiratna Dash, Agronomist, OUAT, Bhubaneswar
Dr Subash Chander, Scientist, ICAR-DWR, Jabalpur

OUAT, Bhubaneswar

Dr. M.M. Mishra, Principal investigator of the centre has presented the salient findings of the centre

- The practice of conventional tillage (transplanted rice) in *Kharif* followed by zero tillage maize in *Rabi* and zero tillage cow pea in summer with recommended herbicides for each crops resulted in the highest system productivity (REY: 11.9 t/ha) with minimum weed count & dry matter.
- Application of glyphosate 5 l/ha in all zero tilled plots followed by pretilachlor 0.5 l/ha in transplanted rice within 3 DAT; pendimethalin 0.75 l/ha within 3 DAS in maize, and oxyfluorfen 0.05 l/ha within 3 DAS was found effective for weed control in cowpea in a cropping system of rice-maize-cowpea.
- Application of 1/3 recommended dose of N each through FYM, *dhaincha* and neemcake with *Azospirillum* + PSB to rice followed by same proportion of organics through FYM, Vermicompost and Neem cake with *Azotobacter* + PSB to tomato & ladies finger along with one manual weed + one mechanical weeding (T4) in rice-tomato-lady's finger system resulted in the maximum grain yield of rice (4.4 t/ha), fruit yield of tomato (16.5 t/ha) and lady's finger (6.03 t/ha) with REY of 21.4 t/ha/yr as compared Chemical practice.
- Application of sulfosulfuron 25 g/ha at 25 and 50 DAS was found to be very effective in controlling *Orobanche* population in Brinjal.
- The application of metribuzin 0.075 kg/ha as pre-emergence spray along with one hand weeding at 40 DAS was found best treatment in increasing the total tuber yield of potato (13.89 t/ha) which was significantly superior than weedy check (7.87 t/ha).

Comments

- Weed seed bank dynamics, carbon dynamics, soil-physicochemical properties to be studied in conservation agriculture experiments (as almost six years have completed).
- Residual toxicity of new molecule (tembotrione) should be tested in succeeding crop, in herbicidal trial in maize.
- Scale down the use of metribuzin in potato as it is very old molecule.
- Herbicidal recommendation should be given only after the proper study of residual toxicity in succeeding crop.

- Check pretilachlor (1.0 kg ha) dose.
- Check yield of sweet corn (green cob yield is very less i.e. 5.0 t/ha)
- *Cassia tora* is to be popularized as a competitive crop for *Parthenium* replacement.
- Herbicide dose should be given in g/ha or kg/ha.

Comments on Technical Program

- In CA experiment observation should be taken on population of cowpea, canopy coverage by cowpea, weed suppression efficiency, moisture conservation and its residual effect on succeeding crop.
- Follow the protocol for weed seed bank study as per ICAR-DWR, Jabalpur.
- Herbicide should not be included in management treatment in organic blocks/experiments.
- Efforts should be made to take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non-chemical weed management.
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

BCKV, Kalyani

Dr. Bikas Mandal, Principal investigator of the centre has presented the salient findings of the centre

- *Sesbania* intercrop 25 kg/ha up to 30 DAS *fb* mechanical incorporation *fb* one hand weeding at 40 DAT in rice and paddy straw mulch 7.5 t/ha *fb* one hand weeding at 30 DAT in Capsicum was found to be best weed management practice in rice-capsicum system under organic farming.
- Conventional tillage along with IWM *i.e.* pretilachlor 0.75 kg/ha PRE *fb* bispyribac-Na 25 g/ha at 25 DAT + mechanical weeding at 50 DAT in transplanted rice; CT + Pendimethalin 1.0 kg/ha PE + mechanical weeding at 30 DAT in rapeseed and CT + quizalofop-ethyl 50 g/ha at 20 DAS + mechanical weeding at 30 DAT in greengram resulted in higher yield and effective weed management in rice-rapeseed-greengram cropping system under conservation agriculture.
- Weed management in transplanted *Kharif* rice at farmers' field with treatment pretilachlor 750 g/ha *fb* bispyribac-Na 25 g/ha at 25 DAT has been found to be the best with 21.5% yield increase and 84.75% weed control efficiency over farmers practice.

Comments

- Weed density and dry weight data must be shown in the presentation.
- The dose of herbicides in sugarcane to be checked (eg. Pendimethalin 500 g/ha and atrazine 1.0 kg/ha is too low)
- In rice-capsicum system under organic farming, a treatment of *Sesbania* intercropping and mechanical incorporation at 30 DAT and 1 HW at 40 DAT is hand weeding required just after 10 days of incorporation.
- Treatment details should also be given in the tables of presentation
- Weed management technologies is to be given in SCSP Programmes.
- Improve the quality of slides and presentation with proper data.

Comments on Technical Program

- Complete data set is required on each proposed experiment, similar soil parameters need to be taken as per protocol

- Relook the treatment details specially butachlor or pretilachlor in WP 1.3
- Herbicide residue must be analysed in high value crop/agriculture
- Efforts should be made to take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non-chemical weed management.
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

AAU, Ananad

Dr. B.D. Patel, Principal investigator of the centre has presented the salient findings of the centre

- Significantly the lowest weed density (9.58 no./m²) and dry biomass (4.89 g/m²) of total weeds at 90 DAS in cotton was recorded under HW at 20, 40 and 60 DAS in weed management in cotton-greengram cropping system under conservation agriculture.
- Significantly higher seed cotton yield (1.37 t/ha) was obtained under conventional tillage (CT-CT) and remained at par with zero tillage with residue followed by zero tillage with residue (ZT+R-ZT+R) (1.35 t/ha).
- All the weed management practices recorded more than 70% weed control efficiency at 120 DAP of turmeric except plastic mulch (0-3 DAP) *fb* HW at 30 and 60 DAP which recorded weed control efficiency of 63%.
- Wheat straw mulch 5 t/ha (0-3 DAP) *fb* HW at 30, 60 and 90 DAP recorded significantly higher turmeric rhizome yield (24.2 t/ha) and B: C (2.15) but it was at par with paddy straw mulch 5 t/ha (0-3 DAP) *fb* HW at 30, 60 and 90 DAP (23.4 t/ha and 2.06).
- Maximum weed control efficiency of 87.4% was recorded under IC + HW at 30 DAP + wheat straw mulch 5 t/ha (30 DAP) *fb* HW at 60 and 90 DAP in turmeric under organic cropping system.
- Sulfosulfuron 20 g/ha at 45 and 90 DAP and ethoxysulfuron 20 g/ha at 45 and 90 DAP was found effective for control of *Orobanche* but stunted growth of brinjal resulted in the reduction of yield
- Oxyfluorfen 120 g/ha PE, oxadiargyl 90 g/ha PE and stale seedbed *fb* pendimethalin 750 g/ha PE were found effective for the control of *Cuscuta* with higher yield of onion and B:C

Comments

- In conservation agriculture experiment, quantify the previous crop residue.
- In parasitic weed management trial of orobanche, the phytotoxicity on brinjal is to be tested and verified.
- Effect of herbicide residue on succeeding crop must be studied.
- Sulfosulfuron and ethoxysulfuron were found effective for management of *Orobanche* in tomato and brinjal but showed phytotoxicity in both the crops. However, OUAT, Bhubaneswar centre showed very good results of these herbicides in brinjal with no phytotoxicity. Therefore, result of these experiments need to be checked and evaluated again
- Keep weed free check as treatment (to know full potential of the crop) in parasitic management experiments for comparisons of yield.
- In parasitic weed management, apart from chemical method, the other methods of weed management should be evaluated.
- Efforts should be made to take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non-chemical weed management.

