

Sexual pheromones and DNA analyses as tools to recognise *Bombus terrestris* (L.) taxa

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Bombus terrestris is the most used bumblebee in European crop pollination. These commercial activities lead to the import of foreign populations in several countries and the escape of individuals from glasshouses cannot be avoided. The species is polytypic and subdivided in 9 taxa, *B. terrestris dalmatinus* being the mainly used one. In order to assess the risks of invasion and hybridization, we compare here the use of Cephalic Labial Glands (CLG) secretions analysis to DNA analysis. We sampled 5 subspecies of *B. terrestris*: *audax* (U.K.), *canariensis* (Canary Islands), *dalmatinus* (Rhodos Island), *terrestris* (Belgium) and *xanthopus* (Corsica). Moreover, a mixed population of *terrestris* and *lusitanicus* from Pyrénées-Orientales (France) was studied. *B. lucorum* and *B. ignitus* were used as outgroup. CLG secretions (including sexual pheromones) are analysed by Gas- Chromatography coupled with Mass Spectrometry (GC-MS). Concerning the genetical analysis, 2 mitochondrial genes were sequenced: Cytochrome Oxydase I and Cytochrome b. Both technics show some similar results. Insular taxa can be distinguished from continental ones by CLG compounds and genetics. On the contrary, only CLG analyses allow us to recognise the different continental taxa. The more they are geographically distant, the more their CLG secretions are different. This shows that the CLG secretions analysis is a very powerfull tool to identify the taxa of *Bombus terrestris*. As the CLG secretions are involved in species recognition, the hybridization risk is likely more important for the taxa which are geographically and genetically closer to the imported taxa.

Analysis of colony losses in Austria (2007/2008) - Strategies of monitoring and parameters to be tested

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In late February, March and April 2008, we made a survey at 7 beekeeping conventions. We questioned 335 Austrian beekeepers who over-wintered 14524 colonies in 2007. In spring 2008 beekeepers still had 12579 colonies, meaning losses of 13.4%. The losses ranged from 8.7% in Salzburg to 18.3% in Lower Austria, where the highest losses were reported. Analogous 115 questioned beekeepers in Southern Tyrol, Italy, reported 3508 surviving colonies in 2008 of 3999 colonies present in autumn 2007, equalling losses of 12.3%. This is the first time over-wintering success is documented in such a way for Austrian climate and beekeeping praxis, and we conclude that no extraordinary losses occurred during the winter 2007/08 in our investigation area. This monitoring was done because of the large losses in the US during the winter in 2006/2007, later entitled Colony Collapse Disorder, CCD. The