Pollen resources of *Apis mellifera* in a rural landscape of North-Western France

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Apimondia Kiev
« Pollination and bee flora »

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Introduction

Colony needs diversity of floral resources for its development

Pollen resources exploited by honey bees may vary from one colony to another one

→ landscape ?
→ season and weather ?
→ colony?
→ needs linked to the development of the colony?
Introduction

Optimal flower map: myth or reality?

→ necessary pollens throughout the beekeeping season for a “good” development of the colony

In rural landscape with sedentary apiary?

→ cultivated plants may change from year to year
→ wild species

A few studies deal with honey bee resources
Introduction

Objectives:

→ evaluate pollen resources in rural landscape

→ determinate the foraging strategies of honey bee colonies

→ determinate which resources would be privileged
Material and Methods
Material and Methods

2 apiaries (France – Région Pays de la Loire), 20 colonies

Rural landscape → cultivated

2 beekeeping seasons (2011 et 2012)
Material and Methods

Botanical inventories of foraging area (1.5 km)
- landcover
- families and species of plants
- abundance of species (Braun-Blanquet)
- phenology of plants

Palynological analyses of pollen pellets
Weather and rate of brood production in North-Western France during the beekeeping season

Background information

Rate of brood production

Average rainfall (mm)
Average minimum temperature (°C)
Average maximum temperature (°C)

Sources: MétéoFrance

Pollen resources of *Apis mellifera* in a rural landscape of North-Western France
Results
Results: foraging area

- One apiary, beekeeping season 2012

- Botanical inventories:
  - 53 families, 159 species
  - 48.9% of cultivated areas (wheat, maize, sunflower)
  - 22.4% of natural grasslands, ditches and roadsides (grasses, dandelion, clover)
  - 6.3% of woods, copses and hedgerows (oak, poplar, alder, blackberry, sloe)
  - 7.9% of urban area (ornamental sloe, roses)
  - 14.5% of others
Results: flora and pollen

- **Significantly correlation** between botanical and pollen data (AFM)
- **Flowering species available** > **taxa of pollen gathered**

![Graph showing the number of taxa available for different types of flora and pollen data over the months.](Image)

- **Botanical data**:
  - Grasslands, ditches and roadsides
  - Cultivated areas
  - Hedgerows, woods and copses

- **Palynological data**:
  - Pollen taxa
Results: flora

Evolution of areas of **flowering plants**

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Results: pollen pellets

**Palynological analyses:**
- 52 families, **102 taxa**

**Diversity of pollens** gathered by honey bees with main pollens
Results: pollen pellets

- a wide choice of available resources from April to August
- the exploited resources are not detected before April and exhibit a low diversity until early July
Results: pollen pellets

Wild resources in grasslands, ditches and roadsides

- available resources occur throughout the whole beekeeping season
- exploited resources are detectable since February with a low diversity during the two first months of the season
Results: pollen pellets

Wild resources in woods, copses and hedgerows

- available resources correspond to sustainable species present principally at the beginning of the beekeeping season
- the diversity of exploited resources increases at the beginning of the beekeeping season
- scarcity of resources in August and at the beginning of September
Results: compilation of pollens gathered from the different landscape components

### Cultivated areas

- **Cultivated and wild species**
- **Cultivated species**
- **Wild species**

### Grasslands, ditches and roadsides

- **type Raphanus**
- **type Taraxacum**
- **type Veronica**

### Woods, copses and hedgerows

- **Salix**
- **Corylus**
- **Quercus**
- **Castanea**
Results: foraging strategies deduced from botanical and pollen data analysis.
Discussion

Pollen resources of *Apis mellifera* in a rural landscape of North-Western France
Diversity of resources in foraging areas with important cultivated areas (one half of foraging area studied)

Diversity of pollens gathered by honey bees with main pollens

Cultivated species in pollen pellets are punctual (end of the beekeeping season)

Wild species in pollen pellets are continuous

A lot of pollen species come from woods, copses and hedgerows
Discussion

• Cultivated landscape
  → cultivated areas > wild areas

• Wild species are much more exploited

• Importance of wild species BUT:
  → self-propagating plants removed by pesticides
  → mowing and grazing of grasslands and roadsides
  → attractiveness of species in ditches

• Importance to maintain the wild sustainable species present in woods, copses and hedgerows
Ensuring pollen resources for honey bees

Absence of hedgerows and woods:
→ low diversity of resources at the beginning of the beekeeping season
→ impact on the development of the colony

Beekeepers must pay particular attention to the choice of site for the apiary

Conduct of “landscape audits”
Thank you

Acknowledgements:

Beekeepers
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