This project is funded by the European Union

TWINNING PROJECT

"Further strengthening of capacities of phytosanitary sector in the fields of plant protection products, plant health and seeds and seedlings, including phytosanitary laboratories and phytosanitary inspections" "EU-FITO-BiH"

Matteo Maspero
Alessandro Bianchi
Eligio Malusà

Anoplophora chinensis and *A. glabripennis*



INTRODUCTION

The transport of **alien arthropods** associated with rapidly expanding global trade has led to an ever increasing list of quarantine pests establishing beyond their native range.

In recent years, ***Anoplophora chinensis,*** the Citrus longhorned beetle (**CLB**) and ***Anoplophora glabripennis,*** the Asian longhorned beetle (**ALB**), were unintentionally introduced in Europe.

In the **EU Plant Health Council Directive 2000/29/EC** the policy did not emphasize the quarantine status of these organisms.

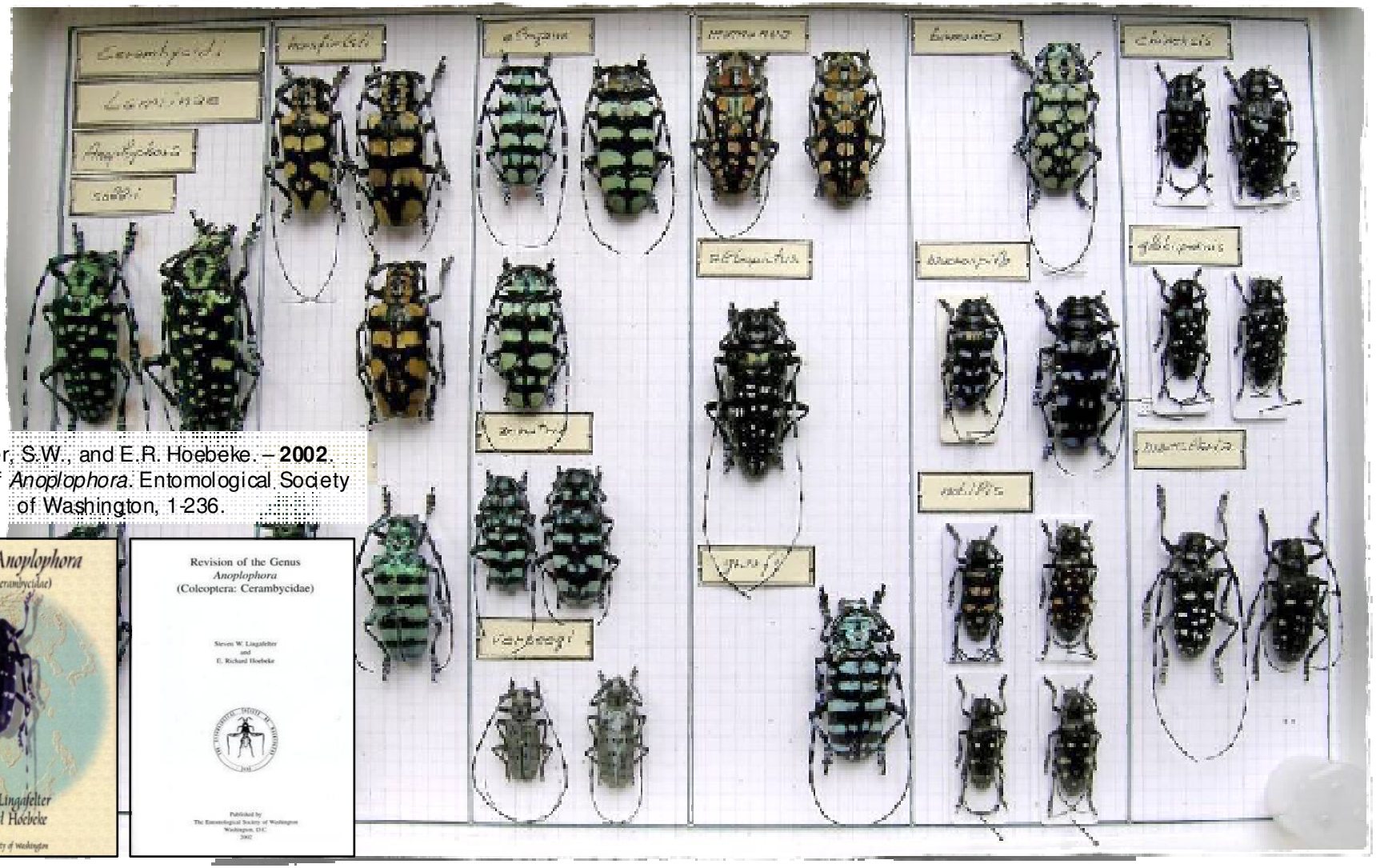
The council directive was later modified, and **CLB and ALB have been added in the specific Annex I, Part A, Section 1** of Council Directive 2000/29/EC.

According to Article 3 (1) and (4) of Council Directive 2000/29/EC **their introduction and spread within all Member States is banned**.

EU member states must notify the European Commission about the presence of the pests in their territories when an outbreak is detected, and they have to take all the necessary measures to eradicate the populations and/or inhibit their spread to other plants in the surrounding environments.

TAXONOMY OF *ANOPLOPHORA* SPP.

CLB and **ALB** are members of the recently revised genus *Anoplophora* Hope (Coleoptera, Cerambycidae, Lamiinae, Lamiini) that now consists of 36 species of wood boring beetles that occur throughout Asia.



Lingafelter, S.W., and E.R. Hoebeke. – **2002**. Revision of *Anoplophora*. Entomological Society of Washington, 1-236.

The biology, habits, and host plants are known only for one- third. The majority of the published scientific works concern the economically important species:

Anoplophora chinensis **(forma *malasiaca*)**

Anoplophora chinensis

Anoplophora glabripennis

Anoplophora glabripennis **(forma *nobilis*)**

Anoplophora macularia

Pseudonemophas versteegii

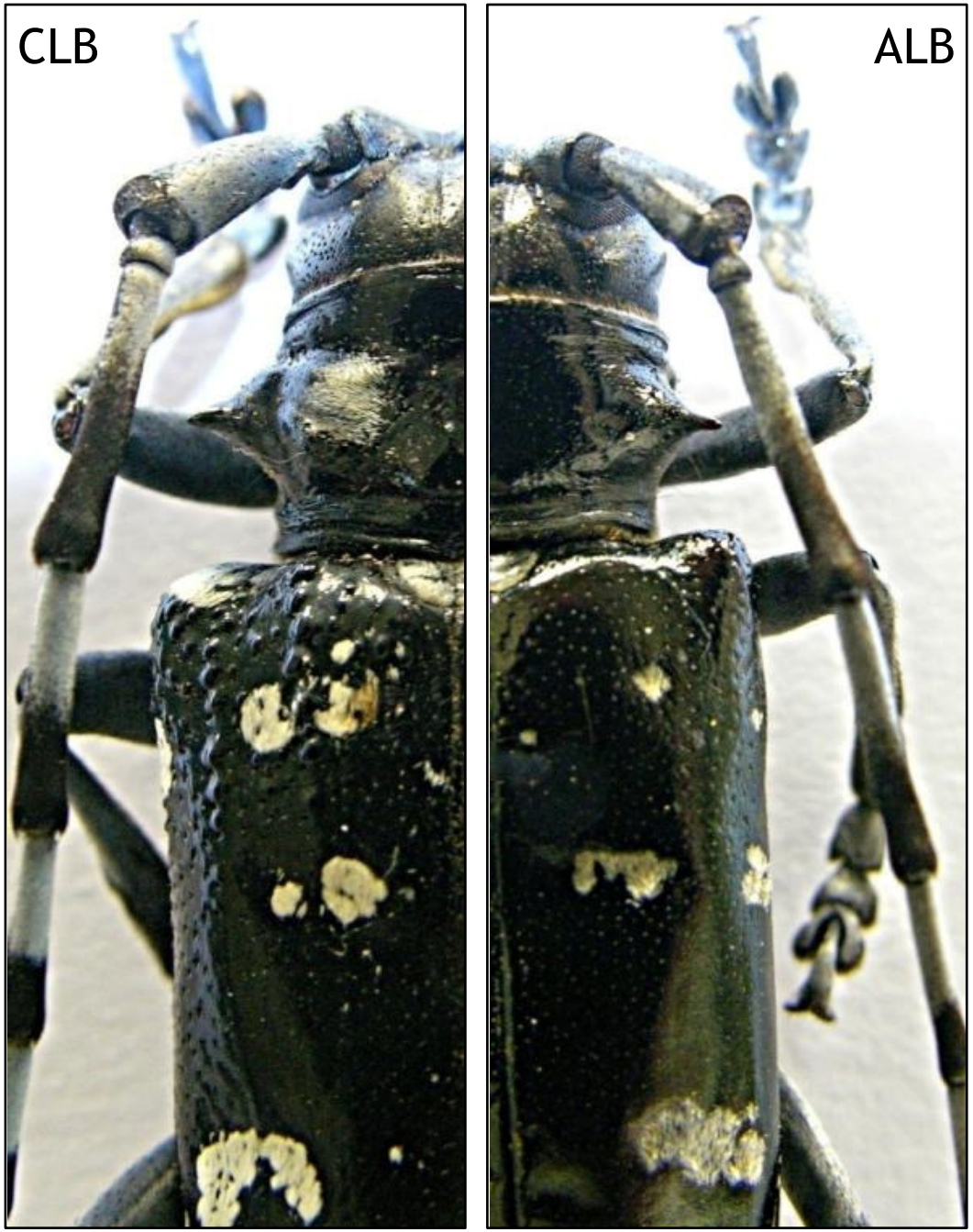
✦ Beetles of CLB and ALB are quite similar and both have white patches, irregular-shaped, on the elytra.

✦ Body size ranges between 11 and 40 mm.

✦ The major distinction between the two species is the presence of numerous granulae at basal one-fourth of elytra in CLB while they are absent in ALB.

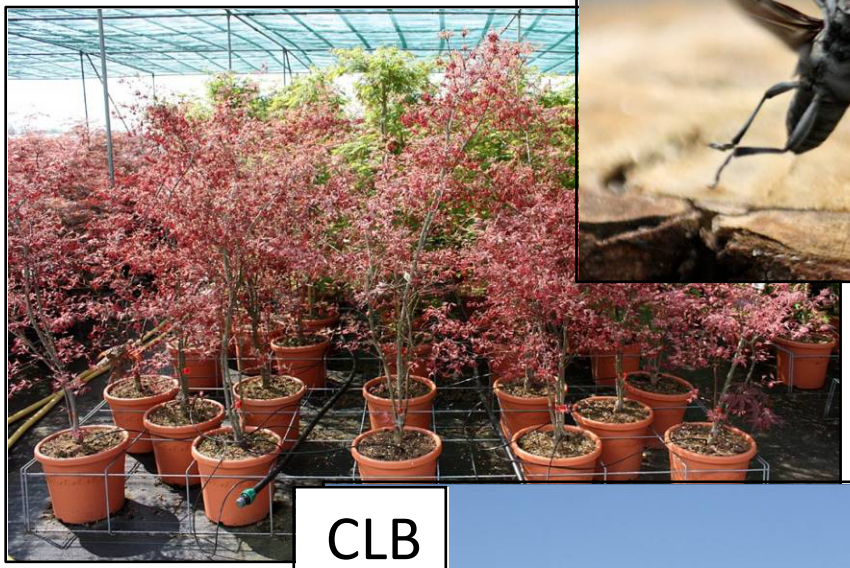
CLB is native to China, Korea and Japan (where it is present under the *malasiaca* form) with occasional records from Indonesia, Malaysia, Philippines, Taiwan and Vietnam.

