

Orijinal araştırma (Original article)

Predators of Scolytinae (Coleoptera: Curculionidae) species of the coniferous forests in the Western Mediterranean Region, Turkey¹

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Summary

Scolytinae (Coleoptera: Curculionidae) species cause economically damage every year in coniferous forests of the Western Mediterranean Region of Turkey. Among these species especially *Orthotomicus erosus* (Wollaston), *Orthotomicus tridentatus* Eggers, *Tomicus destruens* (Wollaston), *Tomicus minor* (Hartig), *Ips sexdentatus* (Boerner) and *Pityokteines curvidens* (Germar) are the most common. The number of trees being killed by Scolytinae species has increased significantly in recent years throughout the region. Predator species are important factors in the dynamics of these pests. In this study, it was aimed to determine predator species of bark beetles in the coniferous forests of Western Mediterranean Region. Specimens were collected from 24 sites throughout the region between 2006 and 2008. Totally nineteen predator species of Scolytinae belonging to ten families of three orders were presented from the Western Mediterranean Region of Turkey in bark beetle galleries on coniferous trees. Among these species *Plegaderus vulneratus* (Panzer), *Nemosoma pliginskyi* Reitter and *Nemosoma cornutum* Sturm were the first records for the Turkish fauna. *Aulonium ruficorne* (Olivier), *Corticus fraxini* (Kugelann), *Thanasimus formicarius* (Linnaeus), *Raphidia ophiopsis* Linnaeus, *Rhizophagus depressus* (Fabricius) and *Temnochila coerulea* (Olivier) were found as the most common predator species.

Key words: Scolytinae, predators, The Western Mediterranean Region, coniferous trees

Anahtar sözcükler: Scolytinae, predatörler, Batı Akdeniz Bölgesi, iğne yapraklı ağaçlar

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Introduction

The subfamily Scolytinae (Coleoptera: Curculionidae), with more than 6,000 described species, is one of the largest group of Coleoptera. Scolytinae species typically cause secondary damage but during occasional outbreaks they are capable of killing relatively vigorous trees (Eroğlu et al., 2005). *Pinus brutia* Ten., *Pinus nigra* Arnold, *Cedrus libani* A. Rich, *Abies cilicica* Carr. and *Juniperus excelsa* Bieb. are the main species of coniferous forests of the Western Mediterranean Region of Turkey. 27 species belonging to 2 subfamilies of Scolytinae were determined in these coniferous forests of the region. Among these species especially *Orthotomicus erosus* (Wollaston), *Orthotomicus tridentatus* Eggers, *Tomicus destruens* (Wollaston), *Tomicus minor* (Hartig), *Ips sexdentatus* (Boerner) and *Pityokteines curvidens* (Germar) are the most common and cause economically damage every year (Sarıkaya, 2008). The number of trees being killed by Scolytinae species has increased significantly in recent years throughout the region. This increase has been observed especially in damaged forests where windstorms and snowy conditions had caused broken and fallen trees, as well as in areas affected by forest fires. In addition, outbreaks have been observed at low quality sites during dry years when moisture stress increases the vulnerability to beetle attack. Such the trees become excellent sources for beetle reproduction and survival.

Natural enemies may be important factors in the dynamics of Scolytinae species. Most of the predators are found in gallery systems of bark beetles. Some of them feed on the immature and mature stages of bark beetles (Reeve, 1997; Schroeder, 1999). Natural enemies are very important factors for biological control. There is less information about predators of Scolytinae species in coniferous forests of the Western Mediterranean Region. The aim of this study is to determine predator species of bark beetles in the coniferous forests of this region.

Material and Methods

This study was included in coniferous forests of the Western Mediterranean Region (Turkey) between 2006 and 2008. Researches were conducted throughout the coniferous forests of the region. Predator species were collected from 24 sites displaying different forest characteristics in Afyonkarahisar, Antalya, Burdur, Denizli, Isparta and Muğla regions. In addition stand characteristics, altitudes and geographical coordinates were also noted (Table 1).

