CHANGES IN THE SENSITIVITY (RESISTANCE) COTTON BOLLVORN HELICOVERPA ARMIGERA Hb TO INSECTICIDES

Shokirova Gavkharoy Nazirgulomovna
Doctor of Philosophy in Agricultural Sciences (PhD)
Teacher, Ferghana State Universiti

ABSTRACT

In order to select the Helicoverpa armigera Hbn population for the experiment, as many times as possible, the drug-sprayed and especially Decis-sprayed padel were sought. Considering the possibility of group resistance to synthetic pyrethroids, it was also assumed that resistance to Decis may occur in the field where other pyrethroids were used, or that the sensitivity of the insect might decrease.

Key words: *pesticide, insecticide, synthetic pyrethroid, carbamate, oxadiazine, emamectin*

Chemical insecticides have been used for many years against the Helicoverpa armigera Hbn. Especially in the years after the war, with the creation of DDT (dust) and GXCG (hexachlorocyclohexane), this problem escalated [154; p. 77-82].

Synthetic pyrethroids were created in 1975-1980 as a symbol of achievement of chemists [154; p. 34-36, 182; p. 40-44]. These insecticides began to be widely tested and implemented in the republics of the former Soviet Union. Among these were the first drugs: Sumitsidin, Tsimbush, Ambush and Detsis. In Uzbekistan, Tsimbush, Detsis and purified Sumicidin (sumi-alpha) are still used. In some meetings, it is emphasized that the results are not the same as before. Such reports may not be without truth if one learns from reports that pyrethroid-resistant Helicoverpa armigera Hbn populations have been identified in foreign countries, especially in Australia for the first time [136; 7-69-p., 154; 34-36-p.].

Such reports may not be without truth if one learns from reports that pyrethroid-resistant populations of Helicoverpa armigera Hbn have been identified in foreign countries, particularly in Australia for the first time. It should also be pointed out that by 1985-1986, The use of pesticides in cotton farming in Uzbekistan has decreased dramatically. If in 1980 cotton was treated with insecticide-acaricides on average 4.2 times to protect against pests, by 1987 - 1.08 times, and in 1991 - 0.7 times. Since 1980-1981, Detsis, Sumitsidin, Rovikurt (ambush), Tsimbush have been used against Helicoverpa armigera Hbn. There is evidence in the literature that, even if the amount of chemical control is reduced overall, it will not solve the problem of pest resistance [67; 91-97-p.]. In some areas, even 1-2 times of processing can be the cause of maintaining the durability of the

cotton tundra [158; 17-p.]. For example, in some districts of Tajikistan, in 1987-1990, the following drug-resistant populations of the bagworm were identified: Fozalon - 78 times, Sevin - 52, Tiodan - 18.5, Ambush - 12, and Ripkord - 14 times [66; 26-p.].

In addition, natural tolerance (tolerantnost) to the same insecticide can be detected in some populations of the bollworm. Therefore, we aimed to study the sensitivity of the bollworm to Detsis, which has the strongest insecticidal properties, in various regions of Uzbekistan. Researches were conducted in 2014-2016 with pest populations distributed in Fergana and Andijan regions.

As a methodological guideline for work, G.I. Sukhoruchenko and Yu.S. Tolstova [24; p. 3-21] methodical instructions for determining the resistance of pests served as a basis [24; 3-21-p.]. According to these instructions, the sensitivity of the solution prepared for diagnostics to determine the sensitivity of the hookworm to Detsis was studied according to the SK_{95} indicator. 0.0002% of the active substance (t.m.) was administered in the form of a diagnostic solution (DE) for a susceptible population of hookworm. In order to select the bollworm population for the experiment, as many times as possible, the drug-sprayed and especially Decis-sprayed padel were sought. Considering the possibility of group resistance to synthetic pyrethroids, it was also assumed that resistance to Decis may occur in the field where other pyrethroids were used, or that the sensitivity of the insect might decrease.

1-Table

Susceptibility to Detsis insecticide of Helicoverpa armigera Hbn populations in Fergana and Andijan region

Laboratory experiments, July, 2016-2017.

