

专论与综述

拟寄生蜂搜索产卵过程中对寄主的竞争

李国清, 慕莉莉

南京农业大学农业部病虫监测与治理重点开放实验室, 南京210095

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摘要 综述拟寄生蜂搜索产卵过程中对寄主竞争的最新研究进展。这类竞争具有四种方式, 即标记寄主、杀卵和杀幼、守护寄主和捕食寄主。(1) 标记寄主常涉及寄主标记信息素, 这是由雌蜂在产卵前、产卵时或产卵后分泌的化学物质。寄主标记信息素常介导拟寄生蜂对已寄生和健康寄主的辨别、减少过寄生和多寄生、减轻种内和种间竞争压力。(2) 雌蜂遇到已寄生寄主时, 很多种类杀死前一雌蜂遗留的卵和幼虫, 再产下自己的卵。雌蜂使用三种方法杀卵和杀幼, 即产卵器穿刺、取食和使用有毒物质。通过杀卵和杀幼, 产卵雌蜂清除了前一雌蜂遗留的后代, 主动改善了寄主品质, 从而有利于自身后代的生存。(3) 守护寄主在肿腿蜂科、缘腹细蜂科、金小蜂科、缨小蜂科和茧蜂科中均有报道, 守护者驱逐入侵者以保护后代及健康寄主。(4) 捕食寄主不仅减少了健康寄主数量, 且直接导致已寄生寄主中拟寄生蜂卵和幼虫的死亡。雌蜂一般在体内成熟卵量较少时捕食寄主。讨论了研究拟寄生蜂搜索产卵过程中竞争寄主的理论意义和实际应用价值。

关键词 [拟寄生蜂](#); [寄主标记](#); [杀卵和杀幼](#); [寄主守护](#); [寄主捕食](#)

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Competition among parasitoids for host during foraging and oviposition

LI Guo-Qing, MU Li-Li

Key Laboratory of Monitoring and Management of Plant Diseases and Pests, Ministry of Agriculture, Nanjing Agricultural University, Nanjing 210095, China

Abstract During foraging and oviposition, hymenopteran parasitoid females often compete for hosts with individuals of the same or different species. The competition involves four types of behaviors: host-marking, ovicide or infanticide, brood-guarding and host-feeding. Advances in research of these behaviors are presented in detail in this review. (1) Host-marking has been documented in about 200 hymenopteran parasitoid species in nearly every super-family. Wasps mark exploited hosts physically or chemically before, during or after oviposition. However, most parasitoids utilize chemical markers, which are defined as host-marking pheromones (HMPs) or oviposition-detering pheromones. HMPs usually mediate the discrimination between parasitized and healthy hosts, reduce super- and multiparasitism, and minimize intra- and inter-specific competition. HMPs can often decrease the tendency for a wasp to lay eggs in a marked host and promote dispersal. When HMPs do not completely suppress oviposition, they can reduce clutch size. Moreover, a gregarious wasp may modify the sex ratio of deposited brood in response to the presence or absence of an HMP. (2) Ovicide or infanticide refers to a parasitoid destroying an existing clutch of eggs or larvae in a parasitized host before laying its own clutch. A wasp usually commits ovicide or infanticide either by piercing eggs or larvae with its ovipositor, eating them, or injecting a toxic substance to the first brood(s) before or during oviposition. Generally, an adult kills brood(s) on conspecifically parasitized hosts more frequently than on hosts parasitized by itself. Ovicide and infanticide are advantageous since they remove the competitor(s) to restore, at least partially, the quality of parasitized hosts. (3) Brood-guarding behaviors are observed in many species in the family Bethyridae, Scelionidae, Pteromalidae, Mymaridae and Braconidae. Guarding wasps attempt to repel intra- and inter-specific intruders to protect their broods or unexploited hosts. (4) Adults of some parasitoids feed on host insects to obtain energy to develop eggs, a behavior defined a

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s host feeding. A host-feeding wasp consumes healthy hosts or even directly kills the parasitoid broods in previously parasitized hosts. Females tend to feed on hosts when they possess lower egg loads than higher egg loads. The theoretical importance and potential applications of host competition during foraging and oviposition among hymenopteran parasitoids are also discussed.

Key words Hymenopteran parasitoid; host-marking; ovicide and infanticide; brood-guarding; host-feeding

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通讯作者 李国清 liguoqing001234@yahoo.com.cn