


**FLORA AND FAUNA GUARANTEE - SCIENTIFIC ADVISORY COMMITTEE**
**FINAL RECOMMENDATION ON A NOMINATION FOR LISTING**
**The introduction and spread of the large earth bumblebee *Bombus terrestris* L. into Victorian terrestrial environments.**

(Potentially Threatening Process)

**FLORA & FAUNA  
GUARANTEE**

**Date of receipt of the nomination:** 6 March 2000  
**Date of preliminary recommendation:** 14 March 2000  
**Date of final recommendation:** 5 September 2000

**File No.:** FF/54/0054

**Validity:** The nomination is for a valid item

**Prescribed Information:** The prescribed information was provided.

**Name of the Nominator** is adequately provided.

**Name and Description of the process:**

In the opinion of the SAC the process is adequately defined and described.

The nominated process is the introduction and spread of the large earth bumblebee *Bombus terrestris* L. into Victorian terrestrial environments. The Large earth bumblebee *Bombus terrestris* is a relatively large and hairy, primitively eusocial bee (invertebrate animal) that has its natural distribution throughout Europe. Mated queens hibernate during winter, and found their nests solitarily in the ground in spring. After the solitary onset of brood production, the size of the colony will increase exponentially over time until it consists of between 300 and 500 individuals: the founding queen plus workers. At that stage, sexuals (i.e. new queens and males) are produced. In cooler areas, colonies die at the beginning of autumn, when the newly eclosed queens mate and hibernate. In warmer areas, colonies can increase to larger sizes. In Tasmania, colonies of over a thousand individuals have been reported, and more than one generation of sexuals can be produced per season (Buttermore 1997). Bumblebees were first reported in Tasmania in 1992 (Low 1999).

*B. terrestris* is renowned for foraging under cool conditions (13°C, Corbet *et al.* 1993), and several plant species in Europe depend on bumblebees for their pollination. The flowers of such plants are morphologically adapted to pollination by bumblebees, either because they require a bee of a certain size (e.g. foxgloves) or weight (e.g. snapdragon) for pollination, or they need a large buzzer to release the pollen from porous anthers (many solanaceous species, e.g. Heinrich 1972).

This characteristic of buzz pollination makes bumblebees suitable to be used commercially to pollinate solanaceous vegetables such as tomatoes and capsicum in greenhouses, to which end they are employed in Europe, North and South America, Israel, Japan and New Zealand. Through their buzzing, bumblebees vibrate the dehiscent porous anthers thereby effectively releasing the pollen and causing pollination of the flowers. When bumblebees are used, crop yields increase by up to 10% compared to pollination using hand held electrical vibration (Banda & Paxton 1991). In Australia, tomatoes are now grown preferentially in greenhouses because of the possibilities for integrated pest control, but tomatoes in greenhouses need pollinators, and bumblebees are preferred by growers over electrical vibration. Therefore, tomato growers and hydroponics associations are pressuring the government to allow bumblebees to be introduced to the mainland of Australia.

**The range of flora or fauna affected or potentially affected was adequately stated in the nomination.**

**Significance of the threat which the potentially threatening process poses or has the potential to pose was adequately stated in the nomination.**

**Eligibility for listing as a potentially threatening process under the Flora and Fauna Guarantee**

The nominated item satisfies at least one criterion of the set of criteria prepared and maintained under Section 11 of the Flora and Fauna Guarantee Act 1988, and stated in Schedule 1 of the Flora and Fauna Guarantee Regulations 1991.

**Evidence that criteria are satisfied:**

**Criterion 5.1** *The potentially threatening process, in the absence of appropriate management, poses or has the potential to pose a significant threat to the survival of a range of flora or fauna.*

*Evidence:*

Bumblebees may compete for resources with nectarivorous birds (honeyeaters eg. Regent Honeyeater and Helmeted Honeyeater), specialised parrots (lorikeets and the endangered Swift Parrot *Lathamus discolor*), some native mammals (Pygmy-possum and Sugar Glider) and endemic bees, thus reducing the reproductive output of these native flower-loving fauna. Foraging of Bumblebees could lead to a reduction in seed set of native plants through nectar competition with their specialised pollinators. Bumblebee visitation to exotic plants may also lead to an increase of the number of weed species and proliferation of these species in the state.

**Sub-criterion 5.1.1** *The potentially threatening process, in the absence of appropriate management, poses or has the potential to pose a significant threat to the survival of two or more taxa.*

*Evidence:*

The Regent Honeyeater (critically endangered), Helmeted Honeyeater (endangered), Black-eared Miner (critically endangered) and the Swift Parrot (endangered) are FFG-listed species which may be affected by the introduction of the bumblebee to Australia through resource competition.

