Assessing, classifying and scoring the environmental impact of invasive insects in pest risk analyses

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In pest risk analyses, one of the most difficult questions to answer is whether the pest under analysis is having an environmental impact in its region of occurrence and, even more difficult, whether it is likely to have an environmental impact in the region for which the pest risk analysis is carried out. There is presently no satisfying method to classify, rank and score the environmental impact caused by an invasive pests. Environmental impacts of pests, particularly insects, have been explored for a limited number of species. In this study, we first carried out an extensive literature survey, which identified over 400 primary research publications that investigated the environmental impacts of 72 invasive alien insects and/or the mechanisms underlying these impacts. Evidence for environmnetal effects in the field was found for 58 insect species. Most publications investigated impacts on native biodiversity at population or community level. Genetic impacts and, to a lesser extent, impacts on ecosystem services and processes were rarely explored. We classified the effects caused by different invasive insects according to: their ecosystem roles, i.e. herbivores, predators, parasites, parasitoids and pollinators; the level of biological organisation at which they occur; the direct and indirect mechanisms underlying these effects. The best documented effects occur in invasive ants, Eurasian forest herbivores invasive in North America, and honeybees. Impacts may occur through simple trophic interactions such as herbivory, predation or parasitism. Alien species may also affect native species and communities through more complex mechanisms such as competition for resources, disease transmission, apparent competition, or pollination disruption, among others. Finally, some invasive insects, particularly forest herbivores and ants, are known to affect ecosystem processes through cascading effects.

These data are presently used to categorise environmental impacts of alien insects and define indicators and impact indexes that can be used to assess present and potential environmental impacts in pest risk analyses. The first results will be presented at the conference.