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Ambrosia beetles, hosts and distribution in Turkey with a study on the species of Istanbul province

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Ambrosia beetles were investigated in Istanbul province. Trap logs were used to collect the insects. In total, 4 insect species, *Xyleborus dispar*, *Xyleborinus saxeseni*, *Trypodendron lineatum* and *Trypodendron signatum* were identified in 2008. Up to date, 12 ambrosia beetles were recorded in Turkey. The faunal composition, host plants and geographical distribution of the species were discussed.

Key words: Ambrosia beetles, Coleoptera, Scolytidae, Platypodidae, Turkey.

INTRODUCTION

Ambrosia beetles, some Scolytidae and all Platypodidae species are feeding on the mycelia of ambrosia fungi that are cultivated in their galleries. Ambrosia beetles spending their entire life within a woody stem generally prefer to weakened or stressed trees (Bobat, 1997).

In a managed forest, the amount of dead wood is lower than in natural forest at stands. Since natural forests of Turkey do not offset to the increasing in demand for wood and wood products, the managed forest plantations and importation are used for closing the gap between the demand and supply. The amount of dead wood increases both the managed forests and plantations because of various factors as global warming, drought, human pressure and wrong forestry applications. Also, the plantations make them prone to a suite of pests and disease while the commercial forest products cause to the introduction of exotic pests into non-infested regions. Most non-native forest insects arrive in new environments as unexpected invaders such as *Dendroctonus micans* (Kugelann). The factors inevitably result in outbreaks of Scolytids in Turkey. Forest trees as well as orchards are at risk to boring and fungal inoculation, particularly by *Xyleborus dispar* (Fabr.) and *Xyleborinus saxeseni* (Ratz.) in Turkey (Schimitschek, 1944; Iren, 1977; Kaya, 2004; Ak et al. 2005a, b).

According to DPT (2001), the demand for industrial wood is met by national forests (65%), plantations (26%) and importation from other countries (9%). In addition, orchards are economically important in Turkey. Fruit-yield is declining because of infestation of ambrosia beetles.

The objective of this study was to investigate ambrosia beetles in Istanbul, and to provide their distributions and hosts in Turkey.

MATERIALS AND METHODS

This study was conducted in Istanbul province in 2008. The trap logs were prepared as 3 m in length and 15 - 20 cm in diameter and placed to identify ambrosia insect species in March. In this study, 16 logs from 4 different tree species (*Alnus* sp., *Castanea* sp., *Fagus* sp. and *Pinus* sp.) were used inside the forests. Trap logs were checked every 10 - 14 days between April and November. The logs with insect activity were brought into the laboratory and kept under constant conditions of 20 - 24°C, 60 - 70% RH. The emerged adults were killed in killing jars with ethyl acetate. In addition, the presence of beetles was monitored on trunks in the studied forests.

All collected specimens were prepared and identified according to a series of guide studies carried out by several authors (Selmi, 1998).

RESULTS AND DISCUSSION

Ambrosia beetles are represented by two families, Scolytidae and Platypodidae. The distribution and host

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plants of ambrosia species are discussed as follows.

Family Scolytidae: Tribe Xyleborini; Genus: Xyleborus (Eichhoff, 1864)

Xyleborus dispar (Fabricius, 1792)

-Distribution and hosts in Turkey: Adana, Ankara, Artvin, Bartin, Bolu, Bursa, Corum, Denizli, Giresun, Gumushane, Hatay, Istanbul, Kastamonu, Nigde, Ordu, Rize, Sakarya, Samsun, Trabzon, Zonguldak on *Carpinus betulus*, *Castanea sativa*, *Corylus avellana*, *Malus domestica*, *Populus nigra*, *Prunus cerasus*, *Quercus* sp., *Tilia* sp. and *Ulmus* sp. (Bodemeyer, 1900 ; Bodenheimer, 1941; Acatay, 1943; Schimitschek, 1944; Alkan, 1946, 1948; Balachowsky 1949; Alkan, 1959; Schedl, 1959, 1961; Alkan, 1964; Iren, 1977; Sekendiz, 1981; Isik, 1984; Kaya, 2004; Ak et al., 2005a, b) (Figure 1a).

-Material examined: Istanbul-Beykoz on *C. sativa*, 7 exs. 11.V.2008, 4 exs. 13.v.2008, 15 exs. 18.v.2008, 12 exs. 20.v.2008, 5 exs. 24.v.2008. Totally 43 specimens.

Xyleborus dryographus (Ratzeburg, 1837)

Distribution and hosts in Turkey: Bursa, Istanbul, Trabzon on *C. sativa* and *Quercus frainetto* (Schimitschek, 1944; Acatay, 1960; Schedl, 1961; Selmi, 1998).

Xyleborus eurygraphus (Ratzeburg, 1837)

Distribution and hosts in Turkey: Adana, Afyon, Antalya, Bolu, Burdur, Bursa, Izmir, Karabuk, Mugla, Tokat on *Pinus brutia*, *P. nigra* and *P. pinea* (Schimitschek, 1944; Canakcioglu, 1956; Schedl, 1959, 1961, 1968; Besceli 1969; Tosun, 1975).