Table 1. Collection sites, geographical positions, altitudes and forest characteristics of sampling sites

Collection Sites	Geographical Positions	Altitude (m)	Forest Characteristics
Afyonkarahisar			
Başmakçı, Yaka	37° 51' N, 30° 03' E	1000	Natural <i>Pinus brutia</i> and <i>Pinus nigra</i> mixed forest
Antalya			
Alanya, Avsallar	36° 36' N, 30° 48' E	100	Natural and young <i>Pinus brutia</i> forest
Alanya, Demirtaş	36° 32' N, 32° 07' E	50	Forest storage
Döşemealtı, Düzlerçamı	36° 58' N, 30° 32' E	315	Natural and young <i>Pinus brutia</i> forest
Finike, Üçkuzluk	36° 22' N, 30° 02' E	1420	Natural <i>Cedrus libani</i> forest
Gazipaşa, Demirliçeşme	36° 18' N, 32° 14' E	80	Forest storage
İbradı, Genboz	37° 15' N, 31° 42' E	1300	Natural <i>Cedrus libani</i> and <i>Abies cilicica</i> mixed forest
Kaş, Kalkan	36° 16' N, 29° 23' E	100	Natural <i>Pinus brutia</i> forest
Kumluca, Sarıcasu	36° 25' N, 30° 13' E	250	Natural and young <i>Pinus brutia</i> forest
Manavgat, Sorgun	36° 45' N, 31° 25' E	50	Natural and mature <i>Pinus brutia</i> forests
Merkez, Çakırlar	36° 50' N, 30° 33' E	100	Forest storage
Serik, Gebiz	37° 06' N, 30° 55' E	100	Forest storage
Burdur			
Ağlasun, Çamlıdere	37° 37' N, 30° 41' E	920	Natural and young <i>Pinus brutia</i> forest
Ağlasun, Çobanpınarı	37° 34' N, 30° 45' E	360	Natural and young <i>Pinus brutia</i> forest
Ağlasun, Kibrit	37° 38' N, 30° 31' E	1095	Young <i>Pinus nigra</i> plantation
Bucak, Kargı	37° 15' N, 30° 49' E	265	Natural and young <i>Pinus brutia</i> forest
Bucak, Karlık	37° 20' N, 30° 39' E	1330	Natural and young <i>Cedrus libani</i> forest
Burdur, Aziziye	37° 26' N, 30° 15' E	1315	Natural <i>Pinus nigra</i> forest
Denizli			
Tavas, Bozdağ	37° 17' N, 29° 05' E	1550	Natural <i>Cedrus libani</i> forest
Isparta			
Aksu, Pazarköy	37° 46' N, 31° 03' E	1325	Young <i>Pinus nigra</i> plantation
Eğirdir, Aşağıgökdere	37° 35' N, 30° 49' E	440	Natural and young <i>Pinus brutia</i> forest
Eğirdir, Yuvalı	37° 43' N, 30° 54' E	1120	Natural <i>Abies cilicica</i> forest
Keçiborlu, Burçaklıksırtı	37° 55' N, 30° 17' E	1165	Young <i>Pinus nigra</i> plantation
Muğla			
Köyceğiz, Zeytinalanı	36° 57' N, 28° 45' E	130	Forest storage

Predator specimens were collected mainly in their adult stage. Also several of them were picked up in larva period. Samples were collected from adults and larvae galleries of Scolytinae species, *O. erosus*, *O. tridentatus*, *T. destruens*, *T. minor*, *I. sexdentatus*, *Ips mansfeldi* (Wachtl), *P. curvidens*, *Carphoborus henscheli* Reitter and *Pityogenes pennidens* Reitter which cause economically losses by their damage. Trees infested by bark beetles were used to determine predator complex of Scolytinae species. Also log traps which were set up by Forest Management for controlling of bark beetles, were checked. Using entrance holes and sawdust around the stems as a guide, main galleries were opened using knives and axes. Specimens were collected and placed in 4.5 x 3 cm cylindrical plastic cups or 10 x 15 cm plastic tubes and labeled with date, location and forest characteristics of the sampling area. Bark sections were placed in 35 x 25 cm sealed plastic bags and taken to the laboratory where predator species were killed by diethyl eter in a killing bottle and stuck to a triangular piece of cardboard. All sampling materials are deposited at the Entomological Museum of Süleyman Demirel University, Faculty of Forestry, Isparta, Turkey.

