



Monitoring the population of Flathead Oak Borer (*Coroebus undatus* F.) in Cork Oak (*Quercus suber* L.)

Introduction

Even though *C. undatus* does not affect the vigour of the host tree it's the most important pest in cork oak stands, since it creates a defect in cork that decrease its value. No pest control method is yet available, since no pesticide as a viable success rate, because the larvae is protected by the bark, few or none predator and parasitic species are known, and no pheromone is available to be use together with traps. Monitoring technics for this species are constantly advancing since the pest is increasing its presence in cork oak stands. The knowledge of the population dynamics is of extreme importance to predict future attacks and to evaluate the susceptibility of the stand. In particularly how the population of the insect and its life cycle will react to the changing climate.

To monitor the presence of the pest in the stand, three monitorization methods were used, the sampling of cork, traps (nets placed around the tree) and vibrant colour slabs with glue. The data collected form this operation was gather and analyse.

In terms of success in capturing the insect, none show potential to be use as a control method. But they were very useful to better understand the population distribution and dynamics. Most of the galleries created by the larvae can be found in the tree between the height of 50 to 100 cm, and there was a preference for the side of the tree exposed to south, it's believed to happen because it is warmer. More attacks were detected in thicker trees, and trees with thicker bark had less attacks, this is thought to happen because vigorous trees (higher bark production) would have enough resources to fight the infestation. For thinner barks opposite results were found in different experiments. Debilitated trees (less bark production) would not be nutritious enough for the insect which can decrease the attacks, but on the other hand thinner bark is easier to be drill by the larvae and trees in stress conditions are more susceptible to biotic and abiotic threats. For the same reason trees grown in deeper soils (more vigorous) had less attacks than tree grown in shallow soils (more stressful conditions). In relation to the stand composition different trials found different results. Some results indicate that mix stands with a diverse understory have less attacks, but other studies show the opposite result. More research is absolutely needed to better understand this question. It was shown a big difference in the attack intensity between sites and trees. The lack of a homogeneous distribution of the

attacks in the trials, suggest the insect specifically selects the tree it's going to attack. By capturing the insect adults after they emerge from the tree, it was possible to define the ratio between female and male, which was above 1 for every year (meaning the population has always more female than males), and the period in which the adults start to emerge which was between June and July.

The data collected from the monitoring operations was crossed with data of the climate, soil, biodiversity and cartography, to establish a relation between the attack intensity and exterior factors. Another model was created to study the variation of the population with the climate change."

Lessons learned

The tested variables with the biggest impact in the population size were: Mean annual temperature, higher population were present in the sites with higher values when compared to sites with lower ones, this variable was the most relevant for the prediction model; Altitude, population were bigger between 200/400m when compared to populations in lower altitudes; Annual mean insolation, the sites with less time of sun light had less attacks when compared to other sites; Type of soil, of all the types of soils present in the sample sites podzo soil was the one that had the smallest populations.

In the climate change model, the best prediction variables found were the minimum temperature reached in the winter and the standardised precipitation evapotranspiration index. The conclusions that can be taken from this work is that higher populations are found in places with higher lower temperatures in the winter and in places with severe droughts (in the model the best response of this variable was for a period of 3 years). For these reasons the climate change is expected to increase the population size and speed up their life cycle.

For further information contact

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The information presented in this factsheet was developed by the FOREST4EU partner, drawing on the innovations and knowledge generated by the indicated operational group with their explicit authorization.

Further information

<https://www.unac.pt/index.php/id-i/grupos-operacionais-accao-1-1-pdr2020/undercork>



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