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MONITORING OF ACRIDOIDS OF SEMIDESERTIC ZONE OF WEST KAZAKHSTAN REGION

Abstract

About 270 types of acridoids insects live in various natural-economic zones of Kazakhstan. The greatest danger to agricultural lands is constituted by 15-20 types. Especially dangerous types among them are: Asian, locust (Locusta migratoria) and Italian locust (Calliptamus italicus) on the extent of distribution and level of injuriousness.

As a result of our researches, the data were obtained on structure of acridoids fauna, biological efficiency of modern insecticides in conditions of semidesertic zone of West Kazakhstan region.

Keywords: *Fodder lands, acridoids, Asian locust, Italian locust, monitoring, egg-pods, insecticides, biological efficiency.*

Global warming became the reason for the desertification of the territory within the last decades that increased the threat of acridoids danger. Ecosystems of dry and arid climate countries, including Kazakhstan were the most vulnerable climate changes in general global warming. At the turn of millennia, devastating flashes of acridoids captured the countries of Africa, Australia, South America, East and Southeast Asia [1, 2, 3].

Acridoids take a special place among many species of harmful insects, because of the popularity since ancient times when they directed horror at many countries of Africa and Asia a raid of uncountable quantity of packs, dooming millions of people to hunger and death.

About 270 types of acridoids insects live in various natural-economic zones of Kazakhstan. The greatest danger to agricultural lands is constituted by 15-20 types. Especially dangerous types among them are: Asian, locust (Locusta migratoria) and Italian locust (Calliptamus italicus) on the extent of distribution and level of injuriousness.

General regularities of harmful acridoids were studied by many scientists; the features of current outbreak of their reproduction deserve special researches.

The important and actual task is to search the ways, methods of number restriction and acridoids injuriousness, it is impossible to search without analysis of modern ecological situation in the region, features of influence on acridoids populations of anthropogenous influences, including held large-scale destructive events.

The work is performed within the grant financing program of Science Committee of MES RK on the project "Acridoids (Orthoptera, Acridoidea): fauna and ecology in connection with climate change, improvement of number forecast, planning of fight measures".

The aim of researches is carrying out complex monitoring of fauna and structure of acridoids communities taking into account the features of pests' ecology, in connection with climate change and study of fight methods.

The features of biology, phenology and ecology of acridoids were studied for the solution of objectives in fodder lands of Zhanakala and Syrym districts of semidesertic zone of West Kazakhsan region.

Exploration of haymakings and pastures, fodder lands of fields which are earlier used, but brought out of crop rotation, and also laylands with xerophile herbs were carried out in the researches zone.

The structure of acridoids fauna and features of their biotopic placement were revealed as a result of route expeditions.

Relative number of acridoids was determined by the method of time accounts in the main types of biotopes.

The major managements were used for the definition of species by egg-pods and accounting of acridoids number [4, 5, 6].

Italian locust - Calliptamus italicus L. Systematic supervision on Italian locust were executed in fodder lands of semidesertic zone on the area of 7,0 thousand hectares.

Spring exploration by egg-pods revealed their population on the area of 3,0 thousand hectares. The density of egg-pods studied on the fodder lands is from 0,8-72,8 pieces/m^2. The amount of eggs was in egg-pods 12-47 pieces. Damage egg-pods is from 2,0 to 40,0%.

The reduction of egg-pods density is noted in places of mass egg-layings (density of egg-pods was from 1,0 to 132,8 pieces/ m^2 at autumn exploration) that is generally connected with the destruction of eggs by Meloidae larvae and birds. Plentiful rainfall dropped out during pairing and egg-laying of locust (40,8 mm of rainfall was in August at the norm of 24,0 mm, in September – 58,4 mm of rainfall at the norm of 25,0 mm.), therefore, high humidity of soil affected condition of egg-pods, eggs are in the scattered state, eggs efflorescence is noted.

The start of larvae hatching in Zhanakala area is noted since May 12, mass hatching - since May 20-21., the start of larvae hatching is noted since May 12-15, mass - since May 17-20 in Syrymsky area. Italian locust was stretched everywhere in current year because of alternation of warm days and cool nights during spring and summer period.

The age structure of larvae was for May 26: 1 age - 80%, 2 age – 20%.

Monitoring on larvae is executed on the area of 2,0 thousand hectares, population was 1,2 thousand hectares above economic threshold of injuriousness of 548,8 thousand hectares. Density of larvae made: from 1 to 36 species/m^2, in swarm - 32-38 species/m^2.

The development of larvae proceeded 34 days. The phenology of Italian locust development is as follows in Zhangalinsky area : I age: 12.05. – 20.05; II age: 20.05. – 26.05; III age: 26.05. – 02.06; VI age: 02.06. – 08.06; V age: 08.06. – 15.06.

