

## In conversation with Dr. Mayabini Jena



***Simple women yet vibrant, who worked on simple things now making a big difference and setting a unique legacy in crop protection of rice. She shares her journey to IE associate editor Dr. Bhagyashree.***

Dr. Mrs. Mayabini Jena hails from Balasore, Odisha, has nearly 4 decades of dedicated research experience in Rice, presently working as an ICAR-Emeritus Scientist at National Rice Research Institute (NRRI), Cuttack and she superannuated as Head, Crop Protection Division, NRRI, Cuttack on 2018 with more than 200 publications and worked in more than 17 externally funded projects of national and international importance as PI and Co-PI with high scientific output.

Dr. Jena worked on persistent toxicity of more than 50 insecticides against brown planthopper and other insect pests of paddy viz., yellow stem borer, gall midge, leaf folder, case worm, swarming caterpillar or cutworm; Residual toxicity of selected insecticides on rice plant was correlated with insect mortality for quantification, particularly in rice–fish ecosystem. She started working on Botanicals from 1988, evaluated the neem (oil, seed, leaf, bark) and about 19 neem-based chemicals against BPH and other rice pests. Validated efficacy of ITK-based botanicals such as *Cleistanthus collinus*, *Sachharum spontaneum*, *Strychnos nuxvomica*, *Polygonum hydropiper*, *Calotropis gigantea*, *Pongamia pinnata*, *Madhuca longifolia*, *Vitex nigundo* etc against rice insect pests.

She also worked on on-station Package development and on-farm validation of IPM on scented rice, Irrigated rice, Rain-fed shallow favourable lowland, Bio-intensive IPM with emphasis on botanicals. Integrated management of BPH along with other pests was also demonstrated successfully in farmers' participatory seed production programme at a large scale in farmers field from 2013 to 2017, till their full acceptance. She studied effect of weather parameters on the occurrence and severity of rice pests through proper surveillance, both at on-station and on-farm condition to know the shift of population, if any. Factors leading to brown planthopper resurgence were studied in detail. Contributed to the development of an alternate energy light trap which got patent during 2021.

Work on host plant resistance was Started during 2000 against BPH. Screened about 5000 rice genotypes against BPH and about 100 highly resistant donors have been identified. Two donors, purified Salkathi and Dhoba numberi are registered under NBPGR, New Delhi and are actively used in rice breeding programme. The resistant gene/QTLs have already been identified from these two donors by different teams. Highly resistant and high yielding breeding lines, CR 2711-76 and 3006-8-2 are also

identified which were evolved from the donors and stood unaffected in BPH endemic areas of Odisha. Similarly, varietal screening was conducted with traditional rice varieties against gall midge and YSB to identify multiple resistant traits. She contributed to the development of six NRRI rice varieties - CR Dhan 503, CR Sugandha Dhan 907, CR Basana Dhan 902, Nua Kalajeera, Nua Dhusura and Nua chinikamini.

She enjoyed training farmers on new technologies and imparted training on “rice pest management with emphasis on botanicals/biointensive IPM” to rice farmers of Odisha, Bihar, Madhya Pradesh, Gujrat, West Bengal, Jharkhand, Meghalaya, assam, Tamil Nadu. Training was also imparted through Trainers’ training programme to agricultural officials of Odisha, Maharashtra, Kerala. She also recognised by contributing to the rice mobile App, the ‘riceXpert’ for rice farmers which is available in English (2016) and Odia (2017).

Even with the dedicated research for nearly 40 decades, she never showcased herself by applying to awards and recognitions; she kept her life simple with immense dedication only to research. Still her institute recognised her as best worker by Best worker Award, NRRI- Principal Scientist category – 2013 and CROPSAP, Govt. of Maharashtra recognised with **Prime Minister’s Award** with gold medal in e-governance category by GOI during 2016-17.

**Dr. BSN (Bhagyashree S.N.):** Dear madam, thank you for accepting our consent and speaking to “Indian Entomologists” we are really happy to interact with you. Can you please tell me what made you to pursue career in

**entomology and how did you choose working especially on Rice crop protection?**

**Dr. MBJ (Dr. Mayabini Jena):** My M.Sc. was from the pure science stream of subject Zoology with special paper Entomology at Utkal University, Vani Vihar, Bhubaneswar, Odisha. The dissertation work on a small research topic, “Life cycle of the aphid, *Aphis nerii* on local *Calotropis gigantea*” under the guidance of renowned professor, late Dr. B.K. Behura and Prof. Ms. Kalyani Bohidar aroused my interest in research. After M.Sc., I was selected for ICAR research scholarship at the National Rice Research Institute, Cuttack (Former Central Rice Research Institute) where I joined during November 1979 and my Ph.D. work on rice started under the able guidance of Dr. I. C. Pasalu, the then Sr. Scientist of CRRI. The Institute gave me the opportunity to know different facets of rice research and also of insect pest management options in Rice crop. My Ph.D. topic was on toxicological aspects of insecticides, “Toxicity of selected insecticides against rice insect pests in relation to their persistence and residues.” I joined as an ARS scientist at the same Institute on 31<sup>st</sup> January, 1985 and I continued the subject, not by choice but by the decision of the Divisional SRC for the necessity of farmers. And I adhered to it because I had experience in working with pesticides, both at controlled and field condition.

