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Feeding preferences of members of the primitive and rare forest pests within tribe Xylosteini Reitter (Coleoptera: Cerambycidae: Lepturinae) in Türkiye with their new and all known host plants and distributional data

Yeni ve tüm bilinen konukçu bitkileri ve yayılış verileri ile birlikte Türkiye'deki ilkel ve nadir orman zararlısı Xylosteini Reitter, 1913 (Coleoptera: Cerambycidae: Lepturinae) üyelerinin beslenme tercihleri

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ABSTRACT

The detection of cerambycids and their feeding preferences within the natural ecosystems is of great ecological and economic importance. Accordingly, the paper presents collectively all taxa of the primitive, rare and hardly studied tribe Xylosteini Reitter in Türkiye with new data on their feeding preferences and distribution patterns for the first time. The available specimens were collected from localities in Artvin, Bolu, Gümüşhane, Kırklareli, Samsun and Sivas provinces of Türkiye in 2002, 2008, 2009, 2010, 2011, 2022. As a result, it is determined that Turkish Xylosteini includes four species of two genera. All of them are rare species. *Abies nordmanniana* (Pinaceae) and *Fagus orientalis* (Fagaceae) are determined as new host plant species for *Xylosteus kadleci* Miroshnikov. Accordingly, at least five or six host plants for each species are determined with the present study. According to the present study, the members of the genus *Leptorhabdium* Kraatz are preferred deciduous trees only, while the members of the genus *Xylosteus* Frivaldszky von Frivald are preferred both deciduous and also coniferous trees. Besides, detailed distribution data with figures show provincial and regional distribution patterns of all species are also given. Apparently, the genus *Leptorhabdium* seems to be represented only by *L. caucasicum* in North-Eastern Anatolia of Türkiye, while the genus *Xylosteus* seems to be represented by *X. spinolae* in European Türkiye (=Thrace), by *X. kadleci* in North-Western Anatolia of Türkiye, and by *X. caucasicola* in North-Eastern Anatolia of Türkiye.

INTRODUCTION

Longicorn beetles display holometabolic development. Mating may occur on larval hosts or adult feeding sites. Adults may be attracted to larval host plants for oviposition, depending on the larval feeding biology (Hanks 1999). The eggs can lay on the surface of larval host plants, in crevices

and wounds of bark or under the loose bark. Each female can lay dozens to hundreds of eggs (Švácha and Lawrence 2014). Larvae of Cerambycidae have various habits. Although most species feed within dead, dying or decaying wood, some taxa can use living plant tissue. Larvae usually bore in the

branches and stems of host plants. Larvae of genera in the tribe Hesperophanini developing within the nutrient-rich distal portion sever living branches or twigs. Mature larvae usually pupate in their host plants. The life cycle usually lasts one to four years. The life spans of most species in temperate regions typically range from one to three years, but many variations exist. Many cerambycine species are important pests of trees and logs. They are of great ecological and economic importance (Monné and Bezark 2009). Therefore, detecting cerambycids and their feeding preferences within the natural ecosystems has great ecological and economic importance in terms of production losses, environmental disasters, and management costs (Özdikmen 2021a, Wang 2017).

The host range of longicorn beetles varies from some that feed on a single species or genus of plants (monophagous) to longicorn beetles that develop on multiple plant species, either all within a single plant family (oligophagous) or multiple families (polyphagous). Typically, species that develop on healthy living plants tend to be monophagous or oligophagous, while species that develop on dead or decaying hosts tend to be polyphagous (Hanks 1999). Many longicorn species found worldwide display great diversity in their feeding habits, including a wide variety of host plants. The great success that longicorn beetles have achieved in exploiting the woody environment is related to their ability to enzymatically break down many wood components. Information on the feeding habits of adult and larval long-horned beetles can be used in the development of integrated pest management programs for pest species. Knowing when and where adults and larvae feed is useful when scheduling detection surveys and pesticide applications (Haack 2017).

