

ANNOTATION

of dissertation work of Saimova Rita Urgenchbayevna for the Philosophy Doctor's degree (PhD) in the major 6D060700 - "Biology" on the topic "Life cycles of ground beetles (Coleoptera, Carabidae) in the agrolandscapes of the south-east of Kazakhstan."

Research topic: Life cycles of ground beetles (Coleoptera, Carabidae) in agricultural landscapes of the southeast of Kazakhstan.

The purpose of the study: to determine the species composition and features of the life cycles of widespread species of ground beetles in the agrolandscapes of the south-east of Kazakhstan and their practical significance.

Research objectives:

– study of the species composition and population structure of ground beetles in the agrolandscapes of the southeast of Kazakhstan;

– to determine the seasonal dynamics and peculiarities of the life cycles of widespread species of ground beetles in the agrolandscapes of the study area;

– to determine the practical significance of ground beetles in the agrolandscapes of the south-east of Kazakhstan and recommend measures to combat pests in crop fields.

Research methods. Specimens were collected using generally accepted insect trapping techniques in entomology (Paliy, 1970, Fasulati, 1971). Ground beetles were collected using a Barber soil trap (Prisny, 1989, Feoktistov, 1980). From the shelter and from the soil surface beetles were collected manually. In the fields specimens were collected by mowing with an entomological net, and at night with help of an artificial light source. The captured insects were placed in a stain containing ethyl acetate, and then the beetles were placed on cotton pads. Under laboratory conditions, large insects were pricked with appropriate entomological pins, and small ones, depending on their size, were glued (by PVA glue) onto cardboard papers, pinned onto an entomological pin.

To identify pests and entomophages, clarify their biological characteristics, distribution and economic value, instructions, articles and guides were used (Kryzhanovsky, 1965; Bei-Bienko, 1965; Lera, 1989; Isaev 2002; Yakobson and Ogloblin, 2005).

The main provisions submitted for defense (proven scientific hypotheses and other conclusions constituting novelty):

– species composition of ground beetles (Carabidae) in sown fields in the south-east of Kazakhstan, analysis of the fauna structure, compiled an annotated list;

– features of the life cycles of the dominant species of ground beetles in the sown areas of the research region;

– distribution of harmful and beneficial species, nutritional relationship of ground beetles found in the fields of the research region.

– the importance of ground beetles in sowing fields, their diversity, the relationship of life cycles with the vegetation period of field plants.

The main results of the study:

- the species composition was determined and an annotated list of ground beetles (Carabidae) common in agricultural landscapes was compiled;
- in the fields of the researched area, the structural features of the beetle fauna were revealed, the dominant and practically-interest species were identified;
- an analysis of the features of the distribution of ground beetles in the fields of the south-east of Kazakhstan was carried out, the reasons for the seasonal change in the population were identified;
- the features of the beetle fauna in natural undamaged landscapes and agrocenoses of the south-east of Kazakhstan were analyzed, recommendations were given to combat harmful species of beetles in the sowing fields.

Substantiation of the novelty and significance of the results obtained and compliance with the directions of scientific development or state programs:

- the results of the dissertation work were used in compiling an annotated list of the fauna of ground beetles of the agrocenosis of the peasant farm "Saratai" in the Zhambyl region; LLP "Kaskelen agropark" and LLP "Bayserke-Agro";
- information about the fauna of ground beetles can be included in the cadastral list of the carabid fauna of the study region;
- based on the identified features of the development cycles of ground beetles in the sown fields of South-Eastern Kazakhstan, ways to combat pest species of agricultural plants will be proposed;
- the results of the research work are recommended for use in the educational process of the Institute of Natural Science and Geography of Abai KazNPU, as well as for use in the educational process of universities in the courses of biology, zoology and ecology.

Scientific novelty

–for the first time, the species composition of ground beetles (Carabidae) in the agrolandscapes of the south-east of Kazakhstan was determined and an annotated list was compiled. As a result of the study, 73 species of ground beetles belonging to 27 families were identified in the fields.

– *Harpalus rufipes* (De Geer, 1774), *H. affinis* (Schrank, 1781), *Amara similata* (Gyllenhal, 1810), *A. familiaris* (Duftschmid, 1812), *Carabus cumanus* (Fischer-Waldheim, 1823), *C. nemoralis* (Muller, 1764), *Zabrus tenebrioides* (Goeze, 1777), *Z. morio* (Ménétriés, 1832), *Poecilus cupreus* (Linne, 1758), *Bembidion guttula* (Fabricius, 1792) are active from late May to late August. The breeding season lasts from the second half of July to mid-August. Mass breeding occurs in July.

– ground beetles (Carabidae) play a key role in regulating the abundance of many soil invertebrates, terrestrial mollusks, including a number of dangerous plant pests in the fields.

