



Policy on Honey Bees

The Trustees' policy:

The Trustees recognizes that the pollination functions provided by native bees and other pollinators are essential for maintaining the integrity, productivity, and sustainability of many ecosystem types and, thus, the biodiversity of Massachusetts. Due to the many uncertainties regarding honey bees (a non-native species) and their impacts on native pollinators, placement of hives will only be permitted on Trustees' properties where commercial food crops are grown, specifically fruit and vegetable crops requiring insect pollination. At such properties, The Trustees will strive to protect populations of native pollinators and to educate visitors about the importance of native pollinators to ecosystems. In some circumstances, hives may be allowed at specific reservations as determined through a management plan or similar planning process.

The rationale for The Trustees' policy:

This conservative approach has been precipitated by a growing awareness and concern in recent decades for the conservation of native pollinators. It is widely believed that native bees, as well as other native pollinators such as flies, wasps, moths and butterflies, have experienced a decline in total population, though the challenges of sampling populations have made empirical data difficult to obtain. The causes for this decline may include habitat loss, widespread pesticide and herbicide use, and competition from introduced species including the honey bee.

Background information:

The honey bee (*Apis mellifera*) is an introduced species that was brought to North America in 1622 by European settlers for the production of honey.⁵ Over the course of the last four centuries, the species successfully established throughout the continental U.S. Although considerable evidence exists that honey bees compete with native pollinators for food resources and nesting sites,^{4,12} no experiment has definitively demonstrated that this competition has led to long-term reductions in the population of native pollinators.^{4,8,12} However, one study conducted in California on the Northern Channel Islands has shown that honey bees can out-compete native bees.¹¹ The removal of feral colonies of honey bees from one of the islands led to a rapid increase in the abundance and diversity of native bees.

Several recent studies have shown that honey bees may be less efficient pollinators of native plants than native bees.^{6,9,10} If honey bees are out-competing native bees and are less efficient pollinators, the reproductive success of native plants may decline. Of particular concern in this regard are plants with small populations, including rare plants.¹⁰

Honey bees may also cause competition for pollination services between native plants and invasive species, such as purple loosestrife (*Lythrum salicaria*). A recent study has shown that competition with purple loosestrife has adversely impacted the reproductive success of the native winged loosestrife (*Lythrum alatum*) by reducing the number of pollination visits the native receives, thus reducing the amount of seed it is able to produce.^{2,3} Further, a study conducted in California has demonstrated that a significant correlation exists between high seed production of a nonnative plant species, yellow star-thistle (*Centaurea solstitialis*), and high visitation levels by honey bees.¹ This suggests that honey bees may be a critical factor in the spread of this invasive plant.

There is widespread belief amongst the agricultural community that honey bees are necessary to pollinate agricultural crops, particularly row crops and berries. Although this may be true in the mid-western and western U.S., where large-scale monocultures have eliminated all native bee habitat, it is not true in all instances. For example, a study conducted in California demonstrated that on organic farms near natural habitat, native bee communities could provide full pollination services, even for crops with heavy pollination requirements (e.g., watermelon).⁷ Farms in the Northeast are generally much smaller in size than those in the mid-western or western U.S. and are often bordered by natural habitat that supports native pollinators. More research is needed to determine whether native pollinators can sufficiently pollinate agricultural crops in New England.

REFERENCES CITED

- 1) Bartell, JF; Thorp, RW; Mitchell, RJ; and Wenner, AM. 2001. Promotion of seed set in yellow star-thistle by honey bees: evidence of an invasive mutualism. *Ecological Applications*. 11(6): 1870-1883.
- 2) Brown, Beverly J. and Mitchell, Randall J. 2001. Competition for pollination: effects of pollen of an invasive plant on seed set of a native congener. *Oecologia*. 129 (1): 43-49.
- 3) Brown, Beverly; Mitchell, Randall J.; and Graham, Shirley A. 2002. Competition for pollination between an invasive species (purple loosestrife) and a native congener. *Ecology*. 83(8): 2328-2336.
- 4) Goulson, Dave. 2003. Effects of Introduced Bees on Native Ecosystems. *Annual Review of Ecology, Evolution, and Systematics*. vol. 34: 1-26. Retrieved January 2005 from: <http://arjournals.annualreviews.org>
- 5) Kellar, Brenda. Honey Bees Across America. Retrieved 4/21/2005 from: <http://www.orsba.org>
- 6) Keys, Roy; Buchmann, Stephen; and Smith, Steven. 1995. Pollination effectiveness and pollination efficiency of insects foraging *Prosopis velutina* in South-eastern Arizona. *Journal of Applied Ecology*. Vol. 32: 519-527.
- 7) Kremen, Claire; Williams, Neal; and Thorp, Robbin. 2002. Crop pollination from native bees at risk from agricultural intensification. *Proceedings of the National Academy of Sciences*. 99(26): 16812-16816. Retrieved January 2005 from: <http://pubmedcentral.nih.gov/articlerender.fcgi?artid=139226>
- 8) Mussen, Eric. 2002. Impact of Honey Bees on the California Environment. University of California, Davis. Retrieved January 2005 from: http://entomology.ucdavis.edu/faculty/Mussen/beebriefs/HB_and_CA_Native_Plants.pdf
- 9) Parker, FD. 1981. How efficient are bees in pollinating sunflowers? *Journal of the Kansas Entomological Society*. 54(1): 61-67.
- 10) Spira, TP. 2001. Plant-Pollinator Interactions: A Threatened Mutualism with Implications for the Ecology and Management of Rare Plants. *Natural Areas Journal*. 21(1): 78-88.
- 11) Wenner, Adrian and Thorp, Robbin. 1993. The Honey Bees of Santa Cruz Island. *Bee Culture*. 121(5): 272-275. Retrieved January 2005 from: <http://www.beesource.com/pov/wenner/bcmay1993.htm>

- 12) Xerces Society. Why the Xerces Society Does Not Work to Protect the European Honey Bee. Retrieved January 2005 from:
http://www.xerces.org/Pollinator_Insect_Conservation/Honey_bees.htm