

Coleopteran insect pests of saxaul (*Haloxylon* spp.) in the desert area of South Eastern Kazakhstan

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ABSTRACT

Species composition of coleopteran pests of saxaul was studied in 2015-2016 in the desert zone of southeastern Kazakhstan. A number of Coleopteran species were found to feed on saxaul, but also on other desert pasture plants from the goosefoot family: *Sphenoptera* spp., *Aclypaeacalva* Rtt., *Bulaelichatshovi* Hum., *Microderaconvexa* Tausch. The majority of the species were polyphagous from families Scarabaeidae, darkling beetles (Tenebrionidae), Alleculidae, Blister beetles (Meloidae), weevils (*Thanymercusspp.*, *Sitonaspp.*, *Chromonotusspp.*, *Bothynoderesspp.*, etc.), leaf beetles (Chrysomelidae) and others. This article provides data about the distribution and biological characteristics of 16 coleopteran species associated trophically with saxaul in the desert area of southeastern Kazakhstan from Meloidae (2 species), Cerambycidae (2 species), Buprestidae (6 species) and Chrysomelidae (6 species).

Key words : Beetle species, Distribution, Coleoptera, pests, Saxaul.

Introduction

Earlier studies reported a total of 167 species (Nurmuratov *et al.*, 1987) feeding on various organs of saxaul (*Haloxylon* spp.) in the desert areas of southeastern Kazakhstan. Many of them are beetles from different families, some of which having a narrow food specialization, eating certain organs or tissues, or developing within the saxaul plants (jewel beetles, longhorn beetles, weevils), others being polyphagous (scarab beetles, darkling beetles, blister beetles, leaf beetles), or oligophagous—long horn beetles, jewel beetles, weevils and others. Their activity is also related to certain seasons of the year.

In a previous study (Mombaeva *et al.*, 2015) we have reported a list of 17 harmful coleopteran species with notes on the biology of 7 of them: *Julodis*

variolaris (Pallas, 1773), *Turñmenigena varentzovi* Melgunov., Yagdyev A. Begov 94, *Sphenoptera orichalcea* Pallas., *Sphenoptera potanini* Jakovlev, *Sphenoptera hauseri* Reitter, *Microdera convexa* Tauscher, *Aclypaeacalva* Rtt., and *Bulaea lichatshovi* Hum. The aim of the current study was to establish the distribution and phenology of the rest of the recorded coleopteran species for which such data was not available.

Material and Methods

In 2015-2016 we conducted further studies to clarify the species composition of coleopteran pests associated with haloxylon and especially the group of stem and root feeders. For collecting field data regular surveys were made in saxaul forests in southeast-

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ern Kazakhstan during the spring and summer of 2015 and 2016 (Fig. 1). Larvae and adults of beetle species were collected using the method of beating, sweep-net sampling, examining plant parts visually and dissecting branches and roots (Fasulati, 1971; Paly, 1979; Dobrovolsky, 1969; Tsurikov and Tsurikov 2001). Species were identified by the laboratory staff "Taxonomy of insects" Sinew S. Y., Volkovich M.G. "Institute of zoology" Russian Academy of Sciences of Saint-Petersburg. We express them a great gratitude.

Results and Discussion

The complex of beetle species feeding on saxaul is quite big, but also very specific. Based on the type of damage they are also diverse and could be divided to pests of generative organs, pests of the vegetative organs, and pests of stem and root. In some species, the larvae are stem feeders or seed feeder, while the adults are damaging the vegetative parts of saxaul. For example, the adult of jewel beetle eats vegeta-

tive and generative organs, and larvae - the roots. The larvae of scarab beetles and click beetles live in the soil and actively move in search of food. Their feeding did not significantly influence the development of older plants, but was dangerous to seedlings of cultivated saxaul. Beetles are eating the vegetative plant organs. Seasonally, the beetle species could be divided to: spring type - these are mostly pests of seedlings, buds and flowers (darkling beetles, weevils); spring and summer type - feeding on vegetative organs (jewel beetles, weevils); autumn type - species feeding on seeds; and all the warm seasons - pests of stem and root (long horn beetles, jewel beetles, and weevils). Distribution and biological characteristics of certain coleopteran species damaging saxaul is discussed below.

