



#### Action C4

Implementation and management of prevention, early warning, eradication and containment protocols in Antibes, Ile Ste Marguerite and Nice Côte d'Azur

Deliverable:

# Revised local management protocols and plans

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SAMFIX Deliverable: Revised local management protocols and plans



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#### Summary

Although using non-specific lures, the 2019 trapping survey in the areas of Antibes, lle Ste Marguerite and Nice Côte d'Azur, revealed an expansion of both *Xylosandrus* species towards the North and the West. However, the coverage of some important core sites such as the Corniches de la Riviera was still rather limited. A meeting held late January 2020, gathering INRAE and staffs of the towns of Nice, Antibes and Cannes in charge of managing these protected areas. Partners considered it necessary to expand the monitoring of beetle expansion and damage in 2020 in order to get a full coverage of the area extending from the Italian border to Cannes, where are located most of the areas to be protected. Thus, we selected 19 sites including, for early warning purposes, a number of new ones within the Natural 2000 zone of the Corniches de la Riviera, and additional ones in Ile Sainte Marguerite. Also for early warning purposes, the survey is targeting new sites in the nearby Cannes heights and nurseries in Nice. Besides, following the development of beetle populations in already invaded areas being essential, trappings are to be maintained in Bois de la Garoupe, Mont Boron, and other sites surveyed in 2019.

Based on deliverable D1's results, the trappings are proposed to consist at each site of a multifunnel black trap baited with a combination of a-copaene, quercivorol, a-pinene and ethanol aimed at being more specific for *Xylosandrus* spp. than the former lures. Taking into account the flight periods of adult insects observed in 2019, the trappings are scheduled to be carried out from late March to late October. The surveys will also include regular visits on sites to look at signs of damage on trees, and eventually decide to remove infested trees as done in some cases in 2019.

In order to control/reduce damage by ambrosia beetles having already invaded the protected areas, "push and pull" experiments are also programmed using the repellent compound verbenone in Bois de La Garoupe and Ile Sainte Marguerite, respectively.

Additionnal Note: the Covid-19 crisis is delaying trap settlings in most sites to late May at least. The crisis is also preventing any "push & pull" experiments in 2020 because adult beetles will havealready emerged before a possible set up of these experiments, which are therefore postponed to 2021.

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#### 1. Modification of the lure-baited trapping network

The 2019 trapping survey of the areas of Antibes, Ile Ste Marguerite and Nice Côte d'Azur, revealed an expansion of both *Xylosandrus* species towards the North and the West (Figure 1).



Figure 1: Captures of Xylosandrus compactus and X. crassiusculus by the trapping network deployed in 2019 between the Italian border and Cannes. Left: location of the Corniches Ia Riviera park (corresponding to the square dotted in red on the right); Right: Location of the traps with the capture numbers into brackets (X.compactus/X. crassisuculus)

However, the coverage of some important core sites, ie. the Corniches de la Riviera, was still rather limited (see Figure 1- left). A meeting held late January 2020, gathering INRAE and staffs of the towns of Nice, Antibes and Cannes in charge of managing these protected areas. Partners considered it necessary to expand the monitoring of beetle expansion and damage in 2020 in order to get a full coverage of the area extending from the Italian border to Cannes, where are located most of the areas to



be protected. Thus, we select a total 19 sites within this area of which 9 are new ones with regard to 2019 (Figure 2).

The sites are including, for early warning purposes, 5 new ones within the Natural 2000 zone of the Corniches de la Riviera, and 2 additional ones in Ile Sainte Marguerite. Also for early warning purposes, the survey is targeting new sites in the nearby Cannes hights and nurseries in Nice.

However, it appears essential to maintain the trappings within the already invaded sites in order to be capable of following the development of the beetle populations, and relate them to possible damage to trees and shrubs. Thus, trappings are to be carried out at Villa Thuret, Bois de la Garoupe, Mont Boron, Villefranche Cap Ferrat and other sites yet surveyed in 2019.



Figure 2: Map of the trapping network to be deployed in 2020 between the Italian border and Cannes



### 2. Modification of the trapping protocol

The 2019 trapping network was based on traps baited with a lure corresponding to a combination of Ethanol UHR (Ultra High Release), (-)a-pinene and a generic blend for cerambycid beetles. This lure could not be considered as representing an optimal lure, the more as it is attracting a large number of species other than *Xylosandrus*, especially large cerambycids and other bark and ambrosia beetles which hindered easy identifications of *Xylosandrus* spp. in the trapping collections.

Deliverable D1 showed that a combination of 4 compounds, i.e. quercivorol, acopaene, Ethanol and a-pinene, could be used as a rather optimal attractant for both species of *Xylosandrus*, and that multifunnel and cross-vane traps are rather equal in capturing these beetles. However, 'dry' multifunnel traps, equipped with a wire mesh at the bottom of the collector, appear more use to use and keep the beetle fresh for identification and possible further genetic studies trying to precise their origin.

Thus, the modified trapping network for 2020 is based on the use of 'dry' black multifunnel traps baited with quercivorol (1ml) + a-copaene (2 ml)+ Ethanol + (-) a-pinene. The exact design is shown in Figure 3.

Quercivorol and a-copaene are obtained as bubble cups (Figure 3) from Synergy Semiochemicals Corp. (Burnaby, BC, Canada) whereas Ethanol UHR (100ml with 96 % purity; release rate 2 g/day at 20°C) and (-) a-pinene (25 ml with 98 % purity; release rate 0.3 g/day at 20°C) are obtained as diffuser packs (Figure 3) from Econex (Spain). Although expected by the suppliers to last 60 days, pragmatic observations led to consider that the efficacy of these doses disappear long before under the Mediterranean climate during summer. Thus, all of these doses are to be replaced after **6 weeks**.

The **position of the doses** must be as follows: the pack of ethanol is placed tied to the middle of the trap (Figure 4) and the bubbles of quercivorol and a-copaene as well the pack of a-pinene are tied to the 2<sup>nd</sup> funnel from the bottom.



Figure 3- from left to right: bubble of Quercivorol or a-copaene, pack of Ethanol, pack of a-pinene



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Figure 4: Trapping design to be used in 2020

The trap is hung using a rope at about 3m high on a carob tree or other broadleaved tree. An insecticide net is placed at the bottom of the collector

Taking into account the successive generations of the two species of beetles, the trappings are scheduled to be carried out from mid-March to mid-October, with a collection every 3 weeks, and a change in lures and insecticide every 6 weeks.

#### 3- Other surveys and management methods

The surveys will also include regular visits on sites to look at signs of damage on trees, and eventually decide to prune or remove the infested trees as it has been done in some cases in 2019, eg. at Mont Boron.

# 4- Control methods

In order to control/reduce damage by ambrosia beetles having already invaded the protected areas, "push and pull" experiments are also programmed using the repellent compound verbenone in Villa Thuret, Bois de La Garoupe and Ile Sainte Marguerite, respectively.

## 5- Conclusions

The modifications of the trapping network and its design, as well as the proposed control methods appeared to fit better the SAMFIX objectives. However, the Covid-19 crisis is delaying trap settlings in most sites to late May at least. The crisis is also preventing any "push & pull" experiments in 2020 because adult beetles will have already emerged before a possible set up of these experiments, which are therefore postponed to 2021.

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