SURVEY METHODOLOGY AND QUALITY MANAGEMENT OF *ANOPLOPHORA CHINENSIS* IN LOMBARDY

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Abstract

Monitoring the principal signs of infestation (frass, exit holes) attributable to *Anoplophora chinensis* is a fundamental aspect of the policies designed to contain and eventually eradicate this alien invasive pest. The activity is carried out by teams of inspectors that check all the plant species that host *Anoplophora chinensis* in the demarcated areas (according to Decision 2012/138/EU). All the fieldwork data are geo-referenced and collected in a database for subsequent treatment (epidemiological statistics, felling of the plants, re-qualification of the infested areas)

INTRODUCTION

Survey activities are the first step of *Anoplophora chinensis* strategy management. The survey activities have been carried out by the Lombardy Region since the first year the insect was found and have been assigned to ERSAF from 2008 on. Approximately 45,000 hectares are monitored every year by 20 inspectors. The survey includes 73 municipalities in the provinces of Brescia, Milan and Varese .

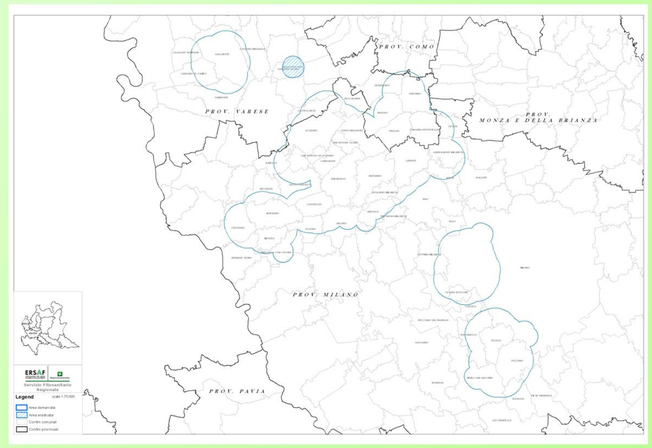

Fig.1- 2013 Demarcated Area of Milano and Varese provinces.

METHODOLOGY

The activity is carried out in accordance with Decision 2012/138/UE and is based on the careful inspection of all the species that host *Anoplophora chinensis* within the areas specified by Regional Decree n. 4650 03/06/2013 (Fig.1).

The Demarcated Areas are classified as:

INFESTED zone: here the presence of *Anoplophora chinensis* has been confirmed; all the specimens of potential host plants are checked, in public and private green areas ;

BUFFER zone: including a radius of at least 2 km surrounding the borders of the infested area; all the specified plants are checked, in public and private green areas within a radius of 500 m from the borders of the infested zone. In the remaining 1,500 m of radius all the potential host plants in the public green areas and some of those in the private areas are checked, in order to monitor a representative portion of the entire area.

In accordance with these indications a geo-referenced set of maps is produced, showing the areas in which the survey activity is based.

Fig.2- Informative paper material.

Step 1. PREPARATORY COMMUNICATION

This phase involves delivering informative materials (Fig.2) to all the municipalities and parks that lie within the demarcated area, in order to set up collaborative efforts involving municipal administrations, local police and volunteers.

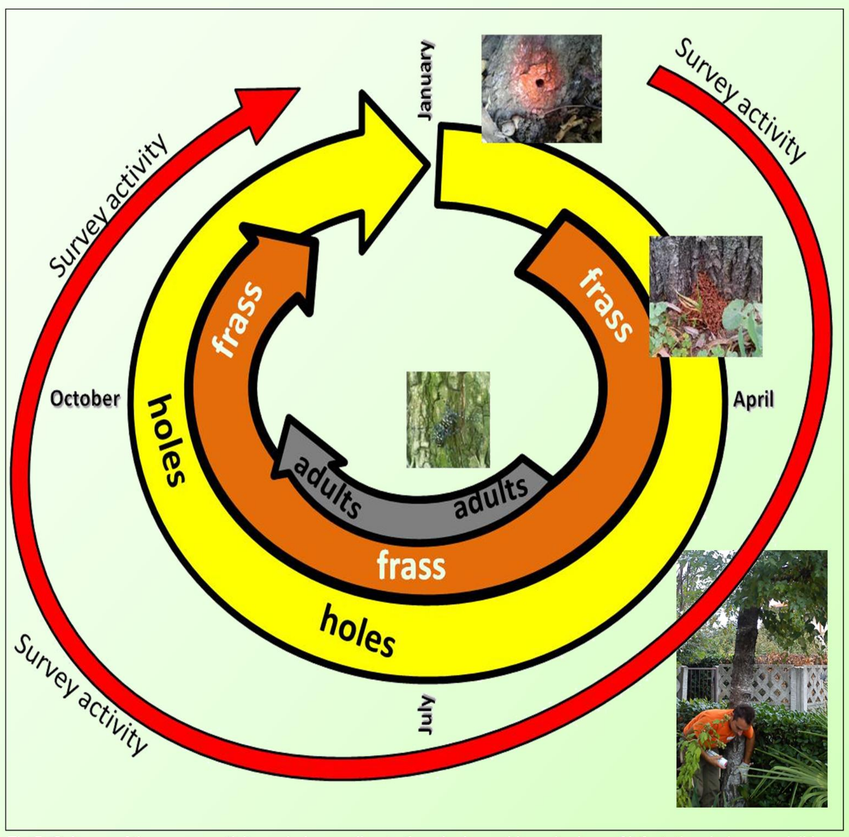

Fig.5- Scheme of the survey activity period according to *Anoplophora chinensis* signs of infestation: holes are visible during the entire year; frass from february to november; adults only from june to september.