The tribe Xylosteini is one of the most primitive and hardly studied group in Lepturinae subfamily. The tribe is generally characterized by coarsely faceted eyes, anteriorly abbreviated head, and laterally tuberculate pronotum. Body usually elongate with normally developed hind wing which is rudimentary in females of species of the genus *Xylosteus*. Several constituent species are still known from single specimen, peculiarities of biology and horology of many species are not or hardly studied. In this connection, detection of the unknown data on biology and distribution of the already established forms, are of great interest (Miroshnikov 2000, 2021, Bi and Ohbayashi 2014, Ohbayashi and Tichý 2017). A little information about the host plants of only eight species among the 25 species of eight genera within the Xylosteini tribe worldwide has been determined by various authors up to now. Therefore, detection of the unknown data on biology and distribution of the primitive and hardly studied group are of great importance.

Although most taxa of Cerambycidae and hence Xylosteini in Türkiye are known through catalogical data, information on their feeding preferences and detailed distribution data in the country are still insufficient. Therefore, we prepared this work as a result of an accumulation of knowledge on longhorn beetles of Xylosteini tribe in Türkiye. The principal aim of the present study is to determine host plants of all Xylosteini species of Türkiye and thus to reveal and interpret their feeding preferences for the first time collectively. Hereby, updating the distribution patterns in Türkiye of these taxa is another output aimed by the present study.

MATERIALS AND METHODS

The available specimens collecting from localities in Artvin, Bolu, Gümüşhane, Kırklareli, Samsun and Sivas provinces of Türkiye in 2002, 2008, 2009, 2010, 2011, 2022 and preserving at Gazi University (Ankara, Türkiye) contain the main study material. The data on feeding preferences, distributions etc. presented in the study for each taxon of known Turkish taxa were firstly obtained from reviewing cited references in the text. Then, data based on observations made during the field studies of the materials were added to these data. The combined results obtained, thus, were given in the text.

The following text, synonyms, host plants and provincial and regional records in Türkiye for each different species were included under the scientific name based on personal data and available references. Available synonyms for each species, citing mainly from Danilevsky (2020, 2022), Özdikmen (2021b) and Tavakilian (2022). Mainly Švácha and Danilevsky (1989), Bense (1995), Tavakilian (2022), Hoskovec et al. (2023) and cited references in the related part and also data obtained from available specimens and Cerambycidae database of the first author were used to determine of the host plants of each species. Cerambycidae database of the first author to determine provincial and regional records in Türkiye for each different species were mainly used. The following map for provincial and regional distribution patterns in Türkiye of the species determined in the present study was used (Figure 1). New host plants are marked with the sign (*) on tables given in the text.



Figure 1. Provinces and regions in Türkiye [1) Marmara region, 2) Black Sea region, 3) Aegean region, 4) Central Anatolia region, 5) Eastern Anatolia region, 6) Mediterranean region, 7) South-Eastern Anatolia region]

RESULTS

With the present study, all taxa of Turkish Xylosteini were determined as four species of two genera. The combined data obtained from both the available specimens and cited references on Turkish Xylosteini taxa are presented below.

Tribe **Xylosteini** Reitter, 1913

Xylosteina Reitter, 1913. Type gen.: *Xylosteus* Frivaldszky von Frivald, 1837

Representatives of the tribe are distinguished by a characteristic unique to Lepturinae, having a stridulatory platform not divided by a suture, like in Cerambycinae (Danilevsky 2014).

The generic composition of this tribe has changed many times and has been considered differently by various researchers. In the Palaearctic catalogue of Coleoptera, Löbl and Smetana (2010) included eight genera as *Leptorhabdium*, *Notorhabdium*, *Palaeoxylosteus*, *Peithona*, *Teledapalpus*, *Teledapus*, *Trypogeus* and *Xylosteus*, in the Xylosteini. However, Vives (2007) transferred *Trypogeus* to the subfamily Apathophyseinae. Also, the genera, *Teledapus*, *Teledapalpus* and *Parateledapus* are deservedly distinguished into the tribe Teledapini. Therefore, Bi and Ohbayashi (2014) erected the new genus *Chiangshunania*, and included six genera as *Chiangshunania*, *Leptorhabdium*, *Notorhabdium*, *Palaeoxylosteus*, *Pseudoxylosteus*, and *Xylosteus*, in the Xylosteini. Then, Ohbayashi and Tichý (2017) established a new genus *Niisatoa*.

