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GRAMINICOLOUS SCALE INSECTS OF TURKMENISTAN

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ABSTRACT

Grasses constitute a significant component of the flora in Turkmenistan mountains, river valleys, deserts and oases. So far 30 species belonging to 6 families of scale insects have been recorded in Turkmenistan from 23 genera of gramineous plants, family Poaceae (= Gramineae). Twenty of these species were also recorded in other regions of Central Asia, whereas six species are known only from Turkmenistan. The recorded scale insects belong to six families, namely Pseudococcidae, Eriococcidae, Coccidae, Diaspididae, Margarodidae and Aclerdidae. The majority of species, 19 in number, belong to the mealybug family, Pseudococcidae. The most frequently infested host plants are *Phragmites australis*, *Ericmthus purpurascens*, *Sorghum*, *Stipa*, *Festuca* and *Agropyron.* Forty-two species of parasitic Hymenoptera, family Encyrtidae, were reared from 14 species of the above mentioned families of scale insects. Complexes of parasitoids are very common in *Eriopeltis festucae* (Fonscolombe) (Coccidae), on *Agrotrigia androssovii; Adelosoma phragmitidis* Borchsenius and *Trionymus copiosus* Borchsenius (Pseudococcidae), on *Phragmites australis; Nipponaclerda tin-anica* (Archangelskaya) (Aclerdidae), on *Phragmites australis.* The encyrtids, which parasitize species of Pseudococcidae and Aclerdidae on *Erianthus purpurascens* and on *Phragmites australis,* are the most specific.

KEY WORDS: Coccoidea, scale insects, Gramineae, graminoid, parasitoid, Encyrtidae.

INTRODUCTION

The study of scale insects (Homoptera: Coccoidea) and their parasitoids in Turkmenistan is of great scientific value, since it is related to the evolution of insects in arid zones. More than 100 species of scale insects inhabiting trees, bushes and herbaceous plants have been recorded from Turkmenistan. Herbaceous plants, in particular of the Poaceae (= Gramineae), are represented in all landscapes of arid zones. Their species composition varies in mountains and valleys, in deserts and oases. For example, more than 150 species of cereals belonging to 74 genera grow in the mountains of Kopetdag, which exhibit the richest flora in Turkmenistan (Gudkova et al., 1982). According to the data of Chopanov, 261 species of Poaceae from 94 genera have been identified in Turkmenistan (Nikitin and Geldychanov, 1988).

During our investigations on the scale insects and their associated parasitoids in Turkmenistan, we found 30 species of scale insects inhabiting several species of gramineous plants. For comparison, in the Far East of Russia 43 species of graminicolous scale insects were recorded (Danzig, 1980), and in Tadjikistan, where the fauna of scale insects has been better studied than in other regions of Central Asia, 22 species have been registered on cereals

(Bazarov, 1968; Bazarov and Shmelev, 1971). The survey of the scale insect fauna in Turkmenistan was possible thanks to the taxonomic researches of N.S. Borchsenius (1949) and E.M. Danzig (1980). We are thankful to E.M. Danzig for her help in identifying the collected scale-insect species. Half of the 30 species collected are new to the fauna of Turkmenistan.

RESULTS AND DISCUSSION

The Turkmenian scale insects of grasses (Table 1) belong to 6 families: Margarodidae (1 species), Pseudococcidae (19 species in 10 genera), Eriococcidae (3 species in 2 genera), Aclerdidae (one species), Coccidae (3 species in 3 genera) and Diaspididae (3 species in 2 genera). The host plants of these scale insects belong to 23 genera of the family Poaceae.

