Ethnobiological and ecological study of the black bee of the Cevennes bred in hollow chestnut trunks Conservation towards sustainable development

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Abstract **Apiary with beehives out of a hollow chestnut-trunk** is an extremely old and rustic beekeeping practice, which, in essence, supposes a minimal intervention of man. Accordingly, such apiary is undoubtedly the most respectful of the natural ecological dynamics. The very first man-made beehives are probably derived from the practice consisting of removing from the wild sections of hollow trunks that were spontaneously colonized by bees and by resettling them near dwellings. **Major specificities of this type of apiary lie in its permanency, its sedentary settlement and the total absence of chemical treatment.** Such specificities have contributed to the production of very typical primary products and by-products, which should all gain to be developed in a context of biological agriculture, sustainable development and fair trade. These specificities should also serve to the preservation of the **cultural and ecological heritage of the Cévennes**. However, the traditional ecological knowledge concerning this old-age beekeeping system is vanishing. It is of utmost importance to concomitantly assess the anthropological and ecological features of hollow trunk hives. This heritage value should be considered in the dramatic context of global change: through its key role as a sentinel species, the **black bee of the Cévennes** is, more than any other pollinator, dramatically sensitive to the ongoing changes in the region, and it may play a major role in informing the scientists about these changes. At the **interface between social sciences and ecological sciences**, the goal of this poster is to expose preliminary results of a near beginning research program that aims to **contribute to the creation of an efficient and protective management plan of the black bee in the Cévennes**.

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Research goals

- **analyse traditional ecological knowledge and related practices on the black bee of the Cévennes and trunk hives**
- **monitor the incidence of this sedentary beekeeping system on the surrounding biodiversity**

Material and Methods

- Semi directive interviews of 26 beekeepers were carried out to assess salient professional profiles and related motivations in keeping and maintaining trunk hives
- Measuring the diversity of invertebrates hosted by melliferous flora dominated by chestnut (*Castanea sativa)*. Measurements were made along a gradient of increasing distance from the apiary. Invertebrates were inventoried on 22 to 40 inflorescences (depending on blooming stage) of each chestnut tree along the transect.

Results

1) Typology of beekeepers

A Multiple Correspondence Analysis (MCA) was carried out to indentify the various types of actors involved in beekeeping in the Cévennes.
Axis 1 explains 57 % of variables and reflects the intensity of beekeeping activities (group 1 as opposed to other groups).
Axis 2 explains 42% of variability and reveals the importance of trunk hive within beekeping activities (trunk hive owners as opposed to Dadant hive owners).

-> Intensity of beekeeping and relative importance of trunk hives are major drivers of the typology

MCA reveals typology of beekeepers in the Cévennes (see related table below for color code)

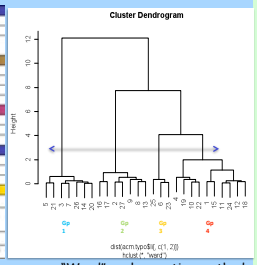
Group 1 is composed of people (mostly elders) who own trunk hives (RT) but do no longer keep the bees (No). Apiaries are left unmaintained (Abandonment) or poorly maintained (Maintenance, NU).

Group 2 is composed of people who own trunk hives and keep the bees (Exploitation, Yes). They also own langstroth hives (RT + RC). A fraction of these predominantly amateur keepers (Am) use trunk hives for tourism purposes (T) and militate among NGOs for the preservation of trunk hives. Another fraction maintain trunk hives for patrimonial interest to carry on tradition, without communication (P). Most of them are multi-active workers.

Group 3 is composed of professional beekeepers (AP, Pro, Yes), who militate among a professional beekeeper association (Ada) and own Dadant hives almost exclusively (RC).

Group 4 is more diffuse: it is a mix of amateur (Am) and professional (Pro) beekeepers (Yes). These people belong to beekeeping syndicates (UNAF) or are not members of any sort of organization (NC). They own both trunk and Dadant hives (RT + RC).

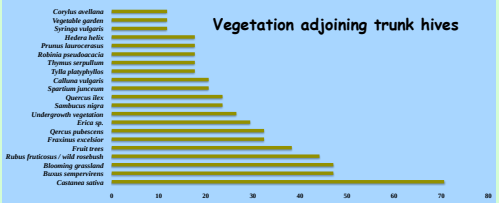
Criterias for analysis



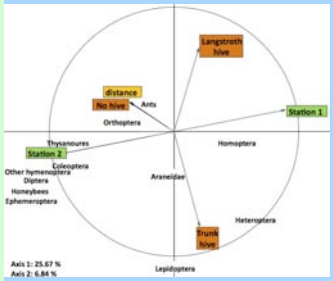
"Ward" agglomeration method based on MCA results discriminates 4 groups of actors

-> Four discriminated groups of actors characterizing beekeeping in the Cévennes

2) Impact on local biodiversity



-> Chestnuts, box, blooming grasslands, bramble bush, wild rosebushes and fruit trees are the most frequent vegetation nearby trink hives



Canonical correspondence analysis and associated correlation circle

-> The marked presence of Lepidopera seems increased near trunk hives but the representativity of axis 2 is too weak to enable firm conclusion.

Conclusion

- **Limited interest of professional beekeepers for this ancestral mode of beekeeping**
- **Trunk hive is more a hobby activity carried out by non professional beekeepers**
- **Trunk hives cannot compete with Dadant hives for honey production but are part of agri-evironmental schemes**
- **Consensus on the need to preserve the local black bee haplotype (rusticity, thrifty, well adapted to local environmental and climatic constraints)**
- **Further explore the differential impact on landscape biodiversity between sedentary (trunk hive) and transhumant (Dadant hive) apiaries**

Need to mobilize the various expertises and actors in order to create a local black bee conservatory that conciliates the high-yield production of langstroth apiaries and the traditional value of hollow-chestnut trunk apiaries

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