

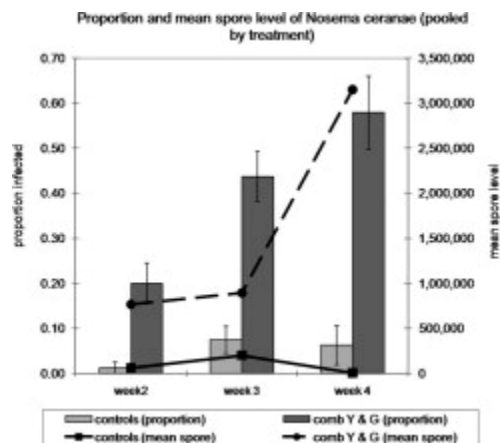
[Honey bees \(*Apis mellifera*\) reared in brood combs containing high levels of pesticide residues exhibit increased susceptibility to *Nosema* \(Microsporidia\) infection](#)

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Abstract

Nosema ceranae and pesticide exposure can contribute to honey bee health decline. Bees reared from brood comb containing high or low levels of pesticide residues were placed in two common colony environments. One colony was inoculated weekly with *N. ceranae* spores in sugar syrup and the other colony received sugar syrup only. Worker honey bees were sampled weekly from the treatment and control colonies and analyzed for *Nosema* spore levels. Regardless of the colony environment (spores+syrup added or syrup only added), a higher proportion of bees reared from the high pesticide residue brood comb became infected with *N. ceranae*, and at a younger age, compared to those reared in low residue brood combs. These data suggest that developmental exposure to pesticides in brood comb increases the susceptibility of bees to *N. ceranae* infection.



Graphical abstract Highlights

Nosema ceranae spore infection levels in adult control and treatment bees. Proportion of *N. ceranae* infected bees (left y-axis) and mean spore level within infected bees (right y-axis) reared from control and treatment combs at week 2–4 post adult emergence. We examined the effects of pesticide residue exposure during development on adult honey bees. *Nosema ceranae* infections were higher in adult bees reared in high pesticide residue brood combs. *N. ceranae* infection occurred at a younger age in adult bees reared in high residue brood combs. Pesticide residues in managed bee operations may contribute to *Nosema* infection and colony loss.