NOTE: Five New Invasive Species of Longhorn Beetles (Coleoptera: Cerambycidae) in Israel

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Five invasive species of longhorn beetles, all known as pests and originating from different geographical areas, are recorded from Israel for the first time: *Phoracantha recurva* (Newman) and *Xystrocera globosa* (Olivier) were collected in nature; *Chlorophorus annularis* (Fabricius), *Neoplocaederus basalis* (Gahan) and *Rhagium inquisitor* (Linnaeus) were reared from imported timber.

KEY WORDS: Acacia; bamboo; *Chlorophorus annularis;* eucalyptus; *Neoplocaederus basalis*; *Phoracantha recurva*; *Rhagium inquisitor; Xystrocera globosa*.

Longhorn beetle species, which develop in timber, are easily transported inside the timber or under the bark of tree logs, and thus expand their geographical range. Some are unable to develop in a new area, whereas others succeed in establishing a population and can be considered as potential pests. Three species of Cerambycidae that were in this manner introduced and established, have been recorded thus far from Israel: the eucalyptus borer *Phoracantha semipunctata* (Fabricius) (8,14); the fig borer *Batocera rufomaculata* (DeGeer) (7,14); and *Xylotrechus smei* (Laporte de Castelnau & Gory), erroneously recorded as *Xylotrechus stebbingi* Gahan (21,25). In the present article we add to this list five new invasive species of Cerambycidae. All the material is deposited in the National Collection of Insects, Department of Zoology, Tel-Aviv University, Tel Aviv, Israel (TAUI).

Three species of longhorn beetles were reared in Israel from imported timber:

1. A male and a female ***Neoplocaederus basalis* (Gahan)** (Cerambycinae: Cerambycini), a species naturally distributed in West, Central and East Africa (Nigeria, Cameroon, Côte d'Ivoire, Benin, Angola, Uganda, Tanzania) (10), were reared by the late Y. Palmoni from a tree trunk, imported from West Africa to the port of Haifa (dates of emergence: 17.VII.1966 and 23.VII.1966, respectively; the specimens are indicated by the identification number B4839). They were found following transfer of Palmoni's insect collection from Bet Gordon in Kibbutz Deganya Alef to TAUI.

2. A specimen of ***Rhagium inquisitor* (Linnaeus)** (Lepturinae: Rhagiini) was reared from a larva found in December 2006 under the bark of a tree trunk imported from Russia (exact locality unknown). The adult emerged in 21.V.2007. This species is distributed in Europe, northern Asia (excluding China) and North America (Canada and USA) (17); it is a well known pest of conifers (*Pinus*, *Picea*, *Abies*, *Larix*), developing under the bark of weak, dying and dead trees, occasionally found also on broadleaved trees (*Betula*, *Fagus*, *Quercus*, *Populus*) (5).

3. Approximately 100 specimens of ***Chlorophorus annularis* (Fabricius)** (Cerambycinae: Clytini) were reared from a 2-m-long flute-like musical instrument, made of a single bamboo stem, brought by an Israeli tourist from northern India in 1997. The adult beetles emerged during May 1998. This species is widely distributed in Asia in temperate and warm-temperate zones (northeast China, Korea, Japan, Ryukyu Island), subtropical zones (South

Received Jan. 8, 2008; accepted Feb. 27, 2008; http://www.phytoparasitica.org posting May 29, 2008.
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China, Myanmar, Thailand, Taiwan), and tropical zones (India [Assam, Punjab], Sri Lanka, Nepal, Cambodia, Vietnam, Hainan Island, Laos, Malaysia [Peninsular Malaysia, Sarawak], Singapore, Philippines, Indonesia [Java, Sumatra], Timor, New Guinea) (1,15) and on the Pacific Islands (Micronesia [Guam, Bonins Island, Marianas], Hawaii) (1,3,15). It was introduced into Australia (15), and is frequently shipped to North America and Europe within bamboo and bamboo products (2,19,28). This cerambycid is primarily a borer of dry bamboo belonging to several genera (15,28): *Bambusa*, *Dendrocalamus*, *Sinobambusa*, *Sinocalamus* and *Phyllostachys* (15,28). Among the reported hosts are other monocots: sugar cane (16) and maize (3), and several dicots: cultivated crops, such as apple, pear, *Citrus*, cotton and grape (1,12), and wild, as *Dipterocarpus*, *Liquidambar*, *Shorea*, *Spondias*, *Tectona* (3,11,12). *Chlorphorus annularis* is considered as a minor pest of stored bamboo and bamboo products (2,15,28), but it is not listed as a pest of quarantine significance by the USDA, possibly due to its lack of ability to damage living plants (20).

None of these species has been collected from Israel in natural habitats to date, and they are not known to be established in Israel, but they may pose a potential threat.