Blisterbeetles (Meloidae)

On saxaul 3 species have been recorded (Nurmuratov *et al.*, 1987): *Mylabris coerulescens* Gebl., *Mylabris magnogutata* (Heyd.), *Mylabris elegantissima* Zubk.



Fig. 1. The main routes and GPS coordinates of sites for collecting insect material from saxaul in southeastern Kazakhstan:

1. Bakbakty-Bakanas 101 km: Latitude - 44 ° 43'17.12 "C, longitude - 76 ° 26'58.83" V;
2. Bura: latitude - 44 ° 54'53.93 "C; longitude - 76 ° 1'7.46"
3. Taukum: latitude - 44 ° 17'20.83 "C; longitude - 75 ° 58'29.71" V;
4. Kanshengel-Aksuek: latitude - 44 ° 13'28.81 "C; longitude - 75 ° 5'32.93" V;
5. Kyzyltu: latitude - 44 ° 14'32.52 "C, longitude - 73 ° 15'17.18" V;
6. Crops haloxylon: latitude - 44 ° 12'5.46 "C; longitude - 72 ° 54'46.43" V;
7. Aktobe: latitude - 43 ° 57'34.03 "C, longitude - 78 ° 46'20.40" V;
8. Akzhazyk: Latitude - 44 ° 7'46.42 "C, longitude - 79 ° 41'58.66" V;
9. Borandysu: latitude - 43 ° 40'5.56 "C; longitude - 78 ° 36'22.98" V.

***Hycleus scabiosae* (Olivier)**

Distribution: the Balkans, the south of Russia, the Caucasus, in Kazakhstan, Central Asia, in Xinjiang. In Kazakhstan it is found in southern and eastern part of the country (Kuzin, 1953). We found it in the deserts of Saryesikatyrau.

Description: Body length 8-12 mm. Black, with more or less long black hairs. Antennae short, more dense. Elytra yellowish-brown, with a pattern. Figure consists of a narrow strip of dark pigment, stains on the shoulder hill. Development also roundly broken median band (Kolov and Kazenas, 2013). (Fig. 2).

The species inhabits ephemeral desert, sometimes the foothills. Beetles are active from early May until August. Registered as a pest of crops. (Nikolaev and Kolov, 2005).

The beetles are found on saxaul from the beginning of May to August. At the second half of June their number on saxaul in the area near the village Bakanas on each tree increased to 15 individuals on a single tree. At that time they ate the mature shoots of saxaul.

Mylabris (Ammabris) elegantissima Zoubkov, 1837.

Distribution: Kazakhstan, Central Asia, northern Afghanistan, Iran, Xinjiang. In Kazakhstan occupies barchan sands south of Ustyurt to Zaisan. The species prefers dunes and hilly sands. Widely distributed in Central Asia and Southern Kazakhstan (Nikolaev, et. al. 2005).

Description: Beetle black, 7-45 mm long. Legs, mouth parts, antennae reddish-yellow. Body in light



Fig. 2. *Hycleus scabiosae* (Olivier), eating shoots of saxaul (photo by Bakanas, 2016)

hairs. Legs slender. Elytra bright tri-color (yellow, scarlet and black), red pigment often located in the main and the apical parts of the elytra, the middle is usually lighter. Black pattern consists of two transverse bands, corner spot and a small spot near the margin. Beetles are most numerous on saxaul from mid-May to July, eating also flowers and leaves of acacia and tamarix. There is no information from the literature about the host plants, development and description (Nikolaev *et al.*, 2005). In our study the species was observed to damage mature shoots, mostly of white saxaul. Flight period is about two months - from mid-May to mid-July. It is polyphagous.