Comments on Technical Program

- Cotton residue takes long time for decomposition and hence, efforts should be made to assess the benefit of using cotton residue.
- Centre have shredder so before sowing pass the shredder for uniformed cut and spread of cotton residue.
- In WP 1.2 Weed management through resource conservation techniques, in T6 to T8-one treatment can be replaced with smother crop (cluster bean)
- Suggested to use mechanical and cultural practices of weed management instead of hand weeding.
- Economics of each experiment need to be workout
- Effect on soil data should be properly recorded
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

PDKV, Akola

Dr. J.P. Deshmukh, Principal investigator of the centre has presented the salient findings of the centre

- The use of two harrowing by tyne harrows and a blade harrow (CT) instead of roto-till (MT) and zero-till (ZT) in combination with herbicide application (IWM) provide added productivity and economic security in vertisols in soybean-chickpea –greengram cropping system under conservation agriculture
- In chickpea, for effective weed management two hand weeding at 30 and 50 DAS found better in controlling weeds, lesser weed dry matter accumulation, higher weed control efficiency, lower weed index and higher grain yield. However, this conventional practice was also comparable with application of pre-emergence herbicides oxyfluorfen 150 g/ha and post- emergence herbicide imazethapyr 50 g/ha at 20 DAS were found economically feasible in chickpea.
- Application of 125% recommended dose of N and K in five splits (P as basal) through drip irrigation and directed spray of paraquat 0.3 kg /ha at 30 DAS *fb* 1 HW 15 days after spraying and paraquat 0.6 kg /ha 60 DAS *fb* 1 HW 30 days after spraying found to be best for maximizing the weed control efficiency, seed cotton yield, net returns and B: C ratio from *Bt* cotton.
- Efforts should be made to take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non-chemical weed management.

Comments

- Weed seed bank dynamics and weed shift to be studied and shown in presentation.
- Check the imazethapyr toxicity on chickpea, it reduces the leaf size.
- Soybean is an important crop and infested with *Cuscuta*, what is the strategy to manage it effectively.
- Check dose of diclosulam and imazethapyr+imazamox in soybean.
- New weed species which are replacing *Parthenium* is to be studied in details and popularize it in massive scale.
- In conservation agriculture the interaction effect and quantification of residue is to be given.
- Economics of each experiment need to be worked out.

Comments on Technical Program

- Strictly follow the CA experiment using Happy seeder or zero till machine.

- In T7 under organic weed management experiment, instead of hoeing, other tools may be used for controlling weeds or power weeder.
- How soybean residue is maintained in wheat. Normally soybean is harvested manually and plants are removed from the field??
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

RSKVV, Gwalior

Dr. Deep Singh Sasode, Principal investigator of the centre has presented the salient findings of the centre

- The maximum production of grain yield 2.92 t/ha and profitability with B: C ratio 2.37 was recorded where conventional tillage was applied in *kharif* and zero tillage *Rabi* and *summer* both (CT-ZT-ZT) *fb* zero tillage with crop residue (2.86 t/ha) in all three seasons (ZT+R-ZT+R-ZT+R) in pearl millet. Under WM practices, atrazine 500 g/ha PE with one HW at 30 DAS resulted in significantly higher yield (4.21 t/ha) and net returns of Rs 39,782/ha.
- Under weed management practices, atrazine 500 g/ha PE with one HW at 30 DAS resulted in significantly higher yield (3.47 t/ha) and net returns of Rs 32,899/ha.
- The significantly maximum seed yield of mustard (1.95 t/ha) was recorded under zero tillage with residue in all three seasons (ZT+R-ZT+R-ZT+R) with net returns of Rs 62,463/ha.
- Application of oxyfluorfen 230 g/ha with one HW at 30 DAS resulted in maximum mustard seed yield (2.01 t/ha) as well as reduced the weed density and dry weight of weeds.
- The tuber yield of potato was recorded maximum 28.25 t/ha and net returns Rs.16,6933/ha under soil solarization with plastic mulch (25 μ) *fb* soil solarization with one hand weeding at 40 DAP (26.0 t/ha) and net returns Rs. 1,39,900/ha.
- Intercropping (maize+greengram) gave maximum yield of cobs (6.39 t/ha) *fb* the application of soil solarization with one hand weeding (6.09 t/ha). Although soil solarization with one hand weeding resulted in better response to suppress the narrow and broad leaved weeds under non chemical weed management in sweet cron.
- Application of imazethapyr 40 g/ha after 1st cut (30 DAS) and again applied after last cut (90 DAS) was also found effective to control *Cuscuta reflexa* in berseem.
- Water hyacinth has been controlled effectively by *Neochetina* spp. and reoccurrence of water hyacinth has not been observed till June, 2020 in the pond of Morena district.

Comments

- Quantify the crop residue of in succeeding crop and its effect on weed emergence.
- Whether pre-emergence herbicide works on crop residue condition, need to be standardized.
- Weed seed bank dynamics and weed shift should be studied and presented.
- The interaction effect in long term conservation trial is to be studied and presented in details with two way tables.
- Residue quantification in conservation agriculture is to be given.
- The *Cuscuta* species needs to be verified (in crop condition *C. compestris* and on trees *C. reflexa*).
- Work on “Weed App” translation in Hindi language?
- Prepare 2-3 minute video on the success story of biological management of water hyacinth and spread through social media for wider adaptability of the technology.

- Efforts should be made to take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non-chemical weed management.

Comments on Technical Program

- Revise the research programme during 2018 and will continue as per suggestion made in ARM.
- Quantify the crop residues in crop and system mode
- Effect of crop residue on weed suppression and efficacy of pre-emergence herbicide under residue retention condition
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

IGKV, Raipur

Dr. Shrikant Chitale, Principal investigator of the centre has presented the salient findings of the centre

- *Echinochloa colona* among grasses, *Cyperus iria* among sedges and *Alternanthera triandra* and *Spilanthus acmella* among broad leaf weeds in rice and in general broad leaf weeds and sedges dominated the weed flora at all the growth stages as compared to grasses and other weeds.
- *Cyperus iria*, *Brachiaria ramosa*, etc. were the other weeds present in small numbers in rice-wheat-cowpea cropping system under conservation agriculture
- The lowest density and dry weight of weeds accompanied with highest WCE (91.7%) were recorded under black polythene mulch in organically grown sweet corn in direct seeded aromatic rice- sweet corn cropping system.
- Weight/cob (g), green cob yield, net income and B: C ratio were significantly higher under 50% N (FYM) + 50 % N (poultry manure). Interaction effect of organic nutrient and weed control options was found and significantly higher green cob yield of in 50 % N (FYM) + 50 % N (poultry manure) X black polythene mulch. 50% N (FYM) + 50% N (PM)+ + PSB + *Azospirillum* in rice and 50% N (FYM) + 50% N (PM) in sweet corn are the better option for supplying nutrients to produce Significantly higher rice yield and green cob yield over the others.
- Penoxsulam + cyhalofop 0.135 kg/ha PoE/ bispyribac-Na 0.025 kg/ha PoE were found effective to reduce the density of *Alternanthera triandra* in rice.
- Significantly highest total green fodder yield (65.1 t/ha) and seed yield (0.21 t/ha) was registered with the application of oxyfluorfen 0.25 kg/ha (PE) to manage *Cuscuta* in berseem.

