Lagascalia 19(1-2): 873-880 (1997)

# THE GENUS OROBANCHE L. (OROBANCHACEAE) IN THE PROVINCE OF ALMERÍA (SE OF THE IBERIAN PENINSULA)

ANTONIO PUJADAS SALVÁ & ANGEL LORA GONZÁLEZ

**Abstract**

A survey has been carried out in order to determinate the *Orobanche* species living in Almería, as well as their geographical distribution, ecological characteristics and hosts. A revision of the main national herbaria has also been made. The presence of a recently published new species, *O. almeriensis* A. Pujadas, and two new references, *O. schultzii* Mutel and *O. foetida* Poiret subsp. *broteri* Gṵimaraes, are pointed out.

## Introduction

The province of Almería is situated in the SE of the Iberian Peninsula, between 1º38'-3º12'E and 36º10'-37º55'N, covering an area of 8,774 sq. Km. It borders on Murcia and Granada to the North, on Granada to the West and on the Mediterranean to the South and South-East. It is the most arid region in Europe with annual rainfalls below 300 mm and the warmest province in Spain with an annual average temperature of 18ºC.

There are no specific works either on this genus in the Spanish territory. Although SAGREDO (1987) makes reference to 20 species of *Orobanche* in the province of Almería, he does not study in depth this subject. His work is limited to general descriptions and quotations from other authors, sometimes without verification and sometimes using synomyms that can lead into confusion. This simplified treatment is sometimes controversial, considering that this genus is taxonomically complex and has a wide distribution in the territory.

## Material & methods

We have been carrying out since 1986 a taxonomic and chorological study of the *Orobanchaceae* in Andalucía, concentrating on the province of Almería. We have accomplished the following:

1, A revision of the bibliography on existing species and their chorology, based mainly on WILLKOMM (1870, 1893), BECK VON MANNAGETTA (1890, 1930), CHATER & WEBB (1972), FERNÁNDEZ & al. (1991), SAGREDO (1987), and PUJADAS & LORA (1995).

2, A critical revision of the existing herbarium material in the main regional and national herbaria: ALME, BC, BCF, COA, COLEGIO LA SALLE DE ALMERÍA, GDA, GDAC, MA and MAF.

3, A floristic survey of the entire region in order to collect fresh material for easier an more accurate identification of the species, and the determination of their corresponding hosts. The samples from these collections are kept in the Herbarium COA.

4, For the identification and nomenclature we have mainly followed BECK VON MANNAGETTA (1890, 1930), TUTIN & al. (1964-1980), VALDÉS & al. (1987) and GREUTER & al. (1989).

## Results

Sixteen different species of *Orobanche* have been identified in the region. They are indicated in Table 1 and their geographical distribution in Fig. 1. Of these species we should point out that *O. almeriensis* was recently described as a new species for science (cf. PUJADAS & LORA, 1995), and the other two, *O. foetida* subsp. *broteri* and *O. schultzii* have never been quoted in the province.

Table 2 includes eight species for which there are bibliographical references but no herbarium material. Some of them such as *O. caesia*, *O. coerulescens* and *O. reticulata* have an Euroasiatic distribution and do not occur in the Iberian Peninsula, according to BECK VON MANAGETTA (1930); it is unlikely to find them in Almería. *O. purpurea* has a middle-European distribution, but it can occur in the NE of Spain. However its presence in our region is very doubtful.

As regards *O. clausonis*, (West-Mediterranean), *O. lavandulacea* (Steno-Mediterranean), *O. rapum-genistae* (West-European) and *O. variegata* (Tyrrhenic distribution), we should state that their presence in the territory could be possible, but they have not been found yet.

