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On potential risks and benefits of an accidentally introduced weed biological control agent in Europe: the case of the ragweed leaf beetle, *Ophraella communa*

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As a direct result of globalisation, we can expect more introductions of invasive species in the future, with prominent examples in invasive alien plant species. With increasing introductions, arrival of natural enemies of invasive species will also increase, with some species used as biological control agents elsewhere. Compared from conventional biological control agents these accidentally introduced agents are not tested for their biosafety or their potential efficacy pre-introduction. Since the accidentally introduced biological control agents are in their new environment already, this gives the opportunity to make more exact assessments of potential risks and benefits compared to conventional biological control programmes. With this thesis, we propose how to react to such a case, using the example of *Ambrosia artemisiifolia* (L.), common ragweed, and its potential biological control agent, the leaf beetle *Ophraella communa* LeSage in Europe as a model.

In the first chapter of the thesis, we evaluated the risk of non-target feeding of *O. communa* on native and endangered plant species closely related to *A. artemisiifolia.* The combined results of a field survey, a common-garden field experiment and laboratory experiments indicate no discernable risk of *O. communa* damaging native plant species on a population level.

For the second chapter, we conducted a field experiment to investigate how *O. communa* abundance and damage in individual *A. artemisiifolia* plants during summer effects the plant's reproductive output. Likelihood of seed production could be explained by leaf damage and plant volume 10 weeks before seed set, while number of beetles observed had a much lower explanatory value.

In the third chapter, we extended a published species distribution model with temperature- and relative humidity driven vital rates of O. communa that we had determined experimentally. We showed that humidity-driven egg mortality is an important factor for *O. communa* population build-up, and that both temperature and relative humidity should be taken into consideration when predicting density-dependent impact of the beetle.

In the context of an expected increase of introductions, we describe how our findings can be used to improve further risk-benefit analyses for accidentally introduced biological control agents.

Jury:

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