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Share the resources or displace the natives: different strategies in invasive *Megastigmus* seed insects

Marie-Anne Auger-Rozenberg, Alain Roques

INRA, Orléans, France

Introduction: Because of the rapidly- increasing, and often unregulated, seed trade, exotic seed chalcids in the genus *Megastigmus* invaded Europe where they presently represent 9 out of the 21 species recorded from tree seeds. We investigated their impact on both the native chalcid entomofauna exploiting seed resources and the potential of natural regeneration of trees.

Methods: Using a standardized procedure, seeds of firs (*Abies* spp.), true cedars (*Cedrus* spp.) and wild roses (*Rosa* spp.) were sampled all over Europe in order to assess the relative importance of the native and invasive species, and their specific impact on tree seed yield. Experimental trials consisted in offering enbagged cones to the attack of *Megastigmus* spp. using various ratios of invasive/ native species. Using X-rays and rearings of infested seeds, we analyzed the spatial distribution of the different species in the cones with and without competition for seed resource

Results: In firs, the exotic *M. rafni* became over the last 10 years the dominant species in most stands, replacing the native species rather than sharing the seed resources within the cone. The decrease in seed yield thus remained equivalent when only one exotic species was present instead of the native species or together with the native. However, seed yield significantly decreased as soon as 2 or more exotic species were present. In this case, all the zones of the cone were attacked. The cone resources were similarly shared in cedars and wild roses when 2 exotic species were present with large consequences on the potential of natural regeneration of the trees.

Conclusions: Research has now to focus on the biological traits susceptible to be involved in the competitive superiority of the exotic seed chalcids with regard to the native ones.