RESEARCHES CONCERNING THE SPREADING AND ATTACK PRODUCED BY THE AMERICAN BOLLWORM (HELICOVERPA ARMIGERA HBN.) IN THE TIMIS COUNTY

CERCETĂRI PRIVIND RĂSPÂNDIREA SI ATACUL PRODUS DE OMIDA FRUCTIFICATIILOR (HELICOVERPA ARMIGERA HBN.) ÎN JUDEȚUL TIMIȘ

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the pest American bollworm Helicoverpa armigera Hbn. at maize which, in Romania are not studied. The obtained data represent original contributions for the study of the pest. The researches were carried out with the help of the pheromonal traps and of the phytosanitary inspections. The results concerning Helicoverpa armigera Hbn. were also published in the precedent years and so that they are accessible. The data are new ,and the results present the progressive spreading of the pest in the Timis County from 2005 to 2007 as well as the significant increasing of the frequency attack (F%), intensity attack (I%) and attack degree (AD%) caused by Helicoverpa armigera Hbn.

Abstract The paper presents the results concerning **Rezumat** În lucrare sunt prezentate cercetările privind omida capsulelor Helicoverpa armigera Hbn. la porumb, care în România nu este studiat. Datele obținute reprezintă contribuții originale în studiul dăunătorului. Cercetările au fost efectuate cu ajutorul capcanelor feromonale și prin control fitosanitar. Rezultate privind Helicoverpa armigera Hbn. au fost publicate și în anii precedenți fiind astfel accesibile. Datele sunt noi, rezultatele prezintă răspândirea progresivă a dăunătorului în județul Timiș în perioada 2005-2007, precum și creșterea semnificativă a frecvenței (F%), intensității (I%) și gradului de atac (GA%) produs de Helicoverpa armigera Hbn.

Key words: Helicoverpa armigera, spreading, pheromonal traps, attack, attack degree (AD%), Timiş County.

Cuvinte cheie: Helicoverpa armigera, răspândire, capcane feromonale, atac, grad de atac (GA%), județul Timiş.

INTRODUCTION

The American bollworm (Helicoverpa armigera Hbn.) attacked a wide range of host crop plants including maize, sunflower, cotton, tobacco, tomatoes and other horticultural crops. And also wild plant hosts which are considered of importance and include species of many plant families (KRANZ et al. 1977).

The pest was signalled during the last years in Romania, especially in the Western part, on the maize cultures and also on some horticultural crops (tomatoes, peppers etc.). The first data concerning the pest's attack on maize in the West Plain of Romania were noticed starting with 2000 by ANDRU (2000), PĂLĂGEȘIU, ANDRU (2002), PĂLĂGEȘIU et al. (2004), ANDRU (2004).

At present the American bollworm is widely distributed in Europe, Africa, Asia and around the Pacific (ČAMPRAG et al. 2004), (KEREŠI et al. 2005), but the distribution is limited by the temperature regime during winter which includes territories between 46-47° Northern latitude.

In Romania and especially on the Western Plain, the Helicoverpa armigera Hbn., on maize, was not studied. The investigations carried out by PALAGESIU et al. (2007) and STAN (2008) presented new data concerning the pest.

MATERIAL AND METHOD

The researches concerning the pest spreading were carried out in the Timiş County from 2005 to 2007. The monitoring of the adults was done with the help of pheromonal traps Csalomon – V.A.R.L. placed in the maize fields from May to October. The imagos were caught after each three – four days. Observations were also made about the attack aspects in the maize fields and the attack degree (AD%), was assessed by calculating the attack frequency (F%) and attack intensity (I%) using the usual formulas.

RESULTS AND DISCUSSION

The American bollworm *Helicoverpa armigera* Hbn. was signalled in 2005 in the maize crops of 18 localities from the Timiş County: Sânandrei, Orțişoara, Satchinez, Variaş, Periam, Sâmpetru Mare, Sânicolau-Mare, Cenad, Teremia Mare, Lovrin, Jimbolia, Cărpiniş, Becicherecu Mic, Săcălaz, Lenauheim, Cenei, Giroc, Şag, S.D. Timişoara (Figure 1).



Figure 1. Spreading of the American bollworm *Helicoverpa armigera* Hb. in the Timiş County (2005)

In 2006 the pest was signalled in the maize fields from 21 communes: Sânicolau Mare, Cenad, Jimbolia, Teremia Mare, Cenei, Cărpiniş, Becicherecu Mic, Săcălaz, Lenauheim, Lovrin, Sâmpetru Mare, Variaş, Satchinez, Orțișoara, Sânandrei, Şag, Timișoara (S.D.T.), Giroc, Moșnița Nouă, Izvin, Recaş (Figure 2).

In 2007 this polyphagous pest spreads continuously and it was signalled in maize crops of 38 villages: Sînicolaul Mare, Cenad, Denta, Moravița, Jamul Mare, Gătaia, Jebel, Peciu Nou, Biled, Dumbrăvița, Jimbolia, Teremia Mare, Cenei, Cărpiniş, Becicherecu Mic, Săcălaz, Lenauheim, Lovrin, Beba Veche, Periam, Gelu, Comloşu Mare, Sâmpetru Mare,

Variaș, Satchinez, Orțișoara, Sânandrei, Șag, Timișoara (S.D.T.), Giroc, Uivar, Foieni, Giulvăz, Giera, Moșnița Nouă, Izvin, Recaș, Banloc (Figure 3).