ALB’s native range includes China and Korea.



CLB is introduced within living trees (bonsais and maple rootstock)
ALB is introduced in wood packaging material

Both species spread through active fly

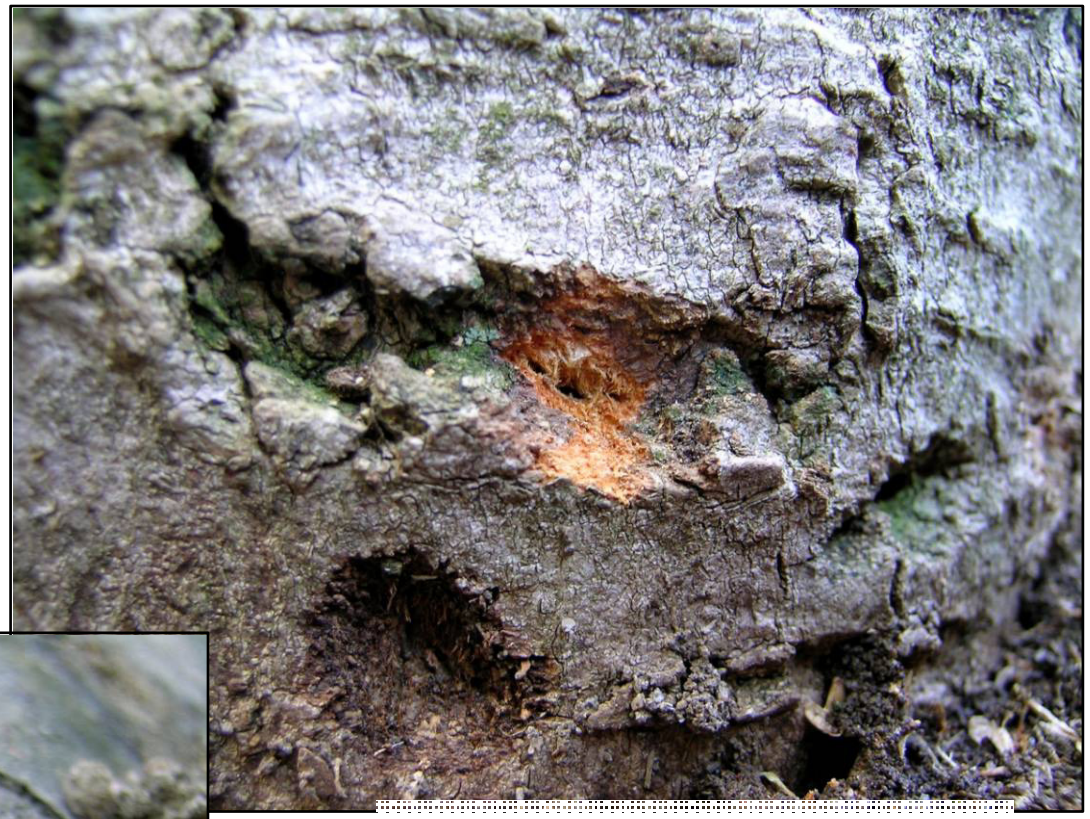


CLB

ALB

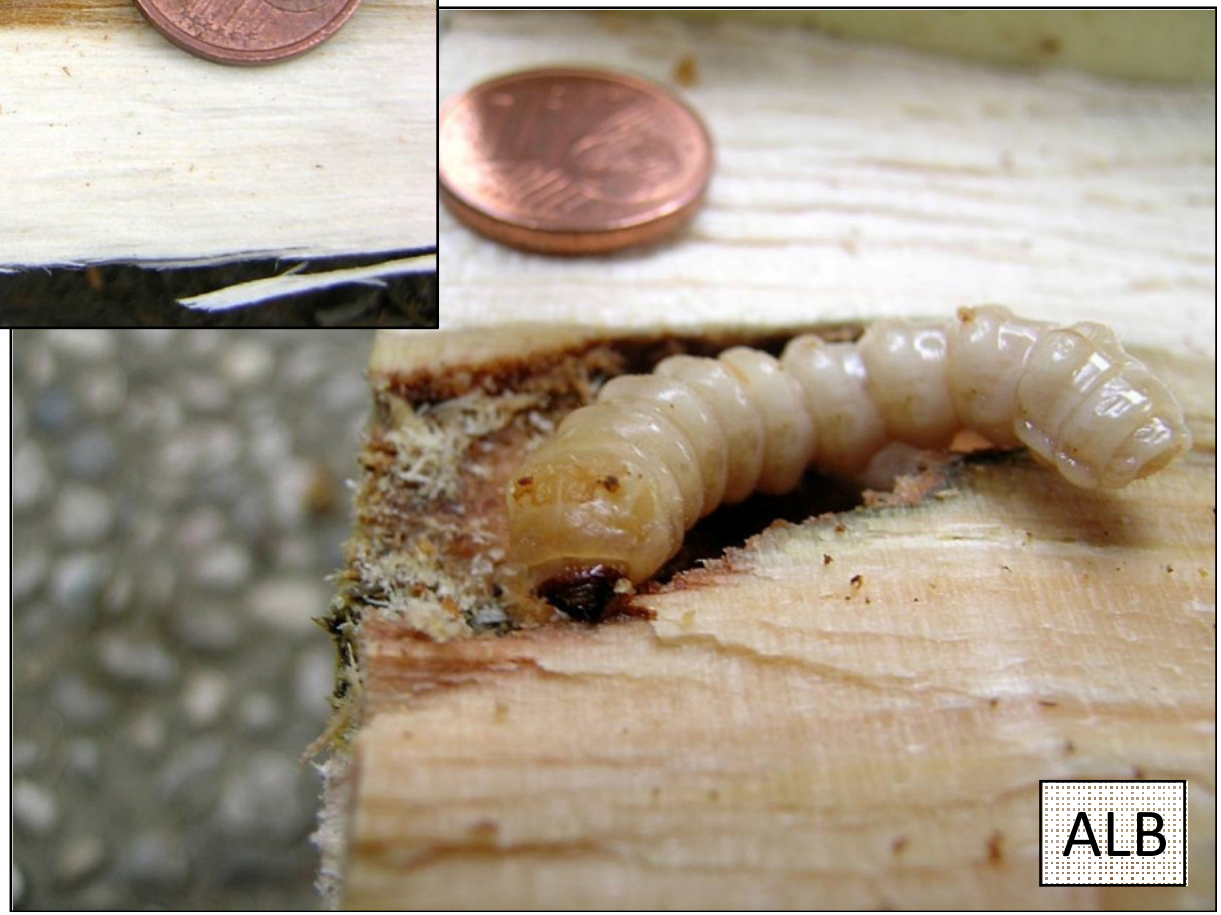

Eggs in both species are
oblong, white, 5-7 mm long

CLB oviposition signs are slits in the bark where female injects a single egg. When the ovipositor is inserted through the bark tissues, the upper layer of bark often splits resulting in a T-shaped oviposition scar.



ALB oviposition pits are funnel shaped, chewed through the bark . The beetle injects a single egg beneath bark.

Larvae are legless, cream-colored, 30-50 mm long when full grown. In both species, pronotum is pigmented with characteristic shield that differs in shape and size.




Pupa, whitish,
27-38 mm long

CLB lays eggs along the lower trunk, root collar region and on exposed roots.

ALB lays eggs on the upper part of the trunk and main branches.

- In both species the egg laying period takes place in summer. Incubation lasts 10-15 days. Larvae initially bore a feeding gallery in the cambium region then an oval-shaped tunnel in the sapwood and heartwood.

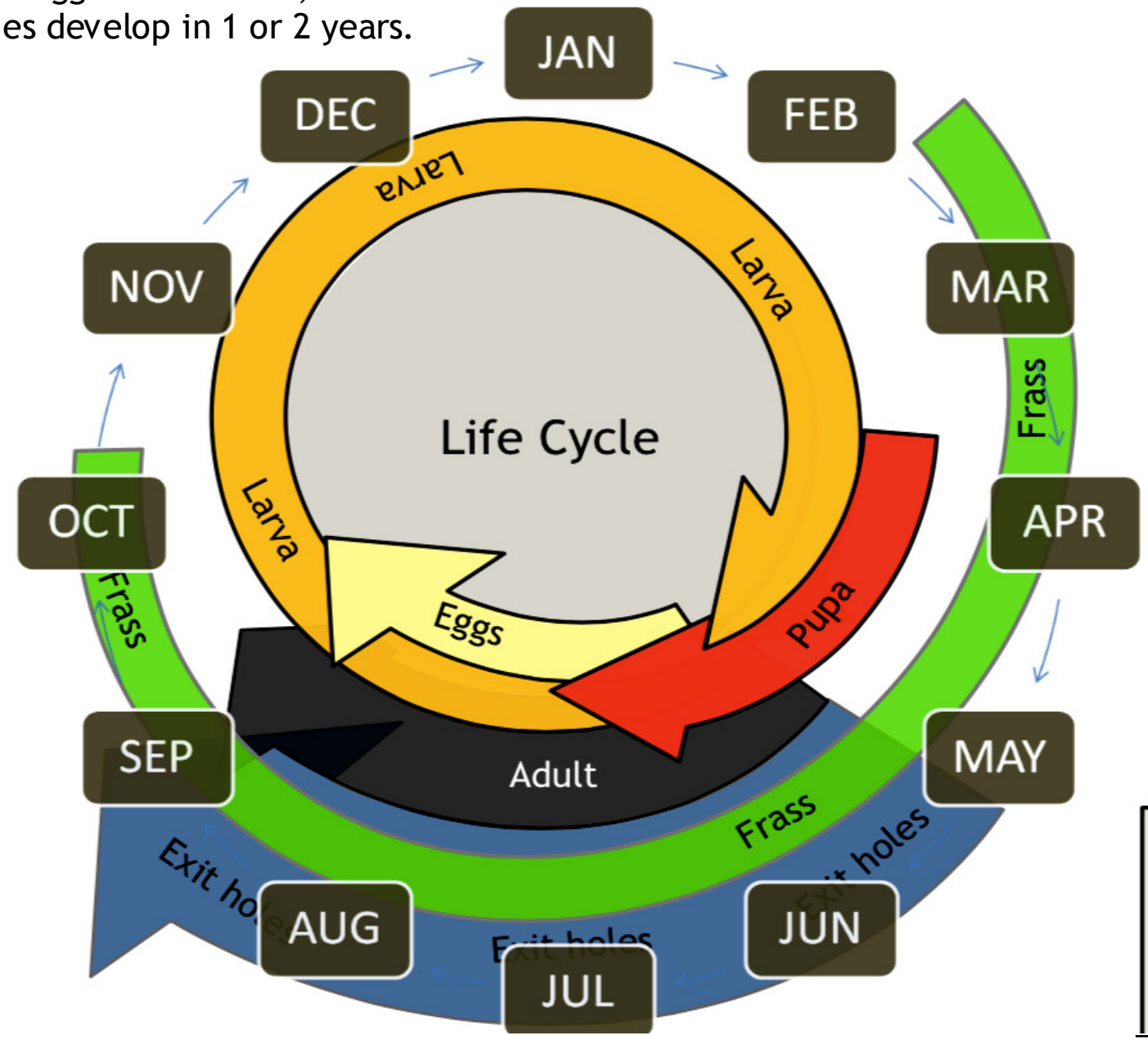
Pupation usually occurs in late spring – early summer into the pupal chamber.