We have found 19 hosts for the different species of *Orobanche*. The hosts and their corresponding parasites are given in Table 3, as possible indicators to facilitate the identification of this species.

| | |
|---|---|
| Sect. *Trionychon* Wallr. | *O. gracilis* Sm. |
| *O. ramosa* L. | *O. foetida* Poiret subsp. *broteri* Guimaraes |
| *O. nana* Reuter | *O. alba* Stephan ex Willd |
| *O. mutelii* F.W. Schultz | *O. haenseleri* Reuter |
| *O. schultzii* Mutel | *O. crenata* Forskal |
| *O. laevis* L. | *O. amethystea* Thuill. |
| | *O. almeriensis* A. Pujadas |
| Sect. *Orobanche* (= Sect. *Osproleon* Wallr.) | *O. artemisiae-campestris* Vaucher ex Gaud. |
| *O. cernua* Loefl. | *O. minor* Sm. |
| *O. latisquama* (F.W. Schultz) Batt | |

Table 1. Species found in the province.

| Species | Sagredo (1987) | Fernández et al. (1991) |
|---|---|---|
| *O. caesia* Reichenb. | X | — |
| *O. clausonis* Pomel | X | X |
| *O. coerulescens* Stephan | X | – |
| *O. lavandulacea* Reichenb. | – | X |
| *O. purpurea* Jacq. | X | X |
| *O. rapum-genistae* Thuill. | X | X |
| *O. reticulata* Wallr. | X | X |
| *O. variegata* Wallr. | X | – |

Table 2. Bibliographical references to species for which no herbarium material was found.

## Key to the identification of the recognized taxa

1 Each flower subtended by 2 bracteoles, as well as by a bract ..... 2
Each flower subtended by a bract, bracteoles absent ..... 6

2. Corolla (18)21-30 mm, campanulate-infundibuliform, deep bluish-violet, whitish at base ..... ***O. laevis***
Corolla 12-21 mm, tubular-infundibuliform to narrowly campanulate, whitish at base, cream or blue distally ..... 3

3. Calyx (12)14-16 mm, teeth 1,5-2 times as long as tube ..... ***O. schultzii***
Calyx 4-10 mm, teeth equalling the tube. ..... 4

4. Stem 8-12 cm. Flowers few. Calyx-teeth triangular with acuminate filiform apex. Corolla with lobes of the lower lip acute, bright blue at apex. Anthers glabrous ..... ***O. nana***
Stem (7)12-31 cm. Flowers numerous. Calyx-teeth subulate or acuminate. Corolla with lobes of the lower lip obtuse, whitish or blue at apex. Anthers glabrous or hairy ..... 5

5. Stem 17-31 cm, branched. Calyx 4-6 mm. Corolla 12-15(17) mm, whitish or pale blue at apex. Parasite on cultivated plants ..... ***O. ramosa***
Stem (7)12-17 cm, usually simple, sometimes branched. Calyx 7-10 mm. Corolla (15)17-20 mm, pale to bright blue. Parasite on wild plants ..... ***O. mutelii***

6. Stigma purple at anthesis ..... 7
Stigma white, pinkish, yellow or orange at anthesis ..... 10

7. Lower lip of corolla glandular ciliate, many of the hairs on the corolla dark at least at base or apex ..... ***O. alba***
Lower lip of corolla not ciliate or subglabrous, hairs on the corolla colourless or pale yellow ..... 8

8. Calyx-segments connate for c. 1/2 their lenght ..... ***O. almeriensis***
   Calyx-segments free ..... 9

9. Calyx-segments unequally bifid or entire. Corolla often inflected near the base, glandular hairy, whitish or cream tinged with violet or brown at apex ..... ***O. amethystea***
   Calyx-segments unequally bidentate. Corolla not inflected near the base, glandular puberulent or subglabrous, whitish or yellowish ..... ***O. loricata***

10. Stigma white ..... 11
    Stigma yellow, orange or pinkish. ..... 13

11. Calyx-segments anterior and posterior largely connate. Corolla 25-30 mm, chalk-white tinged with purple veins towards the lips. Filaments inserted 8-12 mm above base of corolla ..... ***O. latisquama***
    Calyx-segments free or connate at base. Corolla (10)13-18 mm, white or dark violet-blue in the upper half. Filaments inserted 2-6(8) mm above base of corolla .... 12

