

Species Composition of *Tamarix* Pests Distributed in the Deserts of Northwestern Uzbekistan

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Abstract

This article presents the results of scientific research conducted in 1999-2023 on the study of species composition of *Tamarix* pests distributed in the deserts of Northwestern Uzbekistan. A complete list of 7 Orders (Thysanoptera, Homoptera, Heteroptera, Coleoptera, Diptera, Lepidoptera, and Euacarina), 4 Suborders, 30 Families and 175 species belonging to composition of *Tamarix* pests is provided for the first time in Uzbekistan. Studies have identified 175 species on the *Tamarix* plant, with 41 species living in the plant stem, 28 species in the leaves, 4 species in the roots, 2 species in the flowers, and the remaining 100 species are found in the mixed parts.

Keywords: Karakalpakstan, climate and forceful, KOH, checklist, entomofauna, Aral Sea, Noctuidae, Pentatomidae, common species, rare species

1. Introduction

The unpredictable and dangerous nature of climate change has grown substantially since the last century, leading to various hazardous problems such as global warming, storms, heavy rains, changes in land use pattern, drier climate and forced migration of millions of organisms (Sharma & Bisen 2013; Dar & Jamal 2021). Insects have played key roles in terrestrial ecosystems, yet they have been ignored in conservation approaches. Insects are slowly making their way into biodiversity studies (Dar & Jamal, 2021). Because of desertification in the South ~~South~~ Aral Sea region, there are problems such as the loss of land and soil resources, the deterioration of the quality of natural pastures and meadows, and the rapid salinization of the soil. Deserts in Karakalpakstan occupy an area of more than 13.67 million hectares. This includes the Ustyurt Plateau, the Kyzylkum Desert, as well as the Aral Desert, which appeared in the dried-up area of the Aral Sea. These deserts occupy more than 80% of the territory of the republic. As a result of lack of moisture, the city longhorn beetle (*Aeolesthes sarta* Sols.) is increasing massively in woody plants (*Populus*, *Elaeagnus*, *Salix*) that form the main forest in the forest ecosystems of Karakalpakstan. The first information about entomological research in Karakalpakstan is related to the works of Eversman. In 1826, he provided preliminary information about termites during the expedition organized by the Ustyurt Plateau to study the flora and fauna (Shamuratova 2007; Gandjaeva et al. 2020). Research on cotton pests in Karakalpakstan began in the mid-30s of the 20th century. The research conducted by Zavadovsky (1935) is of particular importance. He conducted scientific research on damage to cotton by the field bug in the conditions of Karakalpakstan (Dauylbaeva & Bekbergenova 2012). The paper aims to compile a checklist of Northwestern Uzbekistan species composition of *Tamarix* pests based on available literature including the authors' researches (Bekchanov & Bekchanova 2022; Bazarbaeva et al. 2022).

The data presented in this paper are useful not only for agronomists and biologists but also for agencies and decision-makers with natural resource issues, especially the use of land for planting, growing, cultivating, and harvesting of crops, as well as climate change and pollution. Between 2014 and 2024, new species that were not previously registered in the entomofauna of Karakalpakstan have appeared in forest ecosystems. As a result of the ecological destruction of the Aral Sea in the northwestern part of Uzbekistan, changes in the natural environment, first of all, in the soil conditions and soil fauna of this area, require the implementation of research.

Tamarix is a genus of small trees and shrubs belonging to the tamarisk family (Tamaricaceae). Representatives are located in the desert, semi-desert and steppes of southern Europe, Africa and Asia, and are dominant plants. It is

widespread in the forests of Central Asia, where about 15 species are found. It is resistant to salt in the soil. Relatively cold hardy, all species can withstand temperatures down to -17°C , the coldest down to -50°C . It is photophobic. In the Northwestern Uzbekistan region, *Reaumuria fruticosa* B., *Reaumuria oxiana* L., *Tamarix androssovii* L., *Tamarix bungei* B., *Tamarix elongata* L., *Tamarix florida* B., *Tamarix hohenackeri* B., *Tamarix hispida* W., *Tamarix laxa* W., *Tamarix leptostachys* B., *Tamarix litvinovii*, *Tamarix ramossissima* P., *Tamarix szowitsiana* species are found.

