

News about CLB and ALB in Italy

MATTEO MASPERO, COSTANZA JUCKER, MARIO COLOMBO, FRANCK HÉRARD,
MARIANGELA CIAMPITTI and BENIAMINO CAVAGNA

Abstract

Both longhorned beetles *Anoplophora chinensis* (Förster) (= *malasiaca*) and *Anoplophora glabripennis* (Motschulsky) (Coleoptera, Cerambycidae) have been accidentally introduced in Italy and are subject to eradication. Biological notes, life cycles, natural enemies and eradication attempts carried out by the Lombardy Plant Protection Service are reported.

Keywords: *Anoplophora chinensis*, *Anoplophora glabripennis*, Italy, Lombardy

Kurzfassung

Neues von CLB und ALB in Italien

Die beiden Bockkäfer *Anoplophora chinensis* (Förster) (= *malasiaca*) und *Anoplophora glabripennis* (Motschulsky) (Coleoptera, Cerambycidae) wurden versehentlich nach Italien eingeschleppt und werden nun mit geeigneten Maßnahmen vernichtet. Über Anmerkungen zur Biologie, Lebenszyklen, natürliche Feinde und Ausrottungsversuche des Pflanzenschutzdienstes der Lombardei wird berichtet.

Schlüsselworte: *Anoplophora chinensis*, *Anoplophora glabripennis*, Italien, Lombardei

Anoplophora chinensis

In 2000, *Anoplophora chinensis* was first detected in Lombardy in a nursery at Parabiago, 30 km west of Milan, during a survey made for a research project financed by Regione Lombardia on "New exotic pests in Lombardy". In 2000, the exact extent of the CLB infestation was not known yet but it was obviously larger than observed at the initial point of discovery at Parabiago. After several years of monitoring it appears that CLB is distributed within Milan (mainly in the western and north-western parts of the city) as well as in 30 municipalities northwest, west, and south of Milan. The distribution of the pest was determined during an intensive survey program covering the previously known infested sites and their surroundings within a radius of two kilometres around every infested tree. The monitoring was based on visual inspection of susceptible trees to find symptoms of CLB presence. Twelve workers, working in groups of two, were hired by the Plant Protection Service through Fondazione Minoprio to monitor the CLB-infested area and the associated buffer zones. From summer 2005 onwards, around 60 000 trees were checked in the public areas of more than 60 municipalities.

The main host plants of CLB in the Lombardy region belong to the genera *Acer* spp., *Platanus* spp., *Betula* spp., *Carpinus* spp., *Fagus* spp., *Corylus* spp., *Lagerstroemia* spp., *Malus* spp. and *Pyrus* spp. During the phase of eradication, which consisted of tree cutting and incineration, the periphery of the infested area was processed first.

The table shows the number of trees destroyed so far.

The eradication process consisted of:

1. cutting down the aerial portions of the infested trees;
2. storing them in fenced areas within the municipality territory;
3. chipping the whole plant material and burning it to feed a "thermo-valorisation system";
4. grinding the infested stumps and main roots using a specific machine.

Year	No. of plants destroyed
2001	25
2002	35
2003	15
2004	168
2005	215
2006	2240
2007 (till June)	400

Because of some continuous evolution of the infestations, the monitoring and eradication programs are reviewed each year by the Phytosanitary Service and adapted to fit better to the new situation of the pest.

Biological notes

In the Lombardy Region, it appears that the peak of emergence of CLB occurred in late June. Exit holes were mainly located on the roots that are visible on the ground, and at the base of trunks within 20 cm above ground level.

The oviposition scars were mainly located around the collar of trees. In Northern Italy, it is suspected that most CLB individuals need two years to complete their development cycle, while a small proportion of them only needs one year.

Larvae overwinter at various stages, depending on the date of egg-laying. Larvae resume intense feeding during spring. The individuals, which overwintered as full-grown larvae, pupate during spring and emerge as adults in late May-early June. At the end of the pupal stage, the adults stay inside the pupal chamber for a week, during which their exoskeleton hardens. The adult chew a perfectly circular exit hole to emerge from its host tree.