According to the relatively recent publications (Bi and Ohbayashi 2014, Miroshnikov 2021, Ohbayashi and Tichý 2017), the tribe includes the following genera: *Xylosteus* Frivaldszky von Frivald, 1838, *Leptorhabdium* Kraatz, 1879, *Notorhabdium* N. Ohbayashi et Shimomura, 1986, *Palaeoxylosteus* N. Ohbayashi et Shimomura, 1986, *Pseudoxylosteus* Sama, 1993, *Chiangshunania* Bi et N. Ohbayashi, 2014, *Niisatoa* N. Ohbayashi et Tichý, 2017. In addition, the systematic position of the genus *Peithona* is not yet well studied. Miroshnikov (2021) stated that in my opinion, it would be advisable to establish a separate new tribe for the genus *Peithona*. However, this question requires additional careful examination and is beyond the scope of present work.

Consequently, the Xylosteini Reitter is a tribe distributed in Palaearctic region (Central Europe to Nepal, China and Taiwan), Nearctic region (USA) and Oriental region (Malaysia, Myanmar, Vietnam) among the cerambycine beetles, with 25 species of eight genera worldwide (Tavakilian 2022). The tribe includes 19 species of six genera in the Palaearctic region (Danilevsky 2022), while six species of four genera in the Oriental region [Niisatoa malaise N. Ohbayashi

& Tichý, 2017, *Notorhabdium bangzhui* N. Ohbayashi & W. Wang, 2004, *Notorhabdium immaculatum* N. Ohbayashi & Shimomura, 1986, *Notorhabdium taynguyen* Tichý & Dembický, 2021, *Palaeoxylosteus ornamentalis* Holzschuh, 2013, *Peithona prionoides* Gahan, 1906], and two species of two genera in the Nearctic region [*Leptorhabdium pictum* (Haldeman, 1847), *Pseudoxylosteus ornatus* (LeConte, 1873)] (Tavakilian 2022). Besides, according to Özdikmen (2021b), the tribe represents with four species of two genera in Türkiye.

Genus ***Leptorhabdium*** Kraatz, 1879 [Type sp.: *Xylosteus gracilis* Kraatz, 1873 (= *Xylosteus illyricum* Kraatz, 1871)]

Psilorhabdium Kraatz, 1879 [Type sp.: *Psilorhabdium caucasicum* Kraatz, 1879] According to Tavakilian (2022), the genus includes four species worldwide, while according to Danilevsky (2022), the genus includes three species in the Palaearctic region. On the other side, the genus is represented with only one species in Türkiye (Özdikmen 2021b).

Leptorhabdium caucasicum (Kraatz, 1879) (Figures. 2, 6a, 7a)

Psilorhabdium caucasicum Kraatz, 1879

Material. Türkiye, Artvin prov.: Kaçkar Mts., 11.VI.2008, 1 ex.; Gümüşhane prov.: Kürtün district, Özkürtün, 09.VI.2011, on *Crataegus* sp., 1 ex.; Samsun prov.: Central, 08.VI.2011, 1 ex.; Sivas prov.: Zara env., 05.VI.2011, 1 ex.

The beetle was described by Kraatz (1879: 118) from Caucasus with the original combination *Psilorhabdium caucasicum*. It is known from Europe (South Territory of European Russia) and Asia (Armenia, Azerbaijan, Georgia, Türkiye) (Danilevsky 2022, Özdikmen 2021b).

The rare longicorn seems polyphagous in deciduous trees. According to Danilevsky and Miroshnikov (1985), its larvae are in rotten wood of various deciduous trees. Švácha and Danilevsky (1989) reported it from *Castanea* sp. and *Fagus* sp. (Fagaceae). Recently, it was also reported by Özdikmen (2023) from *Crataegus* sp. (Rosaceae) on the base of the material given in the present study. Moreover, Hoskovec et al. (2023) noted also some deciduous trees, *Acer* (Aceraceae), *Carpinus* (Corylaceae), *Fagus* and *Quercus* (Fagaceae) for this species. As a result, host plants of the species are determined as at least six species belonging to six genera in four families of deciduous trees (Table 1).

