Biological Control of Cardamom Stem borer or Capsule borer or Panicle borer Management with different bio-pesticides and parasites

Problem: Excessive use of pesticides in the plantations and vegetable gardens of Idukki district is posing a threat to the health of soil as well as people in other parts of the State. The farmers are unawareness on various aspects of pesticide application including dosages, time of application, precautions to be taken, methods of storage and disposal of containers etc. Spraying pesticides resulted in large-scale environmental pollution, mortality of bees, and other pollinators and birds besides animal and human health problems. High levels of pesticide residues have been detected in spices.

Source of Technology: ICAR-NBAIR & Indian Cardamom Research Institute.

Technological Intervention:

Spray of *Bacillus thuringiensis* @ 2g / L of water at First - instar larvae stage.

Spray of *Beauveria bassiana* @ 5g / L of water at 3rd & 4th instar larvae and Adult stage. Release of *Apanteles sp* @20000 Larval parasites /ha at 2nd & 3rd instar larvae.

Release of *Friona sp* @ 20000 Larval parasites /ha in effective control of stem borer and thrips.

<table>
<tr><th>Name of technology (With brief details)</th><th>Source (Nameof ICAR Institute)</th><th>Year of release</th><th>From which year promoted?</th><th>Efforts made byKVKs for its dissemination (Year wise and activity wise quantification)</th><th>No. of farmers benefitted (Approximate)</th><th>Area covered (ha) or No. of animals benefitted (Approximate)</th></tr>
<tr><td rowspan="6">Small Cardamom</td><td rowspan="6">ICAR-NBAIR</td><td rowspan="6">2010</td><td rowspan="6">2015-16</td><td colspan="3">Bio-pesticides and parasites against cardamom stem and capsule borer (Conogethes punctiferalis)</td><td rowspan="6">1260</td><td rowspan="6">365 ha</td></tr>
<tr><td>Year</td><td>Activity</td><td>Qty</td></tr>
<tr><td>2015</td><td>OFT</td><td>5</td></tr>
<tr><td>2016</td><td>OFT</td><td>5</td></tr>
<tr><td>2017</td><td>FLD</td><td>50</td></tr>
<tr><td>2018</td><td>TRG</td><td>1200</td></tr>
</table>

**(OFT - On farm testing, FLD - Front Line Demonstration and TRG - Training)

Biological Control of Small Cardamom Stem & Capsule Borer

Beauveria infected adult

OFT conducted at Parathode Village

Farmers Scientist Field visited at Vandanmedu

Apanteles parasitoids on small cardamom capsule borer

Field day conducted

Awareness Programme conducted at Kattapana Village

Horizontal Spread of the technology:

Sl. No.	Villages	Area under Bio-intensive stem borer management Before KVK intervention in ha	Increase in area Bio-intensive stem borer management after KVK intervention in ha
1.	Senapathy	0	15
2.	Parathode	0	52
3.	Santhanpara	4	69
4.	Kattappana	25	94
5.	Udumbanchola	8	125

Vertical Spread of the technology:

Sl. No.	Year	Production in kg (ha)	Productivity (qt. / ha)
1.	2015-16	856*	4.49
2.	2016-17	1065	4.71
3.	2017-18	1104	4.81
4.	2018-19	565**	1.96

Productivity decreased in 2015-16 due to increase in day temperature and acute drought.

****Productivity decreased in 2018-19 due to heavy rainfall.***

Economic analysis:

Parameters	Demonstration	Local practice using chemicals
% reduction in stem borer infestation	31%	60%
Gross cost (Rs. / ha)	269000	390000
Gross Return (Rs. / ha)	645000	572000
BCR	2.39	1.46

Conclusion:

Bacillus thuringiensis var Kurstaki was found to be effective when combination with *Beauveria bassiana*. *Bacillus thuringiensis var Kurstaki* sprays in combination with the releases of parasites *Apanteles* sp and *Friona* sp gave effective control of stem and capsule borer and the technology is well accepted by the farmers in Idukki district of Kerala. Due to this technology, the farmers reduced the number of pesticide application from 14 to 6 numbers.

Steps for Scaling up:

Large Scale demonstrations in convergence with ATMA-Idukki