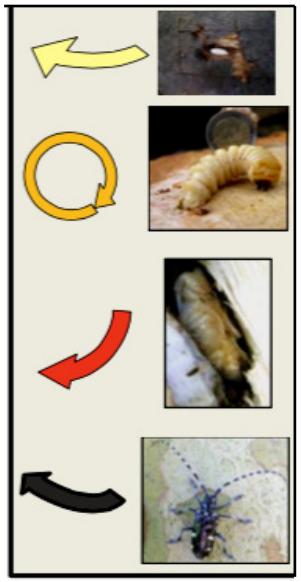
- Adults emerge through circular exit holes, ~ 10-15 mm in diameter.
- Plant tissues proliferation may occur and closes up exit holes

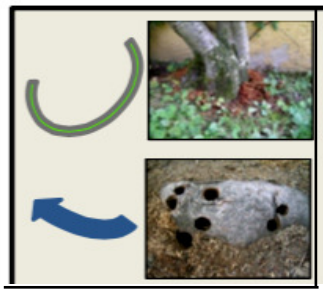
- Adults feed on twigs and petioles.
- Larvae bore galleries in sapwood and heartwood.


Repeated attacks of the same trees during consecutive years usually cause death.

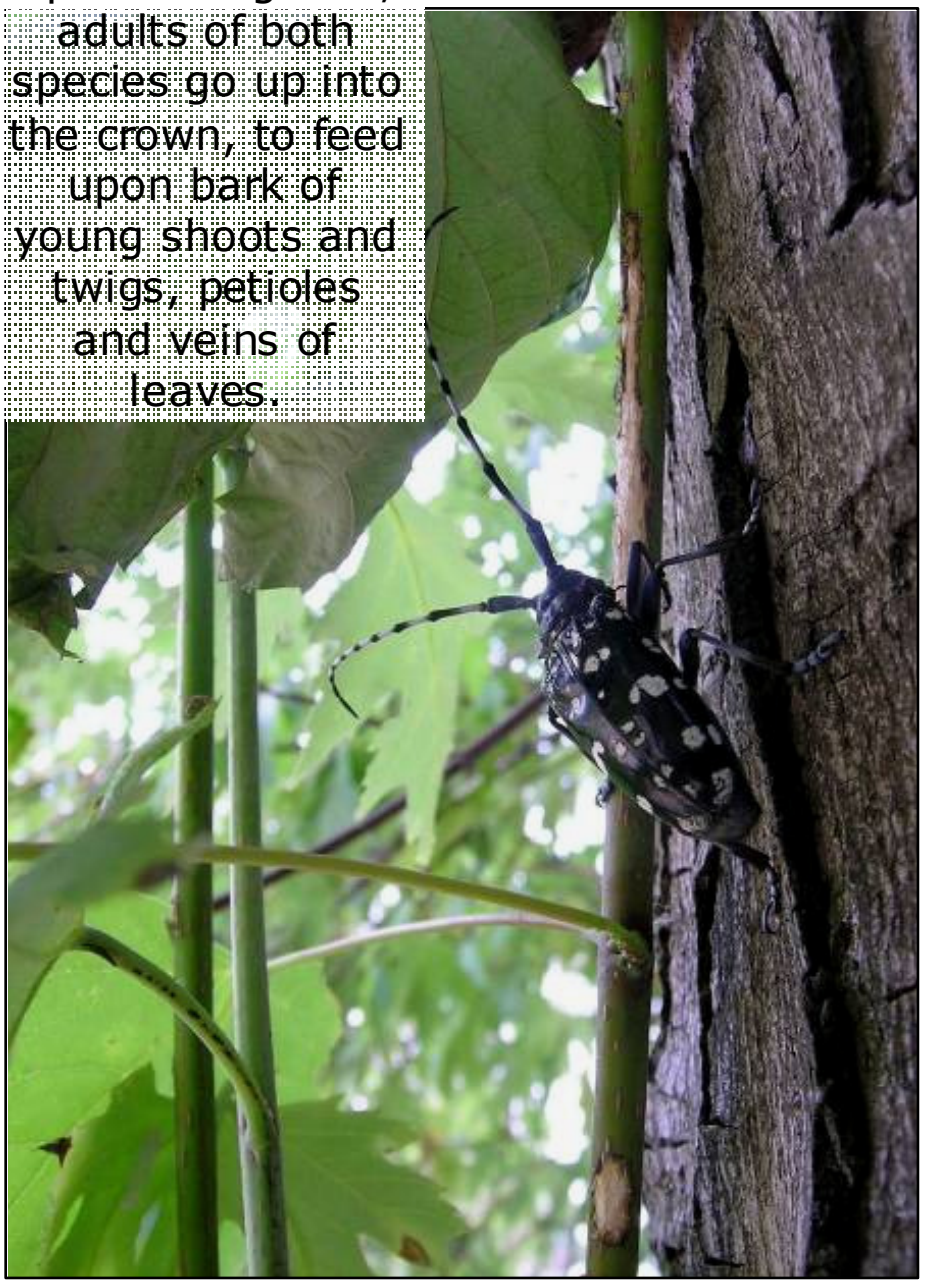
From egg to adulthood, both species develop in 1 or 2 years.







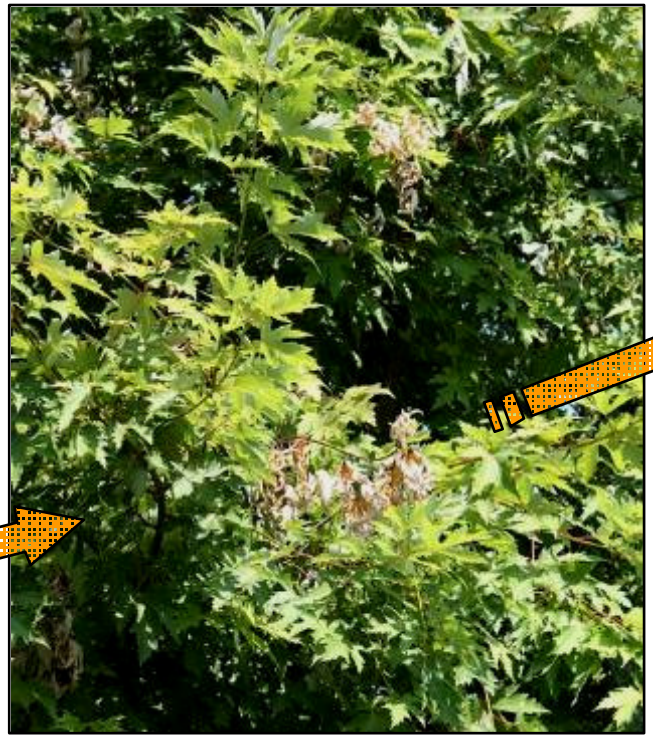
Upon emergence, adults of both species go up into the crown, to feed upon bark of young shoots and twigs, petioles and veins of leaves.



Maturation feeding takes 10-15 days. Mate-finding is governed by contact and short-range pheromones.

… emerging from the tree through a perfect, round shape, exit hole…

The emerging takes hours; even one or two days and usually it occur during the early morning or in late evening… when % humidity is higher…



Following the adult's feeding, on the crown is it possible to see dead twigs…

Some trees dead after CLB's infestation…

… if you cut the tree… fungi and other disease will be present. Exit holes are pathway for all these secondary infections…

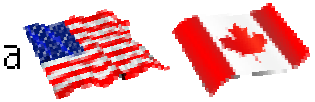
There have been several outbreaks of these two species in Europe and North America:

A. chinensis
A. chinensis (form ***malasiaca***)

- Croatia
- France
- Italy
- The Netherlands

A. glabripennis

- USA and Canada



- Austria
- France
- Germany
- Swiss
- Italy
- The Netherlans
- UK

Controlled through physical methods

- restrictions on the movement of trees and wood
- potentially-infected trees being cut down and chipped or burnt
- injecting imidacloprid into the tree trunks or into the soil at the base of trunks has been shown to be an effective method of preventing infestation by *Anoplophora* in the USA, but is not effective at targeting older larvae or pupae in the sapwood so is unsuitable for use in treating infested trees.

The identification of biological control methods that could target beetles at these stages would therefore be a useful tool in controlling outbreaks of both species.

- **biological control agents** which are self-replicating after release, such as parasitic insects

- **biopesticides** that are applied in a similar manner to conventional insecticides.

GOOD FOR CONTROL NOT FOR THE ERADICATION

Mini-review

Received: 15 August 2013 Revised: 6 September 2014 Accepted article published: 12 September 2014 Published online in Wiley Online Library:

(wileyonlinelibrary.com) DOI 10.1002/ps.3907

Prospects for the use of biological control agents against *Anoplophora* in Europe

Thomas Brabbs,[a] Debbie Collins,[a] Franck Hérard,[b] Matteo Maspero[c] and Dominic Eyre[a*]

Abstract

This review summarises the literature on the biological control of *Anoplophora* spp. (Coleoptera: Cerambycidae) and discusses its potential for use in Europe. Entomopathogenic fungi: *Beauveria brongniartii* Petch (Hypocreales: Cordycipitaceae) has already been developed into a commercial product in Japan, and fungal infection results in high mortality rates. Parasitic nematodes: *Steinernema feltiae* Filipjev (Rhabditida: Steinernematidae) and *Steinernema carpocapsae* Weiser have potential for use as biopesticides as an alternative to chemical treatments. Parasitoids: a parasitoid of *Anoplophora chinensis* Forster, *Aprostocetus anoplophorae* Delvare (Hymenoptera: Eulophidae), was discovered in Italy in 2002 and has been shown to be capable of parasitising up to 72% of *A. chinensis* eggs; some native European parasitoid species (e.g. *Spathius erythrocephalus*) also have potential to be used as biological control agents. Predators: two woodpecker (Piciformis: Picidae) species that are native to Europe, *Dendrocopos major* Beicki and *Picus canus* Gmelin, have been shown to be effective at controlling *Anoplophora glabripennis* Motschulsky in Chinese forests. The removal and destruction of infested and potentially infested trees is the main eradication strategy for *Anoplophora* spp. in Europe, but biological control agents could be used in the future to complement other management strategies, especially in locations where eradication is no longer possible.

