
Ecological interactions between wild bee species and the managed honeybee: towards practical decision rules in protected natural areas

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Abstract

As modern farming practices make agro-ecosystems less suitable environments for sustainable honey production, professional beekeepers now commonly migrate their bees. They periodically move large apiaries to natural areas, either to exploit temporary mass-flowering resources or to escape chemical hazards and seasonal food shortages. But in recent years, conservation biologists have raised awareness about the risk of ecological interference between massively introduced managed honeybees and the native wild bee fauna in protected natural areas. Here we show that high-density beekeeping in natural mass-flowering areas triggers foraging competition which depresses not only the occurrence and foraging success of local wild bees but also nectar and pollen harvesting by the honeybees themselves. This intraspecific competition among the honeybees has practical implications for beekeepers. It shows that the local carrying capacity has been exceeded and raises concerns for honey yields and colony sustainability. It also offers an effective ecological criterion for pragmatic decision-making whenever conservation practitioners envision progressively reducing beekeeping in protected areas. Regardless the considered competition criterion, setting distance thresholds among apiaries appeared more tractable than setting colony density thresholds for beekeeping regulation. Overall, honeybee-induced competition spanned distances of 600–1.100m around apiaries, i.e. covering 1.1–3.8km² areas. Although specific to the studied area, those distance estimates may help raise consciousness about the threat high-density beekeeping may pose to local nature conservation initiatives.

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