Disentangling drivers of parasitoid foraging behaviour in structured plant communities

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In lab experiments, parasitoids have been shown to use volatiles from the host, from the host plant and from the microhabitat to locate hosts. In the field, parasitoids also respond to host density, while the structure and diversity of a plant community can physically affect parasitoid movement by concealing host plants, or by obscuring chemical cues used for host location. Due to the difficulty of disentangling these factors in the field, we developed a spatially explicit pattern-oriented simulation model to investigate the influence of host density, patch size, volatile emission, and habitat complexity on the foraging behaviour of female and male parasitoids. The model is based on two release-recapture field experiments with the tritrophic system *Brassica nigra*, *Pieris brassicae*, and *Cotesia glomerata.* In the first field experiment plant patch size was manipulated, and in the second experiment host density and habitat complexity varied. The central model parameter is parasitoid searching efficiency, which is influenced by the source of chemical cues, experience, the strength of attraction, wind and flying speed, and habitat structure. The model will be used to determine the relative importance of attraction by volatiles as compared to other biotic and abiotic factors under field conditions. Preliminary simulations indicate that attraction is crucial to explain the observed patterns.