The start of winging is since June 8, mass winging - since June 12. The start of summer is since June 15, mass - since June 17. The start of pairing is since June 21, mass - since June 25. The start of egg-laying is since July 7, mass - since July 15.

Exploration during pairing and egg-laying is carried out on the area of 2,0 thousand hectares. 1,1 thousand hectares are populated with the density of 0,1-16 species/m^2.

It was defined on the basis of morphometric indicators definition of Italian locust phase condition: gregarious phase is from 6% to 65,5%; single phase is from 7,5 to 60,2%, transitional is from 19 to 66%.

The start of imago dying off is noted since July 21. 100% imago dying off in Zhangalinsky area is since August 14, in Syrym area - on August 10.

Autumn monitoring by egg-pods was carried out on the area of 3,0 thousand hectares, 1,7 thousand hectares are occupied. The density of egg-pods was from 0,8 to 80 pieces/m^2. The maximum density was in Zhangalinsky - 180 pieces/m^2. The amount of eggs in a egg-pod was 17-44 pieces. Percent of egg-pods damage is from 5,0 to 29,0%. Generally egg-pods are damaged by entomophages (birds, Meloidae), drying up of eggs is noted.

Asian locust - Locusta migratoria L. Systematic observations on Asian locust were made on the area of 2,0 thousand hectares.

Spring exploration by egg-pods was carried out on the area of 1,5 thousand hectares, 1,0 thousand hectares were occupied. The density of egg-pods was 0,8-5,6 pieces/m^2. Amount of eggs in egg-pod is from 30 to 92 pieces. The percent of egg-pod damage is from 10,0 to 40,0%.

The sites populated with egg-pods of Asian locust is a result of spring floods appeared in autumn, it was no opportunity to carry out exploration by egg-pods there. Exploration was carried out on the sites where egg-laying was assumed.

The start of larvae hatching was noted on May 21 in Zhangalinsky area. The start of hatching in Zhangalinsky area was noted in cane natural boundaries since May 26, mass hatching is since May 30.

Larvae hatching were noted in a coastal zone, on the squares freed after the flooding, in this connection, uneven-age larvae (1-3 age) were met in swarms during processing at the same time.

Monitoring by larvae was completed on the area of 0,3 thousand hectares, population was 1,0 thousand hectares. Above economic threshold of injuriousness 0,1 thousand hectares. The number of

larvae was from 1 to 12 species/m^2.

The phenology of Asian locust development is as follows in Zhanakala area:

The start of winging is since June 20, mass - since June 26. The start of flight is since June 25, mass - since July 2. The start of pairing is since July 7, mass - since July 14. The start of egg-laying is since August 17, mass - since August 25.

Exploration during pairing and egg-laying is carried out on the area of 0,5 thousand hectares, 0,1 thousand hectares are populated with the density of 0,006-1215 samples/ha.

It was defined on the basis of morphometric indicators definition of phase condition of Asian locust, gregarious phase makes from 47,5% to 90%; single phase makes from 5 to 100%, transitional is from 5 to 34,5%.

The beginning of dying off is from September 12.

Autumn monitoring by egg-pods is carried out on the area of 1,0 thousand hectares, 0,6 thousand hectares were occupied. Density of egg-podmade from 0,8 to 7,0 pieces/m². The amount of eggs in a jug made 30-89 pieces. The percent of egg-pods damage is 14,0-33,0%, damage by entomophages and drying up of eggs is noted.

Thus, monitoring of acridoids carried out in fodder lands of semidesertic zone of West Kazakhstan region in 2014 revealed the number of populations of especially widespread types of acridoids – Italian locust and Asian locust and determined the area of their settling.

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ТҮЙІН

Қазақстанның әр-түрлі табиғи-экономикалық аудандарында шегірткелердің 270 түрлері тараған. Олардың ішінде ауыл шаруашылығы танаптарына 15-20 түрі өте қауіпті. Таралу қарқыны мен зияндылығы жөнінен азаттық шегіртке мен (Locusta migratoria L.) итальяндық прус (Calliptamus italicus L.) ерекшеленеді.

Зерттеу нәтижелері бойынша Батыс Қазақстан облысының жартылай шөлейт аймағында шегірткелердің т.р құрамы, таралуы мен оларға қарсы қолданылатын дәру дәрмектердің биологиялық тиімділігі анықталды.

РЕЗЮМЕ

В различных природно-экономических зонах Казахстана обитают около 270 видов саранчовых насекомых. Наибольшую опасность сельскохозяйственным угодьям представляют 15-20 видов. Среди них по степени распространения и уровню вредоносности особо опасными видами являются азиатская (перелетная) саранча (Locusta migratoria L.) и итальянский прус (Calliptamus italicus L.).

В результате исследований получены данные о составе фауны саранчовых, установлена биологическая эффективность современных инсектицидов в условиях полупустынной зоны Западно-Казахстанской области.