№	Options	Consumption rate, l/ha	Effectiveness, % days (Ŝ±m)							
			Against small-aged (I-III) worms				Against large young (IV-VI) worms			
			1	3	7	12	1	3	7	12
Population of Bagdad District, Fergana Region (2016)										
1.	Detsis, 2.5% em.c.	0,7	80,7 ±1,9	95,2 ±2,7	90,2 ±5,1	100	24,2 ±3,7	31,7 ±4,2	32,6 ±3,6	32,6 ±5,3
2.	Avaunt, (template)	0,4	91,7 ±0,8	95,3 ±4,1	100	100	82,3 ±4,7	85,3 ±3,6	100	100
3.	Control (no drug)	-	-	-	-	-	-	-	-	-
Population of Khujaabad District, Andijan Region (2017)										
1.	Detsis, 2,5% em.c.	0,7	79,2 ±4,6	100	100	-	17,5 ±2,6	22,7 ±4,7	22,7 ±4,2	22,7 ±4,3

2.	Avaunt, (template)	0,4	81,3 ±3,6	100	100	-	69,3 ±4,7	91,2 ±0,9	91,2 ±1,3	91,2 ±1,6
3.	Control (no drug)	-	-	-	-	-	-	-	-	-

Laboratory studies were conducted in 2016 (with the population of Fergana) and 2017 (with the population of Andijan). In the experiment, a separate test was conducted with young (I-III) and older (IV-VI) youths of Helicoverpa armigera Hbn (see Table 1).

As can be seen from the table, in the 1980s Detsis showed the highest (90-100%) effectiveness against all young worms of G'T - 0.7 l/ha [178; pp. 37-38, 179; pp. 92-94], now showing satisfactory biological efficacy only against small juvenile worms. Such a result was obtained against the populations of the Helicoverpa armigera Hbn in both regions. Avaunt (0.4 l/ha) as a model belongs to the chemical group of oxadiazines, which was introduced in the recent past and showed the highest effectiveness against all young worms. Thus, as it can be seen, synthetic pyrethroids (SP) reduced the effectiveness of Detsis Helicoverpa armigera Hbn against large young worms. This situation also applies to other SPs (Karate, Sumi-alfa, Tsypermethrin, Fastak, etc.) that are in practical use. These results have been confirmed in other experiments.

Expanding the list of insecticides used against Helicoverpa armigera Hbns. One of the main parts of our work is to identify promising insecticides in cotton against the Helicoverpa armigera Hbn and introduce their practical use. This issue is always on the agenda, as examples of pesticides for use against pests and diseases in agriculture are constantly being developed worldwide. Therefore, approaching this issue, these works aimed at satisfying the growing demands in Uzbekistan, and especially for the conditions of Fergana region, were mainly carried out in the Toshloq district farms during 2015-2018.

The list of promising drugs was mainly taken from the section devoted to the development of plant protection by the State Chemical Commission. Work Sh.T. Khojaev [27; 3-104-p.] was carried out on the basis of methodological guidelines published by author. Based on these guidelines, each drug was tested first in small field trials using a wider range of variants, and then by testing the variants that yielded positive results in field trials.

Individual insecticides. It is generally recommended to use one or another insecticide of different chemical classes for use against Helicoverpa armigera Hbns. Until 2017, their number was 26, depending on the unit of action, but the name of

the recommended analog drugs reaches 150 (List, 2016). Nevertheless, researches on new insecticides, analogues and increasing their effectiveness are ongoing.

We have tested and evaluated a number of insecticides against cotton bolls in the 2015-2018 seasons. In particular, we carried out laboratory studies against small and large young worms of the cotton collection, which were bred in laboratory conditions. Only in this way, it is possible to study the toxicological characteristics of any drug and determine the most effective treatment periods. Laboratory tests were carried out individually in petri dishes or glass cylindrical tubes, because cannibalism was rampant in the insect worms. In each variant, 10 worms were collected and exposed to the treated feed. Food (corns, flowers, pods, corn stalks cut into pieces, etc.) is immersed in the drug solution, shaken, and then offered to each worm. Observations were made every 24 hours for the following days. Five new drugs were studied against model and control (no drug) worms (see Tables 2 and 3).