Keywords: non-native; *Steinernema*; *Aprostocetus*; *Spathius*; entomopathogenic fungi; *Trigonoderus*

1 INTRODUCTION

Anoplophora chinensis Forster (Coleoptera: Cerambycidae), citrus longhorn beetle (CLB), and *Anoplophora glabripennis* Motschulsky (Coleoptera: Cerambycidae), Asian longhorn beetle (ALB), are pests of trees and shrubs that are native to China and Korea, and in the case of *A. chinensis* also in Japan and some south-east Asian countries.[1] There have been several outbreaks of these two species in Europe, with breeding populations of *A. chinensis* found in Croatia, France, Italy and the Netherlands[2–6] and breeding populations of *A. glabripennis* found in Austria, France, Germany, Switzerland, Italy, the Netherlands and the United Kingdom, some of which have been eradicated.[3,7–17] In these countries the pests were or wood, they have natural protection from most non-specialist control agents. Current research on biological control has focused on five areas: entomopathogenic fungi, parasitic nematodes, entomopathogenic bacteria, parasites and parasitoids and predators. In the following sections we will review the literature concerning each of these groups of biological control agents, after which we will discuss the prospects for their use in Europe.

2 ENTOMOPATHOGENIC FUNGI

Certain fungal species can infect insects, and a number of studies have sought to identify such species for *Anoplophora*. Five species

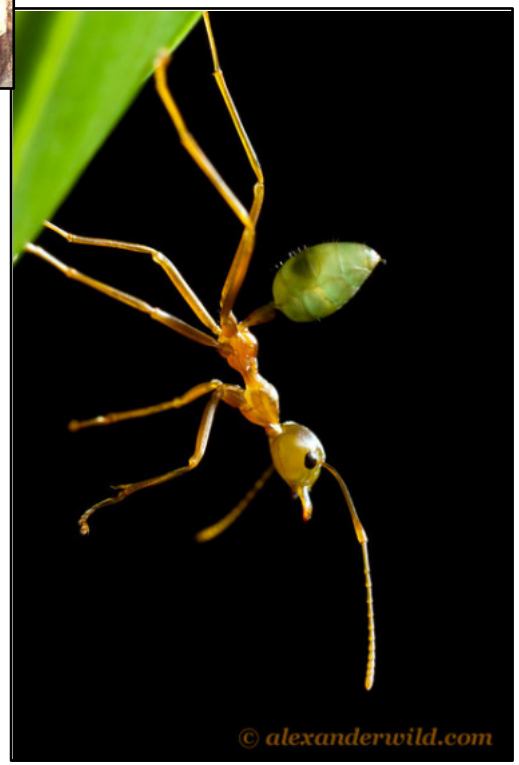
PREDATORS

Dendrocopos major Beicki (Piciformis: Picidae)
Picus canus Gmelin (Piciformis: Picidae)

In China studies to assess the rate of predation of *A. glabripennis* by woodpeckers, the reduction in the beetle's population varied between 31 and 79%,

Oecophylla smaragdina Fabricius (Hymenoptera: Formicidae)

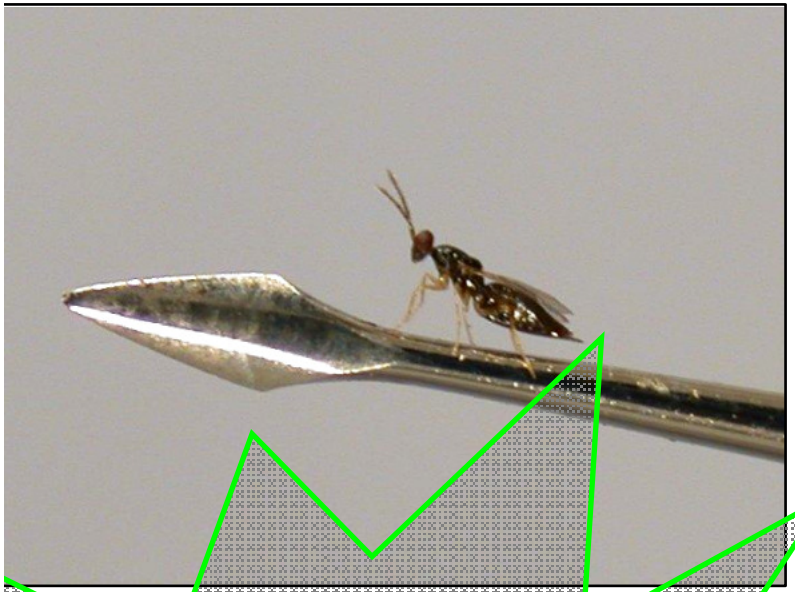
It has been shown that, in areas where it was present, insecticides were not required to control A. chinensis in orchards.




As the number of removed infested trees continues year after year to be high, research on biology of the pest and its **NATURAL ENEMIES**, together with **EARLY DETECTION TECHNIQUES**,are fully justified

PARASITOIDS

Aprostocetus anoplophorae Delvare



IN LOMBARDY

... In February 2002...

An egg parasitoid, new for science, was discovered

Ann. Soc. entomol. Fr. (n.s.), 2004, 40 (3-4) : 227-233. ARTICLE

Description of *Aprostocetus anoplophorae* n. sp. (Hymenoptera: Eulophidae), a new egg parasitoid of the invasive pest *Anoplophora chinensis* (Förster) (Coleoptera : Cerambycidae)

Gérard DELVARE (1), Marie-Claude BON (2), Franck HÉRARD (2), Christian COCQUEMPOT (3), Matteo MASPERO (4) & Mario COLOMBO (5)

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(2) European Biological Control Laboratory (EBCL), USDA-ARS, Campus international de Baillarguet, CS90013 Montferrier-sur-Lez, 34988 Saint-Gély-du-Fesc Cedex, France
(3) Institut National de la Recherche Agronomique (INRA), USC d'Écologie animale et de Zoologie agricole, 2 place Pierre Viala, 34060 Montpellier Cedex 01, France
(4) Fondazione Minoprio, Progetto BioLomb, Viale Raimondi 54, 22070 Vertemate con Minoprio, Como, Italy
(5) Istituto di Entomologia Agraria, Università degli Studi di Milano, Italy

Abstract – *Aprostocetus anoplophorae* n. sp. (Hymenoptera: Eulophidae) is supposed to play a role as an egg parasitoid of the invasive pest, the Citrus Longhorned Beetle, *Anoplophora chinensis* (Förster). The studies of its morphology, and rDNA sequence data, strongly indicate that this taxon differs greatly from all described *Aprostocetus* species, and is new to science. This species is described and illustrated. Both its systematic placement and origin are discussed.

Résumé – Description de *Aprostocetus anoplophorae* n. sp. (Hymenoptera, Eulophidae), un nouveau parasite de l'espèce invasive *Anoplophora chinensis* (Förster) (Coleoptera, Cerambycidae). – *Aprostocetus anoplophorae* n. sp. (Hymenoptera : Eulophidae) est supposée jouer un rôle comme parasite des œufs de l'espèce de Cerambycidae invasive *Anoplophora chinensis* (Förster). L'étude morphologique et les séquences ADNr indiquent fortement que ce taxon est très different des autres espèces décrites d'*Aprostocetus* et est nouvelle pour la science. Elle est décrite et illustrée. Sa position systématique et son origine sont discutées.

Two longhorned beetles *Anoplophora glabripennis* (Motschulsky), and *Anoplophora chinensis* (Förster)

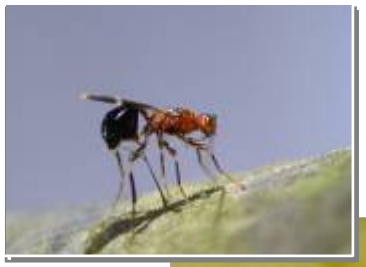
ery where bonsais imported from Eastern Asia were grown. In 2003, *A. chinensis* was detected at Soyons,

Biological control studies *Anoplophora chinensis* early stage parasitoids in Italy

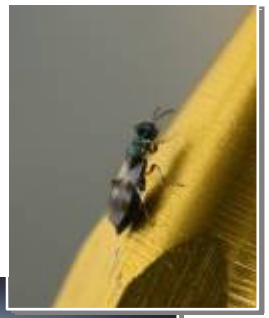
Egg host

Larval host

Aprostocetus anoplophorae
(Hym.: Eulophidae).
New Sp.

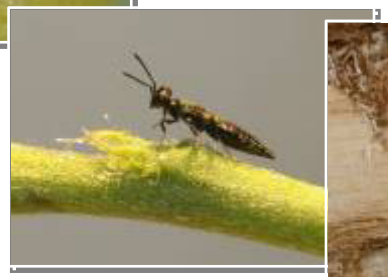


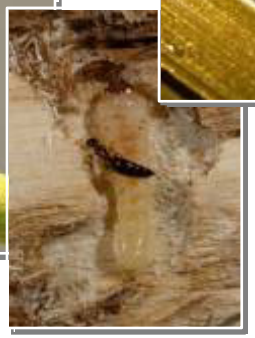
Spathius erythrocephalus
(Hym.: Braconidae)



Eurytoma melanoneura
(Hym.: Eurytomidae)

Trigonoderus princeps
(Hym.: Pteromalidae)





Calosota agrili
(Hym.:Eupelmidae)
.

***Sclerodermus* sp.** (Hym.: Bethylidae)

Photos: F. Hérard
(*fherard@ars-ebcl.org*)

