

Molecular analysis of ecological interactions for optimising biocontrol of the invasive weed *Sonchus oleraceus* L. (Asteraceae) in Australia

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Summary Community ecology is a promising approach for optimising biological control of weeds. The characterisation of ecological interaction networks associated to the target plant in its natural context allows deciphering the complexity of interactions within arthropods community; and gives precious clues on potential undesirable effects induced by biocontrol agents' introduction. Based on this approach, several research questions are addressed: i) What is the diversity and specificity within arthropods' community feeding on the plant? ii) Is there a top-down control of herbivores by natural enemies? iii) Are there differences in network structure between contrasted geographical areas? Our study targets the sowthistle, *Sonchus oleraceus*, that is native to Europe but invasive in Australia. The development of herbicide resistance makes it extremely difficult to manage in its invasive area. As an alternative to pesticide use, biocontrol solutions are explored via a

collaborative research program between Montpellier SupAgro and CSIRO. First steps of the project focus on the molecular characterisation and comparison of the ecological networks among three different climatic regions in its native range. This is done using cutting-edge molecular approaches (*i.e.* multiplex metabarcoding through NGS) to reveal interactions from arthropod gut-content. Network metrics such as species richness, linkage density or connectance are computed and compared between sites to assess differences in levels of complexity among changing environments. The study will be further expanded to Australia in order to confront results between invasive and native ranges and contribute to a better assessment of risks and potential changes induced by such weed management strategy.

Keywords Ecological interactions, molecular analysis, sowthistle, biological control.