



Types of Maize Pests in the Conditions of the South Aral Sea and Effectiveness of the Biological Method in Controlling Them

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Maize is liked and eaten by children and adults. Its main native country is South America. It is an annual plant and there are 26 elements from the periodical table of Mendeleev in its structure. According to the specialists' opinions maize has the peculiarity of obtruding cholesterol from the organism. Grain of the maize consists of B, P, C and K vitamins (which improves the activeness of heart), phosphorus and kaluim.

Oil, which is taken from maize fruit, is used in decreasing the amount of cholesterol in blood, treating arteriosclerosis illness and preventing from it. Also, it is used in improving food digestion in organism, illnesses sugar diabetes, nephrite, kidney-stone and cholecystitis, as an remedy of moving gall and urine.

Not only the grain of maize but also fringe has some medicinal peculiarities. Usually, when maize is ripe its fringes are gathered and dried under shadow. It keeps essential oil, clue like oily things, C and K medicinal elements, organic acid and other micro elements in its structure in a large amount. Boiled fringes are used in nations medicine as an remedy of moving gall, controlling food digestion. When fringes are drunk as a tea, it has a peculiarity of riving stones in kidney (Atabaeva, Umarov, 2004; Azon.uz, 2019).

Not only flour is taken from maize, but also it is used as fodder to farm animals and raw material for reproducing industry. It is one of the most important food and the most necessary protein. The oil of plant is the fastest digestible in human organism, it's the best peculiarity is that it does not collect cholesterol in human organism.

One of the most actual problems of today is producing maize and receiving high yield and decreasing the damage of maize pests in order to satisfy with the food requirement of the region. These days, in Karakalpakstan there can be met different types of pests which damage maize fields. Therefore, in order to increase maize productivity a special attention should be paid to protect them from pests.

Maize is sown on large fields of Uzbekistan as a fodder and food crop. Today the only way of receiving high yield is indicating effective periods and creating effective scientifically based methods against them in using biological method to control pests. Nowadays, as a result of not carrying out the



system of controlling maize pests, large part of yield (50-70) is lost (Xojaev, 2019).

From most scientists in scientific works of F.Z.Yuldashev, M.Zakirova, J.Mirzaeva (2016) information about strong damage of maize stem butterfly in maize agrobiocenosis in the condition of Fergana region was given.

About the development and damage of pests on maize and corn, in the southern regions of Uzbekistan, famous scientist, professor of Uzbekistan – Sh.T.Xojaev made actions on controlling maize and corn pests, their types and damage. But in the conditions of Karakalpakstan, types of maize and corn pests, their peculiarities of bioecological development, spreading, damage, comfortable actions on controlling them were not studied.

Therefore, the main task of the chosen theme is to determine typical structure, peculiarities of bioecological development, wintering period, the time of appearing on the plant, density on plant in vegetation period and damage of maize pests. During the experiment, which was conducted on the basis of the above mentioned plan, typical structure of pests, which develop in maize agrobiocenosis, was identified.

Carrying out the field experiment was conducted on the basis of methods of Nurmatov Sh., Mirzajonov K., Avliyokulov A. and others (2007), types of pests and their entomophagous, their number in the field were determined according to the method of F.M.Uspenskiy (1973) about defining the amount of pests; counting entomophagous in the conditions of the field – the method of V.A.Sharipo, V.A.Shepatelnikova (1976).

Defining the damaging degree of pests was conducted on the basis of V.I.Tanskiy's method "Beginning of economical damage of pests" (1981); carrying out the field experiment and determining biological effectiveness of the chemical method – on the basis of

Sh.T.Xujaev's (2004) methodology and statistically analyzing results of field experiments – on the basis of B.A.Dospekhov's (1987) methodology.

Biological effectiveness of controlling actions of maize pests is determined with the help of the Abbot formula.

$$BE = \frac{Ab - Ba}{Ab} \times 100(\%), \text{ in which,}$$

BE - biological effectiveness

A - number of pests before spraying the preparation in the experimenting variant

a - number of pests after spraying the preparation in the experimenting variant

B - number of pests in the experiment before spraying the preparation in the controlling (without preparation) variant

b - number of pests after spraying the preparation in the controlling variant

Experimenting works were carried out on farms "Shahzod" in Nukus region, "Borzu Ismaylov" in Kungrad region and experimental farm of Karakalpak agricultural scientific research institute in Chimbay region. Experimenting works were conducted on total area of 1 hectare of "Shahzod" farm in Nukus region, 70 hectare maize sowing field of "Borzu Ismaylov" farm in Kungrad region on "PL-700" type of maize which was imported from Turkey, and 3 hectare of experimental farm of Karakalpak agricultural scientific research institute in Chimbay region on "Karasu-350 AMB" and "Uzbekistan 601 ESB" types of maize.

Nowadays, in Karakalpakstan, there can be met many types of pests, diseases and weeds in the fields which damage maize products. Damage of pests, diseases and weeds in the field wastes some millions of dollars. Therefore, in increasing maize productivity a great



attention should be paid to actions of protecting them from pests, diseases and weeds.

