

Ecological and Faunistic Review of Entomocomplexes of Adyr Zones of the Fergana Valley

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Abstract: The article analyzes the state of entomocomplexes in adyr conditions of the Fergana Valley, reflects background species and the state of cenoses based on an analysis of the ratios of insect-phytophages. In the agro-cenoses of the studied region, 94 species and 14 subspecies of insect edificators were recorded, 6 of them were invasive. Dangerous invasive and quarantine species have been registered: *Phthorimaea operculella* (Zeller, 1873) – potato moth, *Tuta absoluta* (Meyrick, 1917) – tomato moth and *Myiopardalis pardalina* Bigot, 1891 – melon fly. As a result of the activity of these species, a violation and reformation of the community of local entomocomplexes is observed.

Keywords: entomocomplex, adyr zones, insects, edificators, adventives, invasives, Fergana Valley, Uzbekistan

1. Introduction

The Fergana Valley is surrounded by the mountain systems of the Pamir-Altai and the Tien Shan. Geographical location and climatic conditions, altitude amplitude determine the variety of environmental conditions in the region. Vertical zoning (adyrs, foothills, tau, yaylau) characterizes the rich fauna and flora of the Fergana Valley. Entomocomplexes, as an integral part of the corresponding ecosystems, play an important role in their formation and functioning.

To date, the entomocomplexes of the adyr zones of the Fergana Valley have not been studied. Some scientific sources provide information on the insect fauna of Central Asia and Uzbekistan of a general nature [1, 7, 11, 12, 14].

The aim of this work is a comparative assessment of the composition and structure of entomocomplexes in various biotopes, adyr zones of the Fergana Valley, the identification of background species and, as a result, the determination of cenosis stability.

2. Material and Methods of Research

The studies were carried out during 2012-2019. in the adyr zones of the Fergana Valley and the territories adjacent to it. During the research, methods and determinants used in general entomology and ecology were used [3, 4, 5, 6, 8, 9, 10, 11]. More than 3 thousand insects were collected during the research period and their collections were created (Fig. 1-3).

3. Results and Discussion

In the course of faunistic studies, it was determined that 94 species and 14 subspecies of insect edificators belonging to 6 orders, 23 families and 80 genera are found on the adyr zones of the Fergana Valley.

We have studied the faunistic composition and bioecology of individual species, as well as the patterns of formation of the entomocomplexes of the adyr zone. During the study in the Adyr zone, we identified 108 species and subspecies of

insects belonging to 6 orders: Orthoptera - 13 species, Homoptera - 21 species, Coleoptera - 41 species, Lepidoptera - 29 species, Hymenoptera - 1 species, Diptera - 3 species), which are edificators of this zone. The general background of the entomocomplex is characterized by the predominance of xerophilic and xeromesophilic insect species. Many of them are potential plant pests and cause significant damage to crops [14, 15, 16].

At the same time, the adyr zone serves as a source of transition of some species of the entomocomplex into agro-cenoses. Representatives of the Coleoptera winged wing group predominate in the species diversity of this entomocomplex. Here 41 (37.9% of the fauna) species were identified, belonging to 31 (38.7% of the biodiversity of the entomocomplex) genus and 9 (Chrysomelidae, Coccinellidae, Curculionidae, Elateridae, Meloidae, Melolonthidae, Nitidulidae, Scarabaeidae, Tenebrionidae 39) (% insect families of the entomocomplex) (Table 1). Beetles of the following species: *Phalton cochlea* Rial., *Epilachna chrisomelina* (F.), *Cluthornhynchus jakovlevi* Schltze., *Agriotesmeticulosus* Cand., *Epicauta erythrocephala* (Pall.), *Meligethes aeneus* F., *Polyphylla adspersa* Motch., *Amphimallon solstitialis* L., *Cetonia aurata* L., *Podonta daghestanica* Rtt. and *Cryllotalpa unispina* Sauss. (Orthoptera: Gryllotalpidae) are most harmful in the cultural landscapes of the adyr zone.



Figure 1: Orthoptera species collected from the Fergana Valley. (I.I.Zokirov, 2019)



Figure 2: Coleoptera species collected from the Fergana Valley. (I.I.Zokirov, 2019)



Figure 3: Coleoptera species collected from the Fergana Valley. (I.I.Zokirov, 2019)

According to the number of species, representatives of the orders Lepidoptera (29 species, 26.8% of the fauna) and Homoptera (21 species, 19.4% of the fauna) occupy the second and third places, respectively. Lepidoptera: *Agrotis segetum* Schiff., *Agrotis exclamations* Schiff., *Chloridea obsoleta* F., *Helicoverpa armigera* Hdn., *Euxoacamsicna* Hch., *Mamestra brassicae* L., *Plutella maculipennis* (Curt.), *Glyphodes pyloalis* Walker, *Phthorimaea operculella* (Zell.), *Tuta absoluta* (Mey.) and species of aphids– *Aphis gossypii* Glov., *Aphis pomide* Geer, *Acyrtosiphon gossypii* (Mordv.) are of economic importance.



