

Intraspecific variation in feeding preference and performance of *Galerucella nymphaeae* (Chrysomelidae: Coleoptera) on aquatic macrophytes

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Abstract. The feeding preferences and performance of a freshwater macrophyte-feeding chrysomelid beetle (*Galerucella nymphaeae*) were assessed in laboratory experiments. Populations of *Galerucella* had a relatively narrow diet breadth, preferring species of *Nuphar*, *Polygonum*, and in 1 case *Brasenia*, while largely ignoring the remaining macrophytes offered in assays. However, because of interpopulation variation in host preferences, the species *G. nymphaeae* should be considered polyphagous. Distant populations from the Upper Peninsula of Michigan, Indiana, and North Carolina collected from *Nuphar* spp. all readily consumed *Nuphar* spp. and *Polygonum* spp., but beetles from a site in south Michigan collected from *P. amphibium* or from *Brasenia schreberi* treated *Nuphar* as a low-preference host. The performance of *Galerucella* in no-choice assays was clearly related to the behavioral preferences of the larvae: larvae performed well on 3 macrophyte species that they willingly consumed, but performed poorly when they refused to consume alternative host plants and presumably starved to death. It is unknown if the starved beetles could have performed well physiologically if they had eaten alternative hosts. Performance was also related to the quality of host plant, given that beetles collected from *Nuphar luteum* or *N. advena* reached a larger adult mass on *N. luteum* than on *N. advena*. The feeding preferences of *Galerucella* were largely non-plastic within a single generation, although there were sometimes behavioral differences among clutchmates raised on different host plants. Morphometric and preliminary allozyme data suggest the North American populations used in this paper are conspecific, but they probably represent a different species than European *G. nymphaeae*. The intraspecific variation of our North American *G. nymphaeae* in host preferences and performance suggests that at least 2 different ecotypes occur in North America.

Key words: behavior, chrysomelid, ecotypes, feeding specificity, freshwater macrophytes, herbivory, host race, host specificity, intraspecific variation, plant-herbivore interactions, water lily.