**Dr. BSN: How would you like to see rice pest management science in future? What are the management practices which you wish to remove and incorporate?**

**Dr. MBJ:** The science of rice pest management is very important to reduce the future loss of the crop since it holds the key to food security in a global perspective. But,

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at the same time, it is very delicate because it is the staple food for a major population. Therefore, human safety should be of greater emphasis in future pest management strategy which can be attained by incorporating available non-pesticide management options such as host plant resistance, biological control, botanicals, cultural control etc. to the judicious use of insecticides leading to IPM. Though we know insecticides are the major culprit for environmental pollution and human health hazard, it is not possible to remove them from the system at present without a suitable alternative. But, absolute dependence on it for pest management can be minimised by following IPM.

**Dr. BSN: What are the traits or attitude, do you think that can help women to be successful as scientist?**

**Dr. MBJ:** Interest in research and hard work is the main trait or attitude to be a successful scientist, both for men and women. But according to my feelings, women prove better researchers if they are provided proper environment to work. Devotion to work has made me an achiever, and I have never thought it as a burden but an enjoyment. For example, I have tested more than 50 insecticides in detail in controlled as well as in field condition which was supposed to be risky. But to see their reaction on different insect pests is more satisfying than the risk. Likewise, the screening of different rice

genotypes or application of botanicals or ITKs where the quest for a better one continues for the larger interest of farming community, definitely it leads to knowledge gain in practical and it never remains unnoticed by others. Farmers listen to practical solution and follow. Only you have to be patient enough to understand their problem and also to make them aware of the solution. Overall, patience, practical knowledge from research and respect to your stakeholder can make you a successful scientist.

**Dr. BSN: A change you would like to see in young agricultural entomologists?**

**Dr. MBJ:** The young agricultural entomologists should be more oriented towards field problems. Controlled condition research findings have to be validated through on farm testing. They should be in touch with rice farmers and their mode of application of technologies so that proper correction can be made for better adoption. But, before applying the technology, all the basic data must be generated on the subject for proper knowledge and implementation.

**Dr. BSN: Do you think your research dimensions are narrowed down because of working in crop specific institute?**

**Dr. MBJ:** No. Rather it has been intensified. Rice science is so vast and rice pest management itself has so many dimensions that after more than 3 decades of research, I still have the notion that many more remained unattended. One crop will provide opportunity for more in-depth study.

**Dr. BSN: So many scientists worked on botanicals still it's not attaining the commercial status of what it deserves in terms of percent share in plant**

**protection, what may be the reason and how to overcome this?**

**Dr. MBJ:** Whether botanicals attained a commercial status substantially or not, one cannot deny their role in pest management in a country like India. Synthetic pyrethroids and neem-based chemicals are the examples of commercial success that were evolved from the botanicals. But, when hundreds of insecticides were paving their way to market by different national and international agencies, it is difficult for one neem or a pyrethrum-based pesticide to exist commercially for a long time. Therefore, we have looked into the rich traditional history of pest management of rural and tribal India and identified many pesticidal plants along with validation of their efficacy. There is a need to identify the active ingredient/s quickly through vibrant laboratory facilities dedicated for the purpose so that botanical pesticides can be formulated within stipulated time. Again, some botanicals have behavioural changing trend for insect like wild sugarcane which attract the spiders to multiply on them and control rice case worms, leaf folders effectively. These technologies should be promoted among the farmers.

**Dr. BSN: Now that rice is holding the highest share in insecticides consumption, what needs to be done to change this scenario?**

**Dr. MBJ:** IPM is to be strengthened through knowledge based interventions, emphasizing incorporation of resistant varieties and ITK-based botanicals, the two alternatives of pesticides which are at farmers hand practically. In addition, rice trading inside the country should be monitored strictly for pesticide residues because there are rice pockets which dump pesticides to the crop irrespective of proper recommendation, dose

and timing. Such pockets are to be identified and policy decisions should be taken for residue analysis in rice in these areas. Trading should be stopped on detection of pesticide residues above MRL. Lastly, awareness among the farmers should be created on negative effect of insecticides.

**Dr. BSN: Since nearly 3 decades you are working in rice, do you think organic rice cultivation is possible, to reduce the chemicals residue? And do you find any difference in indigenous and hybrid rice IPM?**

**Dr. MBJ:** Organic rice cultivation is possible, because any product with market demand, gives more benefit to the grower. The present world has recognized the immense value of human health, bonded with environment and food for which organic rice has great demand nationally and internationally. Another scenario also exists in our country particularly in tribal and many rural areas where the organic rice cultivation is continuing as such in virgin farming lands unexploited by modern agricultural technologies for their own consumption. The experienced as well as young agricultural entrepreneurs are gradually coming forward to grow organic rice in both the situations and seeking pest management advisory time to time during my Headship at NRRI, Cuttack and up till now. Definitely it will reduce chemical load once it gets full momentum. Many hybrids rice attract more pests as compared to indigenous rice. But, proper implementation of IPM should not make any difference except putting always an effective insecticide in the hybrid rice IPM for emergency action, if needed.

