

Contribution to the knowledge of the parasitic genus *Orobanche* L. (Orobanchaceae) in Catalonia (northeastern Iberian Peninsula)

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Introduction

Holoparasitic plants stand out for their peculiar ecophysiology and, some like some species of *Orobanche*, for their economical importance as pests in Mediterranean crops. They establish a close connection with the phloem of their host plants by an **haustorium**, a modified root, by means of which they get water, carbon compounds and nutrients. Basically they have higher transpiration taxa at stem level than hosts and they act like **sinks**.

Parasitic plants are thought to be **key species** in ecosystems, as they can affect species diversity and nutrient cycling. Nevertheless, there is rather poor information about their ecology and distribution, what complicates the determination of some of their conservation status. What is more, recently many species have been newly cited for science and *Orobanche*'s phylogeny has been brought up for discussion.

Objectives

1. Quantify the change in *Orobanche*'s knowledge in Catalonia as of *Flora Manual dels Països Catalans* (Bolòs et al, 2005).
2. Characterize *Orobanche*'s species found in Catalonia.

Material and methods

- Meticulous revision of the latest published articles about *Orobanche*.
- Qualitative analysis of different traits of the Catalan *Orobanche* species.
- Data processed with EXCEL.

Relevant results

How has the knowledge of *Orobanche* in Catalonia changed?

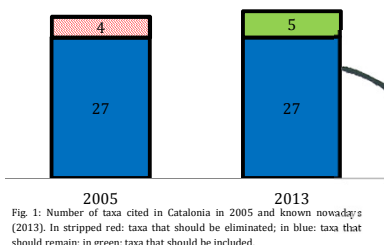


Fig. 1: Number of taxa cited in Catalonia in 2005 and known nowadays (2013). In striped red: taxa that should be eliminated; in blue: taxa that should remain; in green: taxa that should be included.

In comparison to Bolòs et al, 2005 there is a current tendency to include species in *Orobanche*'s knowledge. This is due to:

1. The description of **new species for the science**
2. The citation of **species in new localities**
3. The **correct identification** of species that were confounded with *Phelipanche mutellii* or *Phelipanche nana* (Fig. 1)

Species known in Catalonia (2013)

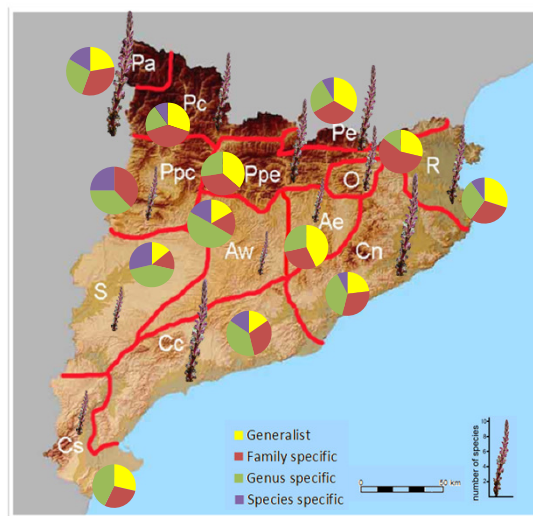
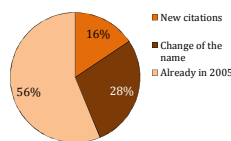


Fig. 2: Number of species per physiographical sector in which Catalonia is divided. Ae (East Aulo-segarric), Aw (West Aulo-segarric), Cc (Central Catalan), Cn (North Catalan), Cs (South Catalan), O (Olositanic), Pa (Pyrenees), Pc (Central Pyrenees), Pe (East Pyrenees), Ppc (Central Prepyrenees), Ppe (East Prepyrenees), R (Ruscine) and S (Sicoric). The degree of Catalan *Orobanche* specificity is included per sector.

Characterization of *Orobanche* species in Catalonia

Catalonia has happened to shelter a **remarkable richness** of *Orobanche* species, specially in the northern and coastal sectors. In central and southern sectors a lower richness is found due to the environmental austerity and probably the lack of sampling.

Specificity of Catalan *Orobanche* species is varied. Most of the species specific *Orobanche* are found in the west and central sectors of Catalonia (Fig. 2).

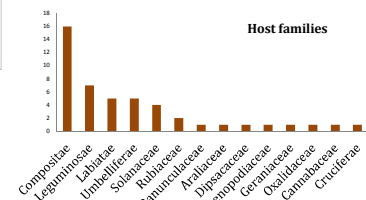


Fig. 3: Host families parasitized by Catalan *Orobanche*.

The most parasited family is **Compositae**, followed by **Leguminosae**. It is notable the fact that none **Poaceae** species are affected, in spite of being the second family with more number of species in Catalonia (Fig. 3).

State of the art

Recent molecular phylogenetic studies combining regions of nuclear ribosomal DNA (ITS) and **plastid genome sequences** give support to the fall of *Orobanche* s.l. into separate genera. In addition, the results match with **kariological** analysis.

Nonetheless, *Orobanche* s.l. is still recognized as a unique genera by some authors, as it is monophyletic. The groups inside *Orobanche* s.l. are not phylogenetically far and there are not extreme differences between them (Fig. 4).

A consensus is still missing with *Orobanche*'s phylogeny.

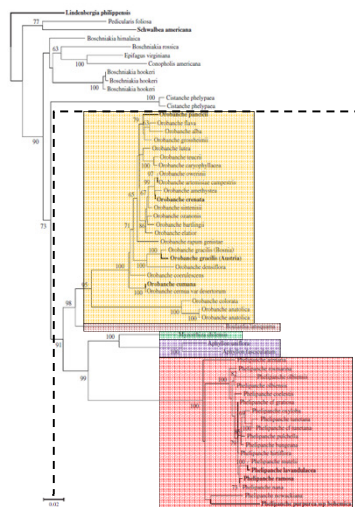


Fig. 4: *Orobanche* phylogeny where five separate genera are suggested (*Orobancha*, *Boulardia*, *Mycorrhiza*, *Aphyllon* and *Phelipanche*, all in colours). On the other hand, the broken line shows how *Orobancha* s.l. is monophyletic and could be considered a single genus. (Adapted from Piednoël et al, 2012)

Conservation

Orobanche and parasitic plants in general are **widely unknown**. This is their most relevant **threat**. They are known to be **key species** for the ecosystems and they are not even taken into account.

Endangered and possibly endangered species in Catalonia

Orobanche foetida Poir.



EN

Phelipanche camphorosmae



DD

Phelipanche portolicitana (A. Pujadas & M.B. Crespo)



DD

Threats

- Anthropoc frequency
- Sandy areas loss

Threats

- Iberian gypsum steppes (1520*) habitat alteration
- Segarra-Garrigues irrigation project

Conclusions

More information about *Orobanche*'s ecology and distribution is still needed in Catalonia. This lack of information leads to poor conservation suggestions for these holoparasites. It is necessary an exhaustive sampling in the Catalan territory. Moreover, it is important to raise public awareness of the importance of these holoparasites.