Results

List of predator species feeding on the bark beetles in coniferous forests of the Western Mediterranean Region and data on the examined materials are provided in the following. In addition, recorded Scolytinae species as hosts of these predators in recently studies were given.

Coleoptera

Scolytinae

Monotomidae

Rhizophagus depressus (Fabricius, 1792)

Material examined: on *Pinus brutia* in *Tomicus destruens* galleries: Antalya: Alanya-Avsallar, 18.IV.2007; Alanya-Demirtaş, 27.X.2007; Döşemealtı-Düzlerçamı, 19.III.2006; Serik-Gebiz, 20.IV.2007; Burdur: Ağlasun-Çobanpınarı, 10.III.2006, 17.III.2006, 31.III.2006; Isparta: Eğirdir-Aşağıgökdere, 17.III.2006, 28.IV.2006; 13.II.2007, 27.II.2007, 13.III.2007. In *Orthotomicus erosus* galleries: Afyonkarahisar: Başmakçı-Yaka, 31.V.2006; In *Pityogenes pennidens* galleries: Isparta: Eğirdir-Aşağıgökdere, 26.III.2007.

Hosts: *Pityogenes bidentatus*, *Ips sexdentatus*, *I. acuminatus*, *I. typographus*, *Cryphalus piceae*, *Orthotomicus erosus*, *Tomicus minor*, *T. piniperda*, *Dendroctonus micans*, *Pityophthorus pityographus*, *Pityokteines curvidens*, *P. vorontzovi* (Yüksel, 1998; Schroeder, 1999; Oğurlu, 2000; Yüksel & Akbulut, 2002; Yüksel et al., 2003; Serin et al., 2005).

Cleridae

***Clerus mutillarius* Fabricius, 1775**

Material examined: on *Pinus brutia* in *Orthotomicus erosus* galleries: Isparta: Eğirdir-Aşağıgökdere, 17.III.2006. In *Tomicus destruens* galleries: Isparta: Eğirdir-Aşağıgökdere, 07.IV.2006. On *Pinus nigra* in *Ips sexdentatus* galleries: Isparta: Aksu-Pazarköy, 25.V.2006.

Hosts: *Pityokteines curvidens*, *P. spinidens* (Tosun, 1975; Yüksel, 1998; Ünal & Yüksel, 2005).

***Thanasimus formicarius* (Linnaeus, 1758)**

Material examined: on *Pinus brutia* in *Orthotomicus erosus* galleries: Afyonkarahisar: Başmakçı-Yaka, 25.V.2006; Antalya: Döşemealtı-Düzlerçamı, 25.III.2006, 15.IV.2006; Kaş-Kalkan, 25.V.2007; Burdur: Ağlasun-Kargı, 05.II.2006; Isparta: Eğirdir-Aşağıgökdere, 14.IV.2006, 19.III.2007, 22.III.2008. In *Tomicus destruens* galleries: Afyonkarahisar: Başmakçı-Yaka, 23.III.2006, 07.IV.2006; Isparta: Eğirdir-Aşağıgökdere, 31.III.2006, 24.IV.2008. In *Tomicus minor* galleries: Afyonkarahisar: Başmakçı-Yaka, 20.IV.2006, 11.V.2006. On *Pinus nigra* in *Tomicus minor* galleries: Isparta: Keçiborlu-Burçaklıksırtı, 23.III.2006. In *Ips sexdentatus* galleries: Burdur: Merkez-Aziziye, 19.IV.2006; Isparta: Aksu-Pazarköy, 12.IV.2006, 17.IV.2007, 08.V.2007, 04.IV.2008, 16.IV.2008. On *Cedrus libani* in *Orthotomicus tridentatus* galleries: Burdur: Bucak-Karlık, 07.VI.2006.

Hosts: *Ips typographus*, *Tomicus minor*, *I. acuminatus*, *I. mannsfeldi*, *I. sexdentatus*, *Orthotomicus erosus*, *Pityokteines curvidens*, *P. spinidens*, *P. vorontzovi*, *Dendroctonus micans*, *Cryphalus piceae* (Ratzeburg, 1837), *Pityophthorus pityographus* (Ratzeburg, 1837), *Pityogenes bidentatus* (Herbst, 1783) (Tosun 1975; Schroeder, 1999; Yüksel, 1998; Yüksel & Akbulut, 2002; Yüksel & Alkan, 2003, Serin et al., 2005, Hilszczański et al., 2007).

