SOME BIOLOGICAL, ECOLOGICAL AND MICROBIOLOGICAL CONTROL DATA REGARDING THE ATTACK OF THE FALL WEBWORM MOTH (*Hyphantria cunea* DRURY), A DANGEROUS PEST IN THE AGRICULTURAL, ORNAMENTAL AND FOREST PLANTATIONS IN THE REPUBLIC OF MOLDOVA

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Abstract. The aim of the present paper is to discuss the results of two years attempt of biological control of *H. cunea* populations with a baculoviral product (HcVPN, VG) previously obtained at The Institute for Plant Protection and Ecological Agriculture, Academy of Sciences of Moldova. In the paper there are presented the results of the researches of the species *H. cunea* DRURY, an important pest for the plantations in Republic of Moldova. Under the conditions of the Republic of Moldova fall webworm has two generation, and in exclusive mode a partial third generation. The investigations were carried out during the period of 2004-2011 years in different agricultural, ornamental and forest ecosystems. The development of *H. cunea* was found to depends not only on temperature but also largely on the food-plant. The larval and pupal stages of both generations in Moldova were shorter on the preferred plants mulberry (*Morus*. L.), apple-tree (*Malus domestica* L.), cherry-tree (*Cerasus avium*) and plum-tree (*Prunus domestica* L.) than on grapevine (*Vitis vinifera* L.)**,** strawberry (*Fragaria moschata* DUCH.), rose (*Rosa damascena* MILL.) or lime (*Tilia cordata* MILL.), walnut-tree (*Iuglans regia* L.) and apricot (*Armeniaca vulgaris* L**.**) occupied an intermediate position. Baculoviral improved product Virin ABB-3 was tested in laboratory against *H. cunea* larvae. In the report there are also submitted the results of the joint application of the biological preparation Virin ABB-3. As to the mortality of the caterpillars on the VG 2011, it has – 78-82%, while VPN has 74-80%. But in the options there were used both viruses VG and VPN (1:1), the mortality increased from 88% to 92%. Being analysed the biological effectiveness of the baculoviruses was 75-90%. The material was used to prepare the biological preparation Virin-ABB-3. Renovated sources of VPN and VG of year 2011 have been used for obtaining viral and experimental material with change of technologies of obtaining the viral preparations on the basis of these sources at the 2nd generation of *H. cunea* in year 2012. The researches point out *H. cunea* the critical stage and will be very useful for the baculovirus treatments management.

Keywords: *Hyphantria cunea* DRURY, Biology, Ecology and control with Virin ABB-3, baculovirus, VG, VPN.

Rezumat. Unele aspecte privind biologia, ecologia şi combaterea microbiologică a omizii păroase a dudului (*Hyphantria cunea* DRURY), dăunător periculos al plantaţiilor agricole, ornamentale şi forestiere din Republica Moldova. Scopul lucrării de faţă este de a discuta rezultatele de control biologic al populaţiilor de *H. cunea* cu un produs baculoviral (HcVPN, VG) care a fost obţinut anterior la Institutul de Protecţia Plantelor şi Agriculturii Ecologice din Republica Moldova. În lucrare se prezintă rezultatele cercetărilor asupra speciei *H. cunea* (omida păroasă a dudului), dăunător important pentru plantaţiile din Republica Moldova. *H. cunea* are două generaţii şi numai în mod excepţional a treia generaţie parţială. Observaţiile au fost făcute în perioada 2004-2011. Dezvoltarea dăunătorului depinde nu numai de temperatură dar şi în mare măsură de regimul trofic. Stadiile larvare şi pupale din ambele generaţii au fost mai scurte pe plantele preferate: dud (*Morus* sp.), măr (*Malus domestica* L.), cireş (*Cerasus avium*) şi prun (*Prunus domestica* L.), decât pe viţa de vie (*Vitis vinifera* L.), căpşun (*Fragaria moschata* DUCH.), trandafir **(***Rosa damascena* MILL.) sau tei (*Tilia cordata* MILL.); cele crescute pe nuc (*Iuglans regia* L.) şi cais (*Armeniaca vulgaris* L**.),** ocupă o poziţie intermediară. Produsul baculoviral Virin ABB-3 perfecţionat a fost testat în condiţii de laborator împotriva larvelor de *H. cunea*. Nivelul mortalităţii înregistrate la VG la a 15-a zi a fost de 78-82%, iar la VPN 74-80%, când s-a efectuat infectarea cu monovirusuri. În variante când s-au folosit ambele virusuri VG şi VPN (1:1), mortalitatea a crescut de la 88 până la 92%. Eficacitatea biologică a baculoviruşilor era la nivel 75-90%. Materialul a fost utilizat pentru pregătirea preparatului Virin-ABB-3. Suşele reînoite de VPN şi VG din anul 2011 au fost folosite pentru obţinerea materialului viral şi experimente cu schimbarea tehnologiilor de obţinere a preparatelor virale pe baza acestor suşe la generaţia a II-a de *H. cunea* în anul 2012. Cercetările subliniază fază critică a *H. cunea* şi va fi foarte util pentru gestionarea tratamentelor cu baculovirusuri.

