Study of the preference-performance relationship in generalist parasitoids

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Abstract

The diversity of species in parasitoid host range defines their host specificity; it has important implications for speciation, community structure and parasitoid ability to invade novel habitats. In addition, predicting parasitoid host ranges is a key challenge in biocontrol (selection of optimal natural enemies). Host specificity is mediated by both host acceptance by the adult (preference) and by the suitability of the host for parasitoid development (performance). Few studies have encompassed these mechanisms for a suite of potential host species for a single parasitoid species. However, a recent study reported that the female of specialist parasitoid selects their hosts according to their suitability. In generalist parasitoids (wider range of host species), we have tested the hypothesis that no or weak relationship may occur between preference and performance traits. We have characterized the host range of three generalist aphid parasitoids (*Aphelinus abdominalis*, *Aphidius ervi* and *Diaeretiella rapae*) when tested on 12 aphid species. The three parasitoids showed low selectivity. However, only 50-70% of aphid species enabled producing offspring. In addition, we did not find correlation between the preference and the performance of *A. abdominalis* and *D. rapae* while the correlation was significant for *A. ervi*. For the later, host phylogeny is important as females have attacked hosts closely related with optimal hosts (*Macrosiphum euphorbiae* and *Sitobion avenae*). Our current research are focused on identifying ecological filters that may lend to narrow parasitoid host range (e.g. the presence of endosymbionts in aphids and the impact of the plants bearing aphid hosts).

Keywords: Host range, Parasitoid, Generalist, Aphid, Specialization, Preference, performance hypothesis

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