Longhorn beetles (Cerambycidae)***Mesoprionus angustatus* (Jakovlev, 1887)**

Distribution: Central Asia, in southern Kazakhstan - Kyzylkum, east of Syr Darya, the foothills of Karatau, Moynkum and Balkhash (Kostin, 1973). Adults are flying from late June to early August. The larvae live in the lower part of the stem of saxaul (*Haloxylon aphyllum*, *H. persicum*). Develops one generation for 4 years. Beetles are active at dusk and the first half of the night when are attracted to light. Prefers clay and sandy deserts of the Ily Valley. Adult beetles and emergence holes on the stem were recorded on saxaul in the western part of the Ily Valley to n. Bakanas (Ishkov and Kadyrbekov 2004). It was not found further to the east. The population density of the species in the Ily valley is not great, probably because it is found in the north-eastern border area. Rare, Turan desert type.

***Mesoprionus komarovi* (Dobrn.)**

Distribution: Rare species, which is a typical inhabitant of arid areas and the sandy deserts of Central Asia (Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan).

Description: Very pronounced sexual dimorphism. Coloration of the female is somewhat reddish. The body length of the males 9 - 25 mm, females 23 - 47 mm, with the ovipositor to 70 mm or more. Males are small, elegant, pale-yellow, eyes - black. The female is big, abdomen is much longer than the elytra, strongly narrowed, can greatly extend, forming a long telescopic ovipositor, almost half the length of the body (Kostin, 1973). The larva is whitish-yellowish in color, growing in woody saxaul (Kryzhanovskiy, 1953). Parfentev

(1958) observed population density of upto 7 larvae on a tree. The width of the tunnel is 5-12 mm, and the length 9 to 40 cm. The tunnels are found aboveground in the trunk (at a height of up to 60 cm), and in the root (at a depth of 30 cm). Most of the tunnels are in the central part of the trunk. Exit openings are often located in the base of the tree.

Parfentev (Kryzhanovsky, 1953) observed frequent occurrence in mature saxaul in southern Balkhash region and the delta of the river Chu. The species prefers clay and sandy deserts (Yahontov and Davletshina, 1954). During the flight period beetles found on the trunks of trees, fodder, as well as cut down saxaul and saxaul wood. Beetles fly at dusk. During the day they are hiding under the bark, in crevices of the soil and other shelters. According to Mahnovskii in natural thickets of saxaul (tract Kirk-Kiz, Karakalpakstan) the infestation level in 1954 reached 60%. In our survey they were found mainly on trees at the age of 25-30 and older (Mahnovski). The duration of a life cycle is 4 years.

Reports on the development on saxaul of other species longhorn beetles: *Apatophysisserricornis* Gebler, 1843, *A. mongolica* Semenov, 1901 (Kostin, 1973) were not confirmed. The larvae of these species were found to develop in the roots of *Salsolaorientalis* and *S. rigida*.

Jewel beetles (Buprestidae)

***Acmaeoderella personata* (Semenov, 1896)**

Turano-Gobi species. Dendrobiont, xerophyte. Polyphagous, larval food plants are *Halocnemum*, *Halothamnus*, *Anabasis*, *Salsola*, *Ephedra*, *Haloxylon* (Volkovich and Alexeev, 1994). Krivoshein *et al.* (1975) described the development of the larvae in the withering branches, and skeletal axes of *Aelleniasubaphylla*. Adults are active in May and June. The species prefers clay and saline deserts. It occurs sporadically in the Ily Valley.

***Sphenopterahauseri* (Reitter, 1895)**

Iranian-Turanian species. Dendrobiont, xerophyte. Narrow oligophagous, the larva develops into the trunks of white and black saxaul (*Haloxylonaphyllum*, *H. persicum*). Adults are active from late June to early August. Common, typical for sandy and clay deserts. It was found in many sites of observation in the Ily Valley (Bakanas, Karakultek, Ulken Kalkan).

