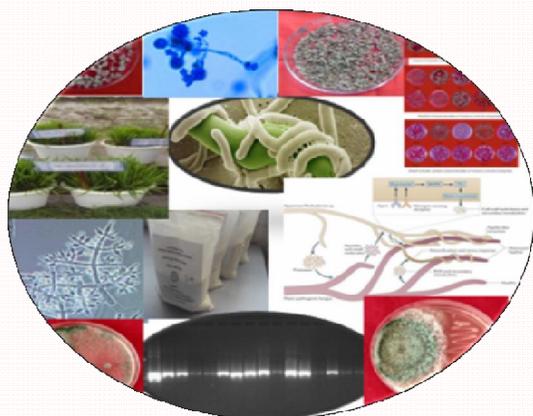


## Success Stories of Biological Control



**Roopali Sharma**  
**B.C. Kabdwal**  
**J. Kumar**



**2019**



**Department of Plant Pathology**  
**College of Agriculture**  
**GBPUA&T, Pantnagar-263145**  
**District- Udham Singh Nagar**  
**Uttarakhand, INDIA**

## Success Stories of Biological Control

G.B. Pant University of Agriculture & Technology has been pioneer in research and popularization of biological control of plant diseases in India. In 2006, Government of India declared Biocontrol Lab, Pantnagar as 'Central Insecticide Lab' in respect of biopesticides (The Gazette of India G.S.R. 756(E); No. 17-6/2006-PP.I). Four formulations of biocontrol agents have been developed for the control of for the management of plant pathogenic microorganisms viz., Pant Bio-control Agent - 1 (*T. harzianum*), Pant Bio-control Agent 2 (*P. fluorescens*), Pant Bio-control Agent -3 (consortium of *T. harzianum*+*P. fluorescens*) and Pant Bio-control Agent -4 (consortium of two strains of *P. fluorescens*).

Under All India Coordinated Research Project on Biological Control, large scale demonstrations on Biocontrol technologies were conducted at farmers' fields in distt. U.S.Nagar & Nainital. Capacity building and awareness creation amongst the farmers was carried out by demonstrating the method of application of bio-pesticides in crops, distribution of inputs, trainings, goshies and regular visits at farmers field. For popularizing the benefits of biocontrol agents, more than 250 quintals of quality biocontrol agent was mass produced in Biocontrol Lab, and distributed to practicing farmers. Through the adoption of biocontrol technologies farmers were able to reduce their cost of production substantially and minimized losses due to pests and diseases resulting in increased benefit-cost ratio and a healthy crop.

### Technologies demonstrated

#### 1. A Common Minimum Programme with following interventions:

**a. Plastic mulching (Soil solarization) of nursery beds:** It is a low-cost technique to reduce losses due to soil borne insect pests and diseases of the nursery.



**b. Preparation and use of vermicompost:** Vermicompost is more nutritious than traditionally used undecomposed FYM and gets ready in lesser time. It reduces the cost of production, increases plant health and improves fertility and water holding capacity of the soil.



**c. Use of bioagents:** They are a better alternative by virtue of being environment friendly, cost effective, safe for humans and animals and improving soil health.



### Bioagents could be used in one of the following ways:

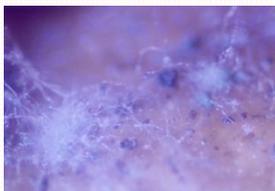
- i. Seed treatment through biopriming:** Seeds are mixed with the formulated BCAs @ of 8-10g/kg and incubate under moist conditions for 24 to 48h before sowing.
- ii. Rhizome treatment:** Rhizomes dipped in solution of bioagent (@ 8-10 gram/ liter water) for 30 minutes, dried in shade and planted.
- iii. Seedling treatment:** Before transplanting roots of seedlings dipped in solution of bioagents @ 8-10 g/ liter for about 30 minutes.
- iv. Spray:** @ 8-10 g/ liter on standing crop at 10-12 days intervals.
- v. Drench:** @ 8-10 g/ liter in soil in the nurseries from time to time.

**d. Value addition of vermicompost:** Before use vermicompost is supplemented with bioagents @ 1kg/q. This increases the nutritive value of the compost and facilitates rapid spread of bioagents in the soil.



