

Success Story of a Progressive Mango Grower

Dr. Poonam Srivastava

Senior Fruit Entomologist (AICRP on Fruits)

Department of Entomology; College of Agriculture

G.B.P.U.A. &T. Pantnagar-263145 UTTARAKHAND

Email: poonamento@gmail.com

1. Title: Fruitful Economy with Novel Pest Management Approaches in Mango

2. Challenge: Reframing the mango orchard for higher yield with low inputs

Production of mango is enormously handicapped by the ravages of insect pests from seedling to their maturity. A wide diversity of fauna of insect pests, pollinators and natural enemies can be seen residing in the mango ecosystem. Fruit entomologists face a significant threat from sucking insect pests specially mango hopper, which has shorter life cycles and quick ability to develop resistance against insecticide.

This is the story of a progressive fruit grower **Mr. Deep Belwal {Swalde Ramnagar, Distt. Nainital Uttarakhand (09837241719)}** having about 30 acres orchard with mango trees. It was planted by his father of Late Mr. Harish Chandra Belwal during the year 1956-60 at Swalde Ramnagar, Distt. Nainital Uttarakhand. At the start, the orchards blossomed and production began. But along with the fruits, they also observed some constraints such as pests specially mango hoppers, mealybug, shoot gall and fruit flies etc. which drastically reduced the yield. To get higher yield, the grower approached pesticide shopkeepers and started spraying pesticides indiscriminately on the trees.

In the beginning, they were able to reduce insect populations with insecticides. But after some time, suddenly the number of pests increased and it caused huge damage which could not be controlled with any insecticide. Gradually the trees started getting weak and production started decreasing. He had completely lost hope of seeing his trees come alive again.

Fortunately, a team of scientists from Pantnagar University saw this neglected orchard during the survey program and examine the situation critically and they assured him that everything would be managed if he follows the guidelines. It was difficult for them to accept that their trees were close to dying due to lack of proper knowledge of plant health management. And no magic was going to happen right away.

3. Initiative

Scientists decisively observed the condition of the orchard and found that continued indiscriminate use of insecticides led to pesticide resistance and death of natural enemies and pollinators. Grower was also not applying any nutrients; hence the health of the trees was

severely affected. They also explained about the role of insect pollinators in the quality of fruit yield. Scientists suggested some important practices to rejuvenate the orchard like- avoid dense plantings, maintained open canopy, prune overcrowded overlapping branches, sanitation by regular ploughing and removal of weeds, conservation of bio control agents and pollinators. They more emphasised on the minimum, rational rotation of insecticides, timely and need based insecticidal application to counteract the tendency of pest to develop field resistance. Grower started following pest management practices under the umbrella of Pantnagar University and AICRP on Fruits. He also used nutrients for the good health of the trees. He was surprised to see the results of applied management practices with lower input costs. Gradually the trees became healthy and started producing more fruits.

4. Key result/insight/interesting fact

The recommendations used in the above pest management program were based on the technologies developed under AICRP trials on Fruits namely Survey and surveillance of insect pollinators, IPM of mango hoppers, mango shoot gall and Cost effective management of fruit flies. The link of important research papers are given below:

1. <https://agris.fao.org/agris-search/search.do?recordID=IN2022005051#:~:text=Diversity%20of%20floral,POONAM%3B%20GOSWAMI%2C%20VIMLA%3B>
2. <https://www.entomoljournal.com/archives/2020/vol8issue5/PartP/8-5-3-412.pdf>
3. <https://link.springer.com/article/10.1007/s42690-021-00524-5>
4. <https://scholar.google.com/scholar?oi=bibs&cluster=4337340387920782726&btnI=1&hl=en>

5. Impact

The mango trees of Mr. Belwal are now in full form of production and are giving an average of 10-12 quintals of fruits per tree. It is increasing the yield by about 40-50 per cent as compared to earlier years.

Table 1 A summarised impact on the yield through recommended pest management technologies