2 Material and Methods

Study area

The Republic of Uzbekistan is located between the Amudarya and Syrdarya Rivers, and its total area is 448,900 km². The area is a lowland located in the northwestern part of Uzbekistan, along the lower reaches of the Amudarya River, between 60° - 61° longitude and 41° - 42° latitude, at 113-138 m above sea level. The vegetation period of plants is 200-210 days. The climate is extremely continental, with an average annual precipitation of 80-90 mm. The average temperature is -14.8°C in January and $+30.2^{\circ}\text{C}$ in July. Meadow, meadow-marsh, marsh-sandy, and traditional alkali soils predominate (Khamraev et al. 2007; Abdullaev et al. 2020; Ruzmetov et al. 2020). The deserts of Kyzylkum and Karakum greatly influence the climate of the oasis. The region is in the steppe zone, in the western part of the Khorezm oasis and the southern part of the Aral Sea, 100 m above sea level. The relief consists of a low plain. It is the old Amudarya Delta and consists of river sediments. The western and southwestern parts of the region connecting with Karakum are covered with sand (Abdullaev et al. 2002; Ruzmetov et al. 2022). Degraded low mountains and escarpments of the Ustyurt Plateau are located amidst the desert and shelter many rare species. However, at the same time, they are subject to pressure from animal husbandry as well as from the mining industry (building stone, gypsum raw material, etc.).

Due to the reason that agriculture is one of the most important sectors in the economy of Uzbekistan, the well-being and sustainable development of Uzbekistan depend significantly on the state of its natural resources. More than 90% of crops are grown on irrigated lands in Uzbekistan. A peculiarity of the most of natural ecosystems of Uzbekistan is their heightened vulnerability, associated with climate aridity. Therefore, the resistance of the ecosystems to external forces is rather low and any anthropogenic interference serves as an additional factor in the degradation of natural systems. The distribution of species in Northwestern Uzbekistan is generally described according to the presence of species in the following biogeographic regions of Uzbekistan: the Ustyurt Plateau and the Kyzylkum Desert. The map with biogeographic regions is presented in Figure 1.



Figure 1. Biogeographic regions in Northwestern Uzbekistan A. Ustyurt Plateau, B. Kyzylkum desert

Studies of species composition of entomocomplexes of desert ecosystems in Northwestern Uzbekistan were carried out during 1999-2023 in the Republic of Karakalpakstan and Khorezm oasis. The following generally accepted entomological and soil-zoological research methods were used to collect the material: visual, manual collection under

stones and under the bark of trees, cutting grasses and flowers, day and night observation of insects in flight, and also using a light trap. Collection sites for each species are presented in the same manner as Drosopoulos et al. (Ribes et al. 2013). Insect material was collected using sweeping nets and glass containers, or by glass tube aspirators (Fig.2).



Figure 2. Exhauster and sweeping nets

The samples killed in the killing bottles are then placed in Petri dishes with blotter paper and information slips indicating when, where and from which plant they were collected. Insects were killed in glass tubes with ethyl-acetate or were directly stored in 70% ethyl-alcohol. Genitalia were prepared for observation under a Carl Zeiss Stemi 305 binocular stereoscope and Olympus CX23 binocular microscope by maceration in 10% potassium hydroxide (KOH).

The geographical scope of this checklist covers the Northwestern Uzbekistan provinces. All species studied and identified for the fauna of Uzbekistan are verified by the Global Biodiversity Information Facility (GBIF).

3. Results

A complete list of 7 Orders (Thysanoptera, Homoptera, Heteroptera, Coleoptera, Diptera, Lepidoptera, Euacarina), 4 Suborders, 30 Families and 175 species belonging to composition of *Tamarix* pests is provided for the first time in Uzbekistan.

Order THYSANOPTERA

Family Phlaeothripidae: *Haplothrips tamaricis* Jakh. *Liothrips dampfi* Jakh.

Order HOMOPTERA

Suborder Cicadinea

Family Membracidae: *Gargara stepposa* Tish., *Stictocephala bisonia* (Kopp. et Junke).

Family Cicadellidae: *Tamaricella tamaricis* (Put), *Tamaricella subpunctata* Vilb. *Tamaricella jaxartensis* (Osh), *Tamaricella nitida* Mit. *Tamaricella grossa* Mit. et Zhur., *Tamaricella parvula* (Dlab.), *Tamaricella iliensis* Mit. et Zhur., *Tamaricella kurchaksholaki* Mit. et Zhur., *Tamaricades decoratus* (Hpt.), *Tamaricades teniatus* Em., *Opsius tigrupes* (Leth.), *Opsius versicolor* (Dist.), *Opsius discessus* (Horv.), *Opsius pallasi* (Leth.), *Opsius ferganensis* Dub.

Family Cicadidae: *Cicadara querula* (Pall.), *Melamsalta musiva* (Germ.), *Cicadetta musiva* Kalt. *Goniognathus palliates* Leth.

Family Tettigometridae: *Tettigometra costulata* Fieb. *Tettigometra vitellina* Fieb.

Family Cixiidae: *Duilius* (=Hemitropis) *fasciatus* (Horv.), *Duilius tamaricis* (Put. et Leth.), *Duilius suleiman* (Em.), *Duilius tatjanae* (Em.), *Duilius halima* (Mit.), *Pseudoliarus jaxsartus* (Mit.), *Pseudoliarus obliterated* (Kusn.).

