Palynology as a tool for assessing the benefit of flowering fallows for bees

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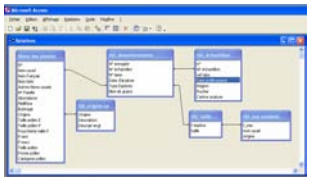
Network

(green: partner coordinating sites with or without fallow; yellow: partner realizing palynologics analyses)

We measured the impact of flower management on feeding resources used by honeybees, calculating the volume rate of pollen, according to the various farmed landscape patterns.

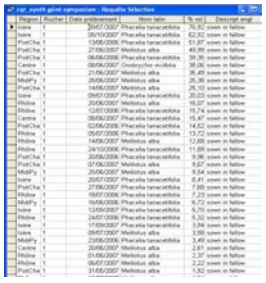
Five areas in France were observed in 2006 and 2007 *(see map above)*.

At each location beehives were placed at both a following fallow and non-flowering fallow of 2 to 4 hectares (*see maps at top right*).
Plants sown in fallows were chosen from those published by the European Common Agricultural Policy.
In the same time, a global monitoring has investigated on agronomical, apicultural, foraging and palynological aspects (Decourtye & Tisseur 2008).

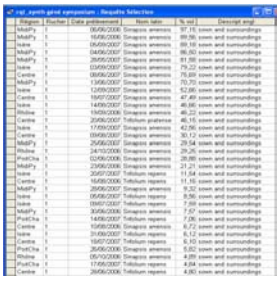


The Access Database table relations. 11129 data recorded in this experiment.

Results



Main scores for sown species only present in fallows.



Main scores for sown species present in fallows and surroundings

Optimal homogenized pollen sampling

Drying 48h 38° C
Mixing

4 x 1g sampling

Place in a beaker with water

Magnetic stirrer for 1h

2 drops per sample

1 drop per microscope slide

Use classical Louveaux method

Identification of >1000 grains/slide

Estimation of pollen volume for each species per sample

With 25 species sown in fallows, pollen identified 18 of these species.

Some floral species were very efficient in open-field landscapes with few feeding resources:

e.g. flowering fallows corresponding to 0.1% of the studied area (7 km²) can provide 90% of the pollen (Centre, June 2006).

Experimental site with flowering fallow

Experimental site without flowering fallow

3 beehives with pollen traps per site × 13-18 dates

Palynological identification of bee pellets

Identification of pollen using the laboratory's internet botanical and palynological database

http://www.poitou-charentes.inra.fr/entomologie

Conclusion

This program allowed two palynological French teams to calibrate a method for pellet analysis and to establish a comprehensive database.
Our results revealed a negative relationship between the quantity of semi-natural habitats in a landscape and the intensity of pollen hoarding by bees in flowering fallows.
However, this relationship although clearly the case for *Phacelia* is not verified by the Fabaceae species tested (*Melilotus, Onobrychis*). Contrary to *Phacelia*, Fabaceae species were present in both managed fallows and the surroundings, as was *Sinapis* which was highly visited in flowering fallows, (reaching 97% for Midi-Pyrénées, June 2006).
Our study shows that flowering fallows represent a good alternative feeding resource for bees in simplified landscapes.

References

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