

Mark-recapture estimates of the survival and recapture rates of *Cerambyx welensii* Küster (Coleoptera cerambycidae) in a cork oak dehesa in Huelva (Spain)

Research Article

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Abstract: The oak decline is probably the most severe plant health problem faced in the Mediterranean region which is one of the habitats of community interest under the EU's environmental legal regime. More information on the role of Cerambycids species in this decay is still needed. This paper reports the apparent survival rate (Φ) and recapture rate (P) for a population of *Cerambyx welensii* Küster (Coleoptera cerambycidae) in a highly degraded cork oak grove near the Doñana National Park (Huelva, Spain) as calculated using the mark-capture-recapture method. High and constants in the time values of apparent survival rates for males and females are detected. The male overall recapture rate (P) exceeded that of the female group with relatively low, but significant, values. The presence of transient individuals suggests a nucleus of population with many immigrants and emigrants in the study plot. The results are used to discuss various aspects of the insect biology, and the potential effect of the gradual deterioration of the studied ecosystem on the insect population it supports.

Keywords: *Cerambycids* • *Cerambyx welensii* • *Mark-recaptures* • *Oak decline* • *CJS model* • *Survival rate*

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1. Introduction

Cork oak (*Quercus suber* Linnaeus, 1753) forests constitute one of the habitats of community interest under the EU's environmental legal regime [1], which compels the member states to take effective steps towards their protection. These forest formations have for centuries been exploited for –mainly– cork and structured as open woodland forests locally called "dehesas" in order to facilitate their use for agronomic and/or gaming purposes. The present decline in *Quercus* woodlands (oak decline) is probably the most severe plant health problem faced in the Mediterranean region as it threatens to extinguish such representative, potential highly productive ecosystems [2,3]. This degradation process is the result of a wide variety of abiotic (rainfall distribution, edaphic characteristics) and

biotic factors (pathogenic fungi and bacteria, insects). There are a lot of insects implied in the decay process (triggering and/or worsening it), of which foliage-feeding insects *Lymantria dispar* Linnaeus, (1758) and *Tortrix viridana* Linnaeus, (1758) are the most important [4]. Wood-boring insects are mainly *Platypus cylindrus* Fabricius, (1792) [5], *Cerambyx welensii* Küster (1846), *Cerambyx cerdo* Linnaeus (1758) and *Prinobius myardi* Mulsant (1842) [6-13]. There is extensive knowledge on the biology and the population dynamics of *L. dispar* and *T. viridana*. Several control methods have already been applied in order to reduce the damages caused by them. The presence of *P. cylindrus* on *Quercus* forests is very rare and local. In spite of its high pathogen potential, its effects are insignificant.

As far as the big cerambycid species concerned, their effects are known in weakening the structural

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