Family Dictyopharidae: *Raivuna striata* (Osh.)

Family Issidae: *Scorlupaster heptapotamicum* (Mit.)

Suborder Psyllinea.

Family Aphalaridae: *Colposcencia aliena* (Low.), *Colposcencia ignota* Log., *Colposcencia jakovleffi* (Scott.),

Colposcena albomaculata Log., *Colposcena conspurctata* Log., *Colposcena loginovae* Baj. *Colposcena vicina* Log. (=araxis Log.), *Crastina tamaricina* (Log.).

Suborder Aphidinea.

Family Aphididae: *Brachyunguis tamaricophilus* (Nevs.), *Brachyunguis tamaricis* (Slicht.), *Brachyunguis brevisiphon* Kad. *Brevicornynella quadrimaculata* Nevs. *Xerophilaphis tamaricophila* Hall.

Family Lachnidae: *Eotrampa tamaricis* (Nevs.), *Aphis craccivora* Koch.

Suborder Coccinea.

Family Pseudococcidae: *Trabutina serpentina* (Green), *Trabutina manipara* Ehr. *Naiacoccus serpentes* Green.

Family Eriococcidae: *Acanthococcus orbiculus* Borchs. et Mat., *Acanthococcus gracilispinosus* Borchs. et Mat.

Family Diaspididae: *Adiscodiaspis tamaricicola* Mal., *Chionaspis etrusca* Leon.

Order HETEROPTERA.

Family Lygaeidae: *Artheneis alutacea* Fieb.

Family Miridae: *Tuponia elegans* Jak.

Family Pentatomidae: *Brachinema germari* Kol. *Raphigaster brevispinus* Horv. *Dolicoris penicillatus* (Horv.), *Carpocoris fuscispinus* Roh.

Order COLEOPTERA.

Family Apionidae: *Carimalia minutissima* Tourn. *Carimalia* spp. (*C. fausti*, Rtt. *C. exanguis* Voss. *C. hyalina* Zher. *C. setulosa* Tourn), *Nanophyes marmoratus* Goese. *Allomalina quadrivirgata* Costa. *Titanomalina komaroffi* Faust. *Apion lopatini* T.-M., *Apion tamaricis* Gyll.

Family Curculionidae: *Coniatus splendidulus* F., *Coniatus steveni* Cap., *Coniatus schrenki* Gebl., *Coniatus setosulus* Petri., *Geranorrhinus virens* Fst., *Geranorrhinus kerzhneri* Korot., *Geranorrhinus nasreddinovi* Korot., *Geranorrhinus pusillus* Motsh., *Liocleonus clathratus* Oliv., *Platymycterus tropicicollis* Ball., *Chlebius sulcirostris* Hoch., *Megamecus variegatus* Gebl., *Megamecus viridanus* Men., *Megamecus urbanus* Flowerl., *Chlorophanus caudatus* Fars., *Chlorophanus magnificus* Fst., *Chromoderus fasciatus* Mull., *Chromoderus declivis* Ol., *Piasomias vermiculosus* Fst., *Lixus incanescens* Boh., *Auletobius akinini* Fst., *Nanophyes minutissimus* Tourn., *Chloebius immeritus* Boh.

Family Scarabaeidae: *Poliphyla alba* Pall. *Rhizotrogus solstitialis* (L.), *Oxythyrea cinctella* (Sch.), *Cetonia aurata* (L.), *Hoplia parvula* Kryn.

Family Buprestidae: *Cyphosoma tataricum* Pall., *Sphenoptera mesopotamica* Mars., *Sphenoptera semonovi* Jak., *Sphenoptera balassogloi* Jak., *Sphenoptera ignita* Rtt., *Sphenoptera gracilis* Jak., *Habroloma aurea* Thomson.

Family Bostrychidae: *Xylogenes dilatatus* Rtt. *Bostrychus capucinus* L.

Family Meloidae: *Mylabris frolovi iliensis* Kus., *Mylabris caerulescens* Gebl., *Mylabris callida* Pall., *Mylabris crocata* Pall., *Mylabris scabiosae* Ol., *Mylabris intermedia* F-W. (= *staudengeri* Hend.), *Cerocoma schaefferi* F.

Family Cerambycidae: *Hesperophanes heydeni* Baeckm.

