

TECHNICAL BULLETIN

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Integrated Pest and Disease Management Packages for Quality and Safe Country Bean

Country bean (*Lablab purpureus* L. Sweet) is a legume crop widely grown throughout the world including Bangladesh as vegetable or pulse for human consumption or as animal forage or feed. In the Mymensingh region of Bangladesh, different vegetables, especially country bean (*Lablab purpureus* L. Sweet), are grown commercially as cash crops. Noldok, a famous

bean variety of Bangladesh originating from the Sherpur district and some BARI released high-yielding varieties including summer country bean are cultivated commercially, but the bean yield is low and quality is poor due to insect and disease infestations. In Bangladesh, over 30 different species of arthropods have been reported in country bean and some of them occur regularly and cause economic damage. Among the insect pests, the pod borer



Fig. 1. Aphid (left) and anthracnose (right) infested country bean

Maruca vitrata (Fabricius), *Helicoverpa armigera*, blue butterfly (*Euchrysops cnejus*) and aphid (*Aphis craccivora*) (Fig. 1) are the major insect pests of country beans. Among diseases, anthracnose (Fig. 1), leaf spot, mosaic virus, foot rot, white molds and root knot etc. are very serious diseases and cause substantial damage to beans every year. For controlling these pests and diseases, farmers still depend solely on the use of chemical pesticides at a very high frequency to save their crop, but this method has several limitations including ineffectiveness, killing of parasitoids and predators, resulting in resurgence of other pest populations and developing resistant insect biotypes, etc. A better alternative would be integrated management methods comprising resistant varieties, seed treatments, manipulation of the planting time, mechanical control, biological control agents and traps, etc. BARI, other research organizations and agricultural universities have developed a good number of integrated pest management (IPM) and integrated disease management (IDM) packages for safe and good quality country bean production, but these have not been properly disseminated among farmers through on-farm validation, refinement and demonstration in bean growing areas. This KGF sponsored project was implemented to evaluate and disseminate some promising integrated pest management (IPM) and integrated disease management IDM packages in the Mymensingh region.



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Methodology

The Horticulture Research Center (HRC) and On-Farm Research Division (OFRD) of BARI jointly implemented the project. Different IPM and IDM packages against pest and diseases of country bean were validated in farmers’ fields of six selected upazilas (Sadar and Nandail of Mymensingh, Nokla and Nalitabari of Sherpur and Durgapur and Kalmakanda of Netrakona) of the Mymensingh division. Seed production was done in HRC research plots, BARI, Gazipur. DAE cooperated with HRC and OFRD in conducting field trials in farmers’ fields.

In the first year winter season, one experiment on on-farm validation of bio-rational integrated pest management (IPM) packages and another experiment on on-farm validation of bio-rational integrated disease management (IDM) packages for quality and safe country bean production were conducted separately in selected farmers’ fields with the winter variety BARI Seem-1 to identify the best IPM and IDM packages. Then in the following summer season, the same experiments were conducted in others farmers’ fields with the summer variety, BARI Seem-7. In the second year, field experiments on the most effective IPM and IDM packages were set up for further confirmation. In the third year, the best IPM and IDM packages were demonstrated in farmers’ fields. Data on numbers of healthy and infested/infected plant, leaf,

pod from whole plots were recorded weekly. Data were also recorded on the percent plant infestation/infection, leaf infestation/infection and pod damage (by visual estimation). Economic analysis was done, monetary returns were calculated on the basis of farm gate prices. The best identified IPM and IDM packages and farmers’ practices



Fig. 2. and yellow sticky trap (left) and sex pheromone trap in a country bean field

(FP) were evaluated in comparison with untreated control. Training, workshop/seminars were organized for different stakeholders (e.g. farmers, DAE/BADC/NGO officials etc), and handouts and booklets on recommended technologies were published and distributed.

Results and Outputs

Three technologies were developed: (1) hand picking and destruction of infested flowers/pods and shoots at 5-day intervals + installation of yellow sticky trap and sex pheromone trap + alternate spraying of Azadirachtin (Fytomax) and Antario @ 2g/L of water at weekly intervals; this was identified as the most effective and economically profitable IPM package, (2) application of Tricho-compost in pit + seed treatment with Bordeaux mixture + foliar spray of Tricho-leachate, which worked most effectively and economically profitably as an IDM package, and (3) seed treatment with Bordeaux mixture @10g per kg seeds + application of

Table 3. Effect of different IPM and IDM packages against insect pests and diseases of country bean

Treatment	% aphid infestation	% pod borer infestation	% Cercospora infection	% anthracnose infection	Marketable yield (t/ha)	MBCR
P ₁	6.52	8.31	7.67	6.52	22.91	9.53
P ₂	8.65	11.69	9.36	8.95	19.71	4.46
P ₃	15.37	21.25	20.78	20.01	15.51	-

Tricho-compost in pit + foliar spray of Tricho-leachate (Trichomax@10ml/L) + hand picking and destruction of infested flower/pods and shoots at 5-day intervals + installation of yellow sticky trap and sex pheromone trap (Fig. 2) for Maruca + alternate spraying of Azadirachtin (Fytomax @ 1.5ml/L) and Bt + abamectin (Antario @ 2g/L) of water at weekly intervals was identified as the best IPM + IDM package against major insect pests and diseases of country bean. The IPM-IDM package caused less incidence of insect pests and diseases in the bean field (Table 1, increased marketable yield, production and net incomes of country bean growers, reduced use of chemical pesticides and, thus, ensure quality and safety of the country bean produced by farmers, and promoted the use of ecologically sound and sustainable IPM/IDM packages for growing country bean.

For technology dissemination, training, field days, workshop/seminars were organized for different stakeholders (e.g. farmers, DAE/BADC/NGO officials etc), and handouts and booklets on recommended technologies were published and distributed. Farmers were trained in 18 batches (30 farmers in each batch), and field days were conducted with 60 farmers on each field day.

Expected Impact

- Use of the IPM-IDM packages will ensure quality and safety of produce in country bean production
- Indiscriminate use of chemical pesticides will be minimized which will cut down costs of production on the one hand and help maintain a sound ecological balance on the other
- The increased marketable yield of beans and improved quality of the produce will fetch higher prices from the markets for farmers and growers, enhanced incomes will improve their standard of living.

Recommendations

1. The combined IPM-IDM package should be up-scaled properly in future, farmers are ready to use this bio-rational IPM-IDM package to produce safe and quality country bean
2. The bio-rational component, i.e., IPM/IDM tools and bio-pesticides are not available in the market, the Government needs to take necessary steps to make them available in the local market at reasonable prices
3. As country bean is a popular vegetable crop and grows well everywhere in Bangladesh, so this bio-rational IPM-IDM package should be disseminated in country bean growing areas across the country.

This technical bulletin has been prepared on the basis of technical information available from a completed BKGET-KGF Funded CGP Project the details of which are given below:

Project Code and Title: TF 66-C/19. On-farm Validation and up-scaling of Integrated Pest and Disease Management Packages for Quality and Safe Country bean Production in Mymensingh Region

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