

FIRST RECORD OF *HYLASTES OPACUS* ERICHSON AND *CRYPTURGUS HISPIDULUS* THOMSON, C. G. (COLEOPTERA; CURCULIONIDAE; SCOLYTINAE) FOR THE TURKISH FAUNA

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Abstract. Scolytinae subfamily (Coleoptera: Curculionidae) is represented by 135 species in Turkey including 8 species of the genus *Hylastes* Ericson and 7 species of the genus *Crypturgus* Ericson. A total of 79 adult individuals of *Hylastes opacus* Erichson and 6 adult individuals of *Crypturgus hispidulus* Thomson, C. G. were obtained from log and pheromone traps in pine stands at twelve localities during 2014. *H. opacus* and *C. hispidulus* were recorded for the first time in Turkey. *H. opacus* were obtained from trap logs of *Pinus brutia* and *Pinus nigra* and also pheromone traps in *P. brutia* stands. Adult individuals of *C. hispidulus* were observed in association with *Orthotomicus erosus* and *Pityogenes pennidens* on *P. brutia* and *P. nigra* log traps.

Keywords: *Hylastes opacus*, European bark beetle, *Crypturgus hispidulus*, *Pinus brutia*, *Pinus nigra*, Marmara, Turkey

Introduction

The Scolytinae subfamily (Coleoptera: Curculionidae) is one of the largest groups of Coleoptera and it is represented by 135 species in Turkey (Wood and Bright, 1992a, b; Knižek, 1998; Selmi, 1998; Sarıkaya and Avcı, 2011; Sarıkaya 2013; Sarıkaya and Knižek, 2013; Cognato, 2015; Lieutier et al., 2016). The majority of species feed on dead or dying tissues and are not normally considered to be of an economic importance. However, such species can become economically important if their galleries create holes in timber used for furniture or veneer, or if they transport pathogenic fungi to living trees during the feeding period by young adults to mature the gonads. The relatively small number of species that attack living trees, saplings or seedlings, or the seeds of commercial crops are sometimes of major economic importance, causing damage estimated in millions of dollars (Knižek and Beaver, 2007).

Species of the genus *Hylastes* Ericson primarily colonize subterranean stem parts of various conifers, predominantly, *Pinus*, *Picea* and *Abies* genera. The genus *Hylastes* has 21 species in conifers throughout the Holarctic region (Webber and Gibbs, 1989; Bright, 2014). It is presented with eight species in Turkey; *H. angustatus* (Herbst.), *H. ater* (Paykull), *H. attenuatus* Erichson, *H. batnensis anatolicus* Knižek & Pfeffer, *H. brunneus* Erichson, *H. cunicularius* Erichson, *H. linearis* Erichson and *H. substriatus* Strohmeyer (Selmi, 1987; Wood and Bright, 1992a; Lieutier et al., 2016; Alonso-

Zarazaga et al., 2017). Their adults feed on the tender bark near the root collars of seedlings and transplants, often girdling them, the species is frequently considered a noxious pest of nurseries and pine plantations, not only killing small plants but exposing older trees to infestation by wound parasites such as *Fomes* (Basidiomycetes, Polyporales: Polyporaceae) (Hoebeker, 1994). *Hylastes* species are also the vector of black stain root diseases and some of them have been reported as serious pests in forestry (Webber and Gibbs, 1989).

The genus *Crypturgus* Erichson breed in conifers throughout the Holarctic region and fifteen species are currently recognized (Wood and Bright, 1992a; Jordal and Knížek, 2007). It is represented with 7 species in Turkey; *C. cinereus* (Herbst), *C. cylindricollis* Eggers, *C. dubius* Eichhoff, *C. mediterraneus* Eichhoff, *C. numidicus* Ferrari *C. parallelcollis* Eichhoff and *C. pusillus* (Gyllenhal) (Wood and Bright, 1992a; Selmi, 1998; Lieutier et al., 2016; Alonso-Zarazaga et al., 2017). Species of the genus *Crypturgus* have very small body size (0.9–1.5 mm) and inhabit bark of the trees. The species are very abundant throughout the whole Mediterranean basin, but largely secondary, infesting only trees heavily stressed or already infested by more aggressive species. They have no economic relevance; high population density of this species may interfere with the development of associated more aggressive species (Lieutier et al., 2016).

In the current study *Hylastes opacus* Erichson and *Crypturgus hispidulus* Thomson, C. G. were reported for the first time to Turkish fauna.

Material and methods

Specimens of *H. opacus* and *C. hispidulus* were collected from trap logs and pheromone traps in stands of *Pinus brutia* Ten. and *P. nigra* J. F. Arnold in Marmara Region, Turkey (Fig. 1).

