Native and introduced bee abundances on carrot seed crops in New Zealand

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 In New Zealand, unmanaged bees species can be important crop pollinators, but their abundance and distribution is poorly known within hybrid carrot seed crops. Standardised counts of bees visiting flowering carrot umbels (1350 umbels observed/field) across 19 commercial hybrid fields were conducted between 1000 h and 1500 h. Despite honey bees being observed in all fields, abundance varied greatly between fields (mean=98.1; maximum=330, minimum=1). Other bees observed visiting umbels were Lasioglossum sordidum (17 fields; mean=14; maximum=65); Leioproctus sp. (12 fields; mean=2.0; maximum=19); Hylaeus sp. (one field; maximum= 1) and Bombus terrestris (six fields; mean=2.0; maximum=11). The number of individual bees (all species together) counted/umbel on male fertile umbels was significantly higher than on male sterile umbels, a factor that could contribute to sub-optimal pollen flow between umbel lines by bees. Examination of their m