Comments

- Present data of experiments on cropping system mode instead of individual crop wise.
- Aromatic rice should be grown in transplanted condition instead of DSR.
- Always use standard units (t/ha instead of q/ha)
- Mention the thickness of black polythene mulch in treatment rather than q or kg/ha.
- No need of decimal values in weed density data in table.
- Submit research paper in the weed science related journals
- Efforts should be made to take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non chemical weed management.

Comments on Technical Program

- The CA experiment was started in the year 2013-14 in inceptisol soil and from 2018-19 it is being conducted in vertisol. The centre is willing to continue the CA experiment for another two years. It was approved with the suggestion that information to be given in Annual report and presented as per protocol under experiments WP 1.1
- In WP 1.2 Aromatic rice needs to be taken under transplanted rice to minimize the weed pressure and azola may be taken as one treatment
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

At the end Dr. N.T. Yaduraju, Chairman of the session summarized with following points

- AICRP-WM centers have experiments on conservation agriculture from last 4-5 years, now the time to sum-up/conclude the results by seeking the expert's opinion.
- Poultry manure can be used in organic farming experiments as nutrient source
- A close watch of introduction of new weed species from other states/countries by surveillance at FCI and railway Godowns, Sea ports, hot spots or import of the seed/propagating material/food grains etc.
- Narrow vision for the study of weed biology, need to study on the competition of weed with crop planting dates, weed density, weak point in life cycle.
- There is lot of scope for the improvement of presentation, quality of slides and time management.
- Lot of data generated by the centres, come up with quality publications
- Prepare short videos on weed identification, chemical/trade names of herbicides, how to calibrate sprayers, how to prepare herbicide spray solution, safe use of pesticide including herbicide etc. and use social media to reach out the farmers.

9 June, 2020

TECHNICAL SESSION - III

Presentation of salient findings of AICRP-WM Centres

- Chairman** : Dr. J. Deka, Dean, Faculty of Agriculture, AAU, Jorhat
- Co-Chairman** : Dr. Sushil Kumar, Principal Scientist (Entomology), ICAR-DWR, Jabalpur
- Rapporteurs** : Dr. Varsha Gupta, Jr. Agronomist, RVSKVV, Gwalior
Dr. Deepak Pawar, Scientist, ICAR-DWR, Jabalpur

CSKHPKV, Palampur

Dr. Neelam Sharma, Principal investigator of the centre has presented the salient findings of the centre

- In conservation agriculture system (Maize–wheat cropping system) tillage as well as weed management treatments significantly affected the grain and straw yield of wheat crop.
- CT-ZT had highest grain yield which was statistically at par with those under ZTR-ZTR and CT-CT. On the other hand, CT-CT resulted in significantly higher wheat straw yield which remained alike to ZTR-ZTR and CT-ZT.
- Tillage treatments did not significantly affect the intercrop grain and straw yield i.e. sarson grown in replacement series in integrated weed management treatment.

- Maximum peach yield was recorded in legume intercropping followed by manual weeding which was at par with fodder intercropping and glyphosate application. Significantly lowest peach yield was recorded in weedy check due to abundance of weeds.
- Atrazine residues in post harvest soil and maize grain and pendimethalin residues in soil and peas crop produce were below detectable levels ($< 0.05\mu\text{g/g}$).
- More than 75% applied tembotrione 60 g/ha, 120 g/ha and 240 g/ha dissipated within 15 days after application.

Comments

- Centre has 12 research papers during the year, emphasis should be given on publishing papers in good quality journals.
- Mention 'Mustard' instead of 'Sarson'
- Put '*Parthenium* free campus' board in the centre, if campus is *Parthenium* free.
- While reporting herbicide residue under different planting mention the immediately after spraying or before sowing instead of initial soils.
- In all the experiments only weed flora and economics are given. Give weed density and dry weight data under different treatments.
- In orchard experiments use the word 'alley cropping' instead of 'intercropping'
- Efforts should be made to take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non chemical weed management.

Comments on Technical Program

- Compile the information on crop residue management experiment and submit to the Directorate.
- Experiment proposed under CA may be withdrawn due to non suitability of CA due to less land use size, non availability of proper machinery. This may be taken under resource conservation techniques programme.
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

PAU, Ludhiana

Dr. M.S. Bhullar, Principal investigator of the centre has presented the salient findings of the centre

- In CA based rice-wheat system, CT (-residue) had highest soil weed seed bank; residue incorporation with MB plough had lower density of *P. minor* than incorporation with rotavator. All CT and ZT (+/- residue) gave similar wheat yield.
- In organically raised basmati rice-wheat system, wheat sown on raised beds using 25% higher seed and one hoeing had lower weeds and gave wheat yield similar to weed free; in basmati, three week water ponding had no weeds and it gave similar yield to weed free.
- Pre-emergence pyroxasulfone at 127.5 g/ha, provided effective control of herbicide resistant *Phalaris minor* in wheat.
- Uniform spreading of paddy straw mulch 6 t/ha, immediately after sowing, followed by one hand weeding after six weeks, provided effective control of weeds in organic soybean.
- Pre-emergence ready-mix formulation of pendimethalin plus metribuzin at 962.5 g/ha provided effective control of *P. minor*, *Poa annua* and other annual weeds in wheat.
- In CA based rice-wheat system, in rice, harvest residues of penoxsulam and cyhalofop-butyl in soil and rice grain were below LOQ; in wheat, harvest residues of metribuzin and clodinafop were below LOQ (<0.01 and $<0.05 \mu\text{g/g}$)
- Dissipation of imazethypar followed biphasic first order kinetics and half life varied from 6.25-7.40 d, during initial phase and 87.2-134.4d during final phase; it was positively related with soil pH and temperature and negatively with soil OM

Comments

- In long-term conservation agricultural trials especially in Punjab there is issue of insect army worm that hides under straws and creates problem in wheat. Has this problem been observed in these trials? if so how it being resolved?
- In organic experiments brinjal yield seems very less, why?
- In conservation agriculture experiment in ZT-ZT treatment highest weed density as well as lowest yield was observed. Whether residues were incorporated in this system? Also give information, how much residue was retained for wheat crop in quantitative terms?
- If possible, observe the machine parameters for weed control.
- Regularly monitor status of the pond where *Neochetina* have been introduced.
- Conduct survey of the weeds in areas under DSR in Punjab.
- Prepare mobile app in local regional language.
- Ensure proper protective equipment be worn by labours spraying herbicides while taking photographs and while going live on social media.
- Shift in weed flora needs to be monitored once the farmers are shifting from transplanted rice culture to DSR in Punjab due to COVID-19.