4. ***Phoracantha recurva* (Newman)** (Cerambycinae: Phoracanthini) is native to Australia (20,26). It has quickly expanded its range of distribution in the last 20 years. It is currently distributed in Oceania (Australia, New Zealand, Papua New Guinea) (26), southern Africa (Malawi, South Africa, Zambia) (9,23,26), South America (Argentina, Brazil, Chile, Uruguay) (26,29), North America (California, USA) (15, 20) and some Mediterranean countries (Morocco, Spain (13, 22, 26), Greece (26), Tunisia (4)), being a pest of many *Eucalyptus* species of economic importance in the aforementioned regions.

Three specimens have been collected in Israel in natural habitats since 2001: in Lower Galilee (lower part of Nahal Tavor, 25.III.2001, V. Chikatunov); Samaria (Qedumim, 13.IX.2006, L. Friedman); and Central Coastal Plain (Hadera, 20.VI.2006, O. Rittner). It is easy to transport unnoticed inside tree logs, thus making it hard to control. In addition, the adults can fly well for long distances. These factors point to *P. recurva* as a serious invasive species that can spread very swiftly.

The specimens from Hadera and Qedumim were collected near *Eucalyptus*. It is likely that *P. recurva* has already spread to other places and, according to the reports – in Los Angeles County alone, 30,000 eucalyptus trees were destroyed (24) – it can cause serious damage.

The invasion of *P. recurva* introduced the second representative of the tribe Phoracanthini into Israel. A closely related species, *Phoracantha semipunctata* (Fabricius), an important pest of *Eucalyptus*, was introduced into Israel during the Second World War (8,14). Although the two species are very similar in size and appearance, there are several obvious differences (15,27): *P. recurva* has long dense golden hairs on the underside of each antennal segment and the hind femur dorsally is densely covered with minute denticles, whereas *P. semipunctata* has bare antennal segments and no denticles on the hind femur. Differences in the shape and coloration of the elytra can be seen in Figs. 1e and 1f.

5. ***Xystrocera globosa* (Olivier)** (Cerambycinae: Xystrocerini) is a pest of a wide range of species of wild and cultivated leguminous trees (Mimosaceae, Papilonaceae), belonging to genera such as *Acacia* (8,15), *Acrocarpus*, *Adenanthera*, *Adina*, *Albizzia*, *Bauhinia*, *Cassia*, *Duabanga*, *Haematoxylon*, *Parkia*, *Xylia* (15), *Paraserianthes* (18), *Samanea* (6,15), and of several Malvaceae (*Grewia*, *Salmalia*) and Rosaceae (*Prunus*) (15). *X. globosa* originates from southeast Asia and is widely distributed in the Oriental Region (East Pakistan, India [including Andaman Islands], Indonesia [Java, Sumatra, Celebes], Sri Lanka, Myanmar, Thailand, Laos, Malaysia, Philippines, Seychelles), Oceania (Australia [Northern Territory], New Guinea) (1,15), Hawaiian Islands (1,6)), Madagascan Region (Madagascar, Rodriguez, Mauritius) (1), Caribbean (Puerto Rico) (1,6), and subtropical areas of the Palaearctic Region (Arabia, Egypt (1), Japan (1,18), Korea, Taiwan (1)).

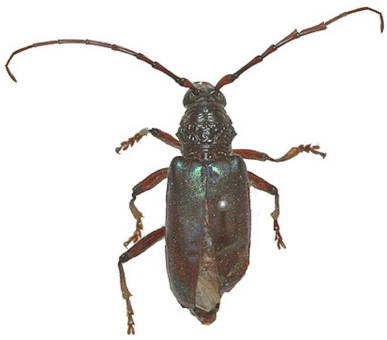

Fig. a

Fig. b

Fig. c

Fig. d

Fig. e

Fig. f

Fig. 1. a, *Neoplocaederus basalis* (Gahan); b, *Rhagium inquisitor* (Linnaeus); c, *Chlorophorus annularis* (Fabricius); d, *Xystrocera globosa* (Olivier); e, *Phoracantha recurva* (Newman); f, *Phoracantha semipunctata* (Fabricius).

Xystrocera globosa was first found in Israel in Nizzanim (15.III.2002) by V. Kravchenko and in Tel Aviv (22.VI.2006) by M. Mahagna. Today (2008) it has become abundant in the Southern Coastal Plain (Rishon leZiyyon, Gedera), developing in the timber of the ornamental Mimosaceae trees.

Phoracantha recurva and *X. globosa* were collected in Israel from natural habitats, which suggests that these species have established a local population. Further investigation is required in order fully to understand their distribution and harmful effects in Israel.

ACKNOWLEDGMENTS

We are grateful to our colleagues from the Department of Zoology, The George S. Wise Faculty of Life Sciences, Tel-Aviv University, Israel: Dr. Amnon Freidberg and Ms. Naomi Paz for editing and improving the manuscript, and Mr. Alex Shlagman for rearing *Rhagium inquisitor*.

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