Cuvinte cheie: *Hyphantria cunea* DRURY, biologie, ecologie şi combaterea cu Virin ABB-3, baculovirus, VG, VPN.

INTRODUCTION

Fall Webworm *Hyphantria cunea* DRURY, of the Arctiidae family is a polyphagous lepidopteran pest insect, the origin of which is North America (Canada, USA), where it is spread everywhere between the Atlantic Ocean and the Pacific. *H. cunea* spread to the EPPO region after the Second World War (HRUBIK, 2007). *H. cunea* is presently distributed in many areas in the northern hemisphere (WARREN & TADIC, 1970) and New Zealand (KEAN & KUMARASINGHE, 2007). The pest has been introduced in various parts of Europe and Asia (LI *et al.,* 2001). The food spectrum of this pest includes more than 626 plant species (WITTENBERG, 2005). At least 20 countries across Europe have reported *H. cunea*, including Hungary (GYORFY, 1954), Romania (MANOLACHE & BOGULEANU, 1957; BOGULEANU, 1968), Ukraine (SICURA, 1972), Greece (MOULOUDIS *et al.,* 1980), Italy (MAZZON & MARTINI, 2000) and other countries (SICURA, 2005); 2 in Eurasia, Turkey (DEMIR, 2006) and Russia (SHAROV & IZHEVSKIY, 2002), and 10 in Asia, Japan (LI & GOTO, 2001), South Korea (KEAN, 2003), China (YANG & ZHANG. 2011), Azerbaijan (NURIEVA, 2002), Iran (REZAEI *et al.,* 2003), Mongolia and Uzbekistan (GRICHANOV & OVSYANNIKOVA, 2003), Georgia (JAPOSHVILI *et al.*, 2006) and Kazakhstan and Kyrgyzstan (ANONIMOUS, 2007).

A series of problems in the field of plants protection and the growing of ecological products can be solved using three important biological agents: insects, microorganisms (viruses) and bacteria (*B. thuringiensis*, etc.) bioactive substances (CROSS & DICKLER, 1994; VOLOSHCHYUK, 2007, 2008).

The recognition of the necessity for the application of the entomopathogenic viruses and baculoviral preparations elaborated on their basis is determined by the qualitative originality of the pathogenic agents, among which their specificity and epizootic character constitute the main advantages compared with the chemical insecticides. There are necessary certain actions meant to underline the importance of the rational utilization of these otherwise efficient means of pest control according to nature laws, which regulate the pest populations under the action of baculoviruses (CHUKHRII, 1988; CIUHRII & ARMENESCU-CIUHRII, 2008; TANADA & KAYA, 1993; VOLOSHCHYUK, 2010).

MATERIAL AND METHODS

The researches have been realised on the caterpillars of 2-3 ages of the *H. cunea.* In the study, we used the Nuclear Polyhedrosis Virus, selected and identified in the laboratory of the insect viruses.

