



IPM in onion: A success story

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Growing bulb onion over the years have direct impact on socio-economic status of farmers of village Wadgaon Sahani of Pune district of Maharashtra. The round the year cultivation of onion in this village resulted into complex of insect pest problem. Pest like onion thrips and diseases such as stemphylium and purple blotch are the major issues of economic concern in onion productivity and causing significant yield losses. Under severe infestation and occurrence of pest and disease, the bulb yield can be reduced upto 50 per cent production. Over use and calendar based application of chemical insecticides were the key tactic adopted to manage various pest and diseases in this village. Round the year production, improved agronomic practices, imbalance fertilizer application and lack of crop rotation practices have aggravated pests and disease problem in onion. In such situation adoption of Integrated Pest Management (IPM) strategies become critical to sustain the productivity in an eco-friendly way. Available crop protection technologies for onion was integrated and a comprehensive IPM package was formulated. In the designed package much importance was given for pest monitoring integrated with cultural manipulation, use of bio-agents, natural enemies conservation and ETL based control action for sustainable production of onion was promoted and validated over 10 acres under farmers field condition at Wadgaon Sahani village, a main onion growing belt of Pune district of Maharashtra state.

Wadgaon Sahani-IPM village : Wadgaon Sahani is a village of Gram Panchayat Wadgaon Sahani. It is located 80 km away from its head quarter Pune and 11 km away from Tehsil Junnar, Pune district of Maharashtra. Onion, sugarcane, wheat, *Bajra*, cabbage, cauliflower, coriander and tomato are important crops grown in this village. The village possess well connected with canal irrigation facility and most of the crops grown at this village are under irrigated condition.

Rationale for selection of Wadgaon Sahani : Wadgaon Sahani village is one of the major onion growing village of Pune districts. Base line information and socio-economic

status of the farmers of this village indicated that over and round the year cultivation of onion led to upsurge of insect pests and diseases. The growers of this village were exploring all kind of improved production and protection technologies, particularly extensive use of chemical fertilizers and insecticides were common among the growers. As a result injudicious use, the village was experienced complex of insect pest diseases problem in onion. Due to this, growers were habituated to go for more than seven sprays of chemical pesticides in a season for pests and disease management. Further imbalanced application of fertilizers particularly nitrogen was also common practice. Besides health hazards, the exorbitant and excessive use of pesticides was increasing per unit cost of production. Spray of cocktail of pesticides was highly common. Keeping this facts in view this village was selected for the promotion and validation



of adoptable IPM strategies for onion cultivation based on the following reasons.

Scenario of onion production and protection practices : Farmers of this village cultivating bulb onion during the seasons, *Late-Kharif (Rangda)* and *Rabi* season. The crop stand in field remains for more than seven month. Moreover, farmers are growing same varieties year by year. Entire village was covered with four to five varieties. Imbalanced use of fertilizer, plant growth promoters and mono-cropping was common in this village. Use of synthetic insecticides remains as a major crop protection strategies in this village. Insecticides like cypermethrin and its combinations, lambda cyhalothrin, imidacloprid, mancozeb, carbendazim and sulfur formulations are the major compounds used widely against pest and disease in this region. The farmers were adopting calendar based application of these chemicals without following regular scouting and concept of action threshold. Spray of cocktail of pesticides was highly common among the growers and more reliance on chemical pesticides were common. These background offered ample challenge and scope for implementation of the IPM approach for

sustainable bulb onion production at this village.

Development and validation of IPDM Module : The adoptable crop protection technologies developed and recommended by ICAR-DOGR have been integrated and designed into a comprehensive IPM Package and was implemented at the farmers field for bulb onion production was implemented during 2014-17 in collaboration with ICAR- National Research Centre for Integrated Pest Management (ICAR-NCIPM), Pusa Campus, New Delhi. The adopted IPM strategies comprised of both prophylactic and curative methods for safe and profitable onion cultivation. The comprehensive package of IPM interventions included

- Onion seed treatment with bio control agent, *Trichoderma* sp @ 4-6 g/kg seed
- Field application of *Trichoderma* sp @ 2 kg which was multiplied in a quintal of farm yard manure (FYM) for a hectare.
- Seedling root dipping (bottom 1/3rd of onion seedling) with fungicide and insecticide combination (0.25% carbosulfan 25 EC + 0.1 % carbendazim 50 WP) solution for 2 hours before transplanting.
- Planting two rows of maize 7-10 days prior to onion transplanting, across the field border as barrier to break adult thrips movement.
- Field scouting or monitoring of onion thrips and other diseases twice a week and
- Need based application of DOGR recommended pesticides like profenophos 1ml/L or Fipronil 1ml/L and fungicide hexaconazole (0.1%)
- Balanced application of recommended fertilizers (110: 40: 60:30 kg of NPKS per hectare) and avoid of excessive use of nitrogen fertilizer.

Kisan Sangosthi to IPM implementation : The IPM experts from ICAR-DOGR and ICAR-NCIPM has

regularly visited the IPM adopted fields, monitored, evaluated and demonstrated deliverable IPM technologies. Regular field scouting was made to detect and monitor pest and disease incidence and population level. Management measures were applied whenever pest population reaches action threshold (ETL). The various IPM interventions were practically explained to the onion growers by organizing village level pre-season, mid-season and end-of-season farmers meeting, regular field visits, and face to face discussion and one to one interactions. The importance, need and benefits while implementing IPM strategies in onion were emphasized.

IPM adoption impact : As a result of adoption of IPM strategies, onion growers of this village were able to substantially reduce the number of sprays in a season, maximum up to three sprays instead of eight to ten sprays that were usually followed for a crop. The total plant protection cost under IPM adopted field was Rs. 7000/- per hectare against Rs. 15000/- per hectare under Non-IPM (Farmer Practice) that reflected a decrease in cost of IPM inputs to the tune of 53.33 per cent. The total cost of cultivation under IPM situation was Rs. 165000 per hectare whereas it was Rs. 175000/- under farmer' practice (Non-IPM). Ultimately, growers were able to cut down the cost of production upto 5 per cent. Moreover, losses incurred due to bulb weight reduction after physiological and storage loss were much higher in bulbs produced with Non-IPM practices. The excessive application of synthetic insecticides, growth enhancer and nitrogenous fertilizers probably contributed to much storage losses in non-IPM regime. The IPM practices resulted higher monetary gains of Rs. 185000 as compared to Rs. 125000/ in non-IPM. The benefit cost ratio (B: C) under IPM was 2.1:1



Fig. 1 : Demonstration of onion IPM at farmers field



Fig. 2 : Kisan Sangosthi at Wadegaon Sahani

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