

## Hints and Tips for Using Wing Morphometry Data in Breeding Native Bees

1. The best use of wing morphometry is to help identify pure colonies for breeding and conversely to identify hybridised colonies to exclude from breeding stock.
2. If you have hybridised colonies then recovering pure native types from them will be near to impossible. You may be able to recover lines with the right wing morphometry but they will still carry mixed genetics, at least to some extent. However native bees do seem to be able to retain semi-pure stocks in at least some mixed areas, so it may be possible to derive near-native stocks from such mixed areas. This is a highly controversial area which could do with more study.
3. One exception to the need to exclude mixed colonies may come from colonies headed by a pure queen but inseminated by non-native drones. Such queens will produce pure native drones as they arise from unfertilised eggs, and so it may be acceptable to use them in mating sites for drone production. Interpretation of the scatter plots from such colonies requires care but the history of the line will be the best guide. An alternative may be to conduct morphometry on the drones themselves.
4. Native honeybees show wide adaptation to differing environments and to differing patterns of forage availability. On the continent ecotypes have been shown to be adapted for different conditions, including types adapted to heather production, and the same may apply in Scotland. For that reason it is sensible to be cautious about obtaining stock from a very different environment.
5. The natural spread of points on a scatter plot of native bee wings is wide. Don't discard a colony because it has some outliers - they may represent drifting bees, or natural variation. Don't discard a colony because of a wide scatter in the general Amm area of a plot for similar reasons. Indeed colonies with a tight cluster of points may be genetically inbred and not the best for breeding.
6. To select colonies for breeding native bees the ideal method is first to look for a mix of traits representative of the type: stocky short-limbed bees, brown to black bodies, brown hair, at most two orange spots on the first abdominal segment, narrow to medium tomentum on the abdominal segments and with long hairs on the abdomen tip. They will also make white cappings on honey stores and tend to have pollen in a broader arch or right round the brood nest. Suitable wing morphometry is then an additional guide and of course temper, productivity and other traits are important too.
7. Don't forget that significant numbers of flying bees drift between colonies and that selecting young bees for analysis is wise.

These data are offered as a guide to the wing morphometry for different bee races. Please regard them as provisional as they contain suggestions for the Hantel Index from an informal source. We should be able to check the HI ourselves, at least for two races, before long.

mellifera	DS negative	CI 1.3 to 2.1	HI 0.6 to 0.925
carnica	DS positive	CI 2.4 to 3.0	HI 0.925 to 1.2
caucasica	DS close to zero	CI 1.7 to 2.3	HI 0.6 to 1.2
ligustica	DS positive	CI 2.0 to 2.7	HI 0.6 to 1.2

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