S. No.	Major constraints in cultivation	Farmers Practices	Recommended Technology
1.	Mango Hoppers; causes 70-80 per cent yield loss if not managed.	Generally, farmers are applying four to six sprays of	Only two sprays of insecticides Imidacloprid @ 3.0 ml/ 10 liters of water at panicle initiation stage

		conventional pesticides.	followed by second spray at pea stage of the fruit with thiamethoxam @ 3.0 g/10 l of water and third need-based spray with NSKE @ 5 ml/ l of water after 15 days of second spray. OR First spray of spinosad 0.4 ml/ 10 l (0.004%) at panicle emergence stage followed by second spray (21 days after first spray) with Thiamethoxam 0.8 ml/ 10 l (0.008%) and third need-based spray of neemazal @ 3ml/l.
2.	Mango Mealy bug: is a notorious pest of mango and severe infestation causes significant loss in fruit size and weight.	Generally, farmers are applying four to six sprays of conventional synthetic pesticides.	1. Soil raking around the tree trunk in the month of May to expose eggs to natural enemies and sun. 2. Polythene sheet (400 gauge) band of 25 cm around the tree trunk with application of grease on both the ends of band. 3. Weed removal followed by Dusting of chloropyrphos on soil around the trunk/tree basin (200-250 gram/tree)
3.	Mango fruit flies; are serious destructive pest and causes 1 to 31% damage.	Mostly farmers focus on insecticides. Due to cryptic nature of the maggots of fruit flies they mostly remain unaffected by such insecticides, vis-à-vis the chance of insecticide residues in the fruits also increase.	Hanging of wooden block (5x5x1 cm) in plastic bottle soaked in solution with the ratio of 6:4:1 (Alcohol: Methyl Eugenol: DDVP) used @ 10 traps /hectare (with replacement of the wooden block at 2 months interval) in the months of May-June.
4.	Mangos shoot gall: Shoot gall is one of the most serious problems of the mango cultivation, interferes fruiting directly by affecting panicle formation.	It is difficult to manage by the farmers if not applied at the right time.	Three sprays of systemic insecticides quinalphos or dimethoate @ 2 ml/l in the month of Aug-Sept at 15 days intervals with sticker (2g/l)

6. Lessons Learned

The lesson to be learned from this process is that early monitoring and warning systems have to be activated to manage pest attack and to avoid any loss in the yield. An awareness program on the importance on insect pollinators should also be started to produce quality fruits

7. Supporting Quotes and Images:

The name of beneficiary farmer/ grower: **Mr. Deep Belwal, Swalde Ramnagar, Distt. Nainital Uttarakhand (09837241719)**. According to the Mr. Belwal, following quotes should be considered for better fruit yield.

1. Use good agricultural practices- No pest problem- Higher fruit production
2. Care your trees- Healthier trees – Tolerable insect pests- No loss in the yield
3. Save pollinators- Conserve natural enemies – Judicious application of pesticides- Safe environment- Healthy consumer



Photo 1 Hero of the story Mr. Deep Belwal



Photo 2 Mr. Belwal with good quality fruits



Photo 3 Demonstration- how to prepare fruit fly traps by own



Photo 4 Growers and scientists interactive meeting

	
Photo 5 Visit of Pantnagar Scientist in the orchard of Mr. Belwal.	Photo 6 Mr. Deep Belwal updating results/ effect of pest management technology

8. Additional information

Please provide additional relevant information, such as:

1. List of all research partners and/or donors who supported the work: The entire scientists team working under AICRP on Fruits at Pantnagar
2. Links to supporting materials, such as news items, photos on Flickr and presentations on Slide Share: Nil
3. Contact person for this story (name, position, email address):
Dr. Poonam Srivastava
Senior Fruit Entomologist, Department of Entomology
College of Agriculture, G.B.P.U.A. & T. Pantnagar- 263145 (UK) INDIA
Contact number: 09411159448
poonamento@gmail.com
4. Other information you want to add- Nil

Finally, use the checklist below to ensure your story meets the 10 criteria outlined and is ready for sharing.

9. Checklist

No.	Question to consider	Yes	No
1.	Is the story interesting to the target audience?	Yes	
2.	Does the story explain what new insights the research brings? What is the main lesson learned from this story? Does the story describe a key insight on what works and what doesn't something that future research	Yes	

	could build on?		
3.	Does the story describe the outcomes the research produced and the people who are benefitting? What changes-in skills, knowledge, attitude, practice, or policy-has the research brought, and who is benefitting from these changes?	Yes	
4.	Does the story make a compelling point that people will remember? Does the story show how the research makes a difference to improving livelihoods and lessening poverty?	Yes	
5.	Does the story provide an interesting fact that people will remember? For example, how much yields increased, how many hectares of land could become more productive from this innovation or technology?	Yes	
6.	Does the story explain what kind of impact this innovation or technology could have if scaled up?	Yes	
7.	Does the story show which partners contributed and how?	Yes	
8.	Does the story include quotes from scientists or beneficiaries?	Yes	
9.	Have links to other media are provided (journal articles, website news, newsletter, blogs, annual reports of ICAR, CGIAR centers, CRPs) that also feature this story?	Yes	
10.	Have the contact details of people who can provide more information are provided?	Yes	