Xyleborus monographus (Fabricius, 1792)

Distribution and hosts in Turkey: Bursa, Hatay, Istanbul, Kocaeli on *C. sativa*, *Fagus sylvatica* subsp. *orientalis* and *Q. frainetto* (Bodenheimer, 1941; Acatay, 1943; Schimitschek, 1944; Schedl, 1961; Selmi, 1998).

Xyleborus pfeilii (Ratzeburg, 1837)

Distribution and host in Turkey: Eskisehir on unidentified plant (Schedl, 1968).

Genus: Xyleborinus (Reitter, 1913)

Xyleborinus saxeseni (Ratzeburg, 1837)

Distribution and hosts in Turkey: Amasya, Antalya, Artvin,

Bolu, Duzce Giresun, Hatay, Istanbul, Kocaeli, Konya, Mersin, Mugla, Ordu, Rize, Sakarya, Samsun, Sinop, Trabzon, Zonguldak on *Abies cilicica*, *Abies nordmanniana* ssp. *bornmuelleriana*, *Alnus* sp., *Cedrus libani*, *C. avellana*, *Fagus sylvatica* ssp. *orientalis*, *Ficus carica*, *Fraxinus ornus*, *Juglans regia*, *Juniperus excelsa*, *Liquidambar orientalis*, *Prunus armeniaca*, *Prunus avium*, *Pyrus communis* and *Quercus cerris* (Schedl, 1961; Chararas, 1965; Ak et al., 2005a, b; Akbulut et al., 2008) (Figure 1b).

Material examined: Istanbul-Belgrade Forest on *F. sylvatica* ssp. *orientalis*, 12 exs. 20.vi.2008, 10 exs. 26.vi.2008, 6 exs. 30.vi.2008. Totally 28 specimens.

Tribe: Xyloterini; Genus: Trypodendron (Stephens, 1830)

Trypodendron domesticum (Linnaeus, 1758)

Distribution and host in Turkey: Hatay, and Sakarya on *F. sylvatica* ssp. *orientalis* (Schedl, 1961, 1968)

Trypodendron lineatum (Olivier, 1795)

Distribution and hosts in Turkey: Ankara, Antalya, Artvin, Bolu, Bursa, Cankiri, Duzce, Giresun, Gumushane, Istanbul, Karabuk, Kastamonu, Mersin, Ordu, Rize, Sakarya, Sinop, Tokat, Trabzon on *Abies nordmanniana*, *A. nordmanniana* ssp. *bornmuelleriana*, *C. libani*, *Picea orientalis*, *P. brutia*, *P. nigra*, *P. pinea* and *P. sylvestris* (Schimitschek, 1937, 1944; Eggers, 1940; Bodenheimer, 1941; Acatay, 1943; Alkan, 1946; Defne, 1954; Canakcioglu, 1956; Schedl, 1959, 1968; Besceli, 1969; Tosun, 1975; Sekendiz, 1981, 1991; Sekendiz and Ozder, 1983; Serez 1987, Bobat 1997, Yuksel 1998; Akbulut et al., 2008) (Figure 1c).

Material examined: Istanbul-Alemdag on *P. nigra*, 4 exs. 03.vi.2008, 7 exs. 08.vi.2008, 13 exs. 12.vi.2008, 5 exs. 18.vi.2008. Totally 29 specimens.

Trypodendron signatum (Fabricius, 1787)

Distribution and hosts in Turkey: Bolu, Gumushane, Istanbul, Karabuk, Sakarya, Sinop, Trabzon on *Alnus* sp., *F. sylvatica* ssp. *orientalis* and *Quercus* sp. (Acatay, 1943; Schimitschek, 1944; Schedl, 1968; Besceli, 1969; Sekendiz, 1981).

Material examined: Istanbul-Sile on *Alnus glutinosa*, 8 exs. 22.iv.2008, 6 exs. 28.iv.2008. Totally 14 specimens.

Family: Platypodidae; Tribe: Platypodini; Genus: PLATYPUS (Herbst, 1793)

Platypus cylindrus (Fabricius, 1792)