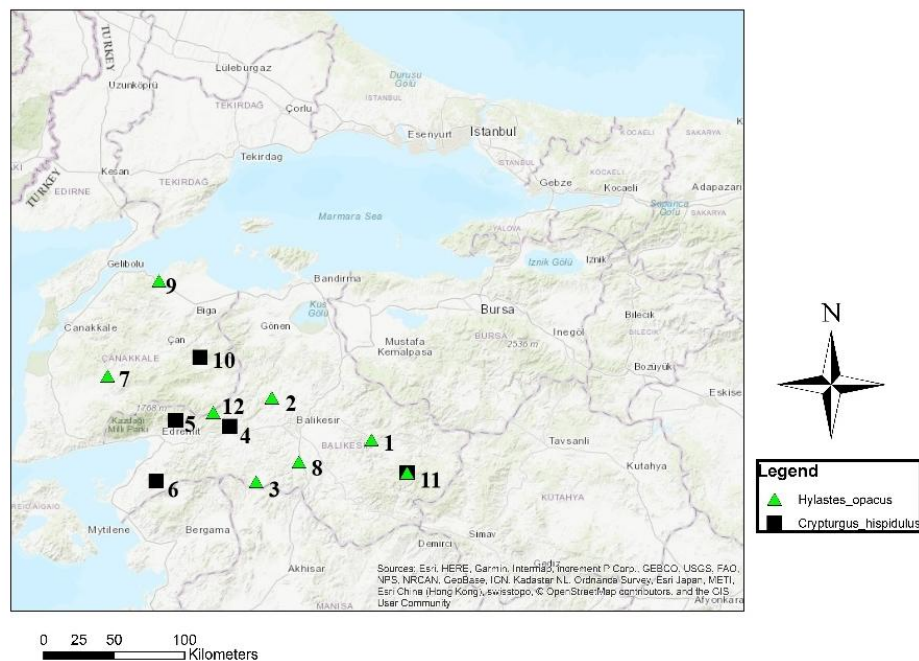


Figure 1. Collection sites

Pheromone traps baited with the pheromone of *Orthotomicus erosus* Wollaston and trap logs were set up in February 2014 in 12 sites. Coordinates of the collection sites and trap types are presented in *Table 1*. Traps were checked for the presence of beetles at regular intervals. Insects were collected and identified on the basis of characteristic morphological features of the elytra and elytral declivity by using a LEICA S8APO stereomicroscope. Taxonomic keys in (Grüne, 1979; Wood, 1982; Hoebeke, 1994; Jordal and Knížek, 2007) were used to determine the specimens. Color photographs of specimens were prepared by using the stereomicroscope with a LEICA DFC295 digital video camera. Voucher specimens of *H. opacus* and *C. hispidulus* were prepared appropriate methods and preserved at Istanbul University-Cerrahpaşa, Faculty of Forestry, Department of Forest Entomology and Protection.

Table 1. Coordinates of the collection sites and trap types

Locality (N)	Geographical positions	Altitude (m)	Trap type	Host plant
1	39°34'46.6"N; 28°21'42.1"E	508	Log trap	<i>P. brutia</i>
2	39°46'52.1"N; 27°43'33.5"E	448	Log trap	<i>P. brutia</i>
3	39°22'07.0"N; 27°37'34.9"E	275	Log trap	<i>P. brutia</i>
4	39°38'26.2"N; 27°27'25.7"E	310	Log trap	<i>P. brutia</i>
5	39°40'15.3"N; 27°06'43.5"E	372	Log trap	<i>P. brutia</i>
6	39°22'19.5"N; 26°59'19.8"E	311	Log trap	<i>P. brutia</i>
7	39°53'11.2"N; 26°40'44.9"E	287	Log trap	<i>P. brutia</i>
8	39° 27' 58"N; 27° 53' 57"E	225	Pheromone trap	<i>P. brutia</i>
9	40°20'59.8"N; 27°00'24.3"E	133	Log trap	<i>P. brutia</i>
10	39°58'41.6"N; 27°16'6.2"E	93	Log trap	<i>P. brutia</i>
11	39°24'47.9"N; 28°35'18.6"E	1164	Log trap	<i>P. nigra</i>
12	39°42'34.9"N; 27°21'09.3"E	730	Log trap	<i>P. nigra</i>

Result and discussion

A total of 79 adult individuals of *H. opacus* and 6 adult individuals of *C. hispidulus* were collected during 2014 from eight localities in Turkey at various altitudes between 93 and 1164 m (*Table 1*). The number, locality and date of captured *H. opacus* and *C. hispidulus* are given in (*Table 2*).