Family Chrysomelidae: *Labidostomis stenostoma* Wse., *Clytra atraphaxidis* Pall., *Clytra quadripunctata* Lac., *Cryptocephalus undulatus* Suffr., *Cryptocephalus tamaricis* Sols., *Cryptocephalus sarafschanensis iliensis* Wse., *Cryptocephalus jaxarticus* Lop. (= *Cr. simulator* Lop.), *Stylosomus major* Brt., *Stylosomus tamaricis* H.-Sch., *Stylosomus fausti* Reitt., *Stylosomus weberi* Reitt., *Chloropterus lefevrei* Reitt., *Stylosomus nigrifrons* Fleiesch., *Malegia turkestanica* Ogl., *Galeruca pomonae* Scop., *Theone silphoeides* Dalm., *Diorhabda elongata* Brull., *Altica tamaricis* Schrk., *Altica tscharynensis* Ogl., *Haltica deserticola* Parf., *Chalcoides plutus* Latr.

Family Bruchidae: *Bruchidus halodendri* Gedl.

Order LEPIDOPTERA.

Family Gelechiidae: *Amblypalpis tamaricella* Dan., *Metanarsia mitjaevi* Dan., *Ornativalva plutelliformis* Stgr, *Ornativalva tamaricicola* Dan., *Zarzinia melanozestes* Milch. *Gelechia* sp.

Family Geometridae: *Semiothisa aestemaria* Hbn.

Family Noctuidae: *Clytie syriaca* Bugn. *Anumeta henkei* S., *Iranada secunda* E., *Hadula sabulorum* A.

Family Lasiocampidae: *Malacosoma castrensis* L.

Family Coleophoridae: *Coleophora* sp.

Family Tineidae: *Parapodia* sp.

Family Cossidae: *Halcocerus arenicola* Stgr.

Order DIPTERA.

Family Cecidomyiidae: *Maricovskiana dentipes* (Mar.), *Maricovskiana mitjaevi* (Mar.), *Psectrosema barbatum* (Mar.), *Psectrosema becknasarovae* Fed., *Psectrosema grumgrzhimailoi* (Fed.), *Psectrosema iliense* (Mar.), *Psectrosema noxium* (Mar.), *Psectrosema squamosum* (Mar.), *Psectrosema tamariciphila* Mar., *Amblardiella diversicornis* (B.Mam. et Beckn.), *Amblardiella turcmenica* (B.Mam. at Beckn.), *Harrisiana mamaevi* Fed., *Dasineura tamariciflora* Fed., *Dasineura tamaricarpa* Fed., *Dasineura tamaricola* Fed., *Dasineura tamaricina* (Kieff.), *Isosandalum dentipes* Marik., *Isosandalum noxium* Marik., *Isosandalum squamosus* Marik.

Order EUACARINA.

Family Eriophyidae: *Eriophyes* sp.

As a result of our research: 175 species belonging to 7 families: Thrips (Thysanoptera) - 2, Homoptera - 54, Heteroptera - 6, Coleoptera - 78, Diptera (Diptera) family - 19, Lepidoptera family - 15, Euacarina family - 1 species were registered (Figure 2).

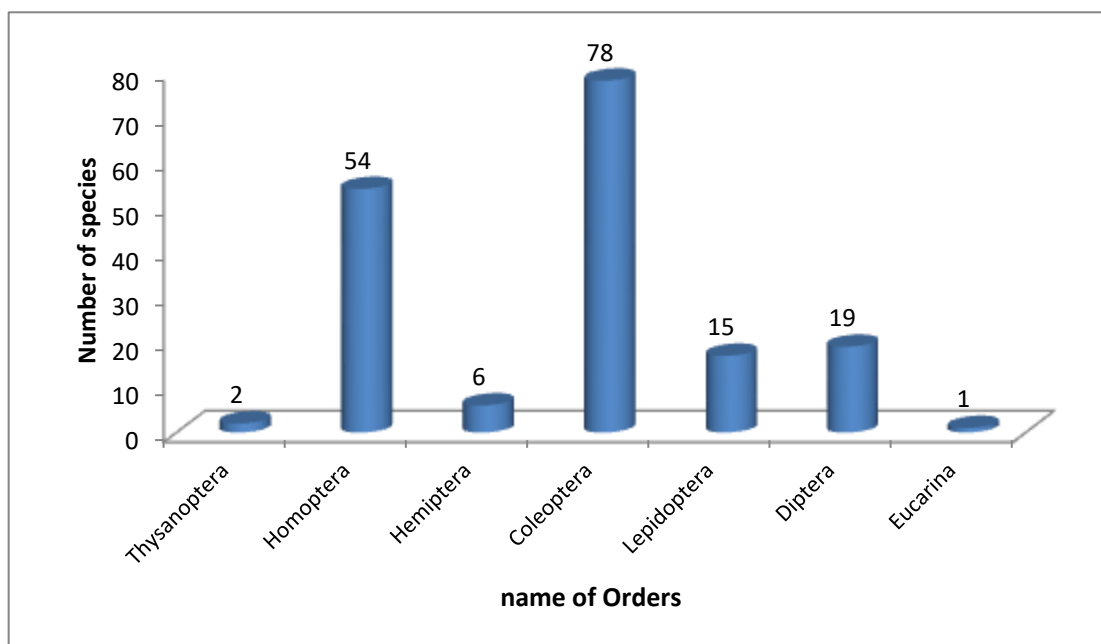


Figure 2. Proportion of genera of *Tamarix* pests in the conditions of Northwestern Uzbekistan

We also paid attention to the occurrences of 175 species of insects found on the *Tamarix* plant during the research and insect feeding (Table 1).