Trogossitidae

***Nemosoma cornutum* Sturm, 1826**

Material examined: on *Pinus brutia* in *Orthotomicus erosus* galleries: Afyonkarahisar: Başmakçı-Yaka, 31.V.2005.

***Nemosoma pliginskyi* Reitter, 1910**

Material examined: on *Abies cilicica* in *Pityokteines curvidens* galleries: Antalya; İbradı-Genboz, 19.IV.2007; Isparta; Eğirdir-Yuvalı, 08.V.2007.

***Temnochila coerulea* (Olivier, 1790)**

Material examined: on *Pinus brutia* in *Tomicus destruens* galleries: Antalya: Alanya-Avsallar, 18.IV.2007; Döşemealtı-Düzlerçamı, 19.III.2006;

Serik-Gebiz, 20.IV.2007; Isparta: Eğirdir-Aşağıgökdere, 13.III.2007, 09.IV.2007. In *Orthotomicus erosus* galleries: Afyonkarahisar: Başmakçı-Yaka, 31.V.2006; Isparta: Eğirdir-Aşağıgökdere, 24.III.2006, 02.IV.2007. On *Pinus nigra* in *Ips sexdentatus* galleries: Isparta: Aksu-Pazarköy, 11.IV.2006. On *Abies cilicica* in *Pityokteines curvidens* galleries: Isparta: Eğirdir-Yuvalı, 12.VI.2007.

Hosts: *Orthotomicus erosus*, *Ips sexdentatus*, *Pityokteines curvidens*, *Tomicus minor* (Tosun, 1975; Yüksel, 1998; Oğurlu, 2000).

Histeridae

***Cylister cornix* (Marseul, 1861)**

Material examined: on *Pinus brutia* in *Orthotomicus erosus* galleries: Antalya: Manavgat-Sorgun, 20.IV.2007; Isparta: Eğirdir-Aşağıgökdere, 24.IV.2007. In *Tomicus destruens* galleries: Antalya: Serik-Gebiz, 20.IV.2007; Isparta: Eğirdir-Aşağıgökdere, 24.IV.2007, 14.IV.2008. On *Cedrus libani* in *Orthotomicus tridentatus* galleries: Antalya: İbradı-Genboz, 19.IV.2007; Burdur: Bucak-Karlık, 29.III.2007.

Hosts: *Orthotomicus erosus*, *Tomicus piniperda* (Linnaeus, 1758) (Tosun, 1975; Oğurlu, 2000).

***Cylister elongatus* Olivier, 1789**

Material examined: on *Pinus brutia* in *Orthotomicus erosus* galleries: Antalya: Merkez-Çakırlar, 13.IV.2007; Alanya-Avsallar, 18.IV.2007. In *Tomicus destruens* galleries: Antalya: Alanya-Avsallar, 18.IV.2007; Burdur: Ağlasun-Çobanpınarı, 06.IV.2006; Isparta: Eğirdir-Aşağıgökdere, 31.III.2006, 14.IV.2006, 13.III.2007. On *Cedrus libani* in *Orthotomicus tridentatus* galleries: Antalya: İbradı-Genboz, 19.IV.2007.

Hosts: *Orthotomicus erosus*, *Tomicus piniperda* (Tosun, 1975; Oğurlu, 2000).

***Plegaderus vulneratus* (Panzer, 1797)**

Material examined: on *Cedrus libani* in *Orthotomicus tridentatus* galleries: Antalya: İbradı-Genboz, 19.IV.2007. On *Abies cilicica* in *Pityokteines curvidens* galleries Isparta: Eğirdir-Yuvalı, 28.III.2007.

Hosts: *Ips typographus* (Linnaeus, 1758) (Hedgren & Schroeder, 2004; Hilszczański et al., 2007).

***Paramalus parallelepipedus* (Herbst, 1792)**

Material examined: on *Pinus brutia* in *Orthotomicus erosus* galleries: Antalya: Gazipaşa-Demirliçeşme, 21.IV.2007; Kumluca-Sarıcasu, 23.V.2007; Isparta: Eğirdir-Aşağıgökdere, 01.VI.2006, 26.V.2007. In *Tomicus destruens* galleries: Antalya: Merkez-Çakırlar, 13.IV.2007.