Step 2. FIELDWORK

The fieldwork is performed by two-man teams.
Theoretical and practical training is provided.
Each team controls a specific area and is equipped with :

- ID cards;
- Geo-referenced maps of survey areas;
- Survey data from previous years;
- Form to record inspection data (Fig.3);
- Hand-held computer with GPS (Fig.4);
- Paint and tape with official logos to mark infested plants;
- Tools for collecting larvae, adults and frass.

The survey consists of visual inspection of trees of the principal host genera, such as : *Acer* spp., *Aesculus hippocastanum, Alnus* spp., *Betula* spp., *Carpinus* spp., *Citrus* spp., *Cornus* spp., *Corylus* spp., *Cotoneaste*r spp., *Crataegus* spp., *Fagus* spp., *Lagerstroemia* spp., *Malus* spp., *Platanus* spp., *Populus* spp., *Prunus laurocerasus*, *Pyrus* spp., *Rosa* spp., *Salix* spp. and *Ulmus* spp.

Signs of *Anoplophora chinensis* infestation are mainly detectable in the basal part of the tree (collar and exposed roots) and include: exit holes of the adult insect (perfectly circular, 1.5-2 cm in diameter); characteristic piles of frass produced by larvae's trophic activities; cortical damage caused by feeding activity of adults on young branches (Fig.5). Each survey area is assigned an ID that is georeferenced by GPS units.

Generally, each ID corresponds to the group of host species located in it. Whenever a plant infested by *Anoplophora chinensis* is found it is marked (Fig.6).

Fieldwork is also based on citizens' reports, thanks to a broad communication campaign. To support field activities in 2013, adult kairomone traps (Fig.7) were positioned, in collaboration with Minoprio Foundation, and genetic analyses (Fig.8) were performed by the Plant Health Service laboratory.

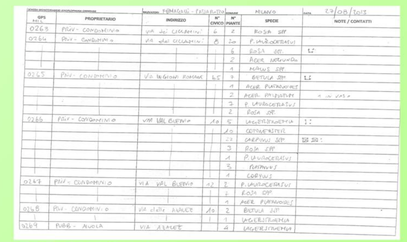

Fig.3- Recording data form.

Fig.4- Hand-held computer with GPS.

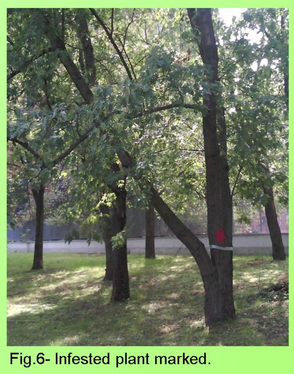

Fig.6- Infested plant marked.

Fig.7– Kairomone trap.

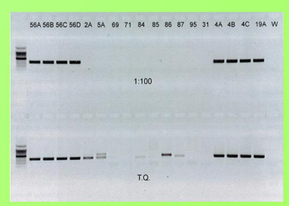

Fig.8- Example of PCR laboratory analysis.

Fig.9- Example of Excel spread sheet where data are collected.

Step 3. DATA IMPLEMENTATION

The acquired data are digitized (Fig.9) and processed in a GIS program. This work is periodically performed and permits constant updating of the monitored areas (Fig.10). Therefore data are easily exportable and processable for subsequent elaboration (epidemiological statistics, felling of the plants, re-qualification of the infested areas).

Fig.10– Example of plants survey: healthy (green), infested (red).

RESULTS

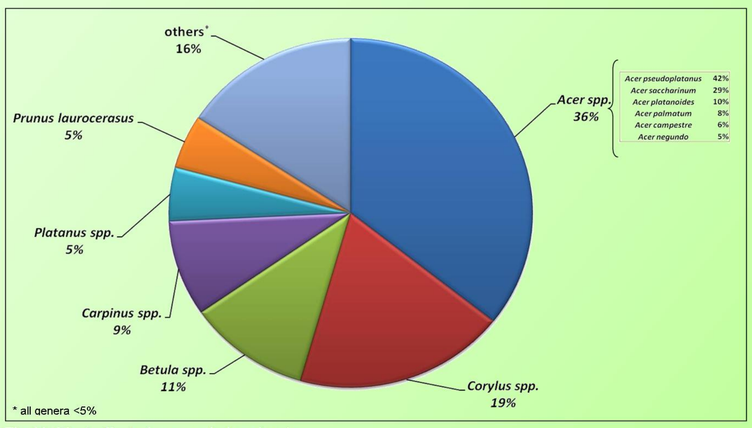

Fig.11- Most affected genera in Lombardy .

Since 2008 more than 3,000,000 inspections have been conducted in Lombardy; nearly 390,000 trees and 250,000 linear meters of hedges are checked each year. The average number of plants checked by each inspector per day is relatively constant, averaging 180 plants in the infested zone and 245 in the buffer zone. This element can be extremely useful to quantify the monitoring activities in economic terms.

Data elaboration shows that the most affected genera in Lombardy are *Acer spp, Corylus spp. and Betula spp.* (Fig.11) *Acer spp. and Corylus spp*. together account for more than 50% of infested plants.

CONCLUSIONS

The survey of *Anoplophora chinensis* main signs of infestation (frass, exit holes) is a fundamental step in the current program of containment and eventual eradication of allochthonous species. The proper execution of effective monitoring operations is the fundamental aspect on which the effectiveness of the subsequent actions of cutting trees and eradication of the insect depend. The acquired information is very important for developing models for estimating residual infestation, checking distances between points of infestation, evaluating the effectiveness of the cuts (also by comparing geo-referenced maps pre and post intervention) and assessing which of the specified plants are affected most and therefore more likely carry the infestation.

"DATA COLLECTION AND INFORMATION SHARING IN PLANT HEALTH" 1-2-3 APRIL 2014 - EFSA PREMISES, PARMA, ITALY