Comments on Technical Program

- Conventional DSR (CT-DSR) can be included in place of zero-tilled transplanted rice as Punjab Government is giving due importance in promoting DSR.
- In addition, one more treatment (T5) may be taken as CT-DSR-ZT Wheat-ZT greengram/green manuring as Govt of Punjab is emphasizing on DSR
- Go for normal DSR as Govt of Punjab is emphasizing on DSR. However, to have a full CA treatment for comparison, ZT-DSR would be better in place of ZT transplanted rice because transplanting manually in ZT is difficult. Or otherwise, ZT mechanical transplanting would be better than ZT-DSR, if paddy transplanter is available. In this case only brown manuring should be done as rice will be under ZT-DSR or ZT-MTR.
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

GBPUAT, Pantnagar

Dr. V. Pratap Singh, Principal investigator of the centre has presented the salient findings of the centre

- Least total biomass of weed grasses and BLWs was found under TPR – RC- Wheat (ZT)-RR-*Sesbania* (INC) and highest grain yield in DSR *fb* wheat (CTW) without residue and *Sesbania* incorporation in rice-wheat cropping system under conservation agriculture.
- Least total weed density and dry weight was found in rice (DSR) + *Sesbania* + MW (25 DAS) + one HW (40 DAS) and (CTW)+ Stale seed bed + 1 HW(30DAS) in wheat. Maximum wheat grain yield was found under DSR (FIRB) on stale bed *fb* one hoeing and one HW under non-chemical weed management options in rice-wheat cropping system under organic mode of cultivation
- Lowest weed dry weight of grassy and BLWs at 45 and 75 DAP was found under sulfentrazone *fb* hoeing *fb* 2,4-D and hoeing after first irrigation *fb* atrazine after second irrigation, however, highest cane yield was found with atrazine *fb* hoeing *fb* topiramizone

Comments

- Centre have demonstrated good results on new herbicide molecules for DSR and transplanted rice in research station experiments, still in farmers field demonstrations centre has demonstrated only pretilachlor and bispyaribac, why?
- In WP 1.3 Add one objective related to weed management.

- What is WP7, WP7.1, WP7.2 & WP7.3? There is have only five technical programmes WP1, WP2, WP3, WP4 & WP5.
- Avoid to take same treatment in FLD and OFR in same location?

Comments on Technical Programme

- Clarification required how the main plot and sub plot treatment will be imposed, especially 50% standing stubbles under super seeder and conventional tillage
- PI should communicate detail treatment combinations, observations under organic weed management for inclusion in detailed technical program.
- Follow the technical program strictly –while taking observations and reporting data.
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

CCSHAU, Hisar

Dr. S.S. Punia, Principal investigator of the centre has presented the salient findings of the centre

- Under different tillage and residue management scenarios, population density and dry weight of *P. minor* was lower in case of zero till wheat with or without residue compared to conventional tillage, while, it was reverse in case of broad leaved weeds.
- ZT wheat (Happy seeder sown) with full residue load with/without waste decomposer (WD) resulted in significantly higher grain yield (6544 and 6596 kg/ha, respectively) compared to retention of partial residue, anchored stubble and conventional sown wheat.
- Application of mesosulfuron + iodosulfuron (RM) 14.4 g/ha along with one hand weeding resulted in more grain yield (6979 kg/ha) as compared to alone application of the same herbicide (6867 Kg/ha), but both were statistically at par with each other.
- Post-emergence application of aciflourfen + clodinafop (RM) at 245-370 g/ha, pyroxasulfone alone at 150 g/ha +pendimethalin 1000 g/ha(PRE) and RM of pendimethalin + imazethapyr at 1000 g/ha (PRE) in greengram proved very effective against *T. portulacastrum*. No carry over effect of aciflourfen + clodinafop (RM) was observed on succeeding mustard.
- A broadleaf weed *Oenothera laciniata* was observed in sandy soils of southern Haryana
- Out of 15 biotypes of *P. minor* evaluated; 11 populations were found resistant to recommended dose of sulfosulfuron, 10 populations to mesosulfuron + iodosulfuron (RM) and 9 populations to recommended dose of pinoxaden.
- Even 5 biotypes (Kheri Raiwali, Kaithal; 78 IB Farm H.A.U (Hisar); Kalwan, Jind;, Sitamai, Karnal and Chanarathal, Kurukshetra) showed resistance at 4x against meso + iodosulfuron (RM) .

Comments

- In weed surveillance studies take reference points that what weeds were present earlier.
- What is the status of the mobile app in regional language?
- In WP2, don't report as new weed species emerged found. As it is not new in the country but in the state, instead you can say write a weed of quarantine nature or invasiveness. Give source of the introduction of the weed. And also give photographs with GPS location.

Comments on Technical Program

- The experiment can't be considered as complete CA experiment. As in rice all the treatments were puddled transplanted rice. Hence suggested to take this experiment under Resource Conservation technology (RCT).
- In CA experiment the objectives should be same.

- Follow all the suggestion made during Annual Review Meeting in the technical programme.

SKUAST, Jammu

Dr. B.R. Bazaya, Principal investigator of the centre has presented the salient findings of the centre

- ZT-wheat + Crop residue with integrated weed management (sulfosulfuron + metsulfuron 30+2 g/ha at 30 DAS + HW at 45 DAS) gave higher grain yield and B: C ratio in wheat with lowest weed density and weed biomass and amongst all tillage and weed management combinations, highest net returns and B: C ratio were recorded in ZT-DSR+R and integrated weed management (Pendimethalin 1 kg/ha as PE *fb* bispyribac-sodium 25 g/ha at 25 DAS *fb* HW at 45 DAS) in rice-wheat-greengram cropping system under conservation agriculture.
- Paddy straw mulch (6 t/ha) + 1 hand weeding at 30 DAT found suitable for weed management in broccoli under organic farming.
- Stale seedbed +1 hand weeding at 30 DAT found suitable for weed management in basmati rice under organic farming.
- 125% RDN + paddy residue with or without waste decomposer (WD) along with sulfosulfuron + carfentrazone 25+20 g/ha or clodinafop-propargyl+metsulfuron (60 +4 g/ha) at 30-35 DAS found suitable in zero tillage wheat.
- Application of acifluorfen + clodinafop 245 g/ha at 3-4 leaf stage resulted in significantly higher grain yield and highest B:C ration under zero-tillage, minimum tillage and conventional tillage in summer greengram.

Comments

- Check the dose of cyhalofop+penoxulam at 150 g/ha as the recommended dose is 120-135 g/ha.
- Focus on weed management under organic farming and high value crops.
- Take physiological observation like canopy coverage, relative growth rate, LAI, SPAD chlorophyll content, partitioning of dry matter, nutrient use efficiency in organic or non-chemical weed management.

Comments on Technical Program

- Initial soil carbon data is very much important to monitor and assess carbon sequestration potential of CA.
- Under organic weed management experiments, objectives need to be reoriented in consultation with Dr R P Dubey. Chopped wheat and rice straw will be used.
- While using azola care must be taken and it should not become another weed.
- Crops may be taken in system mode in WP 1.3.
- Visual observation may be recorded on *Sesbania* population for residual toxicity if any of previous crops herbicides and can be compared to unweeded control in in WP 1.1
- Follow all the suggestion made during Annual Review Meeting in the technical programme.

