RATIONALIZATION OF TREATMENT APPLICATION FOR FIGHTING AGAINST APPLE BLOSSOM WEEVILS (ANTHONOMUS POMORUM)

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***Abstract**. Research have been made on an over-intensive apple plantation in Caransebes for Yonathan kind, through bioecological observations based on meteorological and ecological factors. The population estimation of Anthonomous pomorum (the apple blossom weevils) was made by shaking the trees on sheets and with the help of trapping supporting undergarment placed on the trunk, and determining the number of weevils on m^3 from the crown in order to apply the treatment for fighting against them. In fighting agaisnt weevils the following insecticides have been used: Calypso 480 SC, Diazol 60 EC, Sinoratox Plus applied in phenophase of 10 – 15 % floral buds de-budded before the weevils lay the eggs. The chemical treatment is applied on plantations in which the frequency of attack in the previous year exceeded 8 – 10 % and the density of populations correlated with the load level of fruit buds trees has values of 0,5 – 1 weevils crown meter. Similarly can be used PED of 10-25 weevils (100 shakes branches). In order to rationalize the treatment applied, the efficiency of pesticide Calypso 480 SC, which applied during the warned period has reduced the frequency of attacks comparative to the treatment applied outside the warning period, a fact observed in pesticide Sinoratox Plus and Diazol 60 EC as well. The chemical treatment is applied in plantations where the rate of attack in the previous year exceeded 8-10% in orchards with normal flowering, 10-15% in those with poor flowering and 3-8% in those with abundant flowering, and population density in the year the past correlated with the degree of confusion of the fruit buds have the following values: 0.5 - 1 ladybug at m crown (normal tangle), 1-3 ladybugs per m crown (poor tangle). It can be use PED = 10 - 25 ladybugs (100 shaking branches) The trees have been shaken in the morning before sunrise at lower temperatures when the ladybugs are under exfoliating crust of trees. The observations were made in 15.III – 28.III at intervals of 2 – 3 days, trees having a normal load with sprouts with fruit determining an average of 3 ladybugs/m3 treetop and 15 ladybugs/100 branches what required chemical combating of this pest. Delaying treatment for 3-4 days causes an increase in the attack rate and attacked flowers, respectively, to levels close to the untreated control, significantly reducing production. Applying treatment outside the warning period is not economic, causing undue environmental pollution. The prediction of species Anthonomus pomorum (apple blossom weevils) was made through movement of trees on sheets and with help of belt trap applied on the stem in March and April resulting number of apple blosoom at m3 for treetop, function which is necessary to apply for treatment to combating the pest used the levels of density.*

Key words: *weevils, apple, treatments, pesticides, fighting against*

INTRODUCTION

`Apple blossom weevil is widespread in all growing areas of trees from Europe. In our country the climatic conditions more favourable are met in plantations in the areas with forest steppe and in sub-areas of oak forests. The most damage cause in coarse orchard in counties like: Bistriţa – Năsăud, Suceava, Maramureş, Iaşi, Vrancea, Buzău, Argeş, Vâlcea, Bihor, Caraş
Severin,Arad, Timiş.

The papers about *Anthonomus pomorum* consists in the next year theflowers will be attacked and with what intensity, this element should be known to decide if is necessary to take control measures for this pest (Simeria Gh., 2006).Estimate stage is in the spring when the wheather gets warmer and the temperature exce d 6ºC, before the start of buds development.

During swelling of floral buds, at the invulnerable trees in previous year install drawstrings made by gofer carton, shred or gauze.In the next days, between 9-11, is shaping up the drawstrings and it is shaking the treetop on sheets or tarps.The warming of the fighting land it's done based on the complex method which takes account of phenological condition, biological and insect's ecology.

MATERIAL AND METHOD

At the research used the variety Yonathan.2 The American type, obtained in 1880 by Ph. Rich in Ulster from New York. It is very appreciated and common in our country.
Achieves grafted on all rootstock of trees. Pollinators. Red delicacy. The tree have middle vigor, the trunk is straight, the crust is grey which remain smooth very long time.
The reaches we're made in a plantation of apples at variety Yonathan. We're made ecological observations based on meteorological and ecological factors for a period for 5 years.

The prediction of species Anthonomus pomorum **(**apple blossom weevils) was made through movement of trees on sheets and with help of belt trap applied on the stem in March and April resulting number of apple blosoom at m3 for treetop, function which is necessary to apply for treatment to combating the pest used the levels of density.

Fig. 1 Shaking of trees on sheets early morning for collection of ladybugs

Dates looking for population density of Anthonomus pomorus are presented in the table (Gh. Simeria).

Table1

The level of population density *Anthonomus pomorum L.* in plantation of apple from Caransebeş

The grade of freight of trees with sprouts fruit	**The level of density**		
	small	**medium**	**big**
Normal	< 1 ladybugs /m^3	1 – 3 ladybugs /m^3	> 3 ladybugs /m^3
Abundance	< 3 ladybugs /m^3	3 – 5 ladybugs /m^3	> 3 ladybugs /m^3
Low	< 0,5 ladybugs /m^3	0,5 – 1 ladybugs /m^3	> 3 ladybugs /m^3

Beginning of bud opening of sprouts and triggering of treatment when 15% of sprouts are at beginning of bud opening In previous year in plantation intensive of apple at variety Florina, 14% of cuff links were attacked under one ladybug at m3, not being necessary application of chemical combating. In treatment was used in 3 versions pesticides:

Version 1 – Calypso 480 SC (tiacloprid) conc. 0.2%;

Version 2 – Sinoratox Plus (dimetoat + cipermetrin) conc. 0,1%;

Version 3 – Diazol 60 EC (diazinon) conc. 0,15%.

