



Eva Crane Trust

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Beekeeping round the World

Introduction of non-native bees to new areas

The world's present honey industry would not exist if honeybees (*Apis mellifera*) had not been introduced from Europe into continents that had no native *Apis*, notably the Americas and Australasia. It is therefore understandable that countries in the tropics just starting to develop their own honey industry look to the introduction of similar bees as a first step towards getting large honey crops. Those concerned may not even realize that they have their own valuable *Apis mellifera* or other *Apis* species. Introducing foreign bees can, however, have a negative result: it may prevent the successful development of apiculture and even destroy what already exists. The subject of introducing exotic bees is thus a very important one.

Whether bees should be introduced from another country

1. **Bees must never be introduced** unless: (a) they are completely healthy and without parasites; (b) they have no characteristic that is disadvantageous in their use for beekeeping (such as inbreeding, poor performance, unacceptable behaviour characteristics such as 'aggressiveness'); (c) the characteristics of native honeybees have been adequately assessed. To these points must be added: (d) no combs should ever be introduced, because some diseases can be transmitted by combs; the same applies to used beekeeping equipment. The above criteria must always be followed, in addition to points 2 to 8 below.

2. There is no apicultural objection, subject to restrictions in 1 above, to introducing bees to an isolated area **entirely without honeybees**, such as some Pacific islands.

3. Introduction of European-type *Apis mellifera* into an area **where no honeybees are native**, but where similar bees have previously been introduced (such as Central America), may be permissible. Such introductions may, however, result in hybridization with bees already there, which may or may not be desirable. In no circumstances should new bees be taken to a 'sanctuary' area where previously introduced bees have for some reason been isolated and now form a genetically valuable resource. An example is Kangaroo Island off South Australia, which has purer 'Italian' bees (*Apis mellifera ligustica*) than now exist in Italy or anywhere else⁷.

4. Where **native *Apis mellifera* bees exist**, there is danger in importing foreign bees of the same species, because new genes may then contaminate the local gene pool, and a genetic breeding resource may be lost. This may not matter if the bees in the area are already very mixed as a result of many past introductions, but if there are isolated populations, genes valuable for breeding may disappear for ever. This would be true of parts of Turkey or of North Africa.

5. Where there are **native tropical *Apis mellifera*** (as in tropical Africa), any temperate-zone introductions may well not survive, because they lack several adaptations to life in the tropics.

6. Where ***Apis cerana* is native** (in Asia), introducing *Apis mellifera* can have a variety of results¹. It may lead to the extinction of *Apis cerana*; this process is almost complete in Japan, for instance. Alternatively, competition between the two species may lead to the extermination of *Apis mellifera*, because *Apis cerana* is better at exploiting the local food resources. In other areas both may co-exist.

7. Where **any *Apis* species other than *mellifera* are present** (*cerana*, *dorsata*, *florea*), complications arise with the mating of queens of the introduced bees, because the sex pheromone that attracts drones to a queen is the same for all species. The presence of many drones of other species may prevent drones of the same species getting access to the queen and mating with her.

8. The results of introducing **tropical *Apis mellifera* from Africa** into Brazil in 1956 have been well documented⁶. In no circumstances should tropical African bees, or Africanized bees from America, be introduced elsewhere.

Points to consider if introductions are made

1. Point 1 in list above.

2. Bees should be introduced only under rigid quarantine conditions, and permissions for importations should be granted only to institutions and individuals that can maintain strict adherence to the quarantine requirements. The Director of Animal Quarantine in New South Wales, Australia, has described experimental quarantine procedures used there for imported honeybees³.

3. Bees should be imported only from countries:

- (a) that are free from serious bee diseases², and that have no bees with undesirable genetic characteristics;
- (b) that maintain effective quarantine and disease control programmes;
- (c) that can certify the health status of export shipments.

Pacific islands (including Hawaii) may well be the first choice, then New Zealand, and then certain careful suppliers in mainland USA and Canada.

4. The most common transport of bees is of a young mated queen in a cage with a few accompanying workers. The cage must be destroyed on receipt, and the workers (labelled according to the reference number of the hive into which the queen is introduced) sent to a competent authority for diagnostic examination. Only the queen should be allowed contact with bees or hive materials in the new area.

5. The best available way for introducing bees in bulk is to transport package bees, in new boxes that have had no previous contact with bees.

6. Insufficient information is available for comment on the introduction of productive *Apis cerana* into other tropical countries with less productive *Apis cerana*.

7. Before any major introduction is undertaken, a pilot scheme should be carried out in an area as isolated as possible. The behaviour of the introduced bees under local conditions should be studied; also, if other *Apis* species are present, any robbing, competition in foraging, or other interactions between species should be looked for.

8. As far as is known, adult bee diseases are not transmitted by immature stages of honeybees, and for this reason methods have been worked out for transporting honeybee brood in an incubator, without comb, from one continent to another⁴. Also, without risk of disease transmission, drone semen can be deep-frozen and transported⁵, and subsequently used for instrumental insemination of queens.

Successful introductions

Some successful introductions of European-type *Apis mellifera* have been made into territory of other *Apis mellifera* that are not too dissimilar from the native region of the introduced bees. Such importations have been on a large scale, so that hybridization between the wanted and unwanted bees was minimized, and importations have then been constantly repeated. An example is the introduction to Israel of *A. m. ligustica* (Italian bees) to replace the native *A. m. syriaca*, which are 'aggressive' and in other ways not easy to handle, and also not very productive. Dr. Y. Lensky of the Hebrew University of Jerusalem, Israel, has provided the following information:

Prior to the large-scale replacement of the native *A. m. syriaca*, observations on the introduction of Italian queens into *A. m. syriaca* colonies were made for several years. Introductions were successful when either mated queens or queen cells were placed into small *A. m. syriaca* colonies (2-3 frames covered with emerging workers). But the easiest way proved to be to split Italian colonies and to strengthen them with sealed brood from *A. m. syriaca* colonies.

Hybrid queens must constantly be replaced by Italian queens, because of the influx of *A. m. syriaca* drones across the frontiers with neighbouring countries. To preserve the Italian genes, every year we import several hundred Italian queens from California, USA, and Australia, and distribute these among queen breeders and beekeepers. The replacement of *A. m. syriaca* was achieved here because of the persistent efforts of the beekeepers and of the Extension Service of the Ministry of Agriculture.

Introductions have also been made, and maintained, in certain regions of other countries, including the People's Republic of China, Taiwan, Burma, and Thailand.

Conclusion

The greatest dangers in introducing new bees into an area are:

(a) the introduction of diseases and parasites: European and American foul brood, and acarine and *Varroa* mites, have been gratuitously introduced in this way into various countries, to the lasting detriment of their beekeeping;

(b) the loss for ever of genetic material that could be valuable for bee breeding;

(c) the introduction of unsuitable bees, with a resultant reduction in the productivity of beekeeping.

(d) the possible reduction of populations of native non-*Apis* bees (including stingless bees), through competition for food.

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