ICAR-Indian Institute of Oil Palm Research

Success story "Mass multiplication technology and *Isaria fumosorosea* pfu5, a biocontrol agent against invasive rugose spiralling whitefly on oil palm"

Problem statement

The introduction of rugose spiralling whitefly (RSW), *Aleurodicus rugioperculatus* to India led to invasive dispersal of the pest in plantation crops like coconut, oil palm, custard apple, guava etc. The distribution and establishment of the pest to new areas in aggressive manner is attributed to its polyphagous nature. In Andhra Pradesh, the oil palm growing area, especially the West Godavari, Eluru and East Godavari districts are the worst effected by RSW. White waxy coverage with active life stages of pest on the abaxial surface of leaflets and sootymold coverage on upper side of lower fronds are the chief characteristic symptoms. With no known natural enemies, the distribution of pest and its damage created distress amongst the oil palm growers. Under this emergency conditions, to the best of research efforts, an entomopathogenic fungi (EPF), *Isaria fumosorosea* strain pfu5 from microbial collection of ICAR-NBAIR, Bangalore was identified as effective pathogen against RSW. However, for getting effective control, the biocontrol agent has to be applied all through the leaf biomass. In addition, community approach should be adopted in managing the pest due to the polyphagous nature. This system approach warrants mass multiplication of pathogen in huge quantities.

Technological intervention

A two-pronged strategy for mass multiplication of *Isaria fumosorosea* pfu5 (strain ICAR-NBAIR) was developed using low-cost inputs and easily adoptable methodologies with meagre requirement of technical knowledge. In the first cycle of production, pure culture of fungus is prepared under controlled conditions using mashed potato and broken sago starch. Using 500 ml of this pure culture, ready-to-use culture of the fungus is prepared under field conditions using jaggery, starch and water. In this method, a total of 100 L of fungus culture is made available for spraying at a dose of 5ml/L. Thus, the culture prepared is sufficient for spray application of entomopathogen to an area of 12 ha of oil palm plantation. Therefore, the technology ensured easy availability of biocontrol agent in large quantities to meet the requirement of thorough coverage of huge leaf biomass of oil palm and community approach as well.

Impact of technology

The simple and cost-effective mass production technology developed by ICAR-IIOPR, Pedavegi is well accepted by the farming community and is popular amongst the oil palm growers. Farmers are supplied with 500ml mother culture prepared at ICAR-IIOPR, Pedavegi (with financial support from state government of Andhra Pradesh and farmer FIRST project of ICAR-IIOPR, Pedavegi) and are advised to prepare ready to use formulation at their own farm. Till date ICAR-IIOPR, Pedavegi supplied more than 5800 mother culture bottles and 3575 L of ready-to-use culture of *I. fumosorosea* pfu5 to farmers and horticulture department for distribution and management of the pest. This volume of mother culture was used to cover an area of 81000 ha of oil palm plantations. The mother culture distribution and management of the pest with IIOPR technologies led to successful curtail of the pest not only in West Godavari and Eluru districts but also in East Godavari, Krishna,

Guntur, Srikakulam, Vijayanagarm, Nellore, Chittor districts of Andhra Pradesh. Farmer requests for mother culture and production technology are continuing from different districts of Andhra Pradesh, Karnataka, Telangana and Tamil Nadu. More than 150 on-farm training programs to village level workers, staff of *Rithu Bharosa Kendras*(RBKs), farmers etc and more than 32 training programs to staff of department of Horticulture, Andhra Pradesh and Telangana were conducted.

Economics

In the two-pronged strategy, the cost of production of mother culture is approximately Rs. 115/- per litre including consumable and manpower. Whereas, the production cost of ready-to-use formulation is approximately Rs. 5/- per litre. The produced 100L of ready to use formulation is used to prepare 20000L of spray solution @ 5ml/L which is sufficient to cover an area of approximately 12 ha (at 10L per palm). Whereas, with respect to a hectare area of oil palm with 143 palms the ready-to-use culture required is 7.5 L which accounts to Rs. 37.5/- which is very nominal in comparison to any commercially available insecticide. Above all, without the use of any pesticide, control of the pest using biocontrol agent offers sustaining environment health and economic prosperity of existing ecosystem.

S.No.	Name of Farmer	Mobile Number	Details of oil palm farm	
			Acreage (Acres)	Location
1	Karri Mahidhar	9533066672	15	Vempadu, Pedapadu mandal
2	Tummapti Rajesh	9441013097	5	Challachintalapudi, Eluru mandal
3	Kosaraju Radhakrishna	9666795484	4	Venkatapuram, Musunuru mandal
4	L. Pradeep kumar	9491722316	5	Challachintalapudi, Eluru mandal
5	S. Satyanarayana	9493992992	5	Challachintalapudi, Eluru mandal
6	Kamma Brahmaji	8179267774	6	Challachintalapudi, Eluru mandal
7	Pusunuri Yashwanth Kumar	9133684632	5.20	Challachintalapudi, Eluru mandal
8	Simhadri Appajisrinu	9866136722	5	Challachintalapudi, Eluru mandal
9	Aravapalli Venkayya	9989938792	90	Madicherla, Bapalapadu mandal, Krishna district
10	K. Anandababu	8886862848	60	Madicherla, Bapalapadu mandal, Krishna district
11	E.V.K. Kishore	9849264365	30	Tadikelapudi, Kamavarapukota, West Godavari Dist.
12	D. Srihari	9666508076	14	Chakradevarapalli, Jangareddygudem