H. opacus can be distinguished from other Turkish species of the genus *Hylastes* by frons without longitudinal ridge (Grüne, 1979; Freude et al., 1981). Its adults were 2.5-3 mm long and were recognized by the following combination of characters: frons and vertex closely and coarsely punctured; pronotum as long as wide and constricted anteriorly; interstriae flat, wider than striae; elytral declivity with filiform setae; and body black with antennae and legs reddish brown and elytra dull (*Fig. 2*).

The distribution area of *H. opacus* includes; Austria, Belgium, Bulgaria, China, Denmark, England, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italia, Japan, Korea, Latvia, Lithuania, Macedonia, Norway, Poland, Russia, Slovakia, Slovenia, Sweden, Switzerland, North America and Canada (Wood and Bright, 1992a; GBIF, 2017; Fauna Europaea, 2018).

Table 2. Locality, capturing date and individual numbers of *H. opacus* and *C. hispidulus*

	N	Capturing date	Individuals
<i>Hylastes opacus</i>	1	12 May	14
	2	13 May	1
	3	13 May	24
	7	15 May	4
	8	26 May	17
	9	14 May	1
	11	30 June	11
	12	26 July	7
	Total		79
<i>Crypturgus hispidulus</i>	4	1 July	1
	5	27 August	1
	6	13 May	1
	10	15 May	1
	11	30 June	2
	Total		6



Figure 2. *Hylastes opacus* Erichson

We obtained only six adult of *C. hispidulus* individuals from log traps in Balıkesir and Çanakkale province in 2014. *C. hispidulus* can be differentiated from other Turkish species of the genus *Crypturgus* (except *C. pusillus*, *C. cylindricollis* and *C. parallelocollis*) by shiny elytra and with round punctures of striae and elytral declivity with individually placed setae. It can be distinguished from *C. pusillus* by fine pronotum with sparsely punctured and elytral discs and sides with erect and long setae. It differs from *C. cylindricollis* and *C. parallelocollis* in terms of sizes (Grüne, 1979; Freude et al., 1981; Lompe, 2002; Jordal and Knížek, 2007). Its adults are 1.2-1.3 mm long and have the following features: interstriae with rows of white to light brown, short, thick and filiform setae; body black (Fig. 3).

The distribution area of *C. hispidulus* includes; Austria, Belarus, Bulgaria, Central and North European Russia, Czech Republic, Denmark, England, Estonia, Finland,

Germany, Hungary, Italia, Latvia, Lithuania, Norway, Poland, Slovakia, Slovenia, Sweden, Switzerland, and Ukraine (GBIF, 2017; Fauna Europaea, 2018).



Figure 3. *Crypturgus hispidulus* Thomson, C. G.

There were records from Greece and Bulgaria of *H. opacus*. Likewise, *C. hispidulus* was reported from Bulgaria (Doychev and Ovcharov, 2006). Although both of them were recorded in the neighbouring countries, *Hylastes opacus* and *Crypturgus hispidulus* were recorded for the first time in Turkey. As mentioned above, the Scolytinae subfamily is represented by 135 species in Turkey. Five of those species are known only in the country. We have contributed 2 species to Scolytinae of Turkey by current article.

H. opacus breeds in the bark of stumps or at the bases of unhealthy *Pinus* spp., chiefly Scotch pine (*P. sylvestris*). It occasionally infests the bark of other conifers for example *Picea* spp. and *Larix* spp. (Freude et al., 1981; Wood and Bright, 1992a; Hoebeke, 1994). We obtained *H. opacus* from trap logs of *P. brutia* and *P. nigra* and also pheromone traps in *P. brutia* stands. *C. hispidulus* lives under the bark of *Picea*, *Pinus* and less often on larch species. It also occurs in the galleria of other larger bark beetles for example; *Xylechinus pilosus*, *Hylurgops palliatus*, *Polygraphus poligraphus*, *P. subopacus*, *Tomicus minor*, *Pityogenes chalcographus* etc. (Freude et al., 1981). We observed that their adult individuals were associated with *Orthotomicus erosus* and *Pityogenes pennidens* on *P. brutia* and *P. nigra* log traps. Our findings are consistent with previous studies regarding the presence of adult individuals under the bark of pine species (*P. brutia* and *P. nigra*), and the association of *C. hispidulus* with other Scolytine species.

Conclusion

Bark beetles are important disturbance agents in forestry. They can colonize weak or recently killed trees, however a few species are capable of killing healthy trees. One of the most important characteristics of bark beetles is their association with fungi. In this study, where we present two new species for Turkish fauna, our main goal was to examine the association of bark beetles-fungi. Due to the experimental design we are not able to give more detailed information for these two new species. Additional work, including their life cycle should be conducted to determine their impact on forest ecosystem.

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