FIELD MANAGEMENT OF COMMON BEAN BRUCHIDS BY USING SELECTED PHYTOCHEMICALS IN HARICOT BEAN (*PHASEOLUS VULGARIS*)

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Introduction

Bean storage over long periods at small-scale subsistence farming levels in Ethiopia is limited due to two common bean bruchids *(Acanthoscelides obtectus* and *Zabrotes subfasciatus)* infestation that result in heavy losses in terms of quality, weight and nutritional value. To avoid such excessive losses, most farmers are forced to sell off bulk of surplus grain immediately after harvest when the prices in the local market are much low. This scenario negates motivation to increase production and store for longer periods to have uniform supply of food for the household through out the year.

Bean bruchids are field to storage insect pests. They start infestation in the field and this field infestation serves as initial inoculum to start infestation in the store. The available bean bruchids management methods targeted only in storage with no attention to field infestation. These include the use of edible oils and contact insecticides and fumigants. Chemicals are not affordable by most of subsistence and resources poor farmers of the region. On top of this, the approach is not reliable, as it is not environmentally sound and risk to consumers. . In this study an attempt was made to evaluate field management of bean bruchids by selected botanicals, which proven effective in reducing damage by other legumes in the storage or in the field.

Materials and methods

The experiment was carried out at Awassa Agricultura;l Research Center on-station in 2004/2005 cropping season. The common bean variety, Red Woliata susceptible to field infestation was planted in plot of 2mx2m size at spacing of 10 and 40cm within and between rows, respectively. The distance between plots and blocks was 1m and 2m, respectively. The plots were arranged in a randomized complete block design (RCBD) in three replications. The botanicals to consider in the experiment were *Phytolacca dodecandra*, *Tagetes minuta*, *Nicotina tobaccum* and *Milletia frugenia*. Fenithrothion 60% E.C as standard check and the untreated control were included in the experiment for comparison.

Botanical preparation

One kg of green leaf of each botanical was collected from available areas and then grounded by using Iron and pestle. Then, the grounded leaf was soaked in two liters of water and filtered using fine cloth to obtain concentrated extract. Finally, the concentrated extract was further diluted in four liter of water prior to application. Then, 10gm of powdered soap was added before spraying on the crop to increase the adhesive nature of the extract on the crop. The diluted botanical solution was sprayed at the rate of 400lit/ha on each plot.

Treatment application was initiate at pod filling stage after planting, and was continued on weekly bases four more times. The beans were harvested when the pods dry. Four hundred-gram of working samples was placed in 3lit volume polyten bag and incubated at Awassa Agricultural Research Center laboratory under ambient conditions. The samples will be monitored daily for

common bean bruchids emergence. The bruchids that emerged was identified, counted and discarded in daily basis and this was conditued until there was no further emergence. The mean of collected data were analyzed using MSTAT-C statistical package.

Results and discussion

The only bruchid species that emerged in all treatments was *Acanthoscelides obtectus* (Coleoptera: Bruchidae). There was significant differences ($P<0.05$) among botanical treatments in the number of adult *A. obtectus* that emerged (Table 1). The highest number of adult *A. obtectus* was emerged from *Milletia frugenia* treated plot, while the lowest was recorded from *Nicotina tobaccum* treated plot. The number of adult *A. obtecctus* emerged from *Phytolacca Dodecandra* treated plot and *N. tobaccum* was equal where as the number of adult target pest emerged from *M. fruginia* and *Tagetes minuta* was equal and statistically higher compared to both *P. dedocandra* and *N. tobaccum*. The result of this study indicates that *P. dedocandra* and *N. tobaccum* showed potential to suppress field infestation of adult *A. obtectus* compared to other botanicals.

There was significant difference ($P<0.05$) between botanicals treatments and the untreated control plots in terms of number of adult *A. obtectu* emerged. The highest number of target pest was recorded from *M. fruginia* (13.3) followed by untreated control (12.7), while the lowest was recorded from *N. tobaccum* followed by *Phytolacca dodecandra* treated plot. There was significant differences ($P<0.05$) between botanical treatments and the chemical treated plot interms of number of adult target pest emerged. The lowest number of adult *A. obtectus* was emerged from *N. tobaccum* treated plot followed by fenithrothion 60% E.C treated plot, while the highest was observed in *T. minuta* treated plot. The effect of *N. tobaccum* and *P. dedocandra* in controlling the number of adult *A. obtectus* that emerged was similar to the chemical. In terms of percent seed damage among botanicals applied, tobacco and *P. dedocandra* treated bean plot were the least damaged compared to the other botanicals and the untreated control.

This study has confirmed bruchid bean infestation by *A. obtectus* in the field and its continuation in storage. This was demonstrated by the emergence of F1 generation from the cultured bean seeds in the laboratory.

Table 1. Effect of botanicals on *Acanthoscelides obtectus* mean adult emergence after incubating for one month, Awassa 2004

Treatment	Number of emerged adult bean bruchid	% of damaged seeds
Phytolacca Dodecandra	3.0b	0.2b
Tagetus minuta	12.0a	1.0a
Nicotina tobaccum	2.3b	0.2b
Milletia frugenia	13.3a	1.0a
Fenithrithion 60% E.C.	2.7b	0.2b
Untreated control	12.7a	1.1a
CV% LSD	34.59 4.83	34.66 0.39