TECHNICAL SESSION - IV

Presentation of salient findings of AICRP-WM Centres

- Chairman** : Dr. T.K. Das, Pr. Scientist (Agronomy), ICAR-IARI, New Delhi
Co-Chairman : Dr. M.L. Kewat, Professor (Agronomy), JNKVV, Jabalpur (M.P.)
Rapporteurs : Dr. Shrikant Chitale, Sr. Scientist, IGKV, Raipur
Er. Chetan C.R., Scientist, ICAR-DWR, Jabalpur

Presentation of salient findings of AICRP-WM Volunteer Centres

SKUAST, Srinagar

Dr. M. Anwar Bhat, Principal investigator of the centre has presented the salient findings of the centre

- Performance of DSR in temperate Kashmir as influenced by sowing dates and weed management and showed that the rice sown during last week of May was performed better than the sown in first week of May.
- Weed infestation in pasture lands and reported that the weeds namely *Xanthium strumarium*, *Chicorium inbytus* and *Cirsium arvense* infested the pastures more than other weeds. *Potamogeton distinctus* is a menace in farmers' field and reduced the yield drastically

Comments

- The seeded rice was wet seeded or dry seeded in DSR
- Check the use of oxyfluorfen at 250 g/ha has whether created a toxicity problem for rice germination – at Jammu it created the problem
- Test the different doses of herbicides first and select the possible lower dose for effective control of weeds
- Take data on change in weed flora and water requirement under DSR cultivation (if shifting from TPR)
- Requires a financial support to conduct different experiments like for weed survey and other experiments.
- Experiments should be optimized based on the provided budget.
- Oxyfluorfen is not recommended in rice search for alternate herbicide.
- Generate qualitative data from weed surveying experiment to justify the work.
- Use optimum size of quadrant and quadrant number to collect the weed data
- The availability of azimsulfuron needed to be ensured.
- Include some other treatments like weed smothering, mulching, cultural etc along with chemical treatments in horticultural crops.
- Generated some data through quality research and analyze the data using weed indices and publish research paper in international/national journals
- Take weed flora changes in transplanted as well as DSR rice as mostly farmers of Kashmir valley grow rice through transplanted method.

BAU, Sabour

Dr. Birendra Kumar, Principal investigator of the centre has presented the salient findings of the centre

- Pendimethalin + sulfosulfuron (1000+18) PE + PoE registered the highest WCE, grain yield of wheat and net return followed by mesosulfuron + iodosulfuron-methyl at 60+2.4 g/ha.
- In chickpea, topramezone 40 g/ha as PoE was equally effective to HW twice in controlling weeds, improved yield and found to be an economical option for weed control with minimum phytotoxicity

Comments

- Use recommended dose of fertilizers.
- Give the data of specific weed density under different herbicide dose treatments.
- Is two hand weeding in wheat crop is necessary? Mention time of hand weeding.
- The dose of herbicide should be mentioned in grams instead of millilitre. Mention the time of application of herbicides in wheat to observe the reason for phyto-toxicity in crop.
- Proper preparation of solution, maintaining of dose, time of application and procedure etc should be properly maintained.
- The dose of toperamezone 40 g/ha in chickpea is higher dose justify why higher dose of herbicide was used and always use possible lower dose.
- The hand weeding was done at 30 and 50 DAS but data on weeds was taken after 30 DAS. In this case the weed data will be varied.
- No transformation was used for weed data.
- The selected herbicides for treatments are not according to the state recommendations.
- Pendimethalin is not recommended for your location. Post-emergence herbicide is sufficient to control the weeds.
- Check pendimethalin + sulfosulfuron dose 18 g/ha, is it recommended dose? Always use the correct dose.
- *Solanum nigrum* is not controlled by most of the herbicides, so that, a consolidated research on *Solanum nigrum* should be taken.
- Propose one experiment exclusively on toperamezone for weed control in chickpea. Use different doses of herbicides for experiment. Use other treatments like cultural practices, tillage treatments etc along with chemical treatment.
- The dose of toperamezone for chickpea should be standardized and should be checked with different varieties.

PAJNCOA&RI, Ponducherry

Dr. P. Saravanane, Principal investigator of the centre has presented the salient findings of the centre

- It is reported that out of 37 revenue villages in Karaikal district, there was six revenue villages are heavily affected by *Parthenium* due to heavy truck traffic in the local area, and a 2.0 m tall plants of *Parthenium* was also noticed.
- Allelopathic potential of *Sida acuta* on vigour index of *Parthenium hysterophorus* was studied. *Sida acuta* has significantly reduced the root growth and vigour index of *Parthenium hysterophorus* as compare to *Eucalyptus* leaf leachate, Leucerne and tamarind.
- In finger millet, stale seed bed + intercultivation twice at 20 and 40 DAP produced significantly higher yield.
- *Zygogramma bicolorata* was released to control the *Parthenium*, but not much effectiveness was observed (not complete defoliation).

Comments

- Take experiment on *Casia tora* to control the *Parthenium*.

- Take experiment to check both competitive ability as well as the allelopathic toxic ability of the *Casia tora* and others to control the *Parthenium*.
- Conduct the survey of *Parthenium* infestation along with botanical agents to control them.
- Make a survey for *Parthenium* infestation in coastal areas and in inland areas.
- *Hypolia crassipers* controlling through biological agent.
- Try to explore the different herbicides instead of butachlor in finger millet.
- Inter-cultivation operation should be avoided if a stale seed bed treatment was used.
- Include pretilachlor herbicide and IWM to control the weeds in finger millet.

UAS, Dharwad

Dr. P. Jones Nirmalnath, Principal investigator of the centre has presented the salient findings of the centre

- Soil application of mycorrhizal consortium 8 kg/ha along with 200 kg of compost/acre at the time of planting, resulted in suppression of *Striga* emergence to a tune 38%, and increased the sugarcane yield up to 13.5% with a B: C ratio of 2.51.

Comments

- Follow the maize cultivation in ridge and furrow system to avoid yellowish problem in the crop.
- The controlling of *Orobanche* weed through microbial consortium can be done in mustard crop also. Supply microbial consortium to other AICRP-WM centres also to further evaluate this technology.
- Inoculum of soil can be applied along with the sowing of mustard crop to control the *Orobanche* weed.
- The doses of imazethapyr in chickpea should be corrected. Make collaboration with the agronomists for proper guidance to conduct the experiments.
- Clarify whether the farmers have used the fungicide during planting of sugarcane crop.
- Integration of different herbicides treatments along with the developed technology (microbial consortia) for *Orobanche* treatments.
- Collaborate with TNAU Coimbatore centre for further developing the technology in sugarcane.

BUAT, Banda

Dr. Dinesh Sah, Principal investigator of the centre has presented the salient findings of the

- Imazethapyr + pendimethalin (RM) 1000g/ha as PE and imazethapyr and imazamox as ready mix 70 g/ha at 3-4 leaf stage reduced weed dry weight and showed higher WCE and higher seed yield of blackgram among different herbicidal combinations and carry over effect was visible on succeeding mustard crop.

Comments

- The dose of imazethapyr+imazamox at 80 g/ha needs to be verified.
- Mention the net BCR of the treatments clearly.
- The weed control should be 100% in weed free treatments.
- Verify the treatment where, hoeing in blackgram but succeeding crop mustard showing toxicity effect.
- The photographs of the weed infestation in crop should be given the presentation for proper clarification.
- Give the relative density of weeds when different herbicides are used in treatments.

ANGRAU, Guntur

Dr. B. Prameela Rani and Dr Sandhya, of the centre has presented the salient findings of the

- Application of paraquat was found more effective than glufosinate ammonium 13.5% in fallow fields before sowing of *Kharif* and *Rabi* crops.
- PE of atrazine+alachlor 0.60+0.75 kg/ha fb 2, 4 -D Na salt 0.80kg/ha was effective to control most of the BLWs and grassy weeds in sorghum and emergence and growth of blackgram was not affected either in zero tillage or in shallow tillage when the crop was sown after one, two, three, four five or six months after the spray of atrazine 1.0 kg/ha in previous sorghum.

