

To : Julia Jones, FLS
Flowers of Creta

Genetic markers for studying the mating system of *Rhynchophorus ferrugineus* (Coleoptera, Curculionoidea, Dryophtoridae)

Research team:

Alessio DE BIASE, Research scientist
Silvia BELVEDERE, PhD student, Sapienza Rome University
Gabriele SENIA, Master student
Alessandra LA MARCA, Laboratory technician
Veronica MARCARI, Laboratory technician

Dept. of Biology and Biotechnologies "Charles Darwin", Sapienza Rome University

Our project aims at developing genetic markers through a combined approach of Next Generation Sequencing and Bioinformatic analyses to study particular aspects of the mating system of Red Palm Weevil (*Rhynchophorus ferrugineus*), an invasive species of Coleoptera Dryophtoridae. Our research is part of a joined IAEA-FAO cooperation program aimed to evaluate the Sterile Insect Technique for the integrated management of this pest.

R. ferrugineus is in fact a big and polyphagous phytophagous beetle, associated to a large number of Arecaceae species, among which a lot of palms of economically interest, like the date palm and the Canary Island date palm, very widespread in the whole Mediterranean area. The larval stages of the insect bore deep galleries into the stem and the crown of the host, generally leading to its death when the tunnels reach the meristematic tissues. The species, native of southern Asia and Melanesia, spread by trade of infected palms firstly in the Middle East (in the '80s) and then in nearly all the countries of the Mediterranean basin (included Italy) since the early '90s.

Because of the ineffectiveness of the integrated pest management strategies actually employed to control the infestation, the hypothesis of use a biological control approach named Sterile Insect Technique (SIT) is currently under study. The SIT consists in the sterilization of males (generally through gamma radiation) to be released in the field, with the aim of drastically reduce the population's birth rate. However, to successfully employ SIT is essential a good knowledge of the biology of the target species, and in particular of its reproduction and mating systems. Main goals of the project are to verify the presence of polyandrous behaviors (if females mate with more males) and of cryptic-choice mechanisms by which females can select sperm after multiple copulations.

The chosen methodological approach rely on the parentage analysis of mating individuals to estimate the average number of paternal contributions for reproductive event. The genetic analyses will be based on microsatellite genetic markers, which have been isolated *de novo* for the Red Palm Weevil by using very new DNA sequencing technology and Bioinformatic analyses.

We are currently evaluating degree of genetic variation of Mediterranean and Asiatic populations, in order to design laboratory crosses experiments to verify the hypothesis of polyandry and studying other aspects of the mating system of this species.

We really appreciated the collecting effort of the members of **Flowers of Crete** and we wish to thank everybody for that. We hope to give an useful contribution towards the preservation of the Palms of the Mediterranean region.

Many thanks!!

Alessio