Semiochemical-Baited Traps

ChemTica, Costa Rica

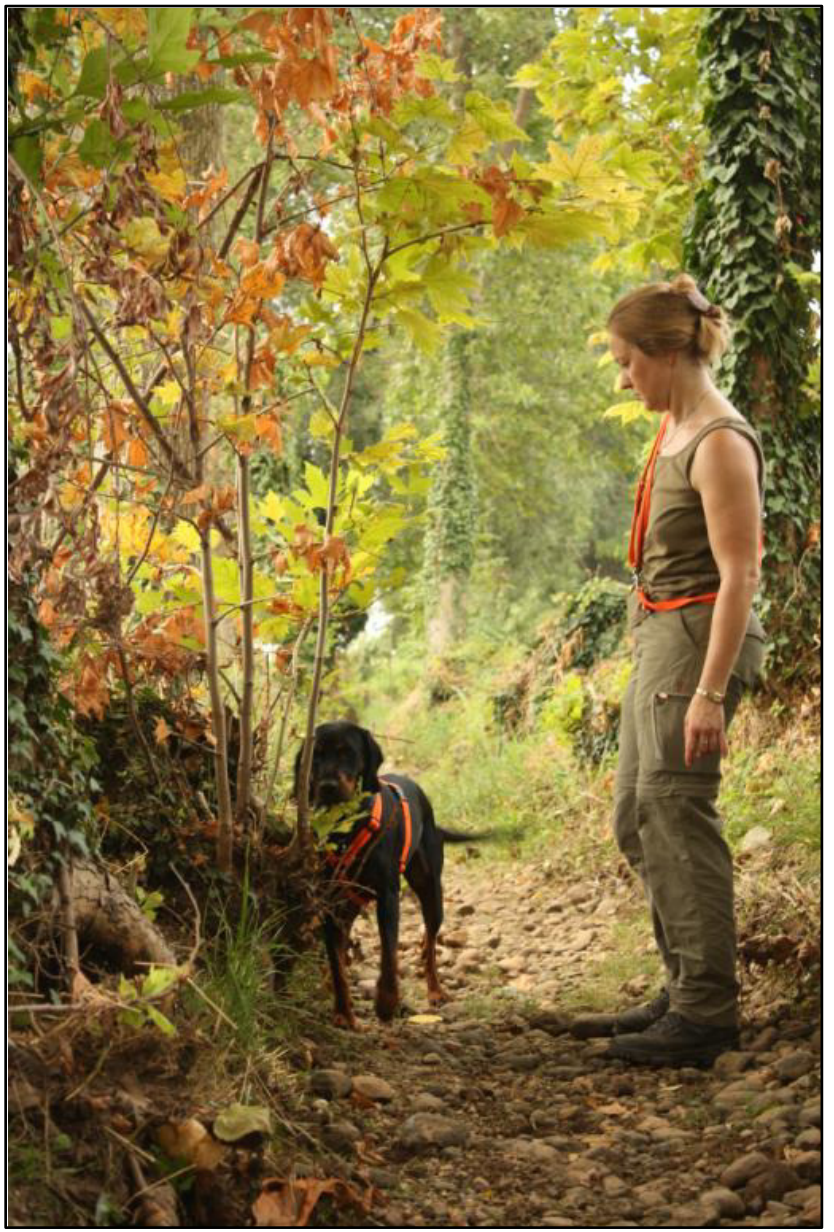
Lures: various mixtures of the **plant volatiles** with the **ALB male-produced pheromone**.

Lures were primarily produced to capture ALB but their efficacy was, for the first time, tested on CLB too.

***Federal Research & Training Centre for Forests, Natural Hazards & Landscape* Seckendorff - Wien (*Vienna*)**

Department of Forest Protection, Federal Research and Training Centre for Forests, Natural Hazards and Landscape, Vienna, Austria

In the picture: Andor and Ute Hoyer-Tomiczek



RegioneLombardia

ERADICATION PROGRAM 2008 - 2010

TOTAL INVESTMENTS 12 MILLION €

ERADICATION PROGRAM 2011- 2013

TOTAL INVESTMENTS 6 MILLION €

ERADICATION PROGRAM 2014 - 2015

TOTAL INVESTMENTS 3 MILLION €

GENERAL SURVEILLANCE
SPECIFIC SURVEY
CHEMICALS
TREE FELLING
TREE REPLACEMENT
REIMBURSEMENT TO NURSERIES
PUBLIC AWARENESS
RESEARCH


Survey


Public awareness
TARLO ASIATICO, UN PERICOLO PER IL NOSTRO AMBIENTE
TARLO ASIATICO, UN PERICOLO PER IL NOSTRO AMBIENTE
TARLO ASIATICO, UN PERICOLO PER IL NOSTRO AMBIENTE
DUOMO
© Matteo Maspero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Tario Asiatico
AL VIA CONTROLLI
IN PARCHI PUBBLICI
E GIARDINI PRIVATI
infarma identità

INFORMATION TO MUNICIPALITIES AND RESIDENTS

ERSAF

RegioneLombardia

Prot. n.

Milano,

RegioneLombardia
AGRICOLTURA
Partenza 21/07/2009 11:46
Giunta

M1.2009.0014237 21/07/2009 11:46

Al Sindaco del Comune
di Montichari (Bs)
Dott.ssa Elena Zanola

Oggetto: "Tarlo asiatico" – campagna di monitoraggio anno 2009.

Come a Sua conoscenza, in diversi Comuni situati nelle provincie di Milano, Varese e Brescia, è stata rilevata la presenza del coleottero di origine asiatica *Anoplophora chinensis*.
Il territorio del Suo Comune risulta interessato dalla presenza del "tarlo asiatico" e ricade nella zona infestata così come definita dal D.d.s. 12 marzo 2009 n. 2408 e dal D.d.s. 23 aprile 2009 n. 3983.

Regione Lombardia, con deliberazione n. VIII/7422 del 13.06.2008, ha attivato un piano straordinario finalizzato all'eradicazione del "tarlo asiatico" che prevede, mediante il supporto operativo di E.R.S.A.F., l'attivazione di azioni di monitoraggio di tutte le piante sensibili al fine di conoscere la reale diffusione dell'insetto all'interno del proprio territorio.

Con la presente si comunica che, a partire dal mese di luglio e fino al prossimo mese di novembre, E.R.S.A.F. effettuerà, attraverso proprio personale appositamente incaricato, il monitoraggio di tutte le piante sensibili appartenenti sia al patrimonio del verde pubblico sia del verde privato della Sua Amministrazione ai sensi degli artt. 2, 5 e 7 del Decreto del dirigente di struttura n. 2408 del 12 marzo 2009.

Per conseguire l'obiettivo è necessario il supporto della Polizia Locale e l'individuazione di un referente tecnico dell'Ufficio comunale competente con il quale condividere tempi e modalità di lavoro.

Il personale tecnico incaricato e il Servizio Fitosanitario Regionale in capo ad E.R.S.A.F. è a disposizione per ogni approfondimento e per illustrare i danni e le problematiche causate dall'insetto. E' disponibile inoltre materiale divulgativo di supporto che verrà messo a disposizione. In attesa di una cortese e urgente risposta e sicuro di una fattiva collaborazione porgo i più cordiali saluti

Presidente ERSAF
Roberto Albetti

Assessore all'Agricoltura
Luca Daniel Ferrazzi

Per informazioni: 02 67404860
[illegible]

Allegati: D.d.s. 12 marzo 2009 n. 2408, D.d.s. 23 aprile 2009 n. 3983, pieghevole "Tarlo asiatico"

E.R.S.A.F. – Ente Regionale per i Servizi all'Agricoltura e alle Foreste
Via Copernico, 14 – 20125 Milano – tel. 02[illegible] – fax 02[illegible]
www.ersaf.lombardia.it – C.F. e P.IVA 07[illegible]


Tree felling
In Lombardy
since 2001
more than 30.000
trees removed

Chipping of aerial part of the infested trees


Grinding of the infested stumps
SC352

GENERAL AGRICULTURAL DIRECTION (DGA)

1. INSTITUTIONAL ROLE VS EU/MINISTRY/REGIONS
2. PHYTHOSANIARY ACTIVITY PLANNIG
3. CONTROL STRATEGIES: COORDINATION
4. CONTROL MEASURES: ISSUE AND RESPONSABILITY

ERSAF - REGIONAL AGENCY FOR AGRICULTURAL AND FORESTRY SERVICES

1. CONTROL MEASURES EXECUTION
2. NURSERIES SURVEY
3. MONITORING OF TERRITORY
4. IMPORT-EXPORT CONTROLS

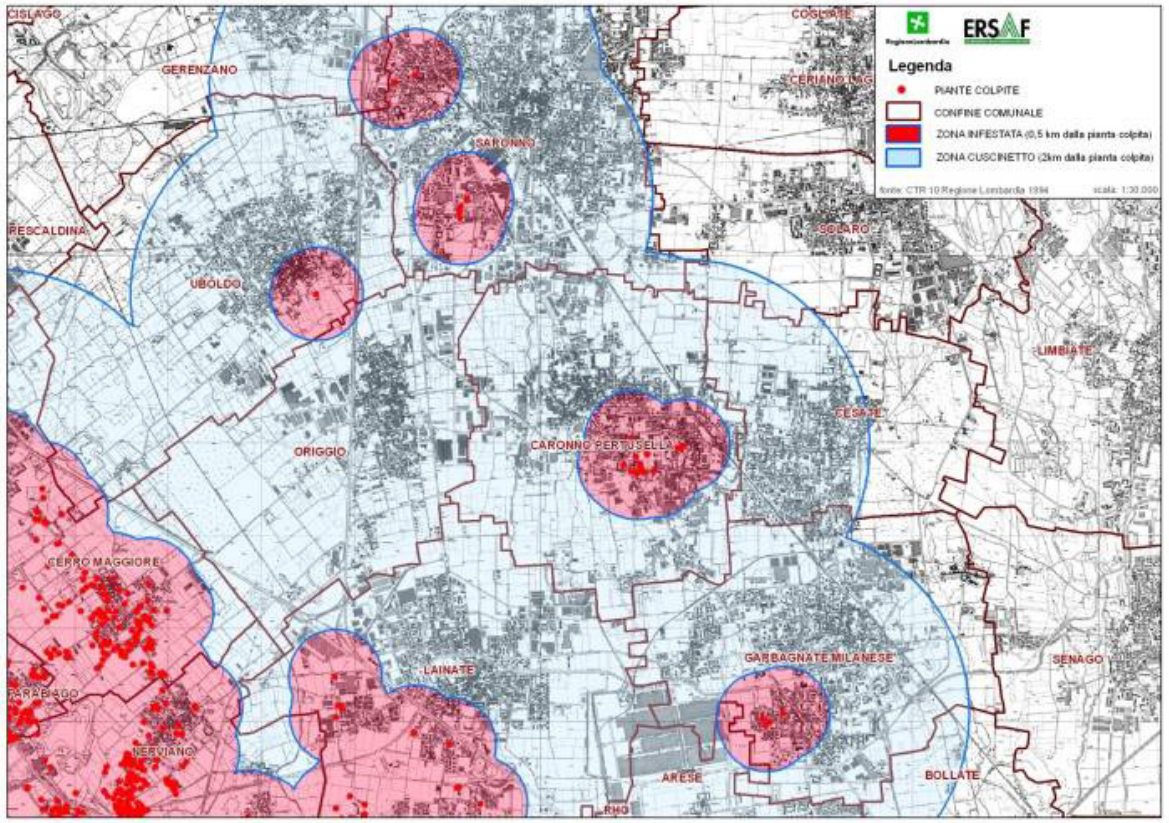
FONDAZIONE MINOPRIO

1. RESEARCH
2. PPS LABORATORIES

SPECIFIC SURVEY
DEMARCATED AREA

- AN **INFESTED ZONE** WHICH IS THE AREA WHERE THE PRESENCE OF ***ANOPLOPHORA CHINENSIS*** (FORSTER) HAS BEEN CONFIRMED, AND WHICH INCLUDES ALL TREES SHOWING SYMPTOMS

- A **BUFFER ZONE** WITH A **RADIUS OF AT LEAST 2 (1) KM BEYOND THE PERIMETER OF THE INFESTED ZONE**



MAP OF A WORKING AREA (2009)

STAFF TRAINING

- TEAMS OF TWO PEOPLE (20 UNITS/ 3.000 DAYS)

- TECHNICAL STAFF MUST HAVE UNIVERSITY DEGREES AND EXPERIENCE IN RELATED FIELD

HOW:

1 DAY OF CLASSROOM TRAINING

1 WEEK OF FIELD TRAINING IN OUTBREAK AREAS

- ENGAGED FOR 10 MONTHS

- A PHYTOSANITARY INSPECTOR HAVE TO ASSIST THEM IN EACH MACRO-AREA OF WORK

GPS INSTRUMENTS

SYMPTOMS

FRASS

EXIT HOLES

ADULTS

INSPECTION

MARKING

MARKING

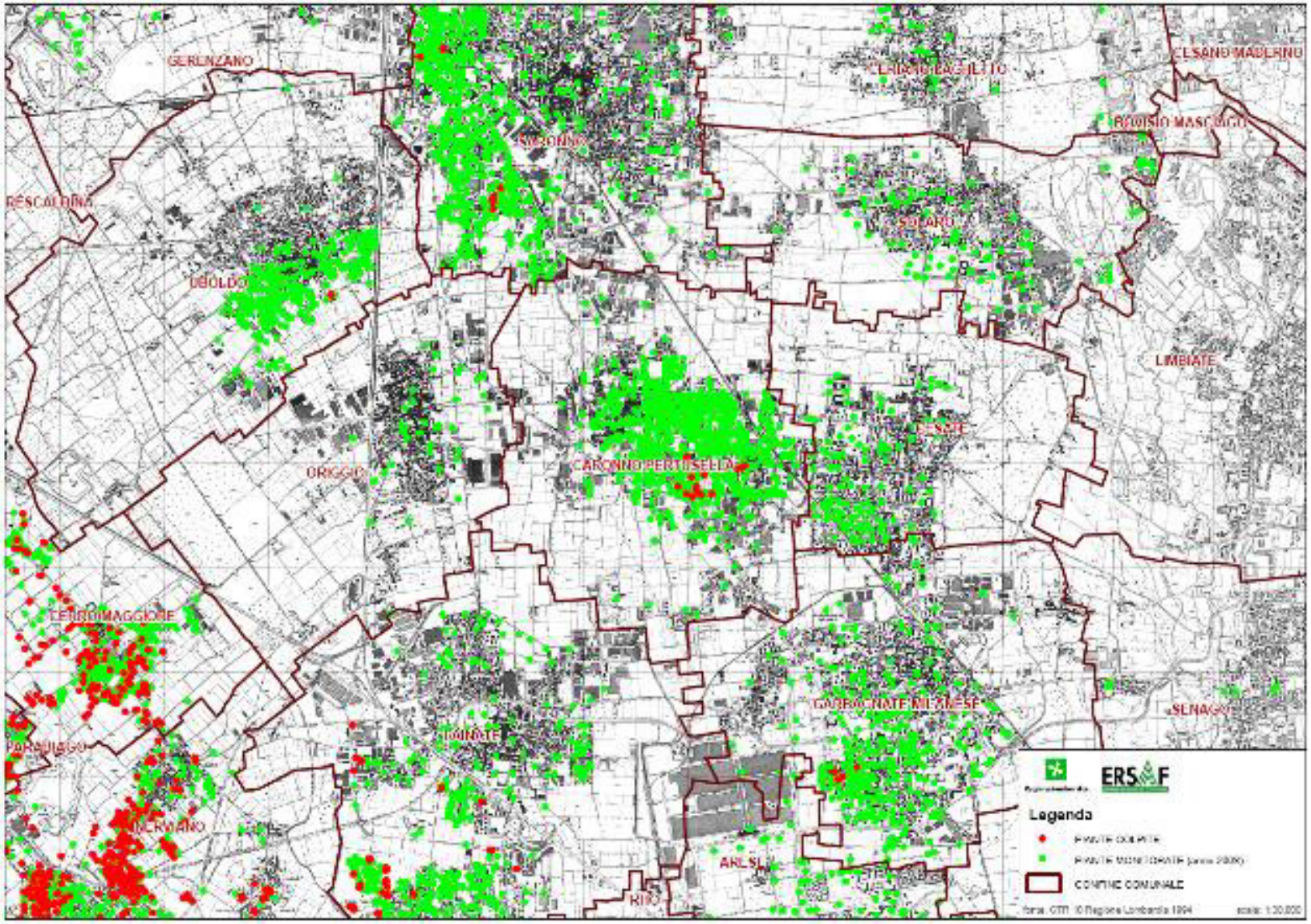
COOPERATION WITH POLICE

SURVEY FORM

NUMA
SCHEDA MONITORAGGIO ANOPLOPHORA CHINENSIS — RILEVATORI: BIANCHI — COMUNE: UBALDO — DATA: 10/06/2009

GPS	NOMINATIVO PROPRIETARIO AMM. CONDOMINIO	INDIRIZZO	N° CIVICO	TELEFONO	N° PIANTE/ ML SIEPE	SPECIE	PIANTA COLPITA (0-1)	N° FORI	N° ROSURE	ADULTI	NOTE
	GIOVANNI/Giuseppino	VIA 4 NOVEMBRE	123	02 4678916	1	ACER PALMATUM	0	0	0	0	
		"	"		7 ml	PRUNUS L.	0				
		"	"		1	PRUNUS L.	0				
		"	"		10 ml	PRUNUS L.	0				
		"	"		1	CHAMAECYS SP.	0				
		"	"		5	ROSA SPP.	0				
		"	"		11	CORNUS AUREA	0				DIFFICILMENTE MONITORABILI TUTTI DA TAGLIARE !
		"	"		1	CORYLUS AVEL.	1	3	0	3	2 MASCHI E 1 FEMMINA CONSERVATI DA PIANTE TAGLIO
	PRIVATO - CONDOMINIO	VIA ADAMI ANGOLO TORINO	14		1	ACER PALMATUM	0				
	"	"	14		2	ACER SACCH.	0				
	"	"	14		2	BETULA SP.	0				
	"	"	14		2	FAGUS SP.	0				
	"	"	14		7	ROSA SP.	0				
	PUBBLICO	"			1	BETULA SP.	0				PIANTA DI FRONTE A CONDOMINIO CIVICO 14
	PRIVATO - CONDOM	VIA ADAMI ANGOLO TORINO	14		1	ACER PLATANOIDES	0				

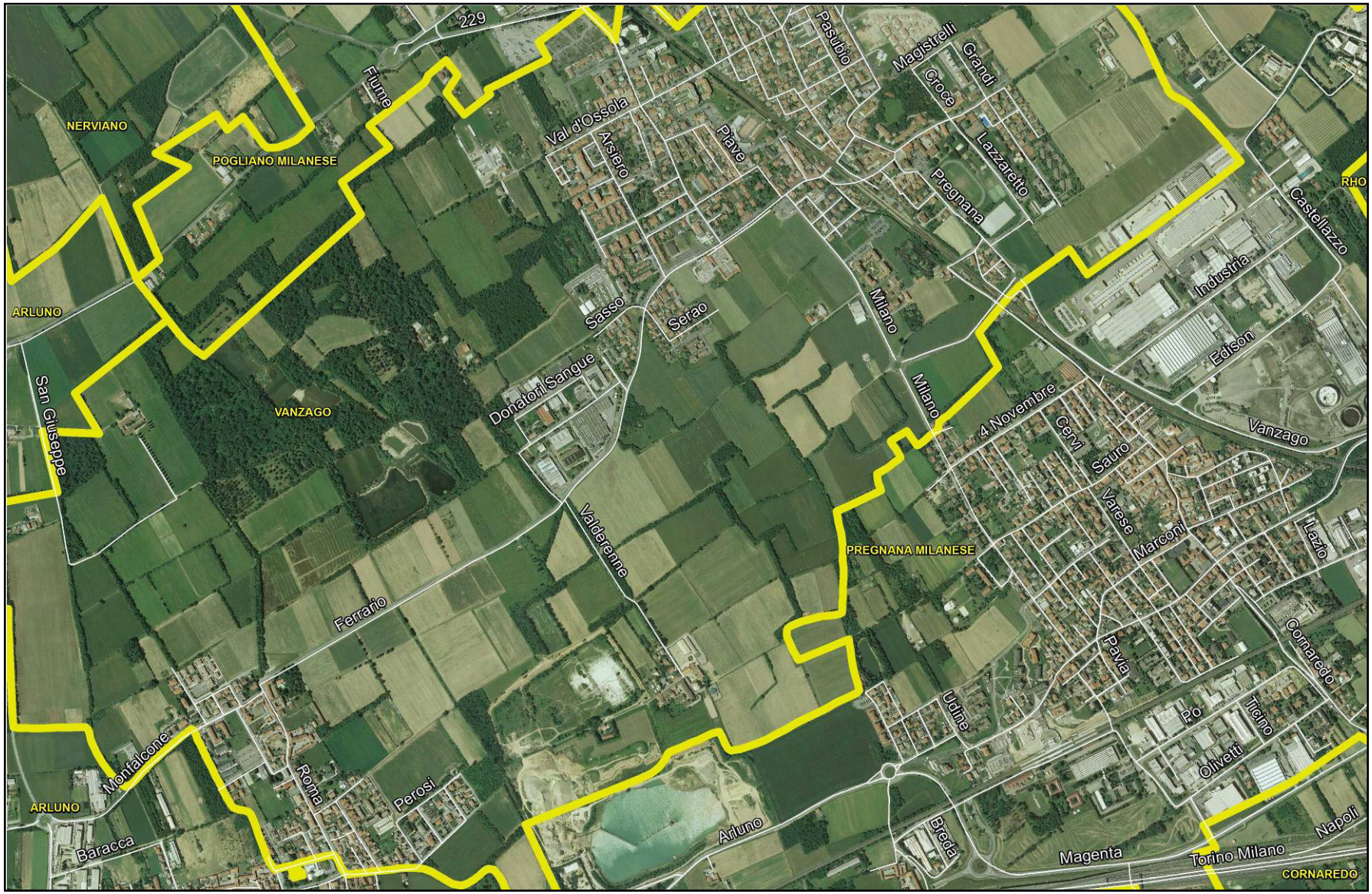
RESULTS OF INSPECTIONS SHOWING INFESTED TREES (RED) AND HEALTY ONE (GREEN)