Destroying weeds from sowing fields and nearest territories prevents fields from the appearance of different types of pests.

In scientific information of Sh. T. Xujaev (2010) white fly is one of the most damaging pests of agricultural crops. There are some types of this pest and they damage more than 270 plants. From them, more than 60 types develop on cultural plants. Among them, cotton earworm mainly damages cotton, tomato and maize. Whitefly is one of the most basic damaging pests the same as maize butterflies, earworms, aphids and spider beetles.

Some researchers wrote cotton earworm is the pest of maize products. These earworms are known as polyphage pests.

Maize stem butterfly – this pest is one of the most widely spread pests among the world, is considered as the most dangerous pest of sunflower. When this pest is widely spread, the product of sunflower is almost destroyed. Worms, which came out of eggs, first damage inside of flower, then come into the grain and eat it. The damaging period of the second generation worms is on the second 10 days of August (Yuldashev, Zakirova, Mirzaeva, 2016).

From scientists Dixon named maize butterfly as maize moth, Bromson and Lindeman - as aster moth, but Krollikovskiy showed that aster moth and maize moth are species different from each other. D.M.Kurulkov mentioned that maize butterfly can damage up to 90% of the product and there are some types of maize which are resistant to the damage of these pests (Kurulkov, 2004).

12 types of pests were shown in maize products. In Central Asia there are two types of green grasshoppers, which damage maize products: long tailed grasshopper

(*Tettigonia caudata* Charp.) and southern wartbiter (*Decticus albifrons* F.). Long tailed grasshopper damages soybean, tobacco, flax, maize and cucurbits crops. Also, rhizome beetle - *Rhizotritus fortis* Rtt. damages wheat, rice, flax, maize, alfalfa and other crops. (Kapitonov, 2018).

It was defined that there can be met 77 types of pests in the growing period of maize, the pests can damage in all phases of growing period of the plant. In the conditions of black soil of the central territory, all types of aphids were determined to damage maize products in 30-40% (Lukomec, Piven, Tishkov, 2007).

In the scientific information of E.Sh.Toreniyazov, A.R.Utepbergenov, A.M.Kutlimuratov (2013), E.Toreniyazov, A.Utepbergenov, A.Zayrova (2014), E.Sh.Toreniyazov, A.R.Utepbergenov, E.G.Eshmuratov (2018), E.Sh.Toreniyazov, Sh.T.Xujaev, E.H.Kholmurodov (2018) noted that from pests: maize stem butterfly, butterfly pest, corn thrips, maize aphid, big wheat aphid, simple wheat aphid can be met on maize fields and damage the plant.

In the scientific experiment of Sh.T.Xujaev (2015) it was defined that the following pests develop in maize agrobiocenosis: from rodent pests: worms, autumn earworm, cotton earworm, maize stem butterfly; from sucking pests: maize aphid, watery maize aphid, white corn, thrips and spider beetle. Worms live in the soil, damage grains, sprouts and the part under soil by gnawing.

As a result of the conducted experiments in the conditions of Karakalpakstan in 2021, typical structure of pests, which develop on maize field, was determined (Table 1).



Table 1 Types of rodent pests which are met in maize products

№	Name in Uzbek	Name in Karakalpak	Name in Russian	Name in Latin
1	Kuzgi tunlam	Gúzlik sovka	Ozimaya sovka	Agrotis segetum
2	Guza tunlami	Ġawasha sovkasi	Xlopkovaya sovka	Heliothis armigera Hb.
3	Makkajuxori poya parvonasi	Mákke paxal gúbelegi	Kukuruzny matilek	Ostrinia nubilalis Hb.

As can be seen from the table, from gnawing pests – autumn earworm, cotton earworm and worms of maize

stem butterfly were met in maize agrobiocenosis where observation was conducted (1-3 pictures).



Picture 1. Autumn earworm which damaged maize sprout.



Picture 2. Cotton earworm is damaging grain of maize



Picture 3. Maize stem, which was damaged by maize stem butterfly, worm and pupa of the pest.

During the experiment we studied structural types of entomophages of maize and corn pests and their importance in decreasing the number of pests: From them:

Ladybird - (from the family Coccinellidae of Coleoptera species). Adult and pupas of ladybird mainly eat plant aphids. Beetles of ladybird are like a long balloon. Eggs are yellow and in

the oval form, they lay eggs among plant aphids in collected form. Beetles of ladybird overwinter in mountains, in our condition they overwinter under the husks of decorative trees in the adult phase. Overwintered beetles spread into gardens and among weeds at the end of March and at the beginning of April, eat aphids there and develop (picture 4).