– larvae of the grain beetle *Zabrus tenebrioides* (Goeze, 1777) and hairy bread beetle *Zabrus morio* (Ménétriés, 1832) feed on seedlings of winter crops of wheat, rye, barley, and corn, gnawing out the parenchyma and leaving only the veins of the leaves; adults eat grains.

– representatives of the genus *Harpalus* and *Amara*: *Amara aenea* (DeGeer, 1774), *A. ovata* (Fabricius, 1792), *A. apricaria* (Paykull, 1790), *Harpalus rufipes* (De Geer, 1774), *H. smaragdinus* (Duftschmid, 1812) are pests of various crops.

– based on the stages of development of beetles in the sown areas, measures were proposed to combat pests of grain crops, which made it possible to increase the yield by 2-2,5 centners per 1 hectare.

Description of the contribution of the doctoral student to the preparation of each edition (the share of the dissertation author is indicated as a percentage of the total text)

9 scientific articles have been published on the topic of the dissertation. There is an article in a journal included into the Scopus database (percentile – 42%). There are 3 articles in publications approved by the Committee for Quality Assurance in the Field of Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan. There are 4 articles in collections of materials from near and far abroad international scientific conferences. All publications were prepared in the course of the study.

Publications in scientific journals included into the international Scopus database:

1. Ground beetles (Coleoptera: Carabidae) in different agroecosystems of Southeast Kazakhstan. *Sabrao Journal of Breeding and Genetics*. Volume 54, Issue 2 – (2022). P. 458–468, (Saimova R.U. 80%), (Co-authored by: Batyrova K.I., Bekenova N.A., Kauynbaeva E., Esimov B.K. 20%).

Publications in journals approved by the Committee for Quality Assurance in Science and Higher Education of the Ministry of Science and Higher Education of the Republic of Kazakhstan:

1. Phenology of Herpetobiontes fauna (Carabidae) in Southeast Kazakhstan. *News of the National Academy of Sciences of the republic of Kazakhstan, Biological and medical series*. ISBN2224 – 5308 Vol.3, Number 339 (2020), 49 – 56, (Saimova R.U. 80%), (Co-authored by: Esimov B.K., Kauynbaeva E. 20%).

2. Taxon composition and nutritional relationship of Coleoptera in the agrocenoses of Southeast Kazakhstan. *Al-Farabi Kazakh National University. Bulletin, Biology series*. №4 (85) December. 2020. page 98–104. ISSN 1563-0218; eISSN 2617– 7498, (Saimova R.U. 80%), (Co-authored by: Rezanov A.G., Esimov B.K.20%);

3. Taxon composition of Coleoptera in the agrolands of Southeast Kazakhstan. *Reports of the National Academy of Sciences of the Republic of Kazakhstan*. № 6 (334), 2020. 65 – 72 page. ISSN 2224 – 5227, (Saimova R.U. 100%);

Publications of materials of international scientific and practical conferences organized in neighboring countries:

1. Review of the study of Coleoptera in the agrolands of Southeast Kazakhstan. II international scientific and practical conference "Ecology and conservation of the animal world". Abai KazNPU. – Almaty, November 6, 2018. – pp. 79-82 (Saimova R.U. 80%), (Co-authored by: Esimov B.K. 20%);

2. Fauna and seasonal dynamics of the activity of ground beetles (Coleoptera, Carabidae) of the foothills of the Ile Alatau. II International Scientific and Practical Conference "Ecology and conservation of wildlife". Abai KazNPU. – Almaty, November 6, 2018. – pp. 190-196 (R.U. Saimova 80%), (Co-authored with B.K. Yessimov 20%);

3. Distribution, reproduction of rare species of ground beetles in the southeast of Kazakhstan and measures to protect them. Collection of reports of students and young scientists of the IV International Scientific and practical conference "Methods, theory and practice of modern biology". A. Baitursynov Kostanay State University – Kostanay. March 15, 2019. – P. 42-44 (Saimova R.U. 80%), (Co-authored by: Esimov B.K.20%);

4. Diversity and seasonal activity of species of ground beetles (Coleoptera, Carabidae) in the foothills of the Ile Alatau. Collection of reports of students and young scientists of the V International Scientific and practical conference "Methods, theory and practice of modern biology". A. Baitursynov Kostanay State University. – Kostanay. March 13, 2020. – P. 42-45. (Saimova R.U. 80%), (Co-authored by: Esimov B.K., Kauynbaeva E. 20%);

5. Almaty region agrobiocenoses fauna of groundbeetles (Coleoptera, Carabidae) and its importance in agriculture. International scientific and practical conference "30th Anniversary of Independence of Kazakhstan: actual problems of biological and environmental education in secondary and higher schools (innovation and practice)". Abai KazNPU. – Almaty. December 20, 2021 – P. 414-417 (Saimova R.U. 80%), (Co-authored by: Rezanov A.G., Esimov B.K.20%).