In particular, it should be noted that in 1997 for the first time a dangerous pest was registered in the Fergana Valley - a mulberry ogne (*Glyphodes pyloalis* Walker), which does great harm to the mulberries in all areas of the valley [13]. To date, invasive and quarantine species common in some regions of the republic: *Phthorimaea operculella* (Zeller, 1873) - potato moth, *Tuta absoluta* (Meyrick, 1917) - tomato moth and *Myiopardalis pardalina* Bigot, 1891 - melon fly was first discovered (2016-2018 years) in the Fergana Valley [15, 16].

Table 1: Species composition of edificators adyr zones of the Fergana Valley

Order	Family	Species (subspecies)
Orthoptera	Acrididae	<i>Acrida oxycephala</i> Pall.
		<i>Calliptamus barbatus cephalotes</i> F.-W.
		<i>Calliptamus italicus italicus</i> L.
		<i>Calliptamus tartarus</i> Costa
		<i>Calliptamus turanicus</i> Tarb.
		<i>Docostaurus maroccanus</i> Thumb.
		<i>Locustamigratoria migratoria</i> L.
		<i>Oedaleus senegalensis</i> Krauss.
		<i>Orullulus desertus</i> Pall.
		<i>Sphingonotus nebulosus</i> (F.d.W).
		<i>Tettigonia viridissima</i> L.
	Gryllidae	<i>Gryllus bimaculatus</i> De Geer.
	Gryllotalpidae	<i>Gryllotalpa unispina</i> Sauss.
Homoptera	Aphididae	<i>Acyrtosiphon gossypii</i> (Mordv.)
		<i>Amphorophora catharinae</i> (Nevs.)
		<i>Aphis chloris</i> Koch.
		<i>Aphis gossypii</i> Glov.
		<i>Aphis magnopilosa</i> Nevs.
		<i>Aphis pomide</i> Geer
		<i>Aphis spiraefila</i> Patch.
		<i>Aphis spiraephila</i> Patch.
	<i>Brachycaudus amygdalinus</i> (Scheuf.)	

Coleoptera		<i>Brevicorune brassicae</i> (L.)
		<i>Dysaphis cousinae</i> Narz.
		<i>Dysaphis crataegi</i> (Kalt.)
		<i>Dysaphis eremuri</i> (Narz.)
		<i>Hyadaphis coerulescens</i> (Narz.)
		<i>Macrosiphum rosae</i> L.
		<i>Schizaphis graminum</i> (Rond.)
		<i>Uroleucon jaceae</i> (L.)
	Lachnidae	<i>Pterochloroides persicae</i> Chol.
	Pemphigidae	<i>Paracletus cimiciformis</i> von Heyd.
		<i>Tetraneura coerulescens</i> (Pass.)
	Chrysomelidae	<i>Entomoscelis adonidisholl</i> Pall.
		<i>Phaldon cochlea</i> Rial.
	Coccinellidae	<i>Epilachna chrisomelina</i> (F.)
	Curculionidae	<i>Cluthornhynchus jakovleve</i> Schlitz.
		<i>Lixus tschinkenticus</i> Fst.
		<i>Lixus hirticollis</i> Men.
		<i>Lixusrubicundus</i> Zoubk.
		<i>Phytonomus variabilis</i> Hrbst.
Elateridae	<i>Phytonomus consimilis</i> Faust	
	<i>Agriotes meticulosus</i> Cand.	
Meloidea	<i>Epicauta erythrocephala</i> (Pall.)	
	<i>Meloe coriarium</i> Brndt.	
	<i>Meloetuecius</i> Rossi.	
	<i>Mylabris quadripunctata</i> L.	
	<i>Mylabris magnoguttata</i> Heyel.	
Melolonthidae	<i>Mylabris germinata</i> F.	
	<i>Polyphylla adspersa</i> Mots.	
Scarabaeidae	<i>Polyphyllatridentata</i> Rtt.	
	Nitidulidae	<i>Meligethes aeneus</i> F.
		<i>Amphimallon solstitialis</i> L.
		<i>Cetonia aurata</i> L.
		<i>Chrysochares asiaticus</i> Pall.
		<i>Copris hispanus</i> L.
		<i>Copris lunaris</i> L.
		<i>Gymnopleurus aciculatus</i> Gebl.
		<i>Melolontha hippocastani</i> Fab.
		<i>Oryctes nasicornis turkestanicus</i> Minck
		<i>Polyphylla adspersa</i> Motch.
		<i>Potosia bogdanovi</i> Sols.
		<i>Potosiakarelini herminae</i> Rtt.
		<i>Potosiamarginicollis</i> Ball.
		<i>Adesmia fischeri</i> Fald.
<i>Centrocnemis mollis</i> Kr.		
<i>Dila laevicollis</i> Kr.		
<i>Dilaseriata</i> Rtt.		
Tenebrionidae	<i>Omophlus pilicollis</i> Men.	
	<i>Opatrum sabulosom</i> L.	
	<i>Pelerocnemis punctata</i> Gbl.	
	<i>Podonta daghestanica</i> Rtt.	
	<i>Prosodes pygmaea</i> Kr.	
	<i>Stenosis sulcicollis</i> Men.	
	Noctuidae	<i>Agrotis exclamations</i> Schiff.
		<i>Agrotis segetum</i> Schiff.
		<i>Chloridea obsoleta</i> F.
		<i>Egira anatolica</i> Hering
		<i>Euxoaaquilina</i> Den.et Shiff.
		<i>Euxoa camsicna</i> Hch.
<i>Euxoa conspicua</i> Hbn.		
<i>Helicoverpa armigera</i> Hdn.		
<i>Leucochlaea muscosa</i> Stgr.		
<i>Lophoterges centralasiae</i> Stgr.		
<i>Mamestra brassicae</i> L.		
Gelechiidae	<i>Plutella maculipennis</i> (Curt.)	