Hosts: *Ips sexdentatus*, *I. typographus*, *Orthotomicus erosus*, *Cryphalus piceae* (Ratzeburg, 1837) (Yüksel, 1998; Oğurlu, 2000; Serin et al., 2005, Hilszczański et al., 2007).

Colydiidae

***Aulonium ruficorne* (Olivier, 1790)**

Material examined: on *Pinus brutia* in *Orthotomicus erosus* galleries: Afyonkarahisar: Başmakçı-Yaka, 25.V.2006; Antalya: Merkez-Çakırlar, 13.IV.2007; Alanya-Avsallar, 18.IV.2007; Serik-Gebiz, 20.IV.2007; Burdur: Ağlasun-Çobanpınarı, 06.IV.2006; Isparta: Eğirdir-Aşağıgökdere, 15.IV.2007. In *Tomicus destruens* galleries: Afyonkarahisar: Başmakçı-Yaka, 16.III.2006; Antalya: Merkez-Çakırlar, 13.IV.2007; Alanya-Avsallar, 18.IV.2007; Gazipaşa-Demirliçeşme, 21.IV.2007; Serik-Gebiz, 20.IV.2007; Burdur: Ağlasun-Çobanpınarı, 31.III.2006, 06.IV.2006, 12.V.2006; Isparta: Eğirdir-Aşağıgökdere, 31.III.2006, 14.IV.2006, 05.V.2006, 12.V.2006, 26.III.2007, 11.V.2008. On *Pinus nigra* in *Ips sexdentatus* galleries: Isparta: Aksu-Pazarköy, 07.III.2006, 12.IV.2006, 11.III.2008. On *Cedrus libani* Rich in *Orthotomicus tridentatus* galleries: Burdur: Bucak-Karlık, 29.III.2007. On *Abies cilicica* in *Pityokteines curvidens* galleries: Isparta: Eğirdir-Yuvalı, 20.III.2007.

Hosts: *Phloesinus aubei* (Perris, 1855), *Orthotomicus erosus*, *Pityogenes bidentatus*, *P. calcaratus*, *Ips sexdentatus*, *I. acuminatus* (Tosun, 1975; Podoler et al., 1990; Yüksel, 1998; Oğurlu, 2000; Yüksel & Akbulut, 2002; Ünal & Yüksel, 2005).

***Colydium elongatum* Fabricius, 1787**

Material examined: on *Pinus brutia* in *Tomicus destruens* galleries: Isparta: Eğirdir-Aşağıgökdere, 19.IV.2007. On *Cedrus libani* in *Orthotomicus tridentatus* galleries: Antalya: İbradı-Genboz, 19.IV.2007. On *Abies cilicica* in *Pityokteines curvidens* galleries: Antalya: İbradı-Genboz, 19.IV.2007; Isparta: Eğirdir-Yuvalı, 05.V.2007.

Hosts: *Orthotomicus erosus*, *Ips typographus* (Tosun, 1975; Yüksel, 1998; Yüksel & Alkan, 2003).

Tenebrionidae

***Corticeus fraxini* (Kugelann, 1794)**

Material examined: on *Pinus brutia* in *Orthotomicus erosus* galleries: Antalya: Döşemealtı- Düzlerçamı, 29.IV.2006; Kumluca-Sarıcasu, 23.V.2007; Isparta: Eğirdir-Aşağıgökdere, 15.IV.2007. In *Tomicus destruens* galleries: Burdur: Ağlasun-Çobanpınarı, 31.III.2006; Isparta: Eğirdir-Aşağıgökdere,

31.III.2006, 14.IV.2006, 21.IV.2006, 28.IV.2006, 05.V.2006, 26.III.2007, 02.IV.2007, 11.IV.2008; Muğla: Köyceğiz-Zeytinaları, 24.X.2006. In *Tomicus minor* galleries: Isparta: Eğirdir-Aşağıgökdere, 06.IV.2006. On *Pinus nigra* in *Ips sexdentatus* galleries: Isparta: Aksu-Pazarköy, 07.III.2006, 26.IV.2006, 18.IV.2006, 16.III.2008. In *Ips mannsfeldi* galleries: Isparta: Aksu-Pazarköy, 07.III.2006. In *Tomicus minor* galleries: Isparta: Aksu-Pazarköy, 19.IV.2006; Keçiborlu-Burçaklıksırtı, 03.V.2006. On *Cedrus libani* in *Orthotomicus tridentatus* galleries: Antalya: Finike-Üçkuzluk, 24.V.2007; İbradı-Genboz, 19.IV.2007; Denizli: Tavas-Bozdağ, 12.VI.2007.