Distribution and hosts in Turkey: Bursa, Duzce, Hatay,

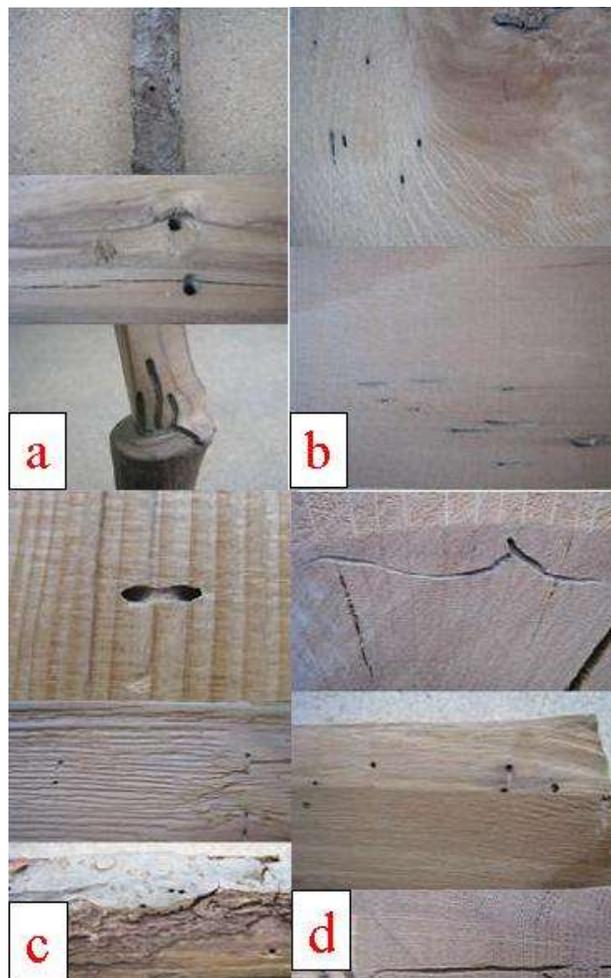


Figure 1. Damages of ambrosia beetles, (a) *Xyleborus dispar* (Fabr.), (b) *Xyleborinus saxeseni* (Ratz.), (c) *Trypodendron lineatum* (Oliv.), (d) *Platypus cylindrus* (Fabr.).

Istanbul, Sakarya on *C. sativa*, *F. sylvatica* ssp. *orientalis*, *F. ornus*, *P. avium*, *Q. cerris*, *Q. frainetto* and *Quercus robur* (Bodemeyer, 1900; Bodenheimer, 1941; Acatay, 1943, 1960; Schimitschek, 1944; Balachowsky, 1949; Schedl, 1959, 1961; Akbulut et al., 2008).

***Platypus oxyurus* (Dufour, 1843)**

Distribution and host in Turkey: On *Abies alba* (Balachowsky, 1949).

***Platypus simulans* (Schedl, 1941)**

Distribution and hosts in Turkey: Mugla on *Alnus* sp. and *L. orientalis* (Schedl 1959, 1961).

The fauna of Turkey's ambrosia species consists of 12 indigenous species. However, no exotic species are

described in Turkey until now. Nine of them can be categorized as forest pest and two of them as both forest and orchard pest. According to host specialisation, seven species damaged on hardwoods and three species on conifers. One species exhibited both hardwoods and conifers.

The distribution and predominance of *X. dispar* are in agreement with other studies in Turkey (Schimitschek, 1944; Sekendiz, 1981). *X. dispar* attacks species of dead or dying hardwoods, especially orchards (Kaya, 2004; Ak et al., 2005a, b). Sometimes, the damages on orchards have caused yield losses in fruit imports to some countries. *X. saxeseni* was in large numbers on trap logs. This beetle is a potentially serious pest of fruit orchards, hardwoods and conifers in Turkey. *T. lineatum* was more abundant on *P. nigra* traps in our study. The beetles captured in the studied areas were totally 29 specimens. Unfortunately, oaks and other deciduous species were uprooted in Istanbul forests during 1948. These areas were planted with *P. nigra* in the same year (Selmi, 1998).

P. nigra trees did not produce top roots extending downward due to inadequate soil structures and recently drought periods. Therefore, the monoculture areas made them prone to a suite of *T. lineatum* and other scolytids. The beetle's infestation to *P. nigra* pulp logs resulted in value losses of desirable wood qualities in Istanbul. And because of mining of state paper enterprises (SEKA) and losses, the pulp logs are not produced here any longer since the last ten years. Bobat (1997) captured 2536 *T. lineatum* species using plastic funnel traps with Linoprax pheromone dispenser. The number of *T. lineatum* represented a substantial portion (57%) of the total number of species captured by the traps. One of the most harmful and well-known beetles is *T. lineatum*. In this study, *T. signatum* was captured in relatively few numbers compared with other studies in Turkey (Acatay, 1943; Sekendiz, 1981). More insect activity in harvested areas was observed than non-harvested areas. The main cause of the insect activity was to leave these harvested materials on forest roads or depots close to forests without the removal of bark from trees. Therefore, these materials attract to bark and wood-boring insects.

Akbulut et al. (2008) suggested that exotic pests may be introduced very easily in forest products imported into Turkey. Alfaro et al. (2007) stated that the countries of the Mediterranean temperate belt including Turkey were at risk about *Megaplatypus mutatus* (Chapius) listing of EPPO.

Although the number of specialised ambrosia beetles documented in this study was small in number, the actual number may be much higher.

The results of the study show no consistent difference in the abundance of species according to other studies. All of ambrosia species except *X. dispar*, *X. saxeseni* and *T. lineatum* were not dangerous species to start an epidemic in contrast to potentially harmful bark beetles in Turkey. There are no detailed studies that have evaluated the effects of ambrosia species and relationships with their fungi. Therefore, it is difficult to reach a conclusion about economic-statistic consequences of damage caused by species. More detailed studies should be conducted to identify ambrosia beetles in different regions of Turkey.

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