

INTEGRATED PROTECTION OF PEACH CROPS FROM PESTS AND DISEASES BY APPLICATION OF BIORATIONAL PREPARATES

DIANA CRISTMAN*, MIHAI GLADEI**

ABSTRACT

The biological effectiveness of Admiral 10 KE as a non-toxic sterilizer in pheromone traps, in the fight against east moth on peaches, was studied in central Moldavian zone conditions, on 6 hectares of peach orchard in comparison with the economic standard. The biological efficacy of sterilization has reached 63,1%.

The estimation of efficacy of biorational preparates: natural chemical and microbiological fungicides in combating peach crop diseases, have shown that the preparates applied in the same phenological stage as the chemical preparates stop the development of *Taphrina deformans* Tul. on leaves and *Monilia fructigena* West., on fruits more effective than the conventional scheme with 13,1% against *Taphrina deformans* and 27,8% against *Monilia fructigena* West., which is also confirmed in experiments examining the effectiveness of resistance and growth stimulators (Reglal, Reacol) that on the background of chemical treatments has reduced the development of diseases *Taphrina deformans* and *Monilia fructigena* and to zero, and have stimulated the formation of triple buds with 27,0% and 33,8% more than the standard.

Key words: Eastern moth, pheromone traps, sterilization of males, biorational preparates

Introduction

Fruit tree crops are of a particular importance for Moldovan agriculture. Fruit crop share in the national economy due to the role that fruits healthy human diet in the prevention and combating of diseases. But plantations and fruit production, are affected by the work of many species of pests in some years mass multiplied by attacking all organs causing considerable damage trees. Therefore it is important for detection, determination and knowledge of pests of fruit trees to be done quickly and correctly to achieve ecologically increased production and quality, unaffected by chemical pollution, with adverse effects on nutrition.

Solving of environmental problems and obtaining qualitative and competitive agricultural production requires the development of integrated protection systems, which will activate the natural forces of resistance, reduce the resistance of harmful organisms, and decrease financial and energy expenses on crops protection.

Harmless plant protection schemes are based on the application of biological or natural chemical means (6,7). A direction of perspective is the application of biorational pesticides: *biochemical*

(hormones, pheromones etc.) which are less toxic but still causing death by disrupting insect ontogenesis development processes and behavior between the sexes, populations, or between insects and host plants (3,5); *rational* – increasing plant resistance to pest, disrupting nutritive connections (extracts and vegetable oils, plant growth promoters, natural chemical preparates with low toxicity), (1,2).

After the data of the authors (2,3,4,5) have a perspective the methods of autosterilisation of pests using the pheromonal traps alone or in complex with microbiological and rational preparates.

The implementation of biorational pesticides application technologies in schemes of integrated tree crop protection is necessary for households to obtain agricultural production with high indicators of quality and competitiveness on global market. Due to the lack of pesticides residues in production, application of pesticides with minimized phytotoxic action, plant growth and resistance stimulators the quantity and quality of production increases, and by simplifying and increasing the efficiency of monitoring and forecasting it reduces the number of treatments with pesticides and their appropriate volume of application, what positively influences on cultural biodiversity.

Material and method

The experiments on comparative examination of two integrated protection schemes:

* The Institute of Genetics Physiology and Plant Protection of the Academy of Sciences of Moldova, Chișinău, Moldova, diana.cristman@mail.ru

** The Institute of Genetics Physiology and Plant Protection of the Academy of Sciences of Moldova, Chișinău, Moldova, mikegladius@yahoo.fr

based on chemical and biorational preparates were spent on peach orchard in household LLC „AgroBrio” v. Băcioi, in Ialoveni. The experiment was mounted on a massive of 15 ha which was separated in two variants: 1 - "Household Etalon" of 14 ha and 2-nd variant - "Experimental" - 1 ha-preventive treatment against pests and diseases are related to the development of plant phenology, in both variants were performed sprayings in the same period as in the integrated protection scheme developed by the Laboratory of Integrated Protection. On Variant 1 were performed 5 treatments with chemical preparates, and 6 treatments in 2-nd variant with biorational preparates in fighting *Taphrina deformans* Tul. on leaves and *Monilia fructigena* West. on fruits of peach crop with biorational preparates *Funecol* - 4,0 l/ha (0,5 l/ha); *Rizoplan* - 2,0 l/ha, *Trihodermina* - 5 l/ha.

The experiments for determining the efficacy of integrated scheme based on the use of biorational preparates in comparison with chemical household etalon against *Grapholita molesta* Busck and *Anarsia liniatella* Zeller were used pheromonal traps, and against aphids and mites the natural insecticide *Pelecot*- 10l/ha.