Comments

- The weed data should be transformed presented to avoid variation in the data.
- Application of atrazine before sowing of blackgram – a scientific justification for the experiment should be given and this type of experiments may be dropped.
- Use alternative herbicides for atrazine+alachlor herbicide.
- The lower dose of atrazine+pendimethalin should be used.
- Explore the use of microbial consortia to control the *Orobanche* weed with the help from Dr. P. Jones Nirmalnath
- *Cuscuta* should be controlled through inter cropping and also with IWM.
- Number of experimental trials should be limited based on the fund provided.
- They should conduct the experiments on farmers oriented.
- The application time of herbicides should be mentioned in all experiments.
- The new herbicides should be included in the experiments.

10 June, 2020

TECHNICAL SESSION - V

Presentation of technical programme 2020-21 and 2021-22

- Chairman** : Dr. A.K. Gogoi, Ex-Asstt. Director General (Agronomy & Agroforestry), ICAR, New Delhi
- Co-Chairman** : Dr. J.S. Mishra, Head, Division of Crop Research, ICAR Research Complex for Eastern Region, Patna
Dr. R.P. Dubey, Pr. Scientist (Agronomy), ICAR-DWR, Jabalpur
- Rapporteurs** : Dr. P.K. Mukherjee, Pr. Scientist (Agronomy), ICAR-DWR, Jabalpur
Dr. V.K. Choudhary, Sr. Scientist (Agronomy), ICAR-DWR, Jabalpur

The proceedings of the meeting was started with formal welcome of Chairman and Co-Chairman by Dr Shobha Sondhia, I/C, AICRP-WM. Chairman in his opening remarks has urged all the scientists of the Directorate to take the leadership in facilitating execution of technical programmes by the different AICRP on Weed Management centres as per the protocol and also monitoring their research activities. After the opening remarks of Chairman, I/C AICRP on Weed Management has made brief presentation of the technical programmes, which have been modified in 4 major heads instead of 5 major heads of previous programme. The technical programmes have been modified on the basis of discussion held during review meeting of ICAR-DWR on 27th May, 2020 under NRM (SMD) which was chaired and suggested by Dr S.K. Chaudhari, DDG, NRM and also by Dr. S. Bhaskar, ADG (AAF & CC). The brief technical programme has been presented as under:

WP 1. Development of location-specific sustainable weed management practices

WP1.1 Weed management in major crops and cropping systems of the state

WP 1.2 Weed management through resource conservation techniques

WP 1.3 Weed management strategies in organic agriculture

WP 1.4 Management of herbicide resistance weeds

WP 1.5 Management of parasitic weeds

WP 2 Management of weeds in non-cropped and aquatic areas

WP 2.1 Surveillance and management of **new/ invasive/ quarantine** weed

WP 2.2 Weed flora shift under changing climatic scenario

WP 2.3 Management of aquatic weeds

WP 2.4 Utilization of weeds

WP 3 Fate of herbicide residues in different agro-ecosystem

WP 3 .1 Assessment of herbicide residues in the long-term experiments and farmers field

WP 3 .2 Degradation of herbicide in the plants, soil and aquatic bodies

WP 4 Demonstration and impact assessment of weed management technologies

WP 4.1 Assessment of weed management technologies through on-farm research

WP 4.2 Dissemination of weed management technologies through FLDs and capacity building

WP 4.3. Impact assessment of weed management technologies

After the presentation, I/C AICRP on Weed Management has invited Chairman, Co-Chairman's and experts for their suggestions, comments and recommendations on the technical programmes. Chairman, Co-Chairman's and experts held in-depth discussion with the PIs and scientists of AICRP on Weed Management centres and Directorate on the technical programmes and made suggestions and recommendations which have been presented as under in nutshell.

- In conservation agriculture (CA) and resource conservation technology (RCT) experiments, emphasis should be given to quantify the residue added in the soil in case of individual crop and also in system mode. Assessment should be done on Carbon sequestration, soil physicochemical parameters and soil biology. Responsibility has been assigned by Chairman to Dr. K.K. Barman, Principal Scientist and Mr. Dibakar Roy, Scientist, ICAR-DWR to collect the results on these aspects from the centres as per the protocol and generate new ideas and thoughts for collection of data and better representation of results.
- In CA and RCT experiments assessment should be made on weed seed bank at certain interval (1st year, 3rd year, 5th year likewise), weed dynamics; weed flora shift and efficacy of herbicide in the context of tillage and residue management. Responsibility has been assigned by Chairman to Dr. V.K. Choudhary to collect the results on these aspects from the centres as per the protocol and review the results and provide feedback to the centres.
- In CA and RCT experiments efforts should be made by the centres to assess energy saving, man power saving, resource saving and resource conservation. Dr. V.K. Choudhary will review the results as per protocol and will provide feedback to the centres.
- Compilation of results on soil parameters, weed shift, weed dynamics, weed seed bank and efficacy of herbicides, residue load needs to be done in long term CA experiment of different AICRP centres for generating recommendation.
- The centres having happy seeder and zero tillage machines can take up experiment under CA and rest will continue the experiment under RCT till they do not have these machines.
- Dr Yogita Gharde was asked to utilise the data of weed shift, weed emergence, weed dynamics, energy saving, resource saving for generating impactful information with the

- use of statistical model. These information will be converted into digitised maps in the form of information in figure tip and will be presented in Annual Review Meeting.
- Instead of surveillance of weed flora, this is time for hunting weeds. Dr. Subash Chander, ICAR-DWR and Dr Deepak Pauer were asked to gather information on new weeds, quarantine weeds, herbicide resistant weeds and problematic weeds (Parasitic and aquatic weeds) and their spread, source and pattern of infestation. These information need to be converted into geo-referenced digitised maps and finally disseminate the information with help of ICT modules so as to make these information available in public domain and provide feedback in terms of technical information, caution and warning to the centres.
 - In organic farming experiment emphasis should be given to include smother crops, cover crop, nurse crop, live mulch, intercrop etc. for controlling weeds and also assess their effect on soil moisture conservation, nutrient dynamics, moderation of micro-climate and maintaining soil temperature.
 - Chairman has assigned responsibility to Dr. R.P. Dubey, Dr. P.K. Mukherjee and Er. Chetan C.R. from Directorate to take up 1 or 2 experiments on use of simple tools for controlling weeds.

General Recommendation on technical program

WP 1. Development of location-specific sustainable weed management practices

- All the observations should be recorded and presented as per protocols.
- Quantification of total residue added in the soil in long term CA experiment and assessment of Carbon addition, soil physicochemical properties, soil biology, shift in weed flora and efficacy of herbicides are highly important. Compilation of these soil attributes and weed parameters in long term CA experiment of different AICRP centres needs to be done for judging the progress of the experiment and based on these results extension of CA experiment will be decided.
- Use of mechanical tools/gadgets and observations on bio engineering, ergonomics, performance indicator, drudgery reduction all these parameters need to take by all centres
- No herbicide-based weed management treatment near or in organic block.
- Weeds in non-crop situation or in aquatic condition or problematic weeds need to be mapped and digitized.
- In lucern instead of pre-emergence, early post-emergence is good option or otherwise it may cause phytotoxicity.
- Gwalior centre may check the species of *Cuscuta*.
- Post emergence need to be clarified at how many days after sowing the spraying operation has been performed.
- Udaipur centre needs to replace the treatment as glyphosate is phytotoxic to tomato and brinjal and finalize the programme in consultation with Dr. S.S. Punia from Hissar centre.
- Dr. Jones from Dharwad centre suggested to include culture for management of *Orobanchae* and for which he will extend the support.
- Bhubaneswar centre will only conduct the experiment in management of *Cuscuta* in berseem
- Weed biology should be studied in the context of management practices like fertilizer management, irrigation management etc. and also under changing climatic condition instead of simple phenotypic study.
- In polythene mulch experiment under organic farming condition basic research can be taken up to study the effect of high temperature on nutrient absorption at rhizosphere zone.
- Other methods like crop rotation, soil solarisation can be explored to control the parasitic weeds.