Table 1. All known host plants of *Leptorhabdium caucasicum* (Kraatz)

Family	Species
Deciduous	
Aceraceae	<i>Acer</i> sp.
Corylaceae	<i>Carpinus</i> sp.
Fagaceae	<i>Castanea</i> sp.
	<i>Fagus</i> sp.
	<i>Quercus</i> sp.
Rosaceae	<i>Crataegus</i> sp.

Biology. Larvae of *Leptorhabdium caucasicum* develop in rotten wood of deciduous trees (Danilevsky and Miroshnikov 1985). Development period of this species is at least two years (2-3 years). Pupation is in summer/autumn. Adults are overwinter in pupal cells (Švácha and Danilevsky 1989). The food substrate for larvae of this species is rotting wood of thick trunks of various deciduous trees lying under the forest canopy. Pupation is in wood in late summer - early autumn. Generation is at least 2 years. Imago is hibernating. The beetles are active from April to July. Sometimes beetles fly into the light (Danilevsky 2014). The adult specimens of the present study were collected in June.

On the other side, the Anatolian-Caucasian species has been recorded only from five provinces of 81 provinces in Türkiye up to now. The known distribution of this species in Türkiye is as given by Özdikmen (2023). According to this, it was firstly recorded by Demelt (1963) from Sinop province (Boyabat district). Then, it was reported by Gfeller (1972) from Gümüşhane province (Torul district). Also, these records were repeatedly mentioned by Danilevsky (2014). In addition, it was recently recorded by Özdikmen (2023) also from Artvin, Samsun and Sivas provinces in Türkiye on the base of the material given in the present study. As a result, it is known from five provinces in Türkiye now as Artvin, Gümüşhane, Samsun and Sinop provinces in Black Sea region of Türkiye, and Sivas province in Central Anatolia region of Türkiye (Figure 2).



Figure 2. Provincial and regional distribution patterns of *Leptorhabdium caucasicum* (Kraatz) in Türkiye [1) Marmara region, 2) Black Sea region, 3) Aegean region, 4) Central Anatolia region, 5) Eastern Anatolia region, 6) Mediterranean region, 7) South-Eastern Anatolia region]

As mentioned above, the genus *Leptorhabdium* Kraatz includes four species worldwide as *Leptorhabdium caucasicum* (Kraatz, 1879), *Leptorhabdium illyricum* (Kraatz, 1871), *Leptorhabdium nitidum* Holzschuh, 1974 and *Leptorhabdium pictum* (Haldeman, 1847) according to Tavakilian (2022). Known host plants of the other species except for *Leptorhabdium caucasicum* (Kraatz) are as follows. Host plants of the preimaginal stages of *Leptorhabdium illyricum* (Kraatz) that is distributed only in Europe (Albania, Bosnia

and Herzegovina, Croatia, Greece, Macedonia and Slovenia), were unknown. Only *Fagus sylvatica* Linnaeus (Fagaceae) was determined as its host plant by Rapuzzi and Sama (2012) from Macedonia and Croatia. Host plants of the preimaginal stages of *Leptorhabdium nitidum* Holzschuh that is distributed only in Europe (Greece and Macedonia), were unknown. It can be polyphagous in deciduous trees. Since, Hoskovec et al. (2023) mentioned that it is polyphagous in deciduous trees. Host plants of the preimaginal stages of *Leptorhabdium pictum* (Haldeman) that is distributed only in USA, were determined by Linsley and Chemsak (1997) as *Betula alleghaniensis* Britton (Betulaceae), *Cornus florida* Linnaeus (Cornaceae), *Castanea sp.* and *Quercus sp.* (Fagaceae) and *Carya sp.* (Juglandaceae), and by Vlasák and Vlasakova (2021) as *Prunus serotina* Ehrhar (Rosaceae). As a result, it can be said that the all members of the genus *Leptorhabdium* Kraatz are polyphagous in deciduous trees.