Table 1. Species composition of *Tamarix* pests in the conditions of Northwestern Uzbekistan

N	Species	Insect feeding	Insect
Thysanoptera			
Phlaeothripidae t			
1	<i>Haplothrips tamaricis</i> Jakh	Flower, leaf	+++
2	<i>Liothrips dampfi</i> Jakh.	Flower, leaf	+++
Homoptera			
Membracidae			
3	<i>Gargara stepposa</i> Tish.	stem, leaf	+
4	<i>Stictocephala bisonia</i> Kopp.	stem	+
Cicadellidae			
5	<i>Tamaricella tamaricis</i> (Put).	stem, leaf	+
6	<i>Tamaricella subpunctata</i> Vilb.	stem, leaf	+

7	<i>Tamaricella jaxartensis</i> (Osh).	stem, leaf	+
8	<i>Tamaricella nitida</i> Mit.	stem, leaf	+
9	<i>Tamaricella grossa</i> Mit. et Zhur.	stem, leaf	+
10	<i>Tamaricella parvula</i> (Dlab.).	stem, leaf	+
11	<i>Tamaricella iliensis</i> Mit. et Zhur.	stem, leaf	+
12	<i>Tamaricella kurchaksholaki</i> Mit.	stem, leaf	+
13	<i>Tamaricades decoratus</i> (Hpt.).	stem, leaf	+
14	<i>Tamaricades teniatus</i> Em.	stem, leaf	+
15	<i>Opsius tigripes</i> (Leth.).	stem, leaf	+
16	<i>Opsius versicolor</i> (Dist.).	stem, leaf	+
17	<i>Opsius discessus</i> (Horv.).	stem, leaf	+
18	<i>Opsius pallasi</i> (Leth.)	stem, leaf	+
19	<i>Opsius ferganensis</i> Dub.	stem, leaf	+
Cicadidae			
20	<i>Cicadara querula</i> (Pall.).	stem, leaf	+
21	<i>Melamsalta musiva</i> (Germ.)	stem, leaf	+
22	<i>Cicadetta musiva</i> Kalt.	stem, leaf	+
23	<i>Goniognathus palliatus</i> Leth.	stem, leaf	+
Tettigometridae			
24	<i>Tettigometra costulata</i> Fieb.	stem, leaf	+
25	<i>Tettigometra vitellina</i> Fieb.	stem, leaf	+
Cixiidae			
26	<i>Duilius fasciatus</i> (Horv.)	stem, leaf	+
27	<i>Duilius tamaricis</i> (Put. et Leth.)	stem, leaf	+
28	<i>Duilius suleiman</i> (Em.)	stem, leaf	+
29	<i>Duilius tatjanae</i> (Em.)	stem, leaf	+
30	<i>Duilius halima</i> (Mit.)	stem, leaf	+
31	<i>Pseudoliarus jaxsartus</i> (Mit.)	stem, leaf	+
32	<i>Pseudoliarus obliterated</i> (Kusn.)	stem, leaf	+
Dictyopharidae			
33	<i>Raivuna striata</i> (Osh.)	stem	+
Issidae			
34	<i>Scorlupaster heptapotamicum</i>	stem	+
Aphalaridae			
35	<i>Colposcencia aliena</i> (Low.).	stem, leaf	+
36	<i>Colposcencia ignota</i> Log.	stem, leaf	+
37	<i>Colposcencia jakovleffi</i> (Scott.).	stem, leaf	+
38	<i>Colposcencia albomaculata</i> Log.	stem, leaf	+
39	<i>Colposcencia conspurctata</i> Log.	stem, leaf	+
40	<i>Colposcencia loginovae</i> Baj.	stem, leaf	+
41	<i>Colposcencia vicina</i> Log.	stem, leaf	+
42	<i>Crastina tamaricina</i> (Log.)	stem, leaf	+
Aphididae			
43	<i>Brachyunguis tamaricophilus</i> (Nevs.)	stem, leaf and Flower	+++
44	<i>Brachyunguis tamaricis</i> (Slicht.)	stem, leaf and Flower	+++
45	<i>Brachyunguis brevisiphon</i> Kad.	stem, leaf and Flower	+++
46	<i>Brevicornella quadrimaculata</i> Nevs.	stem, leaf and Flower	+++
47	<i>Xerophilaphis tamaricophila</i> Hall.	stem, leaf and Flower	+++
Lachnidae			
48	<i>Eotrampa tamaricis</i> (Nevs.).	root	+++
49	<i>Aphis craccivora</i> Koch.	stem, leaf and Flower	+++
Pseudococcidae			
50	<i>Trabutina serpentina</i> (Green).	stem, leaf	+
51	<i>Trabutina mannipara</i> Ehr.	stem, leaf	+