For the contamination of the laboratory insects, we used the dosed feeding, which contains 10 polyhedrons for each caterpillar. The monitoring of the insects lot and the estimation of the dead caterpillars has been carried out daily, beginning with the 3rd day of the contamination.

The effectiveness of the virus action was established according to the Abbot formula, which provides the insects' natural death rate:

$$E_{ab} = \frac{Mo - M_c}{100 - Mc} * 100$$

Where Eab-is the death rate, %; Mo – the number of dead specimens in the experiment; Mc - the number of dead specimens in the control.

The caterpillars *H. cunea* were kept under laboratory conditions at 27˚C.

The mathematical treatment was registered on the 15th day after contamination; the statistical treatment was made according to DOSPEKHOV (1985), GAR (1963), SĂVESCU *et al*. (1978), CIUHRII *et al*. (1990).

In order to establish the density or frequency of the attacks and to render certain aspects regarding their biology, there were carried out observations according to the adequate methodology between 2004 and 2008. The experiments were made in several orchards of the Republic of Moldova. The observations were held both on the pest adults and on development of other phases of the ontogenesis: eggs, larvae, pupas. There were taken into account 100 rosettes with leaves. There were marked 5 control trees disposed on the diagonal of the plots.

To determine the beginning of pest activity, there were carried out registrations using trap-belts, which had been attached around the lower part of the trunk of 10 trees during the previous season.

Laboratory investigation of the sampled material attacked by this species of insects were carried out, in correspondence with the present norms, in order to establish their frequency, intensity, and attack degree. To establish the influence of the trophic factor on the insect development, there were grown larvae (from the same lots) on 12 species of host-plants (ornamental, forest and fruit trees): mulberry (*Morus* L.), maple (*Acer negundo* L.), willow (*Salix* L.), poplar (*Populus alba*. L), lime (*Tilia cordata* MILL.), apple-tree (*Malus domestica* L.), walnut (*Iuglans regia* L.), pear-tree (*Pirus sativa* LAM. et DC.), apricot tree (*Armeniaca vulgaris* L.), plum tree (*Prunus domestica* L.), cherry-tree (*Cerasus avium*). Under natural conditions, there were made observations on the appearance of adults, duration of the flight and, copulation. All data were interpreted in relation with the main climatic factors. Control experiments with the viruses preparations were conducted under natural conditions (2-3 trees in each variant), and under laboratory conditions as well, using special rearing boxes, crystallizers (for larvae of different age of development) of both generations. Observations on larvae mortality were accomplished after 12, 14, 48, and 72 hours.

RESULTS AND DISCUSSIONS

Monitoring the appearance of butterflies from the hibernated pupae of the I generation during a period of five years (2004 – 2008) in different places we have stated that the first butterflies appeared between April 30 (2008) and May 22 (2007). As it is remarked, the first butterflies appeared when the average daytime temperature was higher than 10°C (the lower threshold of the pupa) during 25-32 days. The sum of efficient temperature, at the biological threshold of 10°C varied between 106°C (2008) and 145°C (2006), but at the biologic threshold of 8.5°C, it was between 142°C (2004) and 184°C (2007).

The appearance of the butterflies according to the number of days with 10°C ranged between 25 (2004) and 32 butterflies (2006); at 8.5°C, it varied between 36 (2006) and 47 butterflies (2004); at 14°C, it was between 8 (2006) and 13 butterflies (2008); but at 12°C it was between 15 (2006) and 20 butterflies (2008). The maximum flying was on May 4 (2007) at t°C>10°C=170 butterflies and at t°C>8.5°C= 190 butterflies; on May 19 (2008) at t°C>10°C=204 butterflies and at t°C>8.5°C=223 ones (Table 1). The data rendered in table 1 showed that the sum of the effective temperatures presents rather large variations from one year to another and, thus, it cannot be used as the single criterion for the prognosis of the appearance of the first butterflies in spring. They can be taken into consideration informatively and in correlation with other environmental factors as it follows: humidity, sudden changes of temperature, frost, isolation, etc.