Genus *Xylosteus* Frivaldszky von Frivald, 1837 [Type sp.: *Xylosteus spinolae* Frivaldszky von Frivald, 1837]

According to Tavakilian (2022) and Danilevsky (2022), the genus includes four species worldwide, and in the Palaearctic region. On the other side, the genus is represented with three species in Türkiye (Özdikmen 2021b).

Xylosteus caucasicola Plavilstshikov, 1936 (Figs. 3, 6b, 7b)

Xylosteus caucasicola Plavilstshikov, 1936

Xylosteus caucasicola ab. *inbasalis* Plavilstshikov, 1936

Material. Türkiye, Artvin prov.: Arhavi, 12.VI.2022, *Corylus avellana*, 1 ex.

The beetle was described by Plavilstshikov (1936: 496) from Sochi (Krasnodar Krai, Russia). It is known only from Europe (South Territory of European Russia) and Asia (Georgia, Türkiye) (Danilevsky 2022, Özdikmen 2021b).

The rare longicorn seems polyphagous in deciduous and also coniferous trees. Švácha and Danilevsky (1989) reported it from *Quercus sp.* (Fagaceae) and *Cerasus sp.* (Rosaceae). Also, *Carpinus* (Corylaceae), *Fagus* and *Quercus sp.* (Fagaceae), and *Abies* (Pinaceae) were mentioned by Danilevsky (2014). Özdikmen (2021c) reported it from *Quercus sp.* (Fagaceae), and Tavakilian (2022) mentioned also *Corylus* (Corylaceae) for this species. Moreover, Hoskovec et al. (2023) noted also some deciduous trees, *Carpinus* (Corylaceae), *Fagus* and *Quercus sp.* (Fagaceae) for this species. The specimen given in the present study also is from *Corylus* (Corylaceae). As a result, host plants of the species are determined as at least five species belonging to five genera in three families of deciduous trees, and one species belonging to one genus in one family of coniferous trees (Table 2).

Table 2. All known host plants of *Xylosteus caucasicola* Plavilstshikov

Family	Species
Deciduous	
Corylaceae	<i>Carpinus</i> sp. <i>Corylus avellana</i> Linnaeus
Fagaceae	<i>Fagus</i> sp. <i>Quercus</i> sp.
Rosaceae	<i>Cerasus</i> sp.
Coniferous	
Pinaceae	<i>Abies</i> sp.

Biology. Larvae found in rotting wood of dead fallen stems and stumps of *Quercus* and *Cerasus*, probably polyphagous. Development period of this species is at least two years (2-3 years). Pupation is in summer/autumn. Adults are overwinter in pupal cells (Švácha and Danilevsky 1989). The larvae usually develop in the decaying wood of deciduous trees. They are easy to find in the thick lying trunks of hornbeams (*Carpinus*), oaks (*Quercus*), beeches (*Fagus*) and other moss-covered trees under the forest canopy. But finds are also known in the rotten wood of firs (*Abies*). Generation is at least 2 years. Pupation is in wood at the end of summer. The beetles hatch in late summer - early autumn and overwinter in pupal cradles; active in spring and early summer, nocturnal (Danilevsky 2014). The adult specimen of the present study was collected in June.

On the other side, the Anatolia-Caucasian species has been recorded only from one province of 81 provinces in Türkiye up to now. A single record from Türkiye was given by Danilevsky (2012) from Artvin province in Eastern Black Sea region of Türkiye. The material given in the present study is the second record for Türkiye from Artvin province again (Figure 3).



Figure 3. Provincial and regional distribution patterns of *Xylosteus caucasicola* Plavilstshikov in Türkiye [1) Marmara region, 2) Black Sea region, 3) Aegean region, 4) Central Anatolia region, 5) Eastern Anatolia region, 6) Mediterranean region, 7) South-Eastern Anatolia region]

Xylosteus kadleci Miroshnikov, 2000 (Figs. 4, 6c, 7c)

Xylosteus kadleci Miroshnikov, 2000

Material. Türkiye, Bolu prov.: Abant, 08.VI.2002, *Abies nordmanniana*, 2 exs.; Abant Lake, 10-30.VI.2002, 18.VI.2003, 19.VI.2009, 1400-1700 m., *Abies nordmanniana* and *Fagus orientalis*, 8 exs.