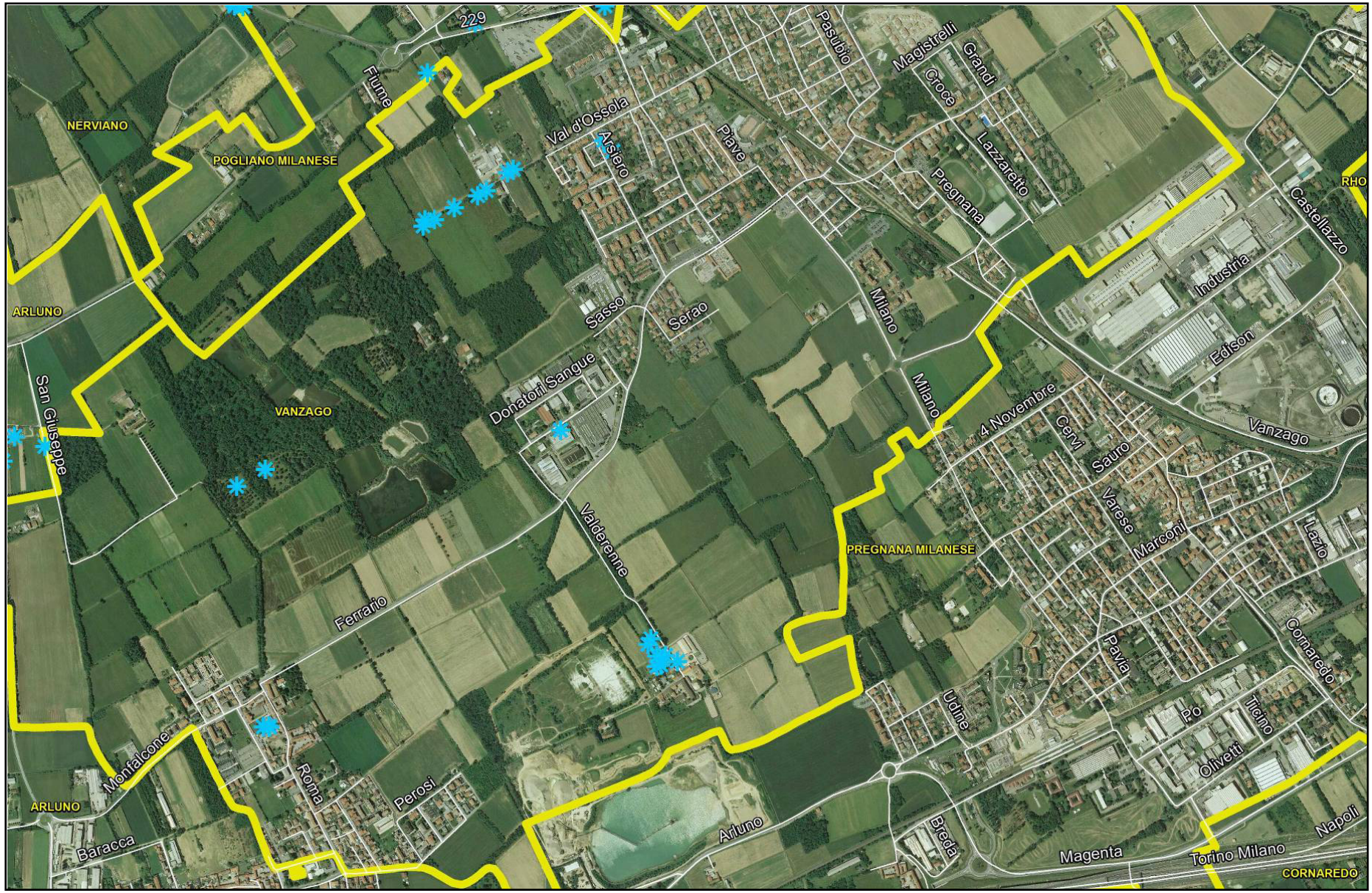


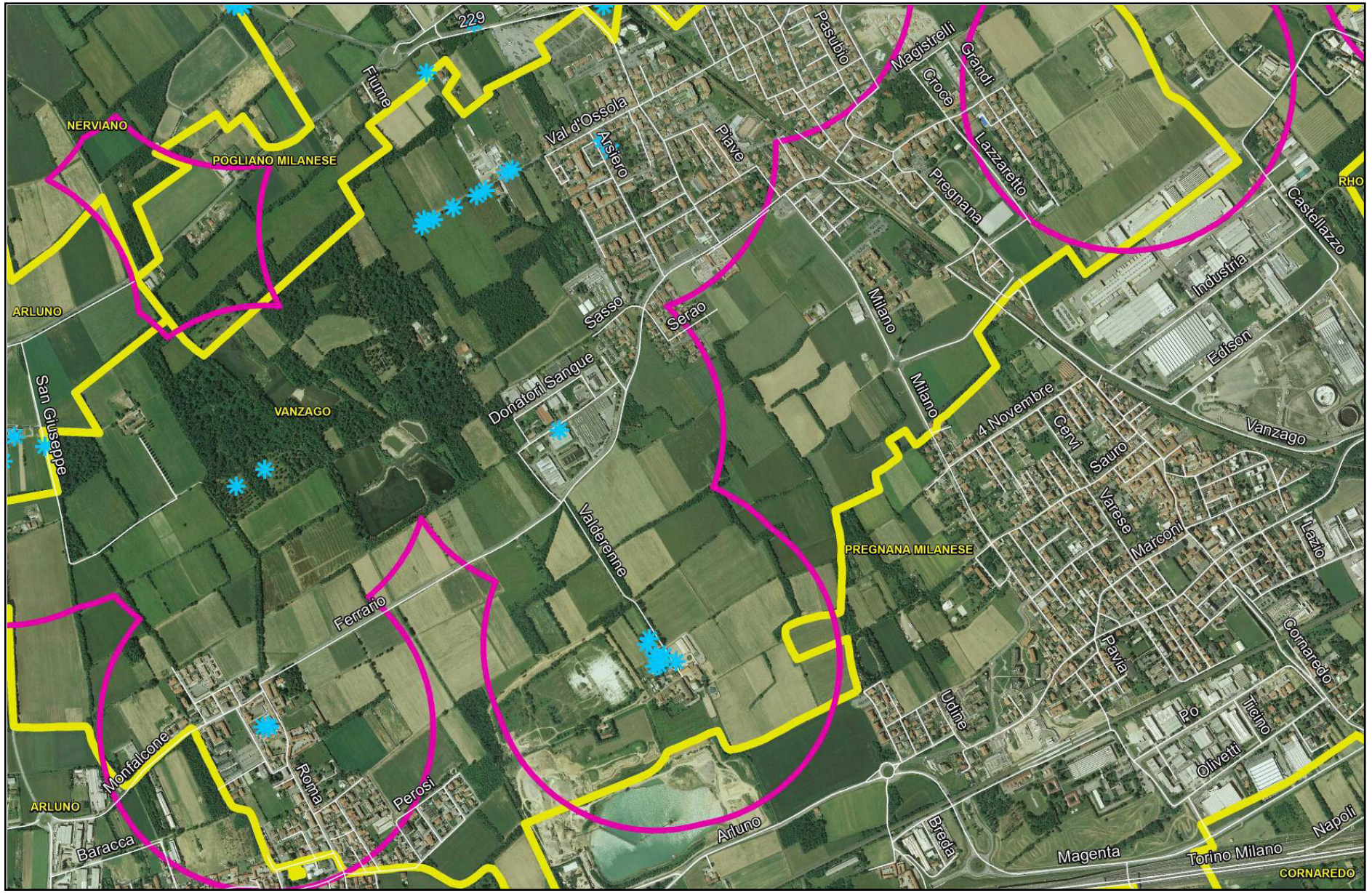
SPECIFIC SURVEY

DEMARCATED AREA

What to do…




NERVIANO
POGLIANO MILANESE
ARLUNO
VANZAGO
PREGNANA MILANESE
CORNAREDO
RHO
229
Fiume
Val d'Ossola
Asiago
Piave
Pasubio
Magistrelli
Grandi
Croce
Lazzaretto
Pregnana
Castellazzo
Industria
Edison
Vanzago
Milano
Sasso
Serao
Donatori di Sangue
San Giuseppe
4 Novembre
Cervi
Sauro
Varese
Marconi
Lazio
Valderenne
Ferrario
Pavia
Cornaredo
Udine
Po
Ticino
Olivetti
Napoli
Torino Milano
Magenta
Arluno
Breda
Montalcone
Roma
Perosi
Baracca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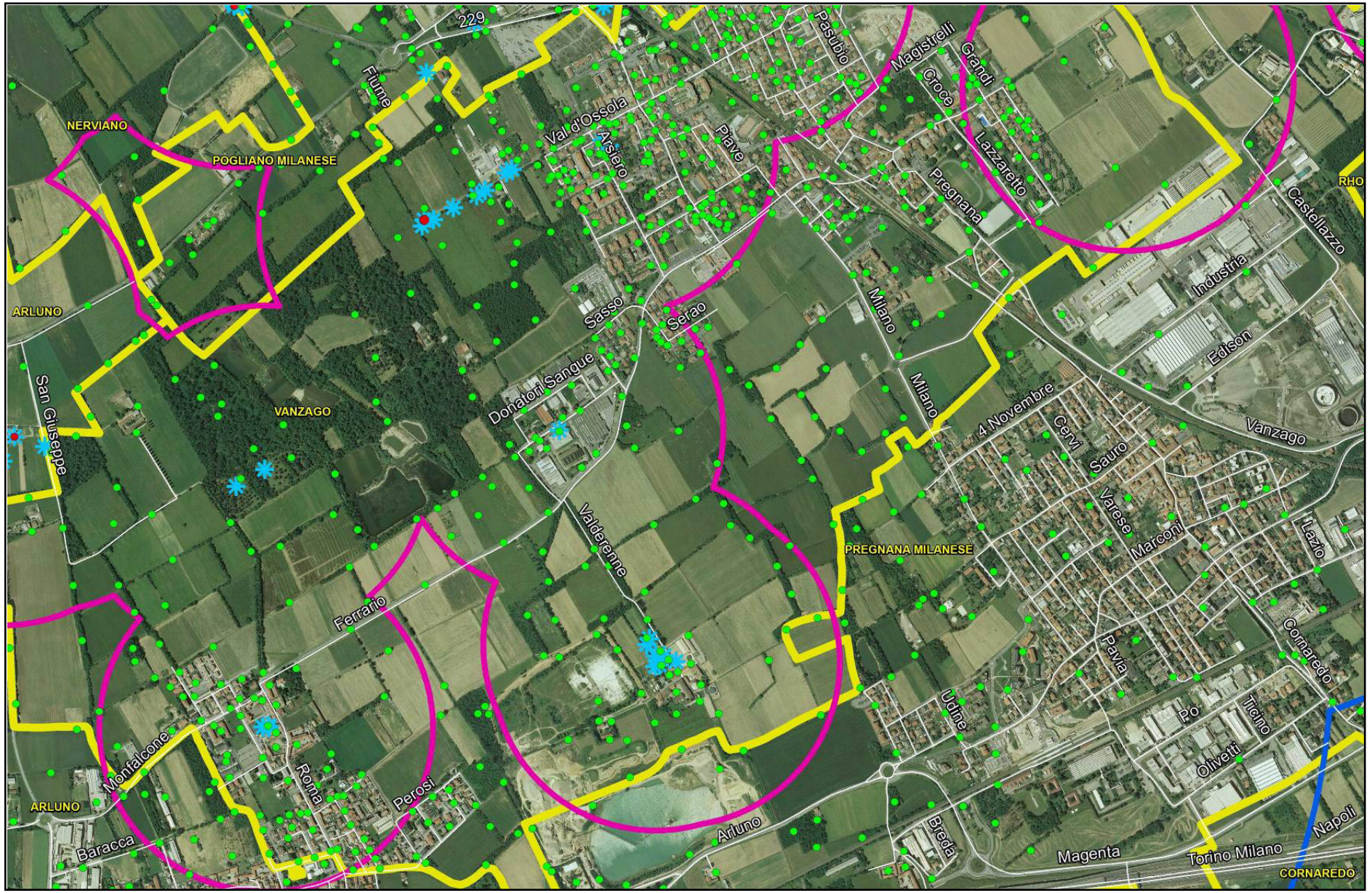
Arluno
Breda
Magenta
Torino Milano
Napoli
CORNAREDO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Magenta
Torino Milano