Analysing the sex index of the fall webworm in relation with the environment factors it was noticed that it is influenced, to at large extend, by the trophic factor. On host ornamental and forest trees (mulberry (*Morus* L.), maple

(*Acer negundo* L.), willow (*Salix* L.), poplar (*Populus alba* L.), and lime (*Tilia cordata* MILL.), the sex index of pupa varied between 0.33 on poplar (*Populus alba* L.) and 0.57 on maple; in case of butterflies, it oscillated between 0.26 on lime and 0.62 on maple (*Acer negundo* L.). In case of host fruit – trees, the sex index of pupa varied between 0.35 on apricot-tree (*Prunus domestica* L.) and 0.49 on plum-tree; as for butterflies – between 0.33 on cherry-tree (*Prunus avium* L.) and 0.48 on walnut (*Iuglans regia* L.) (Table 2).

Table 1. The appearance of the butterflies of *H. cunea* from hibernated pupae in 2004-2008.
Tabel 1. Apariţia fluturilor de *H. cunea* din pupele hibernante în anii 2004-2008.

Year	Date	Appearance of butterflies						Flying maximum		
		Sum of efficient temperatures		By day number				Appearance	10˚C	8.5˚C
		10° C	8,5° C	8,5° C	10° C	12° C	14° C			
2004	May 7	115	142	47	25	16	9	May 18	157	168
2005	May 5	114	177	40	30	19	12	May 15	155	170
2006	May 22	145	156	36	32	15	8	May 29	225	237
2007	April 30	114	184	40	26	18	12	April 4	170	190
2008	March 8	106	165	43	24	20	13	May 19	204	223

Table 2. Sex index of pupae and butterflies *H. cunea* of fall webworm according to the trophic factor.
Tabel 2. Indexul sexual la pupe şi fluturi de *H. cunea* în funcţie de factorul trofic.

No.	Host plant	Pupa			Butterflies		
		total number	female number	sex index	total number	female number	sex index
1	Mulberry (*Morus*)	681	381	0.55	603	307	0.5
2	Maple (*Acer negundo*)	703	407	0.57	651	409	0.62
3	Willow (*Salix*)	591	302	0.51	511	301	0.58
4	Poplar (*Populus alba*)	377	127	0.33	293	108	0.36
5	Lime (*Tilia cordata*)	345	120	0.34	270	72	0.26
6	Apple tree (*Malus domestica*)	524	219	0.41	480	172	0.35
7	Pear tree (*Pirus sativa*)	453	176	0.38	328	123	0.37
8	Wallnut -tree (*Iuglans regia*)	505	231	0.45	435	210	0.48
9	Apricot-tree (*Armeniaca vulgaris*)	317	111	0.35	207	72	0.34
10	Cherry- trees *(Cerasus avium)*	461	204	0.44	383	183	0.47
11	Plum - tree (*Prunus domestica* L.)	585	292	0.49	493	261	0.52
12	Sour cherry tree (*Cerasus vulgaris*)	472	183	0.38	405	137	0.33

As it regards the female fertility it varied according to the host plant. The highest prolificacy was of 570 – 408 eggs on mulberry (*Morus* L.), maple (*Acer negundo* L.), plum (*Prunus domestica* L.), and the lowest of 205 – 286 eggs on cherry tree (*Prunus avium* L.) and willow (*Salix* L.). On some species, especially on fruit trees and fructiferous shrubs, the butterflies the larvae of which fed on the leave of these trees, the fertility was between 301 and 370 eggs – walnut (*Iuglans regia* L.) and apple-tree (*Malus domestica* L.) (Table 3).

Table 3. Fertility of butterflies of fall webworm *H. cunea* resulted from larvae which were fed with the leaves of different host plants.
Tabel 3. Prolificitatea la fluturii de *H. cunea* proveniţi din larve care s-au hrănit cu frunzele diferitor plante-gazde.