The newly emerged adults move upward on the trunk and start feeding on suckers and the tender bark of young

shoots, which may result in the death of these portions of the host plant. During and following their maturation feeding the adults mate repeatedly. Fertilized females move to the base of a tree, around the collar or on main roots, to search appropriate places to lay eggs. With its mandibles, the CLB female starts making a small incision, 3-4 mm long, through the bark, transversally to the axis of the trunk or of the root. When an appropriate place has been found, the female inserts its ovipositor in the prepared incision and injects an egg perpendicularly to the incision, within the bark (more or less at one half of its thickness). Under the pressure of the ovipositor inserted within the bark, the upper layer of bark cracks, so that the visible final symptom of an egg laid is a reverse T-shape crack of the bark. A single egg is deposited in each incision. At the intersection of the arms of the T-shape crack, one can see a tiny ovoid hole made during the insertion of the ovipositor. This hole is plugged with some brown secretion from the female's abdomen. The fluid hardens on contact with air, making a stopper that closes the entrance of the egg chamber. Incubation lasts 15-20 days depending on the temperature.

The first instar larva is around 6 mm in length. It chews the bark around the egg chamber and enlarges it. The second instar larva bores a gallery into the cambium layer and feeds on the latter. The third instar larva bores a gallery within the phloem and in the external layer of the xylem. Larvae develop through a variable number of instars which mainly depends on the duration of the overall larval development, in one or two years. CLB full-grown larvae are 50-60 mm in length.

Through the CLB exit holes and the larval galleries, diseases (mainly fungi) and other insects may produce secondary infections or infestations, thus increasing the stress to the host-plant.

In conjunction with the eradication programs, biological control studies were initiated in order to find, to identify, and to evaluate the parasitoids that could successfully control the pest. With the official agreements ("Letters of Authorization") from the French and the Italian Plant Protection Services, exposure of early stages of the host in sentinel plants placed on sites within or outside the area infested with CLB in Italy, was made. It showed that some natural enemies, pre-existing in the selected habitats, were attracted by the exotic pest and attacked it successfully. The egg parasitoid *Aprostocetus anoplophorae* Delvare (very likely originating from the Far East) was identified as a host specific species. The ectoparasitoids, *Spathius erythrocephalus* Wesmæl (Hym.: Braconidae), *Eurytoma melanoneura* Walker, *Eurytoma morio* Boheman (Hym.: Eurytomidae), *Calosota agrili* Nikol'skaya, *Eupelmus aloysii* Russo (Hym.: Eupelmidae), *Cleonymus brevis* Boucek (Hym.: Pteromalidae, Cleonyminae), *Trigonoderus princeps*

(Westwood) (Hym.: Pteromalidae, Pteromalinae), and *Sclerodermus* sp. (Hym.: Bethyridae) attacked early larvae of *A. chinensis* and developed successfully in this host. Life history traits and behaviour of some of the major parasitoids are currently studied at EBCL, USDA, ARS, Montpellier, France, to evaluate them as potential biological control agents.

Anoplophora glabripennis

The first detection of the Asian Longhorned Beetle, *Anoplophora glabripennis*, in Italy was made at Corbetta, in the yard of a private company, during a survey of the other exotic pest *A. chinensis*. One maple (*Acer pseudo-platanus* L.) and three birch trees (*Betula pendula* Roth) were found bearing many symptoms of ALB presence: oviposition pits, mandible marks, large quantities of frass at the base of the trees and in forks and hollow bark, exposed larval galleries along the stem, many exit holes and adult feeding on petioles and twigs. Wasps and flies attracted by the sap oozing from oviposition pits were also observed. These symptoms were observed from 1.5 m above ground up to the top of the crowns. In contrast, the *A. chinensis* symptoms are located at the base of the trunks and on superficial roots. During summer 2007, more than a dozen of beetles emerging from the infested host plants at Corbetta were captured, and their identity as *A. glabripennis* was confirmed.

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- Matteo Maspero, Fondazione Minoprio, V.le Raimondi 54, I-22070 Vertemate con Minoprio, Como, Italy, email: m.maspero@fondazioneminoprio.it
- Costanza Jucker and Mario Colombo, Istituto di Entomologia agraria, Università degli Studi di Milano, Via Celoria 2, I-20133 Milan, Italy, email: costanza.jucker@unimi.it, mario.colombo@unimi.it
- Franck Hérard, European Biological Control Laboratory (EBCL), USDA-ARS, Campus International de Baillarguet, CS90013 Montferrier-sur Lez, F-34988 Saint Gély du Fesc Cedex, France, email: fherard@ars-ebcl.org
- Mariangela Ciampitti, Servizio Fitosanitario Regione Lombardia, Via Pola 12/14, I-20124 Milano, Italy, email: mariangela_ciampitti@regione.lombardia.it
- Beniamino Lavagna, Servizio Fitosanitario Regione Lombardia, V.le Raimondi 54, I-22070 Vertemate con Minoprio, Como, Italy, email: beniamino_cavagna@regione.lombardia.it