Hosts: *Ips sexdentatus*, *I. acuminatus*, *Tomicus piniperda*, *T. minor* (Schimitschek, 1953; Yüksel et al., 2000).

***Corticeus linearis* (Fabricius, 1790)**

Material examined: on *Pinus brutia* in *Tomicus destruens* galleries: Isparta: Eğirdir-Aşağıgökdere, 10.III.2006. In *Orthotomicus erosus* galleries: Eğirdir-Aşağıgökdere, 16.III.2006.

Hosts: *Cryphalus piceae* (Ratzeburg, 1837), *Pityophthorus pityographus* (Serin et al., 2005).

***Corticeus pini* (Panzer, 1799)**

Material examined: on *Pinus brutia* in *Tomicus destruens* galleries: Isparta: Eğirdir-Aşağıgökdere, 13.III.2007.

Hosts: *Ips sexdentatus*, *Orthotomicus erosus* (Tosun, 1975; Serez & Schönherr, 1983; Oğurlu, 2000).

Staphylinidae

***Staphylinus* sp.**

Material examined: on *Pinus brutia* in *Tomicus destruens* galleries: Isparta: Eğirdir-Aşağıgökdere, 23.IV.2007.

Hosts: *Ips sexdentatus*, *I. typographus* (Yüksel, 1998; Ünal & Yüksel, 2005).

Heteroptera

Anthocoridae

***Scoloposcelis* sp.**

Material examined: on *Pinus brutia* in *Tomicus destruens* galleries: Afyonkarahisar: Başmakçı-Yaka, 12.V.2006; Antalya: Serik-Gebiz, 20.IV.2007; Burdur: Ağlasun-Kargı, 13.II.2007; Isparta: Eğirdir-Aşağıgökdere, 12.V.2006, 25.V.2006, 24.IV.2007. In *Orthotomicus erosus* galleries: Antalya: Döşemealti-

Düzlerçamı, 27.V.2006. On *Pinus nigra* in *Ips sexdentatus* galleries: Isparta: Aksu-Pazarköy, 29.V.2007.

Hosts: *Ips typographus* (Yüksel & Alkan, 2003).

Aradidae

***Aradus* sp.**

Material examined: on *Pinus brutia* in *Carphoborus henscheli* galleries: 17.III.2006. On *Pinus nigra* in *Tomicus minor* galleries: Burdur: Ağlasun-Kibrit, 24.III.2006.

Hosts: *Ips typographus* (Yüksel & Alkan, 2003).

Neuroptera

Raphidiidae

***Raphidia ophiopsis* Linnaeus, 1758**

Material examined: on *Pinus brutia* in *Orthotomicus erosus* galleries: Antalya: Döşemealtı-Düzlerçamı, 02.IV.2006; Isparta: Eğirdir-Aşağıgökdere, 09.IV.2007, 05.V.2008. In *Tomicus destruens* galleries: Afyonkarahisar: Başmakçı-Yaka, 07.IV.2006; Antalya: Alanya-Avsallar, 18.IV.2007; Burdur: Ağlasun-Çamlıdere, 08.XI.2007; Isparta: Eğirdir-Aşağıgökdere, 31.VI.2006, 09.IV.2007; Muğla: Köyceğiz-Zeytinalanı, 24.X.2006. On *Pinus nigra* in *Ips sexdentatus* galleries: Isparta: Aksu-Pazarköy, 07.III.2006, 10.IV.2007, 08.V.2007, 22.V.2007. In *Tomicus minor* galleries: Afyonkarahisar: Başmakçı-Yaka, 07.IV.2006; Burdur: Ağlasun-Kibrit, 02.IV.2006; Isparta: Aksu-Pazarköy, 07.III.2006, 12.IV.2006; Keçiborlu-Burçaklısırtı, 30.III.2006, 08.II.2007.