2-Table

Effect of insecticides on small (II-III) young bollworms of Helicoverpa armigera Hbn

Laboratory experiment, Toshloq district, Laboratory population, 2017.

№	Options	Active substance	Consumption rate of drugs, l(kg)/ha	The number of living worms, pcs						Effectiveness, % days: (Ŝ±m)				
				Until processing	After eating poisoned food, for days:									
					1	2	3	4	6	1	2	3	4	6
1.	Sapport, 10% s.e.	*Zetacypermethrin*	0,3	10	10	9	4	4/3*)	4/4	0	0	55,5 ±4,2	50,0 ±5,3	50,0 ±3,2
2.	Alphasave, 20% em.k.	*Methomyl*	2,0	10	4	0	-	-	-	60,0	100	-	-	-
3.	Killer Extra, 10% em.k.	*Lambda cyhalothrin*	0,25	10	5	4	3	2	0	50,0	55,5 ±4,5	66,6 ±5,7	75,0 ±2,6	100
4.	Entovant PRO 30% em.k.	*Indoxacarb*	0,2	10	1	0	-	-	-	90,0	100	-	-	-
5.	Emamek, 5.7% WDC	*emamectin benzoate*	0,35	10	1	0	-	-	-	90,0	100	-	-	-
6.	Surrender, 5% s.e.g. (andose)	*emamectin benzoate*	0,35	10	1	0	-	-	-	90,0	100	-	-	-
7.	Control (no drug)	-	-	10	10	9	9	8	8/8	-	-	-	-	-

*) – 4- worm, 3- sponge.

3-Table

Effects of insecticides on large (IV-V) bollworms of Helicoverpa armigera Hbn

Laboratory experiment, Toshloq district, Laboratory population, 2017.

Options	Active substance	Consumption rate of drugs, l(kg)/ha	The number of living worms, pcs					Effectiveness, % days: (Ŝ±m)			
			Until processing	For days after eating contaminated food:							
				1	2	3	4	1	2	3	4
Sapport, 10% s.e.	*Zetacypermethrin*	0,3	10	10	6	6	5	0	33,3 ±2,7	33,3 ±2,7	37,5 ±4,0
Alphasave, 20% em.k.	*Methomyl*	2,0	10	10	2	1	1	0	77,7 ±1,9	88,8 ±3,2	88,8 ±3,2
Killer Extra, 10% em.k.	*Lambda cyhalothrin*	0,25	10	10	8/5*)	8/5	8/8	0	11,1 ±0,9	11,1 ±0,9	0
Entovant PRO, 30% em.k.	*Indoxacarb*	0,2	10	4	2	1	0	55,5 ±1,9	77,7 ±1,9	88,8 ±3,2	100
Emamek, 5.7% WDC	*emamectin benzoate*	0,35	10	4	2	0	-	55,5 ±1,9	77,7 ±1,9	100	-
Surrender, 5% s.e.g (andose)	*emamectin benzoate*	0,35	10	3	3	1	0	66,6 ±1,7	66,6 ±1,7	88,8 ±3,2	100
Control (no drug)	-	-	10	9	9	9	8	-	-	-	-

*) – 8- total number, 5- *gumbagi (stage in the development of insects with complete transformation).*

The results showed that all the tested drugs except for Sapport against small young worms showed 100% effectiveness. Among them, the most effective are Alfaceiv, which belongs to the class of promising carbamates, and from oxadiazines - Entovant Pro, and from emamectins - Emamek. Of the synthetic pyrethroids, Killer Ekstra (Karate) was more effective, but it lasted for 6 days. Drugs belonging to the carbamate, oxadiazine and abamectin classes also showed the highest effectiveness against the large young Helicoverpa armigera Hbn (see Table 3).

Synthetic pyrethroids, however, have been shown to be ineffective against such worms.

The results obtained in laboratory conditions were confirmed in our practical experiments conducted in 2017 in the fields of the Sokhibjon-MMM farm in Toshloq district. Here too, Emamek, Alfasave and Entovant PRO have shown the highest and most sustained efficacy against cotton blight in both our experiments (in both the science-based and tampered periods); The effectiveness of Sapport was low (unsatisfactory).

