MONITORING OF OLIVE MOTH, (Prays oleae Bern) IN ALBANIA. LOSS ASSESSMENT AND BIO-CONTROL WITH Bacillus thuringiensis.

J. Tedeschini[1], B. Stamo[2] and D. Pfeiffer[3]

[1] Plant Protection Institute, Albania
[2] Ministry of Agriculture, Food and Consumer Protection, Albania
[3] Virginia Tech University, USA

Abstract

The monitoring of olive moth with sex pheromone was conducted for the first time in Albania during the years 200-2003. The male olive moth catches in the pheromone traps showed three peaks, which during the study were observed around the first week of May, first week of June and first decade of October.

Distinct differences in olive moth susceptibility of olive cultivars were shown. Varietal selection may present another non-insecticidal tool for managing this pest.

It was observed that the fruit drop expressed in percentage of the total yield of the trees was higher in Cv Kalinjot (9,3%) than in Cv Frantoi (4,67 %).

BT, an organically acceptable microbial insecticide, provided effective control of olive moth.

Key words: *Prays oleae* Bern, Integrated Pest Management, Pheromones, *Bacillus thuringiensis* (BT).

INTRODUCTION

The olive moth, *Prays oleae* Bern., is among the most important insect pest of olives in the Mediterranean region. During the spring, its attacks can cause excessive flower drop. During the summer more damage is caused by larval boring in the developing fruits. The means of control most often used against this pest is the chemical control. As the pressure against the use of insecticides is gradually increasing, chemical control should always be justified by a cost benefits study based on an accurate assessment of crop losses. In recent years interest in evaluating the economic importance of this pest has been increased, particularly as loss assessment is essential for the development of integrated control programs. On the other side, the monitoring of pest population and using the alternatives to control this pest, such as BT application are very important for a successful IPM package.

The purpose of this study was to clarify the dynamic populations of the pest, to estimate the crop loss due to the premature loss of fruits through dropping caused by *P. oleae* and to control the antophagous generation by using BT.

MATERIALS AND METHODS

This study was carried out during 2000-2003 in an olive orchards situated in Vlora region, in an area of 13 Ha, aged 30 years. Trees are planted at a density 80 trees/Ha and the cultivars were Kalinjoti, Frantoi and KMB.

Traps baited with sex pheromone were placed on olive trees to evaluated monitoring moth flights. The baits were replaced every three weeks. Concurrently, data on larval population were collected to determine olive moth infestation. Ten leaves, inflorescences and fruits (for the respective generations), from each ten plants were randomly selected and examined for the presence of olive moth larvae and the total number of larvae recorded.

Dropping fruits from 10 olive trees are collected under the trees (at 10 days intervals, during Sept, Oct and Nov) and analysed for the presence of olive moth larvae .The number of fruits fallen from physiological reason was recorded too.

The collecting of fruits and knowing of their weight were done to have clear idea about the infection and damage on fruits from this pest. BT products were used to control olive moth, compared with a broad- spectrum insecticide BI 58 (dimethoate) widely used in Albania. Treatments were applied only once during the flowering stage. Monitoring of larval populations was counted one week after treatment in organic production system as well as in the conventional one. Before and after treatments, 400 inflorescences were analyzed for the presence of olive moth larvae.

RESULTS AND DISCUSSION

Monitoring of Olive Moth

The first adults resulting from the overwintering phyllophagus generation were observed during the second half of February. Later the catches on pheromone traps started to increase having a peak of moth capture on May 5 (capture 83.4 moth/trap) at ending in the middle of May. (Fig1). The main period of adult catches for the antophagous generation were present between the third decade of May until the first decade of July with a peak flight occurring on June 5 (capture of 68.8 moth/trap).

After this period, during seed hardening stage, the captures of olive moth were quite zero until the second decade of August. During the last days of August, started the adult flight of carpophagous generation having an increasing of population during September and having a peak of 71 capture moth/trap on October 10.

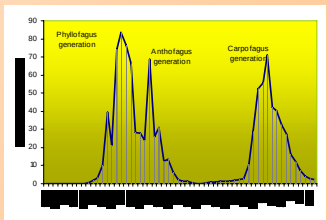


Fig 1 Mean catches of male olive moth in sex pheromone traps in Vlora region

The data of larval infestations for the phyllophagous generation indicated that the damage of leaves was limited and it does not effect photosynthesis or cause any other appreciable damage.