52	<i>Naiacoccus serpentines</i> Green.	stem, leaf and Flower	+++
Eriococcidae			
53	<i>Acanthococcus orbiculus</i> Borchs.	stem, leaf	+
54	<i>Acanthococcus gracilispinosus</i> Borchs.	stem, leaf	+
Diaspididae			
55	<i>Adiscodiaspis tamaricicola</i> Mal.	stem, leaf and Flower	+++
56	<i>Chionaspis etrusca</i> Leon	stem	+++
Heteroptera			
Lygaeidae			
57	<i>Artheneis alutacea</i> Fieb.	stem, leaf and Flower	+++
Miridae			
58	<i>Tuponia elegans</i> Jak.	stem, leaf and Flower	+++
Pentatomidae			
59	<i>Brachinema germari</i> Kol.	stem, leaf and Flower	+++
60	<i>Raphigaster brevispinus</i> Horv.	stem, leaf and Flower	+++
61	<i>Dolicoris penicillatus</i> (Horv.).	stem, leaf and Flower	+++
62	<i>Carpocoris fuscispinus</i> Roh.	stem, leaf and Flower	+++
Coleoptera			
Apionidae			
63	<i>Carimalia minutissima</i> Tourn.	Flower	+++
64	<i>Carimalia fausti</i> , Rtt.	stem, leaf and Flower	+
65	<i>Carimalia exanguis</i> Voss.	stem, leaf and Flower	+
66	<i>Carimalia hyalina</i> Zher.	stem, leaf and Flower	+
67	<i>Carimalia setulosa</i> Tourn	stem, leaf and Flower	+
68	<i>Nanophyes marmoratus</i> Goese.	stem, leaf and Flower	+
69	<i>Allomaliala quadrivirgata</i> Costa.	stem, leaf and Flower	+
70	<i>Titanomaliala komaroffi</i> Faust.	stem, leaf and Flower	+
71	<i>Apion lopatini</i> T.-M.	stem, leaf and Flower	+
72	<i>Apion tamaricis</i> Gyll.	stem, leaf and Flower	+
Curculionidae			
73	<i>Coniatus splendidulus</i> F.	stem, leaf and Flower	+
74	<i>Coniatus steveni</i> Cap.	leaf	+++
75	<i>Coniatus schrenki</i> Gebl.	stem, leaf and Flower	+
76	<i>Coniatus setosulus</i> Petri.	stem, leaf and Flower	+
77	<i>Geranorrhinus virens</i> Fst.	stem, leaf and Flower	+
78	<i>Geranorrhinus kerzhneri</i> Korot.	stem, leaf and Flower	+
79	<i>Geranorrhinus nasreddinovi</i> Korot.	stem, leaf and Flower	+
80	<i>Geranorrhinus pusillus</i> Motsh.	stem, leaf and Flower	+
81	<i>Liocleonus clathratus</i> Oliv.	stem, leaf	+++
82	<i>Platymycterus tropicicollis</i> Ball.	stem, leaf and Flower	+
83	<i>Chlebius sulcirostris</i> Hoch.	stem, leaf and Flower	+
84	<i>Megamecus variegatus</i> Gebl.	stem, leaf and Flower	+
85	<i>Megamecus viridanus</i> Men.	stem, leaf	+++
86	<i>Megamecus urbanus</i> Flowerl.	stem, leaf and Flower	+
87	<i>Chlorophanus caudatus</i> Fars.	leaf	+++
88	<i>Chlorophanus magnificus</i> Fst.	stem, leaf and Flower	+
89	<i>Chromoderus fasciatus</i> Mull.	stem, leaf and Flower	+
90	<i>Chromoderus dicliviis</i> Ol.	stem, leaf and Flower	+
91	<i>Piasomias vermiculosus</i> Fst.	stem, leaf and Flower	+
92	<i>Lixus incanescens</i> Boh.	stem, leaf and Flower	+
93	<i>Auletobius akinini</i> Fst.	stem, leaf and Flower	+
94	<i>Nanophyes minutissimus</i> Tourn.	leaf, stem	+++
95	<i>Chloebius immeritus</i> Boh.	leaf, stem	+++
Scarabaeidae			