WP 2 Management of weeds in non-cropped and aquatic areas

- Weed shift and monitoring of quarantine weeds should be continue
- Collect information as per protocol and specified geo-positioning of these weeds
- GPS system base information should be given these weeds
- Caution may be given to gather the information
- Warning for appearing of new weeds/quarantine weeds need to be done.
- Herbicide resistance biotypes may be collected, screened at various doses and information may be disseminated and planning for better management
- Standard protocol may be followed in all experiment.
- Rearing of bioagent at DWR, Jabalpur and sending to the different centres is a difficult task hence facility needs to be developed at the centre itself in order to cater the need of the centre
- Emphasis should be given on continuous surveillance of weeds in surrounding areas of Govt. seed warehouses and other seed storage places.

WP 3 Fate of herbicide residues in different agro-ecosystem

- Herbicide residue analysis need to be done in all experiment wherever residue chemist is working
- Residue analysis under OFR and FLD to be done.
- Centres may submit samples for residues analysis to the nearest centre where residue work is being done and also explore possibility for analysis under the same organization/SAU if these facilities are available with them.
- Report carryover effects of herbicides on succeeding crops under OFR/FLD.

WP 4 Demonstration and impact assessment of weed management technologies

- In OFR at least three treatment should be there, two best treatment and one of farmers practice
- In FLD there should be two treatment one refined treatment after OFR and second would be farmers practice
- Suggested to collect the herbicide consumption data from agriculture department, industries persons or pesticide distributors or dealers.
- To collect the information questionnaire has been sent to all the centres
- The general suggestions were also given to all the centre that they must follow the guideline provided from the head quarter
- The observations to be recorded as per protocols
- Objectives of the experiment under programme would be same for all

With these the session was concluded and I/C AICRP on Weed Management proposed formal vote of thanks to chairman, co-chairman's, experts and all others.

PLENARY SESSION

Dr. S. Bhaskar, ADG (AAF & CC) chaired the Plenary Session as Chief Guest. The session was started with the formal welcome address made by Dr Shobha Sondhia, I/C, AICRP-WM which was followed by presentation of rapporteur reports of five technical sessions. After the rapporteur report, Dr. P.K. Singh, Director, ICAR-DWR, Jabalpur thanked Dr. S. Bhaskar, ADG (AAF &

CC) for gracing the session. He has also congratulated thanked and all the Chairman and Co-Chairman for successful conduction of the technical sessions and fine tuning the technical programmes. He has briefly highlighted the discussion held during the technical sessions and salient points emerged from technical sessions. He has urged all the PIs to expedite the process of developing weed control mobile app (Weed manager) in respective regional language before imposing any deadline and also develop short high quality video film on success stories and those can be uploaded in YouTube channel or any other social platform so as to make these success stories available in public domain. He has stressed the need of uniformity of presentation both in annual report and PPT as per the guidelines of Directorate. Finally he has urged all the PIs to execute the technical programme as per protocol with greatest zeal and enthusiasm to make the AICRP-WM very much vibrant.

Dr. J.S. Mishra, Head, Division of Crop Research, ICAR Research Complex for Eastern Region, Patna has emphasized on publication of findings in high rated (NAAS rating > 6.0) journals. He has also reiterated about uniformity of PPT presentation so that results can be captured and more discussion can be held on the results presented.

Dr. A.K. Gogoi, Ex-Asstt. Director General (Agronomy & Agroforestry), ICAR, New Delhi has highlighted the ideas like quantification of residue, assessment of Carbon sequestration, soil physicochemical parameters, soil biology, energy saving, resource conservation in CA experiment. Instead of surveillance of weed flora, this is time for hunting weeds and development of geo-referenced digitized map on new weeds, quarantine weeds, herbicide resistant weeds and problematic weeds (Parasitic and aquatic weeds) with the information of their spread, source and pattern of infestation. He has emphasized on inclusion of cover crop, smother crop, nurse crop, live mulch in organic farming experiment for controlling weeds. He also said that there is need to work on invasive weed as most of the National Park is infested with invasive weeds and also emphasized the role of Physiologist to work on problematic weed especially on physiological parameters like pollen bursting potential of *Parthenium* as this type of information is lacking. He has urged all the centres and Directorate to harness the benefits of ICT modules (Facebook, WhatsApp, YouTube etc.) at the maximum extent so as to disseminate the technologies to the small and big farmers.

Chairman and Co-Chairman in different technical sessions emphasized that Artificial Intelligence and drone based technology can be explored to spray soil applied herbicide in collaboration with private agencies. However, calibration and standardization are required as air current created by drone propeller is causing un-uniform spray pattern and drift problem. Weed management can also be initiated in horticultural, spices/medicinal and vegetable crops besides cereal crops.

Dr. S. Bhaskar, ADG (AAF & CC) has appreciated the formulation of new technical programmes of AICRP-WM which are lucrative to him. While discussion the technical programme he has made the following important points.

- CA experiment should be extended and efforts should be made to make the happy seeder available to the centres involved in implementation of CA experiment.
- Focussed research project can be taken on the use of single herbicide in intercropping situation and cropping system mode.
- Management of weeds in non-crop situation with the use of mechanical and biological method of weed control.
- Weed management may also be initiated in horticultural/spices/medicinal/vegetable crops in addition to the field crops.
- Every centre should create the facilities of rearing bio-agents for controlling problematic weeds.
- Identification of new molecules for controlling herbicide resistant weeds.

- Digital mapping on weed shift, weed dynamics, new weed emergence, disappearance of particular weed in the form of decadal information with the use of historical data. Generation of this kind of information will be useful to convince the policy maker.
- Co-relating weed control with ecosystem services as for example infestation of water hyacinth has reduced the acreage of rice cultivation in Kerala and infestation of water bodies with water hyacinth has reduced fish production.
- Efforts should be made to make linkage with ICAR-CIAE, Bhopal and AICRP on Farm Implements and Machinery for adopting the machines and testing the machines in their locations.
- There is a need to develop the machine that can simultaneously perform the functions of sowing of seeds, placement of fertilizers and application of pre-emergence herbicides.
- Efforts should be made to make linkage with commodity Institutes dealing with floriculture, onion, spices on weed control as no selective herbicide is available in these crops.
- Emphasis can be given to include more commodity based ICAR institutes under voluntary centres.
- Action taken report should be based only on the technical points.
- Propose one more post of Agronomist in each centre for better execution of work.

Finally, ADG (AAA & CC) has urged I/C, AICRP-WM to develop a project on climate change in collaboration with NICRA, CRIDA and IIHR to study the weed shift, weed dynamics, weed-crop interference, fast spreading of weeds under elevated CO₂ concentration and elevated temperature regime. At the end of his remarks he has interacted with PIs and other scientists and urged them to implement the experiments with true spirit without any mistake.

The Plenary Session was ended with vote of thanks proposed by Dr Shobha Sondhia, I/C, AICRP-WM.