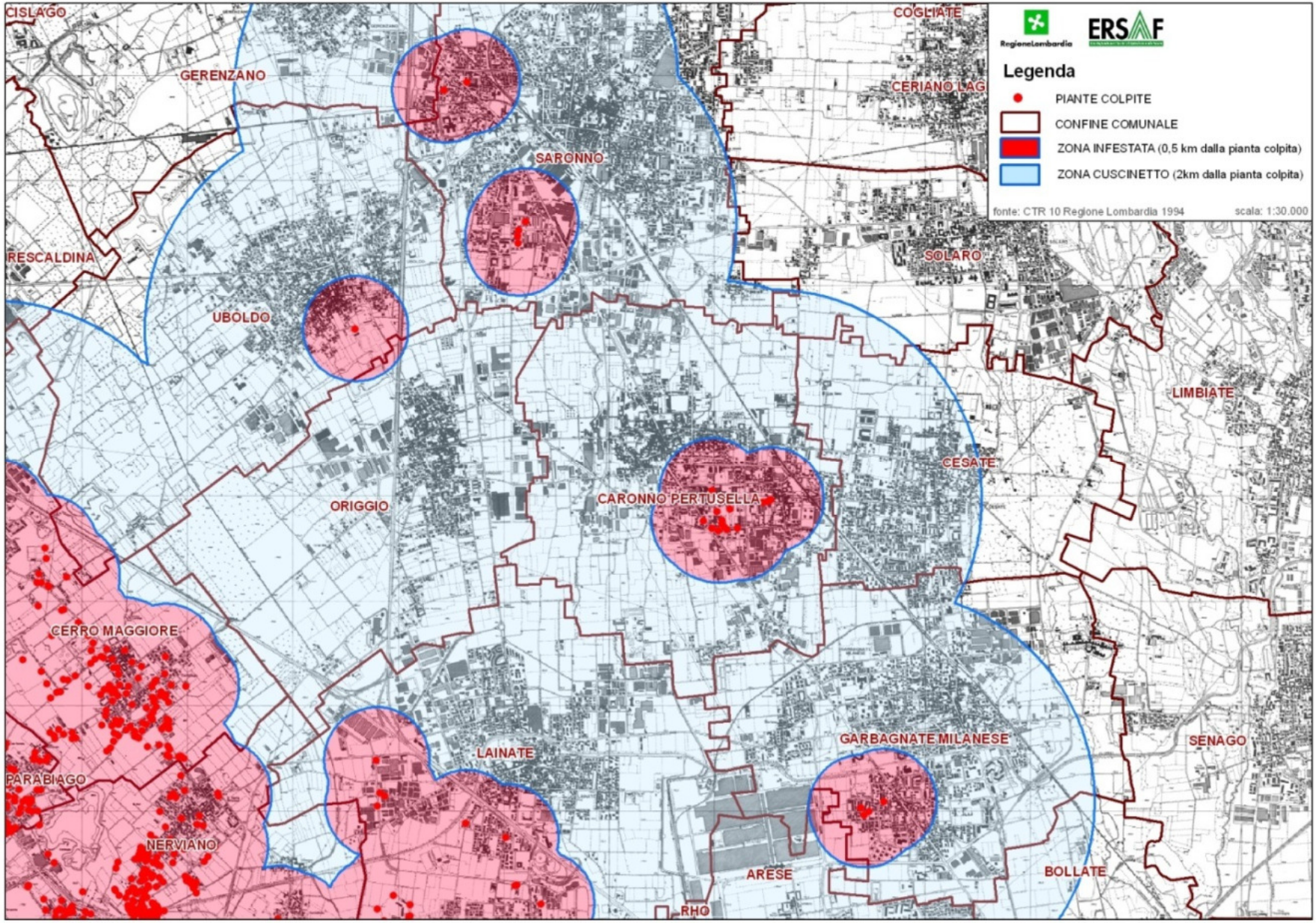
Comune	Rilevatori	ID GPS	n° foto	x	y	Proprietario	Indirizzo	Telefono	E-mail	Data Rilievo	n° piante	Specie	Piante Colpite	Tipologia pianta	n° fori	Adulti (si/no)	n° rosure	Note
Vanzago	Zorzi - Longoni - Giannetti	van001		1498419,19	5040412,77	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	6	*Populus spp.*	0		0	no	0	sponda lago nuovo ovest
Vanzago	Zorzi - Longoni - Giannetti	van002		1498303,14	5040335,40	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	3	*Betula spp.*	0		0	no	0	+ 4 morte
Vanzago	Zorzi - Longoni - Giannetti	van002		1498303,14	5040335,40	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	8	*Populus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van003		1498173,32	5040252,87	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Ulmus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van003		1498173,32	5040252,87	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Acer campestre*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van003		1498173,32	5040252,87	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Betula spp.*	0		0	no	0	3fori morta
Vanzago	Zorzi - Longoni - Giannetti	van004		1498053,75	5040473,18	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Populus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van004		1498053,75	5040473,18	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Crataegus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van005		1497920,34	5040522,49	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	25	*Betula spp.*	0		0	no	0	recinto vacche
Vanzago	Zorzi - Longoni - Giannetti	van005		1497920,34	5040522,49	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Ulmus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van005		1497920,34	5040522,49	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	3	*Acer campestre*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van005		1497920,34	5040522,49	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Acer pseudoplatanus*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van005		1497920,34	5040522,49	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Pyrus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van006		1497766,26	5040459,30	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Crataegus spp.*	0		0	no	0	recinto vacche
Vanzago	Zorzi - Longoni - Giannetti	van006		1497766,26	5040459,30	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Acer pseudoplatanus*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van006		1497766,26	5040459,30	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Ulmus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van006		1497766,26	5040459,30	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	19	*Carpinus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van006		1497766,26	5040459,30	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Populus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van006		1497766,26	5040459,30	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	7	*Acer campestre*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van006		1497766,26	5040459,30	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	47	*Betula spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van007		1497564,96	5040760,59	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	4	*Ulmus spp.*	0		0	no	0	ingresso bosco da gabrina
Vanzago	Zorzi - Longoni - Giannetti	van008		1497643,61	5040706,20	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Corylus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van008		1497643,61	5040706,20	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Malus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van008		1497643,61	5040706,20	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Cornus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van008		1497643,61	5040706,20	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Carpinus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van008		1497643,61	5040706,20	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Acer campestre*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van009		1497696,47	5040648,21	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	3	*Acer campestre*	0		0	no	0	bosco Scheibler
Vanzago	Zorzi - Longoni - Giannetti	van009		1497696,47	5040648,21	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Carpinus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van009		1497696,47	5040648,21	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Corylus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van010		1497805,40	5040549,04	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Carpinus spp.*	0		0	no	0	bosco Scheibler
Vanzago	Zorzi - Longoni - Giannetti	van010		1497805,40	5040549,04	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Acer campestre*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van010		1497805,40	5040549,04	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Corylus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van010		1497805,40	5040549,04	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	5	*Crataegus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van010		1497805,40	5040549,04	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Ulmus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van010		1497805,40	5040549,04	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Rosa spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van010		1497805,40	5040549,04	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Malus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van011		1497895,81	5040622,13	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Acer campestre*	0		0	no	0	bosco Scheibler
Vanzago	Zorzi - Longoni - Giannetti	van011		1497895,81	5040622,13	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Carpinus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van011		1497895,81	5040622,13	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Cornus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van012		1497707,60	5040686,06	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Acer campestre*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van012		1497707,60	5040686,06	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Ulmus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van012		1497707,60	5040686,06	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	4	*Crataegus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van013		1497685,00	5040803,67	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	9	*Ulmus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van013		1497685,00	5040803,67	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Acer campestre*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van013		1497685,00	5040803,67	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Carpinus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van013		1497685,00	5040803,67	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Cornus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van013		1497685,00	5040803,67	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Pyrus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van014		1498474,87	5041321,03	Privato - Bosco WWF di Vanzago	via Valdossola			26/4/14	7	*Platanus spp.*	0		0	no	0	1 ceppo da fresare / 1F su platano con rete
Vanzago	Zorzi - Longoni - Giannetti	van015		1498213,81	5040632,80	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Corylus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van015		1498213,81	5040632,80	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	3	*Crataegus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van015		1498213,81	5040632,80	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	2	*Cornus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van015		1498213,81	5040632,80	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Salix spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van016		1498178,56	5040692,47	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	6	*Carpinus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van016		1498178,56	5040692,47	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	3	*Crataegus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van017		1498177,38	5040827,66	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	20	*Betula spp.*	0		0	no	0	rilasci
Vanzago	Zorzi - Longoni - Giannetti	van017		1498177,38	5040827,66	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Acer campestre*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van018		1498114,28	5040958,00	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	157	*Carpinus spp.*	0		0	no	0	roccolo
Vanzago	Zorzi - Longoni - Giannetti	van018		1498114,28	5040958,00	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Pyrus spp.*	0		0	no	0	
Vanzago	Zorzi - Longoni - Giannetti	van018		1498114,28	5040958,00	Privato - Bosco WWF di Vanzago	via delle tre Campane 21			26/4/14	1	*Acer campestre*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van019		1498889,51	5040193,25	Pubblico	via Valdarenne			19/5/14	10	*Crataegus spp.*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van019		1498889,51	5040193,25	Pubblico	via Valdarenne			19/5/14	13	*Corylus avellana*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van020		1498725,56	5040027,07	Pubblico	via Valdarenne			19/5/14	15	*Ulmus spp.*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van020		1498725,56	5040027,07	Pubblico	via Valdarenne			19/5/14	1	*Acer platanoides*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van021		1498874,84	5040032,32	Pubblico	via Valdarenne			19/5/14	8	*Crataegus spp.*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van021		1498874,84	5040032,32	Pubblico	via Valdarenne			19/5/14	10	*Ulmus spp.*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van021		1498874,84	5040032,32	Pubblico	via Valdarenne			19/5/14	1	*Platanus spp.*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van021		1498874,84	5040032,32	Pubblico	via Valdarenne			19/5/14	1	*Corylus avellana*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van022		1499007,01	5040029,48	Pubblico	via Valdarenne			19/5/14	8	*Platanus spp.*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van022		1499007,01	5040029,48	Pubblico	via Valdarenne			19/5/14	2	*Crataegus spp.*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van023		1499050,47	5039889,69	Privato	via Valdarenne 1			19/5/14	1	*Corylus avellana*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van023		1499050,47	5039889,69	Privato	via Valdarenne 1			19/5/14	3	*Pyrus spp.*	0		0	no	0	
Vanzago	Maschietto – Matarrese	van023		1499050,47	5039889,69	Privato	via Valdarenne 1			19/5/14	20	*Prunus laurocerasus*	0		0	no	0	

An hypothetical NEW OUTBREAK….

Clear cut within 100 mt!

2 kms Demarcated Area

MAP OF A WORKING AREA (2009)



Thank you for your attention