96	<i>Poliphyla alba</i> Pall.	root	+++
97	<i>Rhizotrogus solstitialis</i> (L.).	root	+++
98	<i>Oxythyrea cinctella</i> (Sch.).	stem, leaf and Flower	+++
99	<i>Cetonia aurata</i> (L.).	stem, leaf and Flower	+++
100	<i>Hoplia parvula</i> Kryn.	stem, leaf and Flower	+++
Buprestidae			
101	<i>Cyphosoma tataricum</i> Pall.	stem, leaf and Flower	+++
102	<i>Sphenoptera mesopotamica</i> Mars.	stemlar, leaf	+++
103	<i>Sphenoptera semonovi</i> Jak.	stem	+
104	<i>Sphenoptera balassogloi</i> Jak.	stem	+
105	<i>Sphenoptera ignita</i> Rtt.	stem	+
106	<i>Sphenoptera gracilis</i> Jak.	stem	+
107	<i>Habroloma aurea</i> Thomson.	stem	+
Bostrychidae			
108	<i>Xylogenes dilatatus</i> Rtt.	leaf	+++
109	<i>Bostrychus capucinus</i> L.	stem	+
Meloidae			
110	<i>Mylabris frolovi iliensis</i> Kus.	Flower, stem	+++
111	<i>Mylabris caerulescens</i> Gebl.	Flower, stem	+++
112	<i>Mylabris callida</i> Pall.	Flower, stem	+++
113	<i>Mylabris crocata</i> Pall.	Flower, stem	+++
114	<i>Mylabris scabiosae</i> Ol.	Flower, stem	+++
115	<i>Mylabris intermedia</i> F-W.	Flower, stem	+++
116	<i>Mylabris staudingeri</i> Heyd.	Flower, stem	+++
117	<i>Cerocoma schaefferi</i> F.	Flower, stem	+++
Cerambycidae			
118	<i>Hesperophanes heydeni</i> Baeckm.	root	+++
Chrysomelidae			
119	<i>Labidostomis stenostoma</i> Wse.	leaf	+
120	<i>Clytra atraphaxidis</i> Pall.	leaf	+
121	<i>Clytra quadripunctata</i> Lac.	leaf	+++
122	<i>Cryptocephalus undulatus</i> Suffr.	leaf	+
123	<i>Cryptocephalus tamaricis</i> Sols.	leaf	+
124	<i>C. sarafschanensis iliensis</i> Wse.	leaf	+
125	<i>Cryptocephalus jaxarticus</i> Lop.	leaf	+
126	<i>Stylosomus major</i> Brt.	leaf	+
127	<i>Stylosomus tamaricis</i> H.-Sch.	leaf	+
128	<i>Stylosomus fausti</i> Reitt.	leaf	+
129	<i>Stylosomus weberi</i> Reitt.	leaf	+
130	<i>Stylosomus nigrifrons</i> Fleiesch.	leaf	+++
131	<i>Chloropterus lefevrei</i> Reitt.	leaf	+
132	<i>Malegia turkestanica</i> Ogl.	leaf	+
133	<i>Galeruca pomonae</i> Scop.	leaf	+
134	<i>Theone silphoeides</i> Dalm.	leaf	+
135	<i>Diorhabda elongata</i> Brull.	leaf	+++
136	<i>Altica tamaricis</i> Schrk.	leaf	+
137	<i>Altica tscharynensis</i> Ogl.	leaf	+
138	<i>Haltica deserticola</i> Parf.	leaf	+++
139	<i>Chalcoides plutus</i> Latr.	leaf	+++
Bruchidae			
140	<i>Bruchidus halodendri</i> Gedl.	Flower	+++
Lepidoptera			
Gelechiidae			
141	<i>Amblypalpis tamaricella</i> Dan.	stem	+