CONCLUSION

1. In the conditions of Uzbekistan, the sensitivity of Helicoverpa armigera Hbn populations to synthetic pyrethroids has decreased. As an example: Detsis (0.7 l/ha), Karate (0.5 l/ha) and others have become ineffective against large young (IV-VI) worms of Helicoverpa armigera Hbn. But these drugs can be used against Helicoverpa armigera Hbn in scientifically based periods.

In all situations, the following insecticides are promising in the fight against Helicoverpa armigera Hbn: Emamek, Surrender (emamectin benzoate) - 0.35 l/ha, Entovant PRO (indoxacarb), 30% s.e.g. - 0.2 kg/ha, Alfasev (methomil) - 2.0 l/ha.

REFERENCES

1. Шокирова Г.Н., Хўжаев Ш.Т. Ғўзани тунламдан ҳимоя қилишда ўсимликларни чилпишнинг аҳамияти /Ўсимликларни ҳимоя қилишда УҲҚТ нинг ўрни ва истиқболлари илмий-амалий конф. (22-23.XII.2016 й., Тошкент). – Тошкент: ЎҲҚИТИ, 2016. – Б. 9-12.
2. Хўжаев Ш.Т., Шокирова Г.Н., Мирзаева С., Йўлдошев Ф. Уватларда олдини олиш ишловини ўтказишнинг зараркунандаларга қарши самарадорлиги //Агро кимё ҳимоя ва ўсимликлар карантини журнали. – 2018. - №6. – Б. 21-23. (06.00.00; №11)
3. Шакирова Г.Н. Хужаев Ш.Т Важность агротехнический методов против вредителей растений //Универсум:технические науки: научный журнал. – Москва, 2020. - №7. – С.-25.
4. Ш.И Маматожиев, М.А.Мирзаева, Г.Н.Шокирова Влияние технологии допосевной обработки на содержание влаги в почве //Универсум:технические науки: научный журнал. – Москва, 2021. - №6(87). – С.46-49.
5. Юлдашев Ф.Э., Шокирова Г.Н. (www. mich-agrovestnik.@mail.ru) Прогрессивный приём защиты кукурузы //Мичуринский агрономический вестник. – 2016. – №1. – С. 40-43. (www.mich-agrovestnik.ru) (06.00.00; 10).
6. Шокирова Г., Саттаров Н., Хўжаев Ш.Т. Ғўза тунламига қарши самарали инсектицидлар //Ўзбекистон қишлоқ хўжалиги журнали. – 2013. - №8. – 28 б. (06.00.00;№4)
7. Хўжаев Ш.Т., Шокирова Г., Юлдошев Ф. Ғўза тунламининг ноёб хусусиятлари ва биоусул //Ўзбекистон қишлоқ хўжалиги журнали. – 2014. - №8. – Б. 27. (06.00.00;№4)
8. Хўжаев Ш.Т., Шокирова Г. Ғўза тунламига қарши кураш усулининг самарадорлиги //Ўсимликлар ҳимояси ва карантини. – 2015. - №1. – Б. 35-37. (06.00.00;№11)

9. Шокирова Г., Саттаров Н., Хўжаев Ш.Т. Ғўза тунламига қарши янги инсектицидлар //АгроИлм журнали. – 2016. - №5. – Б. 59-60. (06.00.00; №1)
10. Хўжаев Ш.Т., Юлдашев Ф.Э., Шокирова Г.Н. Уйғунлашган ҳимоя қилиш тизимининг устунлиги //Агро кимё ҳимоя ва ўсимликлар карантини. – 2017. - №1. - Б. 24-26. (06.00.00;№11)
11. А.Р.Абдулхамиджановна Андижон ўрмон хўжаликларида учрайдиган Lepidoptera туркуми вакиллари /Агро Кимё химоя ва ўсимликлар карантини илмий-амалий журнал № 1 2021 йил –Б 31-32(06.00.00 № 11)
12. А.Р.Абдулхамиджановна Р.Жумаев Analysis of scientific Research on Reproduction of Species of Trihograms in Biolaborotory The American Journal of Agriculture And Biomedical Engineering.August 30.2020 -Б148-152