

**SCREENING SELECTED INSECTICIDES  
AGAINST BEAN POD BORER**

*(Maruca testulalis)*

By

**THANUSHYA VINAYAGAMOORTHY**



FAG321  
  
Project Report  
Library - EUSL

**Department of Agricultural Biology**

**Faculty of Agriculture**

**Eastern University**

**Sri Lanka**

PROCESSED  
From Library, EUSL

## Abstract

Bean (*Phaseolus vulgaris*) is one of the major exotic vegetable crop growing in Sri Lanka. Bean pod borer is the one of the pest in Bean at reproductive and pod development stages. Usage of pesticides is an effective and quick method for controlling the pests. However chemical control becomes inefficiency when pest population develops resistant to the pesticides. Repeated application of same pesticides may develop such situation. Therefore pesticide recommendation should be updated periodically. The updating process involved screening of novel pesticides against target pests. The study was carried out to screen pesticides for bean pod borers to select the most suitable pesticides. This study was carried out at the field of Horticultural Crops Research and Development Institute (HORDI), Gannoruwa.

Insecticides selected for the study were Bristifluran 10% EC, Coragen 20SC, Tracer (Spinosad 45%) and Virtako 40WG. Atabron 5EC (chlorofluazuron) was used as the standard insecticide. These pesticides were evaluated in comparison with the untreated control. This experiment was laid out in a Randomized Complete Block Design (RCBD) with 3 replicates. Pesticide spraying was initiated at 45 days after planting (at flowering stage) at which the infestation of bean pod borer usually starts and repeated weekly intervals by counting the number and weight of damaged bean pods and the number and weight of undamaged pods. The data were analyzed using Analysis of variance. The differences between means for different treatments were made with Dunnett Multiple Range Test by using SAS application statistical package.

The results pertaining to percentage pod damage on bean indicated that Coragen 20SC treated plot had the lowest amount of pod damage (2.317%) in pod number and in pod weight (1.830%). Even though the damaged pods were low in Vertako 40WG treated plot it was found highly toxic to all the predators as well as pollinator and bees. Therefore it should not be recommended to be applying at the flowering stage. Tracer (Spinosad 45%) also founded effective against the pests and affecting was superior to the recommended pesticide Atabron 5EC. Tracer (spinosad 45%) and Coragen 20SC are less harmful to the environment. At last, it would be possible to conclude that Coragen 20 SC and Tracer (spinosad 45%) are effective insecticides for control of bean pod borers. Therefore both these insecticides are suitable for controlling the bean pod borer (*Maruca testulalis*) without disturbing natural enemies and the eco-system.

## TABLE OF CONTENTS

ABSTRACT.....	I
ACKNOWLEDGEMENT.....	iii
TABLE OF CONTENTS .....	iv
LIST OF TABLES .....	Vii
LIST OF FIGURES .....	Viii
ABBREVIATION .....	ix
CHAPTER 1	
Introduction .....	01
CHAPTER 2	
Literature review .....	05
2.1 Bean ( <i>phaseolus vulgarics</i> ) .....	05
2.2 Pests in bean .....	07
2.2.1 Bean pod borer ( <i>Maruca testulalis</i> ) .....	07
2.2.1.1 Biology of <i>Maruca testulalis</i> .....	07
2.2.1.1.1 Egg .....	07
2.2.1.1.2 Larva .....	07
2.2.1.1.3 Pupae .....	08
2.2.1.1.4 Adults .....	08
2.2.1.2 Damage symptoms .....	09
2.2.1.3 Control of bean pod borer .....	10
2.2.1.3.1 Cultural Control .....	10
2.2.1.3.2 Biological Control.....	11
2.2.1.3.3 Chemical Control .....	12
2.2.2 Bean flies.....	14
2.2.2.1 Biology of bean flies.....	14
2.2.1.2.1 Egg .....	15
2.2.1.2.2 Larva .....	15
2.2.1.2.3 Pupae .....	15
2.2.1.2.4 Adults .....	16

2.2.2.2	Damage symptoms.....	16
2.2.2.3	Control of bean flies .....	16
2.2.2.3.1	Cultural Control .....	16
2.2.2.3.2	Biological Control.....	17
2.2.2.3.3	Chemical Control .....	17
2.2.3	Whiteflies ( <i>Trialeurodes vaporariorum</i> ) .....	17
2.2.3.1	Biology of white flies .....	18
2.2.3.2	Damage symptoms.....	18
2.2.3.3	Control of white flies .....	19
2.2.3.3.1	Cultural Control .....	19
2.2.3.3.2	Biological Control.....	19
2.2.3.3.2	Mechanical Control .....	20
2.2.3.3.3	Chemical Control .....	20
2.3	Chemicals.....	21
2.3.1	Tracer (Spinosad 45%).....	21
2.3.1.1	Physical and Chemical properties.....	21
2.3.1.2	Mode of action.....	23
2.3.1.3	Effect on natural enemies.....	24
2.3.1.4	Residual activity.....	25
2.3.1.4	Formulation.....	26
2.3.2	Virtako 40WG.....	26
2.3.2.1	Physical and chemical properties.....	27
2.3.2.2	Mode of action.....	27
2.3.2.3	Effect on natural enemies.....	28
2.3.2.4	Residual activity.....	28
2.3.3	Coragen®.....	29
2.3.3.1	Physical and Chemical properties.....	29
2.3.3.2	Mode of action.....	30
2.3.3.3	Effect on Natural enemies.....	30
2.3.3.4	Residual activity.....	31
2.3.3.5	Formulation.....	32

2.3.4 Bistrifluron (Hanaro®).....	32
2.3.4.1 Physical and Chemical properties.....	32
2.3.4.2 Mode of action.....	34
2.3.5 Atabron 5EC (chlorofluazuron).....	34
2.3.5.1 Physical and Chemical properties.....	34
2.3.5.2 Mode of action.....	35
2.3.5.3 Effect on Natural enemies.....	35
2.3.6 Actara®.....	36
2.3.6.1 Application.....	37
2.3.7 Cruiser®.....	38
CHAPTER 3	
Materials and Methods.....	39
3.1 Location.....	39
3.2 Ecological Requirement.....	39
3.3 Description of Crop and Pest.....	40
3.4 Experimental design and planting.....	40
3.4.1 Experiment.....	40
3.4.2 Treatments.....	40
3.4.3 Experimental design.....	41
3.5 Agronomic practices.....	42
3.5.1 Planting the Bean.....	42
3.5.2 Chemical application.....	42
3.6 Measurements.....	43
3.7 Analysis of results.....	43
CHAPTER 4	
Results and Discussion.....	44
4.1 Pod damage.....	44
4.2 Comparison of Yield.....	48
CHAPTER 5	
Conclusion.....	52
References.....	53
Annexes.....	