An analysis of the composition of graminicolous scale insects from Turkmenistan shows that Pseudococcidae is the most common family comprising 63.3% of the fauna. These scale insects (Table 1) are characterized by a high specificity of their distribution: 20 species out of 30 are found in Turanian areas (of these, 6 have been recorded only in Turkmenistan); 5 species are

TABLE 1
A list of scale insects of Turkmenistan and their preferred graminaceous host plants

Scale insects (families and species)	*Phragmites australis*	*Erianthus purpurascens*	*Sorghum* spp.	*Stipa* spp.
Pseudococcidae				
Adelosoma phragmitidis Borchsenius	+			
Heterococcus nudus Green			+	
Heterococcus femoralis Borchsenius			+	
Kiritshenkella stataria Borchsenius	+	+	+	
Neotrionymus monstatus Borchsenius	+	+		
Neotrionymus montanus Borchsenius	+			
Phenacoccus bicerarius Borchsenius			+	
Phenacoccus stipae Nurmamatov				+
Pseudococcus erianthi (Kiritshenko)		+		
Pseudococcus expressus Borchsenius			+	
Spilococcus flavus Borchsenius	+	+		
Trionymus copiosus Borchsenius	+			
Eriococcidae				
Acanthococcus kondarensis Borchsenius				+
Aclerdidae				
Nipponaclerda turanica (Archangelskaya)	+			
Coccidae				
Luzulaspis sp.				+
Scythia festuceti Šulc				+
Diaspididae				
Duplachionaspis erianthi Borchsenius	+	+	+	+
Duplachionaspis phragmitidis Borchsenius	+			
Rhizaspidiotus secretus Borchsenius	+			

known in Central Asia and East Transcaucasus. Four species of the other 5 are distributed in the Palaearctic region and one species is also known from North America. Thus, 83.3% of the graminicolous scale insects of Turkmenistan belong to endemic Turanian species.

The richest fauna of scale insects was recorded on gigantic graminoids — *Phragmites australis* (reed), *Erianthus purpurascens* (erianthoid plant) — and on other graminoids such as *Sorghum* spp. and *Stipa* spp. (feather grasses) (Table 1).

The various species of graminicolous scale insects differ in their life habits. Some are hidden on roots or under leaf sheaths, others live openly, usually on the upper, seldom on the lower surface of leaves. On the roots of desert graminoids belonging to the genus *Stipagrostis* we collected *Neomargarodes aristidae* Borchsenius (Margarodidae) and the mealybug *Phenacoccus kaplini* Danzig. We did not find parasitoids on these scale insects. Roots of different graminoids are inhabited by several mealybug species: *Spilococcus flavus* Borchsenius, *Heterococcus femoralis* Borchsenius, *Mirococcus clarus* Borchsenius. Species of the family Eriococcidae — *Acanthococcus agropyri* Borchsenius, *A. kondarensis* Borchsenius — and of the family Coccidae — *Luzulaspis* sp., *Scythia festuceti* Šulc, *Eriopeltis festucae* (Fonscolombe) — inhabit leaves. Several species of Diaspididae are living in the open (*Duplachionaspis erianthi* Borchsenius, *D. phragmitidis* Borchsenius) and others such as *Rhizaspidiotus secretus* Borchsenius and *Nipponaclerda turanica* (Archangelskaya) (Aclerdidae) are enveloped in the leaves of reeds. Most of the other mealybug species (for example, *Trionymus copiosus* Borchsenius, *Neotrionymus monstatus* Borchsenius, *Heterococcus nudus* Green) infrequently and locally form more or less considerable colonies, the former two species on reeds, the latter on various graminoids.

Chalcidoid parasitoids (Hymenoptera: Chalcidoidea) were reared from 14 species of scale insects and belong to 42 species of the Encyrtidae (Myartseva, 1986). The parasitoids were reared from species of Aclerdidae, Coccidae, Eriococcidae and Pseudococcidae. Several species, e.g. *Nipponaclerda turanica* and *Eriopeltis festucae*, are hosts of large parasitoid complexes, up to 8–9 species. These complexes of parasitoids clearly achieve natural regulation of their scale insect hosts, thus decreasing their damage to gramineous plants.

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