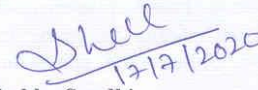
Recommendations

1. All the centre must follow the guideline provided from the head quarter while submitting the information, data, annual report etc.
2. Strictly record all the observations in all experiments as per protocols and approved technical program.
3. Use of mechanical tools/gadgets and observations on bio-engineering, ergonomics, performance indicator, drudgery reduction all these parameters need to take by all centres in organic agriculture
4. GPS system base information along with good quality photographs should be given while collecting weed shift and monitoring of quarantine weeds/new weeds
5. Follow the safety precaution while spraying herbicide in the field.
6. Herbicide resistance biotypes may be collected screened at various doses and information may be disseminated for better management.
7. Facility needs to be developed for rearing of bioagent at the centre itself in order to cater the need of the centre
8. Collect herbicide consumption data from agriculture department, industries persons or pesticide distributors or dealers and submit to the PC unit.
9. Follow the standard guidelines while conducting OFR and FLD.
10. All the centre should develop weed control mobile apps (Weed manager) in regional language.

11. All the centres should prepare a short high quality video film on the success story and that can be submitted to the ICAR-DWR, Jabalpur to make these success stories available in public domain.
12. There is a need to harness the benefits of ICT modules (Facebook, WhatsApp, YouTube etc.) at the maximum extent so as to disseminate the technologies to the mass of the farmers. While using social media for demonstration of technology/success story, acknowledge ICAR-DWR, Jabalpur name properly.



Dr P.K. Singh
Director, ICAR-DWR, Jabalpur



Dr Shobha Sondhia
Principal Scientist and In-charge, AICRP-Weed
Management

**XXVII ANNUAL REVIEW MEETING OF
ALL INDIA COORDINATED RESEARCH PROJECT ON WEED MANAGEMENT**

ICAR - DIRECTORATE OF WEED RESEARCH, JABALPUR

**8-10 JUNE, 2020
PROGRAMME**

Meeting ID: 236 661 5239

Password: 7SWGw7

MODE: VIDEO CONFERENCEING

8 June, 2020 (Monday)

1000-1100 hrs	INAUGURAL SESSION
Welcome address by:	Dr. P.K. Singh, Director, ICAR - DWR, Jabalpur
Introductory remark by Guest of Honour:	Dr. S. Bhaskar, ADG (Agro., AF & CC), ICAR, New Delhi
Address by Chief Guest:	Dr. S.K. Chaudhari, DDG (NRM), ICAR, New Delhi
Vote of thanks	Dr. Shobha Sondhia, I/C AICRP-WM
TECHNICAL SESSION - I	
Chairman	Dr. S. Bhaskar, ADG (Agro., AF & CC), ICAR, New Delhi
Co-Chairman	Dr. V.P. Singh, Principal Scientist, ICAR-IISR, Lucknow
Rapporteurs	Dr. P. Murali Arthanari, Associate Professor, TNAU, Coimbatore Dr. Dibakar Ghosh, Scientist, ICAR-DWR, Jabalpur
1100 -1300 hrs	Salient achievements of AICRP on Weed Management by Dr. Shobha Sondhia, I/C AICRP-WM
	Presentation of salient findings by Principal Investigators of AICRP-WM centres
	PJTSAU, Hyderabad: Dr. M. Madhavi
	UAS, Bengaluru: Dr. K.N. Geetha
	KAU, Thrissur: Dr. Meera V. Menon
	TNAU, Coimbatore: Dr. P. Murali Arthanari
	MPUAT, Udaipur: Dr. Arvind Verma
AAU, Jorhat: Dr. I.C. Barua	
1300-1330 hrs	DISCUSSION
1330- 1430 hrs	LUNCH BREK

TECHNICAL SESSION - II	
Chairman	Dr. N.T. Yaduraju, Ex-Director, ICAR-DWR, Jabalpur
Co-Chairman	Dr. J.S. Mishra, Head, Division of Crop Research, ICAR Research Complex for Eastern Region, Patna
Rapporteurs	Dr. Rabiratna Dash, Agronomist, OUAT, Bhubaneswar Dr Subash Chander, Scientist, ICAR-DWR, Jabalpur
1430-1630 hrs	OUAT, Bhubaneswar: Dr. M.M. Mishra BCKV, Kalyani: Dr. Bikas Mandal AAU, Anand: Dr. B. D. Patel IGKV, Raipur: Dr. Shrikant Chitale PDKV, Akola: Dr. J.P. Deshmukh RVSKVV, Gwalior: Dr. Deep Singh Sasode
1630-1700 hrs	DISCUSSION

9 June, 2020 (Tuesday)

1030-1300 hrs	TECHNICAL SESSION – III Presentation of salient findings by Principal Investigators of AICRP-WM centres
Chairman	Dr. J. Deka, Dean, Faculty of Agriculture, AAU, Jorhat
Co-Chairman	Dr. Sushil Kumar, Principal Scientist (Entomology), ICAR-DWR, Jabalpur
Rapporteurs	Dr. Varsha Gupta, Jr. Agronomist, RVSKVV, Gwalior Dr. Deepak Pawar, Scientist, ICAR-DWR, Jabalpur
	PAU, Ludhiana: Dr. M.S. Bhullar GBPUAT, Pantnagar: Dr. V. Pratap Singh CSKHPKV, Palampur: Dr. Neelam Sharma CCSHAU, Hisar: Dr. S.S. Punia SKUAST, Jammu: Dr. B.R. Bazaya
1300-1330 hrs	DISCUSSION
1330- 1430 hrs	LUNCH BREK
TECHNICAL SESSION – IV	
Chairman	Dr. T.K. Das, Pr. Scientist (Agronomy), ICAR-IARI, New Delhi
Co-Chairman	Dr. M.L. Kewat, Professor (Agronomy), JNKVV, Jabalpur (M.P.)
Rapporteurs	Dr. Shrikant Chitale, Sr. Scientist, IGKV, Raipur Er. Chetan C.R., Scientist, ICAR-DWR, Jabalpur
1430-1630 hrs	SKUAST, Srinagar: Dr. M. Anwar Bhat BAU, Sabour: Dr. Birendra Kumar PAJNCOA&RI, Punducherry: Dr. P. Saravanane UAS, Dharwad: Dr. P. Jones Nirmalnath BUAT, Banda (U.P.): Dr. Dinesh Sah ANGRAU, Guntur: Dr. B. Prameela Rani
1630-1700 hrs	DISCUSSION

10 June, 2020 (Wednesday)

TECHNICAL SESSION – V	
Chairman	Dr. A.K. Gogoi, Ex-Asstt. Director General (Agronomy & Agroforestry), ICAR, New Delhi
Co-Chairman	Dr. J.S. Mishra, Head, Division of Crop Research, ICAR Research Complex for Eastern Region, Patna Dr. R.P. Dubey, Pr. Scientist (Agronomy), ICAR-DWR, Jabalpur
Rapporteurs	Dr. P.K. Mukherjee, Pr. Scientist (Agronomy), ICAR-DWR, Jabalpur Dr. V.K. Choudhary, Sr. Scientist (Agronomy), ICAR-DWR, Jabalpur
1030-1300 hrs	Presentation of technical programme 2020-21 and 2021-22
1300- 1400 hrs	LUNCH BREK
1400-1630 hrs	CONCLUDING / PLENARY SESSION
	Remarks by Dr. A.K. Gogoi and Dr. J.S. Mishra
	Remarks by Director, ICAR-DWR, Jabalpur
	Remarks by ADG (Agro., AF & CC), ICAR, New Delhi
	Vote of thanks by Dr. Shobha Sondhia, I/C AICRP-WM