The effectiveness examination of preparate Admiral in combating (*Grapholita molesta* Busck), and (*Anarsia liniatella* Zeller) on peach trees was spent on a surface of 6 ha of peach orchard in the pheromonal traps processed with sterilisators. The traps were uniformly installed- 10 traps/ha on a distance of 30x30 m, at a proper height- 2-2,5 m. The

evidence of captures in the control traps was performed once every 5 days until the end of butterfly flight after method (5). The number of predatory insects was calculated on 10 trees in every variant.

Results and discussions

Examination of the data presented in (Tables 1) shows that biorational preparates applied in the same phenological stage as the chemical preparates stop the development of *Taphrina deformans* Tul. on leaves and *Monilia fructigena* West. on fruits more effective than the conventional scheme with 81,6% against *Taphrina deformans* Tul. and 52,2 % against *Monilia fructigena* West.. Which is also confirmed in experiments about examining the effectiveness of growth and resistance stimulators (Reglalg, Recol) that on the background of chemical treatments have reduced the development of diseases *Taphrina deformans* and *Monilia fructigena* to zero, and have stimulated the formation of triple flower buds with 27,0% and 33,8% more than the etalon.

Analyzing the data from tables 3 and 4 we found that the biological effectiveness of the method of *Grapholita molesta* Busck and *Anarsia liniatella* Zeller male autosterilisation in pheromonal traps processed with hormonal preparate Admiral in peach orchard was 63.1% at the evidence of damaged shoots and an efficacy of 77.6% at the evidence of damaged fruits compared to chemical etalon.

Table 1 - The efficacy of applying schemes of biorational preparates in peach protection against *Taphrina deformans* Tul. on leaves and *Monilia fructigena* West., on fruits, peach orchards at LLC „Agrobrio”, central zone, 2014.

Variants	Spreading degree of <i>Taphrina deformans</i> on 100 shoots, (%)	*Biological efficacy, (%)	Spreading degree of <i>Monilia fructigena</i> on 100 fruits, (%)	*Biological efficacy, (%)
Control	81.6	-	20.1	-
Chemical Etalon	63.3	22.4	13.3	33.8
Experiment	15.0	81.6	9.6	52.2
*- in comparison with untreated control				

Table 2 - The biological effectiveness of the sterilization method of *Grapholita molesta* Busck and *Anarsia liniatella* Zeller males in pheromonal traps processed with hormonal preparates, LLC “Agrobrio”, peach orchard, central Moldavian zone conditions, Băcioi village, 2014

Variant	Nr. of fruits (pieces)	Damaged fruits	Damaged fruits, %	*Biological efficacy of the method %
Control	300	215	71.6	-
Chemical	300	104	34.6	51.7

Etalon				
Experiment	300	48	16.0	77.6
*in comparison with untreated control				

Analyzing the data from tables 2 and 3 we found that the biological effectiveness of the method of *Grapholita molesta* Busck and *Anarsia liniatella* Zeller male autosterilisation in pheromonal traps

processed with hormonal prepare Admiral in peach orchard was 63.1% at the evidence of damaged shoots and an efficacy of 77.6% at the evidence of damaged fruits compared to chemical etalon.

Table 3 - The biological effectiveness of the sterilization method of *Grapholita molesta* Busck and *Anarsia liniatella* Zeller males in pheromonal traps processed with hormonal preparates, LLC “Agrobrio”, peach orchard, central Moldavian zone conditions, Băcioi village, 2014

Variant	Nr. of shoots (piece)	Damaged shoots	Damaged shoots, %	*Biological efficacy of the method %
Control	600	350	58.3	-
Chemical Etalon	600	193	32.1	44.9
Experiment	600	129	21.5	63.1
*in comparison with untreated control				