Figure 2. Spreading of the American bollworm *Helicoverpa armigera* Hb. in the Timiş County (2006)



Figure 3. Spreading of the American bollworm *Helicoverpa armigera* Hb. in the Timiş County (2007)

It can be concluded that during the last three years the spreading area of the *Helicoverpa armigera* Hbn. expanded in the Timiş County, from the western border of Romania to the East and the North regions, particularly from the low plain area to the hilly area. The pest spreading was also favoured by the climate conditions of this period.



Figure 4 Cob damaged by Helicoverpa armigera larvae (original)

In the Timiş County the attack caused by American bollworm was increasing significantly. In 2005 the attack degree (AD%) caused by the pests in the maize crops (Figure 4) oscillated between 1.66% in the first decade of June and 65.36%, in the last decade of August, the attack intensity being 3%, at the end of June and 5.54% in the first decade attack of September. The maximum attack degree (3.37%) was noticed on August 26, and pointed a potential increase of the attack, during the following years (Table 1).

Table 1

Period	No plants total	No plants attacked	Attack frequency (F%)	Attack intensity (I%)	Attack degree (DA%)
1	2	3	4	5	6
23.06.05	300	5	1.66	3.00	0.04
1.07.05	300	13	4.33	4.07	0.17
11.07.05	300	31	10.33	4.12	0.42
25.07.06	300	75	25.00	4.49	1.12
4.08.05	300	116	38.66	4.56	1.76
15.08.05	300	174	58.06	4.58	2.65
26.08.05	300	196	65.36	5.17	3.37
3.09.05	300	110	36.66	5.54	2.03
10.09.05	300	98	32.66	5.5	1.79
16.09.05	300	94	31.33	5.45	1.07
30.09.05	300	86	28.66	5.03	1.44
14.10.05	300	82	27.33	4.07	1.11
Mean	300	90.0	30.100	4.63	1.414

Frequency, intensity and degree of the attack produced by the larvae of *Helicoverna amigera* Hbn (2005)

In 2006 the attack frequency (F%) has high values oscillating between 4 and 32%. It was in main in all in mean 20.47%, intensity attack (I%) oscillated between 0.33% and 7.66% it was in mean 4.30%. The attack degree oscillated between 0.19% and 2.14% and it was in mean 1.015% (Table 2).

Frequency, intensity and degree of the attack	produced by the larvae of
Helicoverna armigera Hbn	(2006)

Period	No plants total	No plants attacked	Attack frequency (F%)	Attack intensity (I%)	Attack degree (DA%)
1	2	3	4	5	6
26.07.06	300	2	4.00	0	0
30.07.06	300	3	6.00	0.33	0.019
01.08.06	300	5	10.00	2.33	0.233
03.08.06	300	13	26.00	4.66	1.211
08.08.06	300	11	22.00	4.66	1.025
13.08.06	300	8	16.00	5.66	0.905
15.08.06	300	10	20.00	4.66	0.932
19.08.06	300	16	32.00	5.33	1.705
24.08.06	300	10	20.0	3.00	0.600
28.08.06	300	14	28.00	4.33	1.210
01.09.06	300	13	26.00	4.00	1.040
05.09.06	300	15	25.00	6.33	1.580
11.09.06	300	14	28.00	7.66	2.140
21.09.06	300	13	26.00	6.66	1.730
25.09.06	300	9	18.00	5.00	0.900
27.09.06	harvested	-	-	-	-
Mean	300	10.40	20.47	4.30	1.015

In 2007 the attack frequency had high values oscillating between 2% and 42% the mean being 15.47% the attack intensity oscillated between 1% and 11.0% and the mean was 4.64%. The attack degree oscillated between 0.08% and 4.66%. Its mean was 1.518% (Table 3).

Table 3

Frequency, intensity and degree of the attack produced by the larvae of *Helicoverpa armigera* Hbn. (2007)

Period	No plants total	No plants attacked	Attack frequency (F%)	Attack intensity (I%)	Attack degree (DA%)
1	2	3	4	5	6
24.06.07	300	1	2.00	0	0
30.06.07	300	-	-		0
5.07.07	300	4	8.00	1.00	0.080
10.07.07	300	6	12.00	3.33	0.390
14.07.07	300	7	14.00	2.66	0.370
20.07.07	300	7	14.00	3.00	0.420
24.07.07	300	8	16.00	5.66	0.902
29.07.07	300	6	12.00	5.33	0.630
2.08.07	300	15	30.00	7.00	3.102
5.08.07	300	7	14.00	6.33	0.88
9.08.07	300	12	24.00	8.33	1.99
16.08.07	300	21	42.00	11.0	4.62
23.08.07	300	12	24.00	8.66	2.07
28.08.07	300	6	12.00	4.66	4.66
3.09.07	300	4	8.00	2.66	2.66
10.09.07	harvested	-	-	-	-
Mean	30	7.33	15.47	4.64	1.518

The values of the attack frequency (F%), attack intensity (I%), and of attack degree (AD%), as well as the relatively long period of tine during which the attack occurred justify the taking of proper control measures.

Table 2

CONCLUSIONS

In the Timis County the American bollworm *Helicoverpa armigera* Hbn. presented from 2005 to 2007 a progressive spreading in the maize crops.

The spreading took place from the West to of County to the East of the County, from the low plain area, to the hilly area respectively.

The pest was signalled in the maize crops from 18 localities in 2005 to the 38 localities in 2007.

Three years the frequency attack (F %) oscillated mainly from 15.44% to 30.10%.

The attack intensity oscillated mainly between 4.30% and 4.64.

The attack degree oscillated in main between 1.41% and 1.52%.

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