## 2. Seed Biopriming

A seed biopriming method was developed for the application of *Trichoderma* and *Pseudomonas*. This method ensures uniform seed germinations and enhances efficacy of biocontrol agents against root and seed borne diseases.



Colonization of seed surface by *Trichoderma harzianum*

## 3. Improved method for mass multiplication of bioagents (at farmer's level)

Colonization of FYM, poultry manure, press mud by *Trichoderma* and/or *Pseudomonas* at farmers level is recommended. Such compost acts both as biofertilizer & biopesticide. Content of water soluble humic matter, Phosphorus and micronutrients is higher in colonized compost than non-colonized.

### Experiences shared by some Farmers

**Mr. Rebhader Joshi** is a native of Bakullia village of district Nainital. He grows rice, wheat, tomato and cabbage in his one acre agricultural land. After adopting biointensive technologies for farming within three years, the input of chemical fertilizers is now reduced to 50 kg per year. The expenditure on chemical pesticides which was Rs. 5000 per year earlier is now reduced to Rs. 3000 per year. Now he uses more vermicompost and bioagents than earlier. He has his own vermipits for vermicompost preparation.



**Mr. Girish Chandra Joshi** of Kishanpur Shakullia village of Nainital district practices farming in approximate 3 acre agricultural land. Mr. Joshi grows rice and wheat only under subsistence farming. He uses about 2q Urea, 2q DAP as well



as chemical pesticides costing about Rs. 8000 per season. After getting to the attached Biocontrol programme, Mr. Joshi started cultivation of tomato and cabbage which resulted in reduction of his dependence on chemical pesticides. For tomato cultivation he practices soil solarization during nursery bed preparation and uses biocontrol agents for seed, root and soil treatments. Now the use of chemical pesticides is very less. As a result, he earns an additional income of Rs. 20,000 by the use of this technology in tomato crop only.



**Mr. Hemant Singh Bisht** is a native of Nathupur village of district Nainital and is associated with Biocontrol programme in 2009. He grows tomato, cabbage, brinjal, rice, mustard, wheat, sugarcane and pea in about 2.5 hectare agricultural land. Earlier he used more chemical pesticides and chemical fertilizers for crop production. Mr. Bisht attended various training programmes organized under the AICRP. He is using about 60q vermicompost per year which is being produced at his own farms. The use of inorganic fertilizers in vegetables is almost negligible. He uses biocontrol agents (approx. 60 kg per year). According to him he is earning an additional income of Rs. 50,000 after getting attached with this programme. He is disseminating the information given to him by the scientist in his nearby area also.



**Mr. Chandrashekhar Kabadwal** belonging to Dhanpur village of Nainital District is doing conventional farming in about 2.5 ha agricultural land. He participated in training programme in 2009 and was highly influenced by this technique. According to Mr. Kabadwal by the use of information given during the training programmes and through the advice of specialist on specific problems the use of chemical pesticides has reduced to less than half. He is using about 200 Q vermicompost per year. According to him, he is using the biocontrol agents being produced in Biocontrol Lab in Pantnagar University for seeds, seedlings and standing crop treatments and he is enriching the compost by incorporating biocontrol agents in vermicompost. Mr. Kabadwal never forgets to disseminate information about this technique to other fellow farmers.



**Mr. Indal Singh Mehta** is the native of Devla Malla village of Golapaur area of Nainital district. He is growing vegetables in about four acre land with major crops like tomato, ginger and pea. He is associated with Biocontrol programme since years. According to him, he used to spend about Rs. 20000-25000 per year on inorganic pesticides and fertilizers but after adopting the Biocontrol programme, the same amount has reduced to Rs. 3000-4000 per year during the last five years. Now he uses biocontrol agents, cow urine and vermicompost up to its maximum extent on his agricultural land with the result that he is getting the healthy produce.



**Published by**  
**BIOCONTROL LAB**  
Department of Plant Pathology  
College of Agriculture  
GBPUA&T, Pantnagar- 263 145  
Distt.- Udham Singh Nagar (Uttarakhand)