**Sub-criterion 5.2** *The potentially threatening process poses or has the potential to pose a significant threat to the evolutionary development of a range of flora and fauna.*

*Evidence:*

The potential threat to survival of species, as well as the potential to alter the foraging habits of flower-loving species could influence the evolutionary development of several taxa and communities.

**Additional Information**

- The species of bumblebee that appeared in Tasmania is known to visit 400 different exotic flowers in New Zealand alone (Low 1999).
- Ford *et al.* (1979, in Paton 1996) indicates that more than 100 species of birds have been recorded harvesting nectar from flowers in Australia. Most of these are species of honeyeater (genus Meliphagidae), some of which depend on nectar or similar carbohydrates for energy.
- Honeyeaters can defend floral resources from subordinates but they cannot prevent honeybees from removing a substantial share of the resources (Paton 1996). The introduction of bumblebees would add to this removal of nectar resource.
- Honeybees are known to alter the foraging patterns of birds in Australia with birds concentrating their foraging activity on the flowers least used by these bees (Paton 1996). Bumblebees have been shown to do the same to two species of native bees in Tasmania (Hingston & McQuillan 1999).
- The Regent Honeyeater, Helmeted Honeyeater and Black-eared Miner are FFG-listed species which may be affected by the introduction of the bumblebee to the Australian mainland. These honeyeaters and the miner are classified as 'endangered' or 'critically endangered' in Victoria (NRE 2000).

**Advertisement for public comment**

In accordance with the requirements of Section 14 of the Flora and Fauna Guarantee Act 1988, the preliminary recommendation was advertised for a period of at least 30 days.

The preliminary recommendation was advertised in:

'The Age' - on 21 June 2000

'The Weekly Times' - on 21 June 2000

The *Government Gazette* - on 29 June 2000

Submissions closed on 4 August 2000.

**Further evidence provided:**

No public comments were received by the Scientific Advisory Committee.

No evidence was provided to warrant a review of the Scientific Advisory Committee's preliminary recommendation that the taxon is not eligible for listing.

## Documentation

The published information provided to the SAC has been assessed. To the best of their knowledge, the SAC believes that the data presented are not the subject of scientific dispute and the inferences drawn are reasonable and well supported.

## Final Recommendation of the Scientific Advisory Committee

The Scientific Advisory Committee concludes that on the evidence available the nominated item is eligible for listing in accordance with Section 11 of the Act because primary criteria 5.1 and 5.2 have been satisfied. The SAC also concludes that sub-criterion 5.1.1 has been satisfied and that no evidence exists to suggest that primary criterion 5.1 cannot be satisfied as a consequence of sub-criterion 5.1.1 being satisfied.

The Scientific Advisory Committee recommends that the nominated item be supported for listing on Schedule 3 of the **Flora and Fauna Guarantee Act 1988**.

## Selected references:

- Banda, H. J. & Paxton, R. J. (1991) Pollination of greenhouse tomatoes by bees. *Acta Horticulturae* **288**: 194-198.
- Buttermore, R. E. (1997) Observations of successful *Bombus terrestris* (L.) (Hymenoptera: Apidae) colonies in southern Tasmania. *Australian Journal of Entomology* **36**: 251-254.
- Buttermore, R. E., Pomeroy, N., Hobson, W., Semmens, T. & Hart, R. (1998) Assessment of the genetic base of Tasmanian bumble bees (*Bombus terrestris*) for development as pollination agents. *Journal of Apicultural Research* **37**: 23-25.
- Corbet, S. A., Fussell, M., Ake, R., Fraser, R., Gunson, C., Savage, A. & Smith, K. (1993) Temperature and the pollinating activity of social bees. *Ecological Entomology* **18**: 17-30.
- Dafni, A. (1998) The threat of *Bombus terrestris* spread. *Bee World* **79**: 113-114.
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- Donovan, B. J. (1980) Interactions between native and introduced bees in New Zealand. *New Zealand Journal of Ecology* **3**: 104-116.
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- NRE (2000) *Threatened Vertebrate Fauna in Victoria - 2000. A systematic list of vertebrate fauna considered extinct, at risk of extinction or in major decline in Victoria*. Department of Natural Resources and Environment: Victoria.
- Paton, D. C. (1996) *Overview of Feral and Managed Honeybees in Australia: Distribution, abundance, extent of interactions with native biota and future research*. Invasive Species Program. Environment Australia: Canberra.
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- Semmens, T. D. (1996) Flower visitation by the bumble bee *Bombus terrestris* (L.) (Hymenoptera: Apidae) in Tasmania. *Australian Entomologist* **23**: 33-35.
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**Website:** The Possible introduction of Bumblebees for Pollination of Horticulture crops in Australia.  
<http://www.tmag.tas.gov.au/workshop/proceedings.html>

**Endorsement by the Convenor of the Scientific Advisory Committee**

**Date**

SIGNED BY

18 September 2000

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**Professor Virginia Studdert**  
**Convenor**