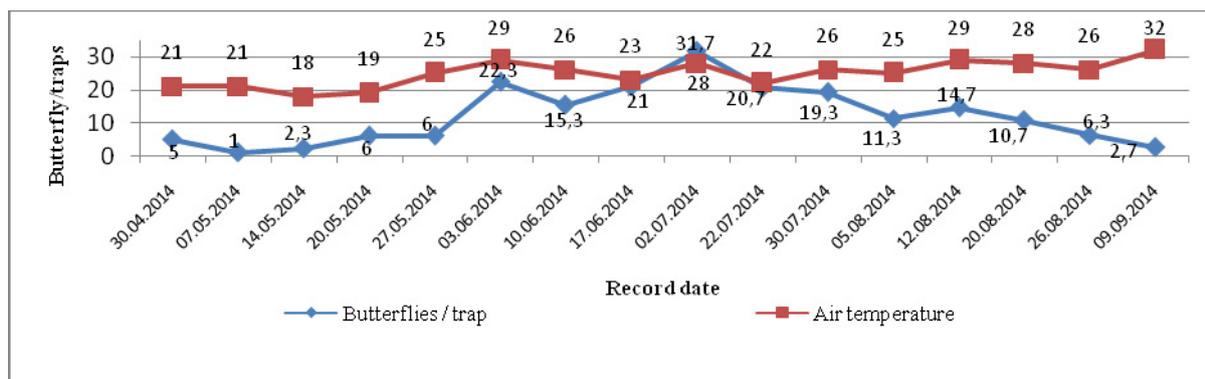


Fig. 1 - The dynamics of *Grapholita molesta* Busck butterflies catch in pheromonal traps on peach trees LLC “Agrobrio”, central Moldavian zone, Băcioi village, 2014.

The researches had shown that in natural conditions typical for Republic of Moldova *Grapholita molesta* Busck. has developed in 4 full generations (Fig. 1). Seasonal dynamics of the first generation of the *Grapholita molesta* Busck species 2014 is within the limits from 30 April to 27 May, with a duration of about 1 month. The peak of the 2nd generation sexual cycle was fixed from 3 June to 17 June, during 15 days. The 3-rd generation has a seasonal sexual cycle in the time that lies between the 2nd decade of July and the first decade of August. The 4-th generation has a seasonal cycle from 12 August to 19 September lasting for 37 days.

Conclusions

1. Applying six treatments with biorational preparates to combat *Taphrina deformans* Tul. on leaf and *Monilia fructigena* West. on fruits with prepare Funecol- 4.0 l/ha (2 treatments and 2 treatments with 0,5 l/ha with Rizoplan - 2.0 l/ha and *Trihodermina* -5 l/ha) had reduced in the experimental variant the degree of extent of *Taphrina deformans* Tul. disease on leaves to 15.0%, compared to chemical etalon which spread has reached - 63.3% and to untreated control which spread was - 81.63%.
2. The researches we made had shown that the oriental worm on peach culture in the Central region of Moldova, had developed four full generations.

3. In the experience with autosterilisation with biorational pesticide *Admiral* were captured in total 612 males, in average 36 individuals/trap of Oriental worm (*Grapholita molesta* Busck) and 134 males in average of 8.3 individuals/trap. of striped moth (*Anarsia liniatella* Zeller). The biological efficacy of the autosterilisation method was of 63.1%.

4. Applying three treatments with growth promoters (*Regalg*, *Recol*) on peach crops had stimulated triple flower bud formation with 27.0% and 33.8% more than in etalon variant

References

1. BUSUIOC, M., 2006 - *Entomologie agricolă*. Chişinău, p. 59.

2. CHRIS WILLIAMSON, R., PH.D. 2004 - Biorational pesticides: What are they anyway? Alternatives emerge for regulated chemical products., p. 27.

3. БЫХОВЕЦ, А.И., ГОНЧАРУК, В. М., ЛАХВИЧ Ф. А. 2009 - *Создание нового поколения химико-биологических средств защиты растений- биорациональных пестицидов* // Информ. Бюлл., ВПС/МОББ, Кишинев, № 40. с.167-170.

4. ВИЛКОВА, Н.А., СУХОРУЧЕНКО, Г.И., ФАСУЛАТИ С.Р. 2005 - *Стратегия защиты сельскохозяйственных растений от адвентивных видов насекомых-фитофагов на примере колорадского жука *Leptinotarsa decemlineata* Say (Coleoptera, Chrysomelidae)*. Вестник защиты растений. СПб, , №3.-708. Пушкин., с. 303-332.

5. ВОЙНЯК, В.И., и др. 2009 - *Итоги и перспективы применения БАВ в системах интегрированной защиты растений*. Информ. Бюлл. ВПС/МОББ, , Кишинев, № 40. с.212-217.

6. ВОЛОЩУК, Л.Ф., 2008 - *Экологическое земледелие-надежный путь улучшения фитосанитарного состояния агроценозов. Биологическая защита растений-основа стабилизации агроэкосистем*. Краснодар, вып. 5, с. 64-67.

7. ЗАХАРЕНЕКО, В. А., 2008 - *Мировые тенденции развитие научного обеспечения биологической защиты растений. Биологическая защита растений-основа стабилизации агроэкосистем*. Краснодар, вып. 5, с. 32-52.