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ABSTRACT

Since its introduction in the late 1970s, Vespa germanica has become one of the major urban pests in Australia. Absence of natural competitors and enemies, the ability for long-term spent storage, plus human transportation have enabled the wasp to spread quickly. Despite costly eradication efforts, little is known of the species’ biology under Australian conditions. In this study, the ecology of V. germanica was examined in South Australia. Results indicate that in comparison with its native range in England, milder seasons enable the wasp to be active for seven as opposed to four months. Additionally, three times as many workers and queens are produced per colony. However, at temperatures ≥ 35°C, foraging activity diminishes by 50%, while colony requirements for water increase. Hot summers also have a negative effect on nest densities in the following year.

The possible impact of V. germanica on the environment was assessed by determining its prey diet, and comparing it to the diet of a native paper wasp, Polistes humilis. Prey were identified using a combination of visual and molecular techniques. Results indicate that V. germanica feeds on at least nine arthropod orders, as well as vertebrate prey, while P. humilis is restricted to feeding on Lepidoptera. Phylogenetic analyses reveal that only a small overlap in prey exists. However, future studies need to determine if the numerical dominance of V. germanica gives it an advantage as a competitor.

Apart from hot temperatures, the rainfall in April and number of nests destroyed during the previous year were also significant predictors of future wasp densities in a population model. Thus, the spread and development of V. germanica may be inhibited by weather, and its distribution may be limited by water availability. The population model also indicates that current control measures are effective in suppressing wasp densities, and broad-area poison baiting should occur.

Although this study has provided a basic outline of the ecology of V. germanica in South Australia, future studies on the population genetics of the species and the importance of inter- and intra-specific competition are needed to determine the pathways responsible for its invasion success.

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