The beetle was described by Miroshnikov (2000: 38) from Abant Lake (Abant district, Bolu province, Türkiye). It is known only from Türkiye (Danilevsky 2022, Özdikmen 2021b).

The rare longicorn seems polyphagous in coniferous, and also deciduous trees. Miroshnikov (2000) reported it from *Abies cephalonica* (Pinaceae) and *Fagus* (Fagaceae). He also stated that in laboratory conditions beetles were coupled and laid eggs to *Picea* sp. and *Abies alba* (Pinaceae), and *Quercus petraea* (Fagaceae). Also, Hoskovec et al. (2023) noted also the coniferous trees, *Abies* (Pinaceae), for this species. In addition, the specimens given in the present study are from *Abies nordmanniana* (Pinaceae) and *Fagus orientalis* (Fagaceae). Therefore, these are new host plant species for this species. As a result, host plants of the species are determined as at least four species belonging to two genera in one family of coniferous trees, and two species belonging to two genera in one family of deciduous trees (Table 3).

Table 3. All known host plants of *Xylosteus kadleci* Miroshnikov

Family	Species
Deciduous	
Fagaceae	* <i>Fagus orientalis</i> Lipsky <i>Fagus</i> sp. ? <i>Quercus petraea</i> (Mattuschka) Lieblein
Coniferous	
Pinaceae	? <i>Abies alba</i> Michaux <i>Abies cephalonica</i> Loudon * <i>Abies nordmanniana</i> (Steven) Spach <i>Abies</i> sp. ? <i>Picea</i> sp.

Biology. The bulk of specimens – in pupal chambers in dead timber of medium-sized fulcrums, remaining – under cortex of the fallen trees. It was already impossible to find the beetles in pupal chambers at the end of June. They were found predominantly at the butt end of thin fulcrums at night time (Miroshnikov 2000). Dead stumps of smaller diameter is the preferred larval substrate. The species is nocturnal (Hoskovec et al. 2023). The adult specimens of the present study were collected in June.

On the other side, the Anatolian endemic species has been recorded only from one province of 81 provinces in Türkiye up to now. According to this, it was firstly recorded by Sama and Rapuzzi (1999) from Bolu province (Abant district) as *X. spinolae caucasicola*. Then, it was reported by Sama (2002) from Bolu province (Abant district, Abant Lake) as *X. spinolae caucasicola*. Also, it was reported by Malmusi and Saltini (2005) from Bolu

province (Abant district) as *X. spinolae caucasicola* again. Lastly, it was recorded by Özdikmen (2011) from Bolu province (Abant district env.) as *X. kadleci*. In addition, the specimens given in the present study are also from Bolu province (Abant district, Abant Lake). As a result, the species is known only from one province in Türkiye now as Bolu province in Western Black Sea region of Türkiye (Figure 4).



Figure 4. Provincial and regional distribution patterns of *Xylosteus kadleci* Miroshnikov in Türkiye [1) Marmara region, 2) Black Sea region, 3) Aegean region, 4) Central Anatolia region, 5) Eastern Anatolia region, 6) Mediterranean region, 7) South-Eastern Anatolia region]

Xylosteus spinolae Frivaldszky von Frivald, 1837 (Figs. 5, 6d, 7d)

Xylosteus spinolae Frivaldszky von Frivald, 1837

Rhagium rufiventre Germar, 1844

Xylosteus spinolae var. merkli Pic, 1910

Material. Türkiye, Kırklareli prov.: Demirköy, 22.VI.2010, *Corylus avellana*, 1 ex.

The beetle was described by Frivaldszky von Frivald (1837: 180) from Rumelia (?Bulgaria). It is known only from Europe (Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Italy, Macedonia, Romania, Slovenia, European Türkiye) (Danilevsky 2022, Özdikmen 2021b).