Hosts: *Ips sexdentatus*, *Pityokteines curvidens*, *Pityophthorus pityographus*, *Dendroctonus micans* (Kugelann, 1794), *Ips sexdentatus*, *I. typographus*, *Pityogenes bidentatus*, *Orthotomicus erosus*, *Cryphalus piceae* (Tosun, 1975; Selmi, 1998; Yüksel, 1998; Yüksel & Akbulut, 2002; Yüksel & Alkan, 2003; Serin et al., 2005).

Discussion

In this study, nineteen species belonging to ten families from three orders were collected. *Aulonium ruficorne*, *Corticeus fraxini*, *Thanasimus formicarius*, *Raphidia ophiopsis*, *Rhizophagus depressus* and *Temnochila coerulea* were found as the most common predator species on Scolytinae fauna of the region. Among the collected species, *Plegaderus vulneratus*, *Nemosama pliginskyi* and *Nemosoma cornutum* are new records for Turkish insect fauna.

In this study, the findings about *Thanasimus formicarius*, *Cylister cornix*, *Cylister elongatus*, *Plegaderus vulneratus*, *Aulonium ruficorne*, *Colydium*

elongatum and *Corticeus fraxini* were among first records in the galleries of *Orthotomicus tridentatus* which is spread in only Turkey and a monophagous pest on *Cedrus libani*.

In the galleries of *Tomicus destruens*; *Aulonium ruficorne*, *Corticeus fraxini*, *Rhizophagus depressus*, *Thanasimus formicarius*, *Raphidia ophiopsis*, *Clerus mutillarius*, *Cylister cornix*, *Cylister elongatus*, *Paromalus parallelepipedus*, *Colydium elongatum*, *Corticeus linearis*, *Corticeus pini*, *Staphylinus* sp. and *Scoloposcelis* sp. were found as predator species and these were the first records for *Tomicus destruens* in Turkey. In addition, *Colydium elongatum* was observed as a predator of *Pityokteines curvidens* first time.

The study should be regarded in the biological information needed for insect pest management as only a preliminary step for the description of predator complex of bark beetles in the Western Mediterranean Region.

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Özet

Batı Akdeniz Bölgesi iğne yapraklı ormanlarının Scolytinae (Coleoptera: Curculionidae) türlerinin avcıları

Scolytinae (Coleoptera: Curculionidae) türleri Batı Akdeniz Bölgesi iğne yapraklı ormanlarında her yıl önemli ekonomik zararlara neden olmaktadır. Bu türler arasında *Orthotomicus erosus* (Wollaston), *Orthotomicus tridentatus* Eggers, *Tomicus destruens* (Wollaston), *Tomicus minor* (Hartig), *Ips sexdentatus* (Boerner) ve *Pityokteines curvidens* (Germar) en yaygın türlerdir. Son yıllarda bölge genelinde Scolytinae türleri tarafından kurutulmuş olan ağaçların sayısında önemli bir artış görülmektedir. Avcı türler, bu zararlıların yoğunluğunu etkileyen önemli faktörlerdendir. Bu çalışma, Batı Akdeniz Bölgesi iğne yapraklı ormanlarında yayılış gösteren kabuk böceği türlerinin avcılarını tespit etmek amacıyla gerçekleştirilmiştir. Çalışma alanında, 2006-2008 yılları arasında 24 farklı sahadan örnekler alınmıştır. Araştırmanın sonucunda, kabuk böceği türlerinin ana ve larva yollarında 3 takımdan 10 farklı familyaya ait toplam 19 avcı tür tespit edilmiştir. Bu türlerden, *Plegaderus vulneratus* (Panzer), *Nemosoma pliginskyi* Reitter ve *Nemosoma cornutum* Sturm Türkiye faunası için yeni kayıt niteliğindedir. Çalışmada,

Aulonium ruficorne (Olivier), *Corticus fraxini* (Kugelann), *Thanasimus formicarius* (Linnaeus), *Raphidia ophiopsis* Linnaeus, *Rhizophagus depressus* (Fabricius) ve *Temnochila coerulea* (Olivier) en yaygın avcı türler olarak bulunmuştur.

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