The rate of *P. oleae* infestations for the anthophagous generation varied between 6 - 16 % for cv Frantoi and 12 –23% for cv Kalinjot, depending on the years Tab 1.

Losses caused by the carpophagous generation occurred after fruit formation. The observation done during this stage indicated different level of infestation among the cultivars. The high fruit infestation was observed in cv KMB followed by cv Kalinjot and cv Frantoi. Tab 2.

Tab 1. Olive moth infestation of anthophagous generation

Date	No of analysed inflorescence	Antophagous generation	
		cv Frantio	cv Kalinjot
May 19, 01	100	10 %	23 %
May 23, 02	100	16 %	22 %
May 19, 03	100	6 %	12 %

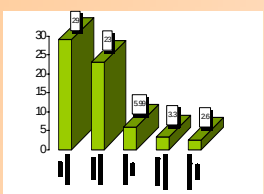
Tab 2. Olive moth infestation of carpophagous generation

Date	No of analysed fruits	Fruit formation stage		
		Cv Frantio	Cv Kalinjot	Cv KMB
June 20, 01	100	17 %	23 %	33 %
July 4, 02	100	15 %	17 %	21 %
July 4, 2003	100	15 %	19 %	24 %

Losses assessment due to P. oleae

The fruit dropping from the whole of the tree canopies under observation was recorded at 10 days intervals from fruit setting to harvesting. The percentage of olives which dropped as results of *P. olea* infestation was 28,8% and 43,3% of the dropped fruits, respectively for Cv Frantoi and Cv Kalinjoti.

Cv Kalinjot



Cv Frantoit

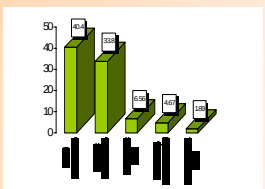


Fig 2. Evaluation of losses due to *P. oleae*

Acknowledgments
Funding for this study was provided by USAID through IPM CRSP/ Albania.

The weight losses due to the olive moth was on average in the 10 trees, 5,6% and 11,3% of the weight of harvest fruits, respectively for Cv Frantoi and Cv Kalinjoti.

Given the density 80 trees/Ha, the losses due to the pest action was 151,2 kg/Ha for Cv Frantoi and 208 kg/Ha for Cv Kalinjot. Of the previous results, it is clear that the infestation of *P.oleae* is important and that the resulting losses justify the costs of the means of protection. Fig 2

Olive fruit moth control

Data presented in Fig 3 revealed that the insecticide treatments gave good results to control olive fruit moth (*P oleae*). The larval mortality indicated a not significant difference between BT and Rogor. BT produced a mortality rate about 80%.

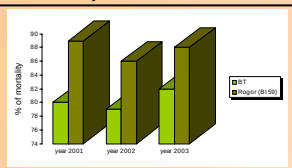


Fig 3 Effects of BT and BI 58 on olive moth larval populations (Anthophagous generation)

In the field trials the direct effect of Rogor and BT – product on non-target arthropods indicated that there are no significant differences in the number of this arthropods on the trees treated with BT and on untreated trees. *Apanthelus xanthostigma* (Hal) was one of the most important natural enemies of olive moth founded in the plot mentioned above.

In the plots treated with Rogor the number of arthropods were quite different and much lower respect to other treatments. (Fig. 4)

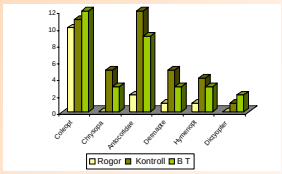


Fig 4 Effects of pesticide treatments used against olive moth towards natural enemies and innocuous insects.

CONCLUSION

The findings of this study have helped to establish new methods for monitoring of key pest, economic injury levels and sampling strategies for one of the major pest of olive such as olive moth.

Monitoring methods for olive moth can be improved and timely application of insecticides will result in a significant reduction in production cost and hazards to farmers and the environment.

BT was identified as a product with an acceptable efficacy for olive moth control under field conditions. The bio-pesticide can be considered useful for farmers in the control of one of the key pest on organic olive orchards.

References

Paraskaksis M. 1990 – The influence of olive moth in olive production. Acta Horticulturae 286 p 375-378.

Ramos P. et al, 1998 – An IPM strategy for olive moth based on the relationship between catches of adults in pheromone traps and subsequent infestation of olive fruits. IOBC/VRSP Bulletin 12 (2) p 121-122.