

The risks and opportunities associated with the use of the bumblebee population in Tasmania for commercial pollination purposes.

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Dear Sir / Madam,

In 2004, the NSW Office of Environment and Heritage Scientific Committee determined that *Bombus terrestris* was a threat to native species, based on a great deal of evidence at the time. It was determined that *B. terrestris* colonies, which contain between 300 and 1000 workers, heavily compete with a multitude of flower-visiting native animal species, both vertebrate and invertebrate. It was also determined by the Committee that *B. terrestris* facilitated an increase in the abundance and distribution of weed species, due to its unique pollinating qualities. In the years between its introduction into Tasmania (1992) and the above mentioned report (2004), *B. terrestris* has spread throughout much of the island of Tasmania (OEH 2004).

Studies conducted in 2000 show that the existing *B. terrestris* populations throughout Tasmania originate from as few as two individuals, resulting in a population which has developed very low genetic diversity (Schmid-Hempel *et al.* 2007). Yet, these populations have still become a highly invasive species, establishing in a range of different vegetation types (native and exotic), altitudes (sea level to 1,250 m) and rainfall areas (600 - 3,200 mm) (Hingston *et al.* 2002).

If the proposal to use Tasmanian populations of *B. terrestris* commercially is approved, it would be necessary to import new genetic material from overseas, to improve their genetic diversity and ensure the populations are suitable for commercial rearing (Buttermore *et al.* 1998). With an increase in genetic diversity comes an increase in species fitness and vigour (Frankham *et al.* 2010). This could potentially lead to enhanced aggression and competition with native flower-visitors, at floral resources. Increased hybrid vigour could also see an increase in individual colony populations, which would increase overall floral resource competition and also increase the incidence of exotic weed pollination and weed seed distribution (Stout *et al.* 2002).

Introducing new genetic material, via the importation of *B. terrestris* breeding stock, will open the quarantine pathways to an increased risk of introducing exotic pests and diseases into Australia. Overseas, bumble bee species have been found to carry multi-host pathogens such as deformed wing virus (Genersch *et al.* 2006, Fürst *et al.* 2014), Black queen cell and

Sacbrood virus (Reynaldi *et al.* 2013) as well as *Nosema cerana* (Gamboa *et al.* 2015). These diseases and pests co-infective to the European honey bee (*Apis mellifera*). The introduction of breeding material from overseas will increase the risk of introducing such co-infective diseases. It is possible that bumble bees may become alternative pest-hosts or viral reservoirs (Reynaldi *et al.* 2013), thus threatening the Tasmanian honey bee industry, both pollination services and honey production. Also, there is no way of knowing if any of these diseases will affect our native bee populations.

B. terrestris has been commercialised throughout the world, and as such, its populations have fallen victim to the woes of mass rearing. When animals are reared within a high density environment, existing pests or diseases within the host populations will spread more quickly. Commercially reared colonies of *B. terrestris* are known to frequently suffer from high pathogen loads (Goulson 2014).

Allowing the commercialisation of *B. terrestris* for use in Tasmania for commercial pollination purposes would function as an incentive to illegally introduce any organism that conveys a benefit to an industry.

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