No.	Host plant	Number of eggs		
		minimum	maximum	average
1.	Mulberry (*Morus*)	370	912	570
2.	Maple (*Acer negundo*)	254	802	510
3.	Willow (*Salix*)	130	438	286
4.	Poplar (*Populus alba*)	122	354	253
5.	Lime (*Tilia cordata*)	112	344	243
6.	Apple – tree (*Malus domestica*)	94	601	370
7.	Pear – tree (*Pirus sativa*)	158	310	304
8.	Walnut – tree (*Iuglans regia*)	108	423	301
9.	Apricot – tree *Prunus armeniaca*)	85	524	365
10.	Cherry – tree (*Cerasus avium*)	157	630	408
11.	Plum – tree (*Prunus domestica*)	32	580	370
12.	Sour cherry tree (*Cerasus vulgaris*)	83	360	205

The experiments for the preparation of Virin-ABB-3 with contaminated caterpillars (larvae) of *H. cunea* on different plants became an acute necessity for the determination of the percentage of the mortality of specimens with the same concentration and the same number as well as the determination of biological effectiveness. The results of the experiments are presented in Table 4. The highest mortality rate of the caterpillars was registered in case of the mulberry – 97.3% and the lowest mortality rate in case of acacia – 75.0 %. The biological effectiveness according to Abbott formula on the 15^{th} day represented 73.8%. The mortality rate in the control on the 10^{th} – 15^{th} day was 5%.

Table 4. The degree of infection of *H. cunea* with biopreparation Virin-ABB-3 on different plants.
Tabel 4. Gradul de infectare a *H. cunea* cu biopreparatul Virin-ABB-3 pe diferite specii de plante.

Plants	No. of caterpillars	Solution Conc Poliedre/ cmc	No. of the dead caterpillars / days					Mortality percentage			Biologic Efficacy to the Abbot, on the 15 days %
			3	5	7	10	15	on the 5th day	on the 10th day	on the 15th day	
Mulberry (*Morus*)	40	10^6	0	12	19	34	39	30.0	85.0	97.5	97.3
Maple (*Acer negundo*)	40	10^6	0	8	16	29	38	20.0	72.0	95.5	95.2
Walnut–tree (*Iuglans regia*)	40	10^6	0	6	9	28	38	15.0	70.0	85.0	84.2
Cherry tree (*Cerasus avium*)	40	10^6	0	5	10	27	32	12.0	65.0	80.0	78.9
Acacia (*Robinia pseudacacia*)	40	10^6	0	2	5	16	30	5.0	40.0	75.0	73.8
Control	40	10^6	0	0	2	4	4	0	5.0	5.0	-
										$DEM_{0,05}$	3.6

As it regards the mortality of the caterpillars on the VG 2011 it reached 78-82%, while VPN reached 74-80%. In options, there were used both viruses VG and VPN (1:1), and mortality increased from 88 % to 92%. Analysing the biological effectiveness of the baculoviruses we noticed a value of 75-90%. Baculoviruses were used to prepare Virin ABB-3. The material was used to prepare the biological preparation Virin-ABB-3. Being analysed the biological effectiveness of the baculoviruses was 75-90%. The material was used to prepare the biological preparation Virin-ABB-3. Renovated sources of VPN and VG of year 2011 have been used for obtaining viral and experimental material with change of technologies of obtaining the viral preparations on the basis of these sources at the 2nd generation of *H.cunea* in year 2012. The researches point out *H. cunea* the critical stage and will be very useful for the baculovirus treatments management. The results of the experiments are presented in the table 5.

Table 5. The degree of infection of *H. cunea* with new baculovirus in 2011 (I-generation). Natural food - leaves of mulberry.
Tabel 5. Gradul de infectare de *H. cunea* cu baculovirus nou. Hrană naturală frunze de dud.