RESULTS AND DISCUSSION

Apple blossom weevil (Anthonomus pomorum L.) is wintering at the stage of adult having the biological verge lower to 6Oc. The results of researchers about pest stages in 2014 – 2018 at Caransebeş are in the table.2

Table 2

Biological studies of Apple blossom weevil (*Anthonomus pomorum* L.) in 2014 – 2018 in Caransebeş

Specification	2014	2015	2016	2017	2018	Average
I. Adult						
The date of appearance of adult	20.03	4.04	10.03	10.3	25.03	
∑ (tn-6)°C	41,6	15,3	10,1	10,9	30,2	1,6
Stage of vegetation	Swollen of sprouts	0,5% of floral sprouts of bud opening	0,5% of sprouts of bud opening	Swollen of sprouts	Swollen of sprouts	
II. Egg						
Beginning of egg-laying	5.04	19.04	20.04	1.04	6.04	
∑ (tn-6)°C	68,7	56,1	35,6	39,3	80,4	5,9
Stage of vegetation	Bud opening 5 0 – 65%	Advanced bud opening	Advanced bud opening	Advanced bud opening	Bud opening over 50%	
III. Grub						
The date of appearance	21.04	29.04	3.05	16.04	7.04	
∑ (tn-6)°C	111,0	143,7	91,4	136,6	149,6	28,2
The stage of vegetation	At riddling inflorescences	At riddling inflorescences	Flowering corolla	At riddling inflorescences	At riddling inflorescences	
IV. Nymph						
The date of appearance	10.05	15.05	19.05	2.05	12.05	
∑ (tn-6)°C	129,6		270,8	224,4	309,8	

		285,2				59,9
V. Undeveloped adults						
The date of appearance	9.05	25.05	29.05	10.05	21.05	
∑ (tn-6)°C	336,2	295,5	370,6	312,6	388,1	60,6
During the day	59	52	59	60	57	7

From the data submitted in this table result that during the 5 years of study in Bazinul Caransebeş the appearance of adults from wintering stages happened in years of study at an average temperature effective of 21,6o C and in the year 2018 to an amount temperature effective of 30,2o C. For Apple blossom weevil the moment when must intervene with combating treatment is the period of additional feeding before the start laying. Beginning of laying has occurred at an average effective temperature of 55.9 ° C in the phenophase of deworming.

The appearance of the first larvae occurred between 16.04.2015 and 3.05.2016 at an effective temperature of 91.4 - 149.6 ° C, with an average of 128.2ºC, usually at the inflorescence resumption and only in one year in the corolla flowering phenophase, and in 2015 on April 7 at an effective temperature of 149.6 ° C. The date of the nymph stage occurred between 2.05.2018 and 19.05.2017 at an average effective temperature of 259.9 ° C, and the new non-mature adults appeared no earlier than 10.05.2018 and no later than 28.05. 2017, at an effective temperature of 312.6 - 395.5 ° C, with an average of 360.6 ° C. The life cycle of the insect was 52-60 days, on average 57 days, in 2011 it was 57 days as the average of the period.

Table 3

Average temperatures around the date of occurrence of the biological stages of apple blossoms (*Anthonomus pomorum* L.) between 2014 and 2018

Year	**Adult**		**Egg**		**Grub**		**Nymph**		**Undeveloped adults**
	tn°C	**Pre-emptive day**	**tn°C**	**Duration of day incubation**	**tn°C**	**Stage of the day**	**tn°C**	**Stage of the day**	
2014	8,8	16	13,8	16	4,5	19	14,7	9	14,0
2015	9,5	15	16,1	10	6,7	19	15,6	10	17,7
2016	7,1	13	15,3	13	6,5	17	15,3	9	14,5
2017	9	22	13,8	15	1,1	23	17,9	8	16,7
2018	4	12	11,	11	0,8	25	14,0	9	14,3
Average	7,0	5,6	4,2	13	3,9	0	5,5	9	5,4

Prevention of the attack and pest control is achieved by applying the treatment when it is recorded that 10-15% of the fruit buds are at the beginning of the defoliation, using Calypso 480 SC (tiacloprid) conc. 0.02%, Sinoratox Plus (dimethoate + cypermethrin) conc. 0.1%, Diazol 60 EC (diazinon) conc. 0.15%. It can be use PED = 10 - 25 ladybugs (100 shaking branches).

CONCLUSIONS

The appearance of adult apple blossoms in the wintering areas under the conditions of the Caransebes fruit tree basin usually takes place in the second half of March only when the air temperature exceeds 6ºC, in the phenophase of the buds - the beginning of the bug opening.

The pre-storage period averaged 15.6 days, and the beginning of laying usually takes place in the first decade of April, sometimes even in the second decade of this month, at an average effective temperature of 55 , 9ºC during the advanced dewlapping period.

The length of the insect's biological cycle in the Caransebes Basin is 52 to 60 days on average 57 days, with an average effective temperature of 360.6ºC.

The time to intervene with combating treatment is in the supplementary feeding period of immature adamant adults when 10-15% of the floral buds are at the beginning of laying before the eggs are deposited.

Delaying treatment for 3-4 days causes an increase in the attack rate and attacked flowers, respectively, to levels close to the untreated control, significantly reducing production.

Applying treatment outside the warning period is not economic, causing undue environmental pollution.

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