Pyralidae	<i>Phthorimaea operculella</i> (Zell.)	
	<i>Tuta absoluta</i> (Mey.)	
	<i>Glyphodes pyloalis</i> Walker	
	<i>Pieris brassicae ottonis</i> Roeb.	
	<i>Pieriscanidia palaeartica</i> Stgr.	
	<i>Pierisrapae debilis</i> Alph.	
	<i>Colias erate erate</i> Esp.	
	Nymphalidae	<i>Chazara briseis maracandica</i> Stgr.
		<i>Chazaraenervata</i> Alph.
		<i>Fabriciana niobe</i> L.
		<i>Hyponephele dysdora</i> Led.
		<i>Hyponephele interposita interposita</i> Ersch.
		<i>Hyponephele lupina intermedia</i> Stgr.
		<i>Issoria lathonia lathonia</i> L.
<i>Melitaea didyma turkestanica</i> Shelj.		
<i>Mesoacidalia aglajia</i> L.		
<i>Pandoriana pandora</i> Den.et Schiff.		
Hymenoptera	Fenthredinidae	<i>Athallia colibri</i> Christ.
Diptera	Syrphidae	<i>Eumerus strigatus</i> Fall.
	Tephritidae	<i>Myiopardalis pardalina</i> (Big.)
	Anthomiidae	<i>Delia brassicae</i> (Bouché)
Total	23	94(14)

The studied insect species occur not only in the entomocenosis, but also in the feed ratio. If the species range as a geographical rank determines its distribution in space, then the environment - its distribution and ecological niche.

Selective attitude of insects to environmental factors generates selectivity to habitat, i.e. environmental specialization. Insect habitats and stations are a combination of environmental conditions within the range of a species: part of a feed plant or a certain type of environment where it occurs [2].

In the entomocenosis and fodder plant, the differentiation of ecological niches to a greater extent goes in the direction of complementing each other, and not in the direction of direct competition for the use of ecosystem space, time, fodder plants and possible types of interactions.

4. Conclusions

In agrocenoses of the adyr zones of the Ferghana Valley, 94 species and 14 subspecies of insect edificators are found, 6 of which were invasive.

In general, in the region of the Ferghana Valley, adventitious species migrated under the influence of natural and anthropogenic factors, due to which the diversity of species expanded. Along with this, they began to hinder the reproduction of local species characteristic of this territory. The wide spread of pests throughout the valley, their adaptation in any territories and the occupation of dominance leads to various changes in the biocenosis. As a result, under the influence of new edificators, local species become autochthonous and move to more favorable places. This, in turn, leads to disruption and reformation of permanent entomocomplexes in agrocenosis.

Each type of insect has its own place in the entomocenosis and fodder plant. If the species range as a geographical rank determines its distribution in space, then the environment - its distribution and ecological niche.

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