Picture 4. Ladybird

Golden eye - (from the family Chrysopidae of Neuroptera species). It is an insect which is widely spread in nature and there are 24 types in Central Asia. In Uzbekistan, there are met 11 types of these natural entomophages. Adults of golden eye are light green and

they are very delicate insects. The length of both wings reaches from 19 to 55 mm. Eyes are like gold. The colour of fresh laid eggs is light green, after some time it gets dark. Pistil golden eye lays eggs to cotton branches, leaves or buds, and to the top of vulnerable

branches one by one or in collected form. Pupae of golden eye are light green, there are looped fluffs on the sides of the chest. Pupae of golden eye are predators and they eat more than 70 arthropods. Adults of golden eye overwinter in different buildings. In early spring they are copulated after receiving additional nourishment.

Each pistil lays 500-700 eggs during the life. In order to get high results in using golden eye two days, old embryonic developed eggs in 1:10 proportion or 150-200 thousand pieces of second years pupae can be distributed to each hectare (picture 5).



Picture 5. Golden eye predator

Pouch - this insect is from the family of pouches (Braconidae) (of Hymenoptera species). Pouch is an outer parasite, paralyzes medium and old aged worms of earworm and then lays 4-5 or 16 eggs on them. Pouch overwinters in cortex of trees, plant remains and

houses in the adult phase. This entomophage is mostly met in nature (picture 6). From these entomophages golden eye and pouch can be manipulated on moth worms in the conditions of biolaboratory and used for controlling pests.



Picture 6. Pouch parasite



Picture 7. Cotton earworm damaged by pouch parasite

In our experiment it was defined that there was 1 cotton earworm on average 3 plants in maize agrobiocenosis, and poach parasite was used to control them in account

of 5:1, 10:1 and 15:1 (worm: parasite). Results of the conducted experiment is given on Table 2.

Table 2 Biological effectiveness of poach parasite in controlling cotton earworms on maize field

№	Variants	Number of used entomophagous, piece	Number of pests after using poach, piece, in days			Biological effectiveness, %, in days		
			3	7	14	3	7	14
1	for 10 worms	2	8	4	3	20	60	70
2	for 20 worms	2	17	9	8	15	55	65
3	for 30 worms	2	26	15	12	13,6	50	60
4	Observation (entomophagous was not used)	-	18	21	26	-	-	-

As can be seen from the table when 1 couple (pistil-paternity) of poach parasite was used for 10 worms in the first variant, biological effectiveness was 70% after 14 days. In the second variant it was 65% and in the third – 60%.

Conclusion

1. From gnawing pests - autumn earworm, cotton earworm and worms of maize stem butterflies damage at the ripening period of maize.
2. In natural conditions, from entomophages of maize pests, ladybird, golden eye and poach parasite are met.



3. 70% of biological effectiveness was reached when poach parasite was used 1 couple (pistil-paternity) for 10 worms in controlling cotton earworms.

References

1. Atabaeva H., Umarov Z. Planting. – Tashkent: TSAU, 2004. p-53-58.
2. Kapitonov T. Land pests of maize in France. Tournesol Le point sur les insectes aeriens. La France agricol. 2018. – p. 63 – 65.
3. Kurulkov D.M. Controlling the main pests of maize.-Leningrad. – 2004. – p. 87 – 88.
4. Lukomec V.M., Piven V.T., Tishkov N.N. Protecting sunflower from pests and diseases.- 2007.- №5.- p. 14-15.
5. Methodological manual on defining and counting the number of entomophagous pests of agricultural crops. V.A.Sharipo, V.A.Shepatelnikova. Moscow: Kolos, 1976. p-16.
6. Nurmatov Sh., Mirzajonov K., Avliyokulov A. and others. Methods of carrying out field experiments. – Tashkent, 2007. p-147.
7. Toreniyazov E.Sh., Utepbergenov A.R., Kutlimuratov A.M. Pests of agrobiocenosis in Karakalpakstan.-Nukus: Karakalpakstan, 2013.- p.22-23.
8. Toreniyazov E.Sh., Utepbergenov A.R., Zayrova A. Protecting plants.-Nukus: Bilim, 2014.-p.105-107
9. Toreniyazov E.Sh., Utepbergenov A.R., Eshmuratov E.G. Protecting plants.-Tashkent: Science and technologies, 2018.-p.118-122.
10. Uspenskiy F.M. Defining the number of pests. – T.: 1973.
11. Xujaev Sh.T. The basis of entomology, protecting agricultural crops and agrotoxicology.- Tashkent: Science, 2010.-p.28-30.
12. Xojaev Sh.T. Modern methods and instruments of protecting plants from pests. Tashkent: Navruz, 2015. p-208-223.
13. Xojaev Sh.T. General and agricultural entomology and the basis of the protection system. Tashkent, 2019. p-141-150.
14. Yuldashev F.Z., Zakirova M., Mirzaeva J. Development of maize stem butterfly in the eastern Fergana and controlling it. Scientific research institute of natural sciences of Karakalpakstan. Materials of international scientific-practical conference. Nukus: Ilim, 2016. p-70-71.
15. Lucomec V.M., Piven V.T., Tishkov N.N. Protecting sunflower from pests and diseases // Plant protection and quarantine. 2007. #5. p. 14-15.15.

Internet sources:

[Useful peculiarities and harmfulness of maize. Azon.uz. 2019.](#)