The options	Repetition	No. of larvae	Larvae age	Solution no. polyhedrons/ml	The mortality of day			
					7		15	
					No. of larvae	%	No. of larvae	%
VG 2011	I	50	II-III	10^5	24	48.0	39	78.0
VG 2011	II	50	II-III	10^5	25	50.0	41	82.0
VPN 2011	I	50	II-III	10^5	26	52.0	37	74.0
VPN2011	II	50	II-III	10^5	27	54.0	40	80.0
VPN±VG (1:1)	I	50	II-III	10^5	28	56.0	46	92.0
VPN±VG (1:1	II	50	II-III	10^5	28	56.0	44	88.0
Control	I	50	II-III	10^5	0	-	1	4.0
Control	II	50	II-III	10^5	0	-	2	6.6

However for early detection of the fall webworm and moth liquidation, and its further settling prevention it is necessary to know the development terms of the pest. For this aim the phenological calendars for the fall webworm moth allows solving other ecological problems, such as prognoses of pairing predictions for pests and entomophagous, precise determination of treatment terms, and number of generation in the given region. If the dynamics of the number of species according to the living conditions is a multifactorial process, then the number of environmental factors, which significantly influences the number of the populations of a species, is always much smaller. This situation can be explained by the fact that non-possessing the ability to adapt simultaneously to a large number of factors, the population is forced to organize its vital activity in order to avoid contact with the majority of limiting factors and to depend on a minimum number of factors. Thus, as the main factor influencing the development of the fall webworm moth is temperature, in connection with the fact that the most efficient treatments were carried out against younger larvae ages of the fall webworm moth we made the phenological calendar for the territory of the Republic of Moldova (Table 6). In order to achieve the calendar, the method of SERGEEV & LEVINA (1973) was used.

The calendar is used in this. Let's suppose that the beginning of egg deposition by fall webworm moth in Moldova occurs on the 15th of May, and the average air temperature in May of the current year is 1°C higher than the multiannual norm. Then at crossing of the first column of the 15th of May and of the column + 1°C we find the date of the appearance of the first larvae generation, namely the 26th of May. Protecţia plantelor impotriva Omizii paroase a dudului este mai eficientă atunci cand larvele sunt de varste mici. At an average deviation of the air temperature for the same period of time by 1 degree, the beginning of the emergence of fall webworm moth larvae will take place on the 30th of May. Normally the larvae do not emerge simultaneously from all laid eggs. The emergence process lasts for another 1-1.5 weeks. Plant protection against *H. cunea* larvae is the most efficient when the larvae are of younger ages. That is why the treatments should be carried out when the larvae emergence from all deposition is finished.

During this period a small part of larvae are at the third, the largest part at the second, and a part at the first stage. Using the presented calendar, it is possible to predict beforehand the terms for beginning protection treatments, that allows not only to prepare the necessary facilities and stock in due time but also to prepare the local human population. By the same

terms it is possible to begin cutting out the caterpillars found within the web feeding in the tree crown. Carrying out this work earlier than this term can lead to the case when a part of the nests will be not observed and destroyed. In consequence, the phenological calendar offers the possibility to precisely and the most advantageously use the protection means against the fall webworm moth, and to carry out the mechanical control by nest cutting out before the elder age larvae are settled.

Table 6. Phenological calendar rendering the beginning of *H.cunea* larvae hatching and the date recommended for the start of protective treatments with Virin ABB-3 depending on the actual dates of oviposition and temperature conditions.
Tabel 6. Calendar fenologic al începutului incubaţiei larvelor de *H. cunea* şi data de protecţie cu Virin-ABB-3 în funcţie de datele reale ale ovipoziţiei şi de condiţiile climaterice.