The rare longicorn seems polyphagous in deciduous and also coniferous trees. Švácha and Danilevsky (1989) reported it from *Corylus* (Corylaceae), and also *Abies* and *Picea* (Pinaceae). Then, Bense (1995) and Sama and Rapuzzi (1999) reported it from *Corylus* (Corylaceae). Klausnitzer et al. (2016) and Doychev et al. (2017) also reported it from *Corylus* (Corylaceae), *Fagus* (Fagaceae), and *Abies* and *Picea* (Pinaceae). The specimen given in the present study also is from *Corylus* (Corylaceae). As a result, host plants of the species are determined as at least two species belonging to two genera in two families of deciduous trees, and three species belonging to two genera in one family of coniferous trees (Table 4).

Table 4. All known host plants of *Xylosteus spinolae* Frivaldszky von Frivald

Family	Species
Deciduous	
Corylaceae	<i>Corylus avellana</i> Linnaeus (the main)
Fagaceae	<i>Fagus sylvatica</i> Linnaeus
Coniferous	
Pinaceae	<i>Abies alba</i> Michaux
	<i>Picea abies</i> Linnaeus
	<i>Picea excelsa</i> Link

Biology. Larvae feeding in dead wood. Habits are apparently similar to other *Xylosteus* species (Švácha and Danilevsky 1989). Larvae infest the dead wood of the lower parts of the stems and the roots, also in thick branches. The larvae tunnel down into the roots. Generation is 2 years. Pupation is in the wood. Adults are overwinter in the pupal cells and emerge in May-July. Adults attracted by light (Bense 1995). The adult specimen of the present study was collected in June.

On the other side, the C- and SE European species has been recorded only from one province of 81 provinces in Türkiye up to now. According to this, it was firstly recorded by Sama and Rapuzzi (1999) from Kırklareli province (Yıldız Mts., from Demirköy to İğneada) as *X. spinolae caucasicola* in pupal cell on *Corylus avellana*. Then, it was reported by Sama (2002) from Kırklareli province (Demirköy) as *X. spinolae caucasicola*. In addition, the specimen given in the present study is also from Kırklareli province (Demirköy). As a result, the species is known only from one province in Türkiye now as Kırklareli province in European Türkiye part of Marmara region of Türkiye (Figure 5).



Figure 5. Provincial and regional distribution patterns of *Xylosteus spinolae* Frivaldszky von Frivald in Türkiye [1) Marmara region, 2) Black Sea region, 3) Aegean region, 4) Central Anatolia region, 5) Eastern Anatolia region, 6) Mediterranean region, 7) South-Eastern Anatolia region]

As mentioned above, the genus *Xylosteus* Frivaldszky von Frivald includes four species worldwide as the above mentioned three species and *Xylosteus bartoni* Obenberger & Mařan, 1933 that is distributed only in Europe (Bulgaria, Greece, Macedonia). Known host plants of *Xylosteus bartoni* Obenberger & Mařan are *Betula pendula* Rothmaler (Betulaceae), *Corylus avellana*

Linnaeus (Corylaceae), *Abies picea* Miller, *Picea abies* Linnaeus, *Pinus sp.* (Pinaceae) (Doychev et al. 2017, Rapuzzi and Sama 2018, Tavakilan 2022). Therefore, the Balkanian species also seems polyphagous in deciduous and also coniferous trees. As a result, it can be said that the all members of the genus *Xylosteus* Frivaldszky von Frivald are polyphagous in deciduous and also coniferous trees.

DISCUSSION AND CONCLUSION

The primitive and hardly studied tribe Xylosteini Reitter is represented with four species of two genera in Türkiye as *Leptorhabdium caucasicum* (Kraatz, 1879), *Xylosteus caucasicola* Plavilstshikov, 1936, *X. kadleci* Miroshnikov, 2000 and *X. spinolae* Frivaldszky von Frivald, 1837. A little information about the host plants of only eight species among the 25 species of eight genera within the Xylosteini tribe worldwide has been determined by various authors up to now. Therefore, detection of the unknown data on biology and distribution of the most primitive and hardly studied group are of great importance. Accordingly, at least five or six host plants for each species of four Turkish taxa in the tribe Xylosteini were determined with the present study. As a result, the members of the genus *Leptorhabdium* Kraatz are only preferred deciduous trees, while the members of the genus *Xylosteus* Frivaldszky von Frivald are preferred both deciduous and also coniferous trees. *Abies nordmanniana* (Pinaceae) and *Fagus orientalis* (Fagaceae) are determined as new host plant species for *X. kadleci* Miroshnikov. Besides, the genus *Leptorhabdium* apparently seems to be represented only by *L. caucasicum* in North-Eastern Anatolia of Türkiye, while the genus *Xylosteus* apparently seems to be represented by *X. spinolae* in European Türkiye, by *X. kadleci* in North-Western Anatolia of Türkiye, and by *X. caucasicola* in North-Eastern Anatolia of Türkiye.