***Sphenopteraignita* (Reitter, 1895)**

Turan species. Dendrobiont, xerophyte. Oligophagous, feeding on fodder plants - shrubs (Chenopodiaceae) (Volkovich and Alexeev 1994), including white saxaul (*Haloxylonpersicum*). Mitya (1958) describes adult beetles feeding on foliage of tamarisk (*Tamarixramosissima*). Adults are found from the second half of June to September. Common in sandy deserts. It occurs sporadically in the Ily Valley.

***Sphenopterastriatipennis* (Jakowlew, 1885)**

Iran-Turan-Gobi species. Dendrobiont, xerophyte. Narrow oligophagous, the larva develops into the trunks of saxaul (*Haloxylonaphyllum*, *H. persicum*). Adult beetles feed on shoots. Adults are active in the second half of June and first half of August. Common, typical for sandy and clay deserts. Recorded in the Ily Valley in the vicinity of Bakanas, Borandysu in Charyn canyon and in the sands of Taukum.

***Sphenoptera punctatissima* (Reitter, 1895)**

Turan species. Dendrobiont, xerophyte. Narrow oligophagous, fodder plant is saxaul (*Haloxylon*). Adult beetles feed on shoots haloxylon assimilation (Yagdyev 1976) Adults are active in June and July. Rare dedicated to the sandy deserts, look. Marked in the Ily Valley, in the lower reaches of the Ily River (Karaturanga), in the sands of Aygaykum (Big Kalkan), in the vicinity of n. Borandysu and Bakanas.

Leaf beetles (Chrysomelidae)

The saxaul Saryesikatyrau (Bakanas, Bura) is the most numerous Saxaul. The crowns of Haloxylon, sometimes accumulate up to 30 beetles from the species *Ischyronolaconicicolis* Weise and tortoise beetle-*Ischyronotadesertorum* Gebl. Both are eating shoots and buds.

***Ischyronola conicicolis* Weise**

It develops two generations per year. Overwinters in adult stage more often in the litter. The leaf beetle is eating haloxylon shoot since the end of April and the severely damaged wither. Young shoots and twigs of saxaul may die as a result of the feeding.

***Ischyronota (Cassida) desertorum* Gebl.**

This species is typical inhabitant of the desert zone with the most numerous beetle populations in sandy saxaul. It occurs from April to September. Beetles

and larvae feed on the green shoots saxaul. The complete development takes place on saxaul.

Among other beetles on saxaul *Rachybrachys probus* Nsl. was recorded sporadically. In June and July *Clytra atraphaxidis* Pall. and *S. quadripunctata* L. were found on saxaul plantings and in July and August-*Cryptocephalus undulatus* Sffr.

Conclusion

As a result of the additional field observations, in the zone of deserts in the south-east of Kazakhstan, we obtained data on the distribution, biology, and damage of 16 species of beetles that are trophically associated with haloxylon: Blister beetles (Meloidae) - *Hycleus scabiosae* (Olivier) and *Mylabris (Ammabris) elegantissima* Zoubkov, feeding on young shoots and generative organs of saxaul; Longhorn beetles (Cerambycidae) *Mesoprionus angustatus* (Jakovlev, 1887) and *Mesoprionus komarovi* (Dobrn.); Jewel beetles (Buprestidae) - *Acmaeoderella personata* (Semenov, 1896), *Sphenoptera hauseri* (Reitter, 1895), *Sph. ignita* (Reitter, 1895), *Sph. striatipennis* (Jakowlew, 1885), and *Sph. punctatissima* (Reitter, 1895); Leaf beetles (Chrysomelidae) *Ischyronola conicocolis* Weise, *Ischyronota desertorum* Gebl., *Dachybrachys probus* Nsl., *Cryptocephalus undulatus* Sffr., *Clytra atraphaxidis* Pall. and *Ñ. quadripunctata* L. which damage haloxylon growing and mature shoots during the vegetative season.

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