

## **Chestnut ecotypes resistant to *Dryocosmus kuriphilus*. New assessments for integrated pest management**

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The Asian Chestnut Gall Wasp (ACGW) *Dryocosmus kuriphilus* Yasumatsu (Hymenoptera: Cynipidae), reported in Italy since 2002, is a major threat to chestnut orchards. ACGW lays eggs into chestnut buds and induces the development of galls that cause severe reduction of plant photosynthetic activity. This damage results in an intense productive decline in the attacked plants. Currently, the most effective method to control ACGW is the use of its natural enemy *Torymus sinensis* Kamijo (Hymenoptera: Torymidae), introduced in Italy since 2006. However, despite the good results achieved, the parasitoid is still unable to completely control the pest in some areas and with particular climatic conditions. Therefore, besides the evaluation of the parasitoid control action, one aim of the Chestnut Special Project, coordinated by the Institute for Sustainable Plant Protection (IPSP) of the Italian National Research Council (CNR), is to assess resistance or tolerance to ACGW attack in local chestnut ecotypes. Through sampling and based on agronomic and morphological plant descriptors, some ecotypes, showing resistance/tolerance to ACGW, have been identified in the Campania region. To highlight the potential phenomenon of cross-resistance the ACGW resistant ecotypes have also been evaluated against *Gnomoniopsis castaneae* Tamietti (syn. *G. smithogilvyi*), the main agent involved in nut rot in chestnut. During the study, monitoring activities were carried out in Campanian chestnut orchards where both susceptible and resistant ecotypes were present. The aim of this monitoring was to compare the damage levels caused by *D. kuriphilus* and *G. castaneae* on different ecotypes and to characterize the type of resistance. Two samplings per year were performed: the first between June and July, to evaluate the eggs laid by ACGW or repellence phenomena expression; the second one in spring, to observe the presence of ACGW loculi and larvae, and their development stage. Several variables have been considered: galls per linear meter, healthy and infested shoots, healthy leaves, the mean number of loculi and larvae per gall, the percentage of *T. sinensis* parasitism. The totality of the considered parameters highlights that the resistant ecotypes showed a significant difference compared to the susceptible ones. In particular, shoots from resistant trees resulted mostly healthy and free of damage caused by *D. kuriphilus*. A single ecotype showed almost complete absence of attacks and damages. Conversely, the susceptible ecotypes show a higher number of galls, both on shoots and leaves, a lower number of healthy and well-developed leaves, and lower parasitization levels.

Similar results were observed about the presence of *G. castaneae*: even in this case the resistant ecotypes displayed a lower incidence of damages ascribable to the pathogen. This result shows how the hypothesis of cross-resistance is a real phenomenon and an interesting field for future investigation.

**KEY WORDS:** *Castanea sativa*, cross-resistance, invasive species, parasitization.