Progress on Bumble Bees as Commercial Pollinators in Australia

Progress on bumble bees as commercial pollinators in Australia: update on risks and opportunities (PH23001)

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The buff-tailed bumble bee (*Bombus terrestris*), a bumble bee species native to Europe, is now a ubiquitous feature of the Tasmanian countryside since its arrival in the island state in 1992. In Australia, it is declared an invasive species, having most likely arrived here via New Zealand, where it was introduced for clover pollination in the late 1800s. Due to its status as an invasive species, the possession and managed use of bumble bees is outlawed in Australia under a federal ban.

Despite this ban, wild bumble bees are thriving in the Tasmanian landscape, with individual colonies often producing 100s of queen bees by the end of summer, and these queens become the progenitors of new colonies in the springtime after hibernating for the winter.

In contrast, within their native range, wild bumble bee colonies appear to produce on average far fewer queen bees. Despite this disparity in reproductive rate, bumble bees appear to be much more abundant on crops such as raspberries in their native range than on the same crops in Tasmania.

For example, in one study of raspberry pollinators in the UK, bumble bees made up approximately 60% of floral visitors. In contrast, our preliminary results in Tasmania suggest they are much less common visitors of this economically important crop. So, what is going on?

Over the past year and a half, researchers from Western Sydney University, James Cook University and the University of Tasmania have been scouring the Tasmanian countryside to understand the good, the bad and the ugly of the wild bumble bee population in Tasmania. We want to take an unbiased snapshot of the potential ecological impacts, and the on-farm pollination benefits this wild bee population is providing to the island state.

At the end of our 4-year study period, we will present to relevant stakeholders in industry and government, information on what they are doing in Tasmanian farms and ecosystems, and whether their wild populations can be supported in contexts where they are wanted (around farms), and suppressed where they are a potential nuisance (sensitive ecological communities).

An apple-pollen foraging bumble bee queen tagged with a radio transmitter. We are using radio telemetry to track down bumble bees to their colonies so that we can monitor what plant species are critical for bumble bee colony survival in Tasmania

A pollen foraging bumble bee worker on an autumn-flowering Silver Banksia *(Banksia marginata)* in Maydena, Tasmania

A bumble bee queen drinks nectar alongside a honey bee worker on this spring-flowering Pride of Madeira *(Echium candicans)* located near Bridport, Tasmania

All photos credit: James Makinson

We are currently in the middle of our first main field season of data collection, and so far, we are finding the following:

- The location of Springtime queen bee foraging activity is a strong indicator of where summertime colonies will be present. Therefore, the availability of spring-flowering plants around farms is likely to strongly influence whether bumble bees turn up at the crop once it starts flowering. For example, non-native plant species such as *Ecchium* sp. and blueberries appear to be a valuable springtime floral resource for queen bumble bees.
- Similarly, the availability of late autumn and winter forage sources may be determining where queen bees overwinter, and therefore where they emerge in spring. Native plant species such as the Silver Banksia (*Banksia marginata*) appear to provide an important pollen and nectar source for bumble bees and other native pollinators during this lean period.

To promote wild pollination services on farms, both from bumble bees and native pollinator species, it is important that floral resources are available year-round to sustain wild insect populations. Denuded landscapes that are only punctuated by a single period of floral resource availability, the flowering of your crop, are not likely to promote and sustain the presence of the insects critical for healthy wild pollination services.

Further updates will be shared in this journal as the project progresses.

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