

Invasive populations of *Brassica nigra* express fewer glucosinolate compounds and are more deterrent to generalist herbivores than native populations

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May 5, 2020

Abstract

The shifting defence hypothesis attributes the invasion success of many plant species to the species' post- introduction evolution of traits that confer high fitness including reduced allocation to physiologically and ecologically costly chemical defence compounds against herbivores. However, to date, most of the studies that compared invasive and conspecific native plants for differences in defence compounds focused only on one or a few compounds. Thus, it remains unclear whether invasive plants may evolve a lower diversity of defence compounds in response to a simplified herbivore community assemblages in the introduced range. Therefore, the present study used *B. nigra* plants from 11 invasive- and 14 native range populations to test whether invasive *B. nigra* plants: i) express a lower diversity of glucosinolate compounds and higher concentration of a single dominant glucosinolate compound owing to a reduced diversity of herbivores in the introduced range; ii) are less preferred by generalist herbivores and attract more specialist herbivore species than *B. nigra* from the native range when grown in a common garden in the native range; iii) are less preferred by generalist herbivores than native-range *B. nigra* in no- choice feeding bioassays. In support of the shifting defence hypothesis, invasive *B. nigra* plants expressed a lower diversity of glucosinolates and a higher concentration of sinigrin (a major glucosinolate compound in *B. nigra*) than native-range *B. nigra* plants. Moreover, the invasive *B. nigra* plants were more deterrent to two generalist herbivore species in no-choice feeding bioassays than native *B. nigra* plants. *Brassica nigra* plants that expressed higher concentrations and diversities of glucosinolate compounds were visited by a more diverse specialist herbivore community than *B. nigra* plants with low concentrations and diversities of glucosinolates. The biogeographical differences in glucosinolate profiles observed here may be the result of differential herbivore selection pressures in the respective invaded and native ranges.

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