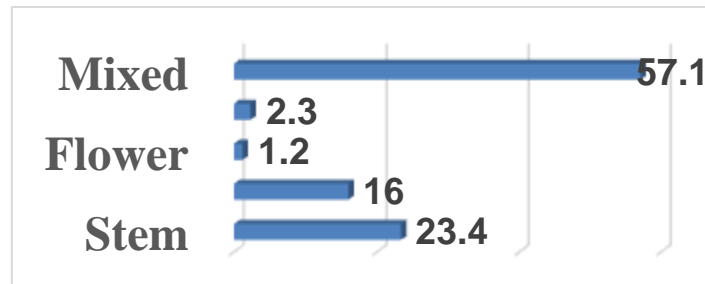
142	<i>Metanarsia mitjaevi</i> Dan.	stem	+
143	<i>Ornathalva plutelliformis</i> Stgr	stem	+
144	<i>Ornathalva tamaricicola</i> Dan.	stem	+
145	<i>Zarzinia melanozestes</i> Milch.	stem	+
146	<i>Gelechia</i> sp.	stem	+
Geometridae			
147	<i>Semiothisa aestemaria</i> Hbn.	stem	+
Noctuidae			
148	<i>Clytie syriaca</i> Bugn.	Leaf	+++
149	<i>Anumeta henkei</i> S.	Leaf	+++
150	<i>Iranada secunda</i> E.	Leaf	+++
151	<i>Hadula sabulorum</i> A.	Leaf	+++
Lasiocampidae			
152	<i>Malacosoma castrensis</i> L.	stem	+
Coleophoridae			
153	<i>Coleophora</i> sp. I.	stem	+
Tineidae			
154	<i>Parapodia</i> sp.	stem	+++
Cossidae			
155	<i>Halcoecus arenicola</i> Stgr.	stem	+++
Diptera			
Cecidomyiidae			
156	<i>Maricovskiana dentipes</i> (Mar)	stem	+
157	<i>Maricovskiana mitjaevi</i> (Mar.)	stem	+
158	<i>Psectrosema barbatum</i> (Mar.)	stem	+
159	<i>Psectrosema becknasarovae</i> Fed.	stem	+
160	<i>Psectrosema grummgrzhimailoi</i> (Fed.)	stem	+
161	<i>Psectrosema iliense</i> (Mar.)	stem	+
162	<i>Psectrosema noxium</i> (Mar.)	stem	+
163	<i>Psectrosema squamosum</i> (Mar.)	stem	+
164	<i>Psectrosema tamariciphila</i> Mar.	stem	+
165	<i>Amblardiella diversicornis</i> (B.Mam.)	stem	+
166	<i>Amblardiella turcmenica</i> (B.Mam.)	stem	+
167	<i>Harrisiana mamaevi</i> Fed.	stem	+
168	<i>Dasineura tamariciflora</i> Fed.	stem	+
169	<i>Dasineura tamaricicarpa</i> Fed.	stem	+
170	<i>Dasineura tamaricicola</i> Fed.	stem	+
171	<i>Dasineura tamaricina</i> (Kieff.)	stem	+
172	<i>Isosandalum dentipes</i> Marik.	stem	+++
173	<i>Isosandalum noxium</i> Marik.	stem	+++
174	<i>Isosandalum squamosus</i> Marik.	stem	+++
Euacarina			
Eriophyidae			
175	<i>Eriophyes</i> sp.	stem	+++

Note: "+++" - common species, "+" - rare species

According to Table 1, 175 species of insects were found on *Tamarix* plants, of which 117 species were recorded as rare and 58 species as widespread. These insect species belong to 22 families, including 2 species of the Phlaeothripidae family, 5 species of the Aphididae family, 2 species of the Lachnidae family, 1 species of the Pseudococcidae family, 2 species of the Diaspididae family, 1 species of the Lygaeidae family, 1 species of the Miridae family, 4 species of the Pentatomidae family, 1 species of the Apionidae family, 6 species of the Curculionidae family, 5 species of the Scarabaeidae family, 2 species of the Buprestidae family, 1 species of the Bostrychidae family, 8 species of the Meloidae family, 1 species of the Cerambycidae family, 5 species of the Chrysomelidae family, 1 species of the Bruchidae family, 4 species of the Noctuidae family, 1 species of the Tineidae family, 1 species of the Cossidae family, 3 species of the Cecidomyiidae family, and 1 species of the Eriophyidae family. Among the recorded families, the Meloidae family with 8

species, the Curculionidae family with 6 species, the Scarabaeidae, Aphididae, and Chrysomelidae families with 5 species each, and the Noctuidae and Pentatomidae families with 4 species each were found to be dominant.

Additionally, when studying the pest insects living in the vegetative and generative organs of *Tamarix* plants, it was found that 41 species (23.4%) live in the plant stem, 28 species (16.0%) in the leaves, 4 species (2.3%) in the roots, 2 species (1.2%) in the flowers, and the remaining 100 species (57.1%) were found in other parts.



4. Conclusion

In the Northwestern part of Uzbekistan, the drying up of the Aral Sea, the increase in desertification, and the degradation of fertile soils have led to an increase in the species composition of plants, including the *Tamarix* entomofauna. Studies have identified 175 species on the *Tamarix* plant, with 41 species living in the plant stem, 28 species in the leaves, 4 species in the roots, 2 species in the flowers, and the remaining 100 species are found in the mixed parts.

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Author's contributions

Dr. Bekbergenova Zakhira was responsible for data collection and species identification, Jamila Sultanbaeva and Dilshod Romanov were responsible for data collection and studying ecological features, Dr. Abdulla Iskandarov was responsible for study design and revising, Prof. Ikram Abdullaev drafted and revised the manuscript.

Competing interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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