Figure 6. Elytral designs of a. *Leptorhabdium caucasicum* (Kraatz), b. *Xylosteus caucasicola* Plavilstshikov, c. *Xylosteus kadleci* Miroshnikov, d. *Xylosteus spinolae* Frivaldszky von Frivald

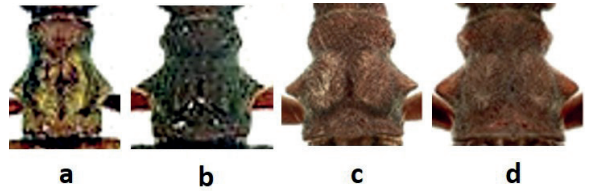


Figure 7. Pronotal designs of a. *Leptorhabdium caucasicum* (Kraatz), b. *Xylosteus caucasicola* Plavilstshikov, c. *Xylosteus kadleci* Miroshnikov, d. *Xylosteus spinolae* Frivaldszky von Frivald

Finally, the members of Turkish Xylosteini are easily distinguished from each other by their elytral and pronotal designs. Accordingly, the elytral and pronotal designs of males of the four species are presented in Figure 6 and 7.

ÖZET

Doğal ekosistemler içerisinde cerambycidlerin ve onların beslenme tercihlerinin tespiti büyük ekolojik ve ekonomik öneme sahiptir. Buna uygun olarak, makale, Türkiye'deki ilkel, nadir ve neredeyse hiç çalışılmamış Xylostini Reitter, 1913 kabilesinin tüm taksonlarını, beslenme tercihleri ve dağılım biçimleri hakkında yeni verilerle birlikte ilk kez toplu olarak sunmaktadır. Mevcut örnekler Türkiye'nin Artvin, Bolu, Gümüşhane, Kırklareli, Samsun ve Sivas illerindeki lokalitelerden 2002, 2008, 2009, 2010, 2011, 2022 yıllarında toplanmıştır. Sonuç olarak, Türkiye Xylosteini'nin iki cinsten dört tür içerdiği belirlenmiştir. Bunların hepsi nadir türlerdir. *Abies nordmanniana* (Pinaceae) ve *Fagus orientalis* (Fagaceae) *Xylosteus kadleci* Miroshnikov için yeni konukçu bitki türleri olarak belirlenmiştir. Buna uygun olarak, bu çalışma ile her tür için en az beş veya altı konukçu bitki belirlenmiştir. Mevcut çalışmaya göre, *Leptorhabdium Kraatz*, 1879 cinsinin üyeleri sadece yaprak döken ağaçları tercih ederken, *Xylosteus* Frivaldszky von Frivald cinsinin üyeleri hem yaprak döken hem de iğne yapraklı ağaçları tercih etmektedir. Ayrıca tüm türlerin detaylı yayılış verileri de il ve bölge bazında dağılım modellerini gösteren şekillerle birlikte verilmiştir. Görünüşe göre, *Leptorhabdium* cinsi Türkiye'nin Kuzey-Doğu Anadolu bölgesinde sadece *L. caucasicum* tarafından temsil edilirken, *Xylosteus* cinsinin Avrupa Türkiye'sinde (Trakya'da) *X. spinolae* tarafından, Türkiye'nin Kuzey-Batı Anadolu bölgesinde *X. kadleci* tarafından ve Türkiye'nin Kuzey-Doğu Anadolu kısmında ise *X. caucasicola* tarafından temsil edildiği görülmektedir.

Anahtar kelimeler: Konukçu bitkiler, beslenme tercihleri, il ve bölge dağılımı, Cerambycidae, 47 Xylosteini, Türkiye

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