Date of the laying beginning	The actual deviation of the average air temperature for a part of the prognosticated period from the începerii tratamentelor multiannual mean, °C													
	0	The terms for carrying treatments	+1	The terms for carrying treatments	+2	The terms for carrying treatments	+3	The terms for carrying treatments	-1	The terms for carrying treatments	-2	The terms for carrying treatments	-3	The terms for carrying treatments
May 1	19	29	16	26	14	24	12	22	21	1.06	25	5.06	30	10.06
May 3	20	30	17	27	16	26	14	24	23	3.06	26	6.06	30	10.06
May 5	21	1.06	18	30	17	31	16	26	24	4.06	27	7.06	31	11.06
May 8	23	3.06	21	1.06	19	1.06	18	30	25	5.06	29	9.06	1.06	12.06
May 10	24	4.06	22	2.06	21	1.06	20	31	26	6.06	30	10.06	2.06	13.06
May 13	26	6.06	24	4.06	23	3.06	23	3.06	28	8.06	31	11.06	4.06	15.06
May 15	27	7.06	26	6.06	25	5.06	25	5.06	30	10.06	1.06	12.06	5.06	16.06
July 10	20	27	19	26	19	26	18	25	20	27	20	27	21	28
July 13	22	29	22	29	22	29	21	28	23	30	23	30	24	31
July 15	24	31	24	31	24	31	23	30	25	20	25	20	26	2.08
July 18	27	3.08	27	3.08	27	3.08	26	2.08	28	4.08	28	4.08	29	5.08
July 20	29	5.08	29	5.08	29	5.08	28	4.08	30	5.08	30	5.08	31	6.08
July 23	1.08	7.08	1.08	7.08	1.08	7.08	31	6.08	208	9.08	2.08	9.08	3.08	10.08
July 25	3.08	10.08	3.08	10.08	3.08	10.08	2.08	9.08	4.08	10.08	4.08	10.08	5.08	11.08
July 28	6.08	12.08	6.08	12.08	6.08	12.08	5.08	11.08	7.08	13.08	7.08	13.08	8.08	14.08
July 30	8.08	14.08	8.08	14.08	8.08	14.08	7.08	13.08	9.08	15.08	9.08	15.08	10.08	16.08

CONCLUSIONS

To effectively manage new invasive pest insects and prevent their further expansion, it is necessary to study in detail the biological and ecological aspects of the local insect populations. In addition, specific studies on the efficacy of the indigenous natural enemies and their ability to control or reduce possible outbreaks of the alien species have to be done. In the recent infestations of *H. cunea* in the forests of the Republic of Moldova, it will be important to perform complementary investigation of biological and ecological aspects before implementing microbiological control strategies. Further studies should be carried out on the distribution pattern and preferred host plants in the Republic of Moldova, on different sub-species and forms of the fall webworm are present in other countries. During the years 2004-2011 the fall webworm moth (*H. cunea*) is on average level of population development. Analysing the pest in relation with the environment factors it is established that it is greatly influence by the trophic factor (except for temperature). Analysing the sex index of fall webworm in in relation with the environment factors it is stated that it is influenced, to a large extend, by the trophic factor. On host ornamental and forest trees (mulberry (*Morus* L.), maple (*Acer negundo* L.), willow (*Salix* L.), poplar (*Populus alba*.L), and lime (*Tilia cordata* MILL.), the sex index of pupa varied between 0.33 in case of poplar (*Populus alba* L.) and 0.57 on maple (*Acer negundo* L.); as for butterflies, it ranged between 0.26 on lime and 0.62 on maple (*Acer negundo* L.). In case of host fruit – trees, the sex index of pupa varied between 0.35 on apricot-tree (*Prunus domestica* L.) and 0.49 on plum and in case of butterflies – between 0.33 on cherry-tree (*Prunus avium* L) and 0.48 on walnut (*Iuglans regia* L.). Baculoviral improved product Virin ABB-3 was tested in laboratory against *H.cunea* larvae. In the report there are submitted the results of joint application of biological preparation Virin ABB-3. As to the mortality of the caterpillars on the VG 2011 reached 78-82%, VPN reached 74-80%. In the options there were used both viruses VG and VPN (1:1) and mortality increased from 88 % to 92%. Analysing the biological effectiveness of the baculoviruses we obtained a value of 75-90%. The material was used to prepare of biological preparation Virin-ABB-3. Renovated sources of VPN and VG of year 2011 have been used for obtaining viral and experimental material with change of technologies of obtaining the viral preparations on the basis of these sources at the 2nd generation of *H. cunea* in year 2012.The researches point out *H. cunea* critical stage and will be very useful for the baculovirus treatments management.

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