**Dr. BSN: What were the challenges you have faced being in Women cell and PME cell?**

**Dr. MBJ:** I was chairman of Women cell for two terms. Problems were social, administrative and also the ignorance of women workers of their own right to get proper facilities at their work place. As a committee, we took our suggestions for the problems to the authority and they were suitably sorted out. Authority being co-operative and grievances being within the rules and suggestions being proper, I have faced no challenge during my tenure.

But as PME cell chairman and Secretary, IRC, I had greater responsibility at NRRI. It was both for research and administration. I had to help the Director in conducting IRC, monitoring publications, annual reports of the scientists according to their work plan and maintaining the documents in PME cell. It was a huge job in addition to my job as the Head, Crop Protection and demanded more of my time and energy. But at the same time, I was fortunate to work under two dynamic, sincere and sensible Directors, Dr. Trilochan Mohapatra and Dr. Himansu Pathak, that transformed my job from challenge to pleasure. I was also blessed in the home front as my husband and son were not only co-operative, but very encouraging towards my work.

**Dr. BSN: You are one of those, who are championed in rice Pest Management right from 1980s, how was it then and how is it now?**

**Dr. MBJ:** In 1980s, the work on pest management in rice was pesticide-based but farmers based. A few insecticides were at farmers' arena. As an entomologist, first I used to generate detail data of commonly used insecticides in controlled condition against insect pests so that their efficacy was known in relation to their mode of application with timing and dose. Then, I was visiting farmers field through lab to

land programme or as a resource person of the state agricultural departments to make them aware of the effective insecticides against particular pest. I still remember perusing the farmers not to apply Phosphamidon against BPH which was the most popular insecticide. It took more time but we succeeded.

Now, there is great improvement over the past years. Surveillance has been brought to the lime light to educate the rice farmers on identifying insects with their time of occurrence through different techniques to which I was also a part. It has curtailed unnecessary use of pesticides and also use of unwanted pesticides. The system is linked to weather parameters, other pest management techniques and residue analysis of hazardous insecticide residues within the form of IPM which has created an awareness among the farmers to reduce pesticide use. Now, there is a need for frequent interaction with farmers at field level to accelerate the implementation of the IPM strategy.

**Dr. BSN: Role model/the person you admire/follow in your life as well as in professional life?**

**Dr. MBJ:** My father Sri. Manamohan Jena is always my role model from whom I have learnt sincerity and honesty to my job. In professional life, I have acquired qualities from many seniors but particularly, I follow my Ph.D. guide Dr. I.C. Pasalu, who taught me precision, integrity, hard work and respect in research. He inspired me by his devotion to the duty and at the same time, for his mentorship to the young ones, encouraging them to be a very good human being which I tried to impart to my juniors.

**Dr. BSN: How to tackle the shift in pest's scenario? is it going to be a big challenge?**

**Dr. MBJ:** Shift in pest scenario is due to many reasons. the major factors responsible for the change in insect pest scenario are - change in weather parameters to suit their multiplication and feeding, change in cultivation practices, extensive cultivation of high yielding varieties without pest resistance, intensive rice cultivation throughout the year, imbalanced use of fertilizers and indiscriminate use of pesticides.

But, with the present-day techniques, particularly keeping surveillance in the front, the problems can be tackled.

**Dr. BSN: What working women should possess to have balanced and healthy life?**

**Dr. MBJ:** A working woman is also a home maker and it is no less a responsibility than professional research life. Balance between these two arena keeps a woman healthy and happy. I am fortunate to join the ARS as it does not have frequent transfer to disturb the household which is very difficult in research life. Patience, hardworking and understanding the problem of self as well as others, help to maintain a healthy balance and also brings in co-operation from family members and from professional front.

**Dr. BSN: Your suggestions/views and opinion on “Indian entomologist” magazine?**

**Dr. MBJ:** The magazine is one of its kind which can reflect the inner talent, knowledge and aspiration of Indian Entomologists, particularly, providing a platform to the young and dynamic ones for free communication of knowledge. The general articles arouse much interest and a pleasure to study. The section “remembering the legends” gives a chance to know the achievements of such veteran entomologists.

Overall, the magazine expresses many aspects of popular as well as educative scientific Entomology, including the interview with Women Entomologist where I am going to be a part. My utmost regards to Dr. V.V. Ramamurthy whose able guidance has shaped the magazine so nicely, with varied topics. I profusely thank Dr. Shashank and you for selecting me and conducting the interview. I wish all the best for a dazzling future of the magazine.

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