12. Corolla inflected at base, constricted and inflected near the middle, dark violet-blue in the upper half. Filaments inserted (3)4-6(8) mm above base of corolla ..... ***O. cernua***
    Corolla tubular, slightly curved, not inflected at base, not constricted near the middle, whitish. Filaments inserted 2-3 mm above base or corolla ..... ***O. minor***

13. Lower lip of corolla not ciliate ..... 14
    Lower lip of corolla ciliate ..... 15

14. Corolla 18-28 mm, with large strongly divergent lips, glandular pubescent, white often with lilac veins. Filaments inserted 2-3(4) mm above base of corolla. Stigma yellowish,orange or pinkish ..... ***O. crenata***
    Corolla (11)13-16 mm with short lips, subglabrous, dark purplish-red. Filaments inserted 1-2 mm above base of corolla. Stigma yellow ... ***O. foetida*** subsp. ***broteri***

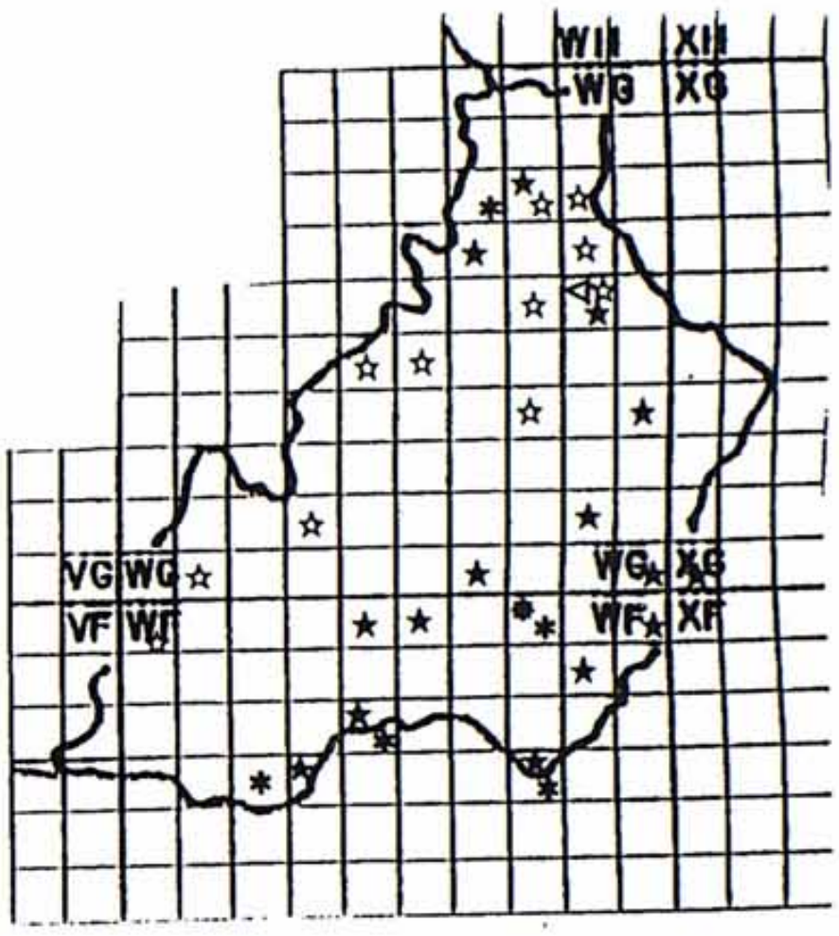
15. Corolla shining dark red inside ..... ***O. gracilis*** var. ***gracilis***
    Corolla not shining dark red inside ..... 16

16. Corolla (16)18-24 mm, yellow to ochreus with red or brown veins. Filaments inserted 1-2(2,5) mm above base or corolla ..... ***O. gracilis*** var. ***spruneri***
    Corolla 20-25 mm, reddish-orange. Filaments inserted (2)4-5 mm above base of corolla ..... ***O. haenseleri***

**MAP 1**

Sect. *Trionychon*

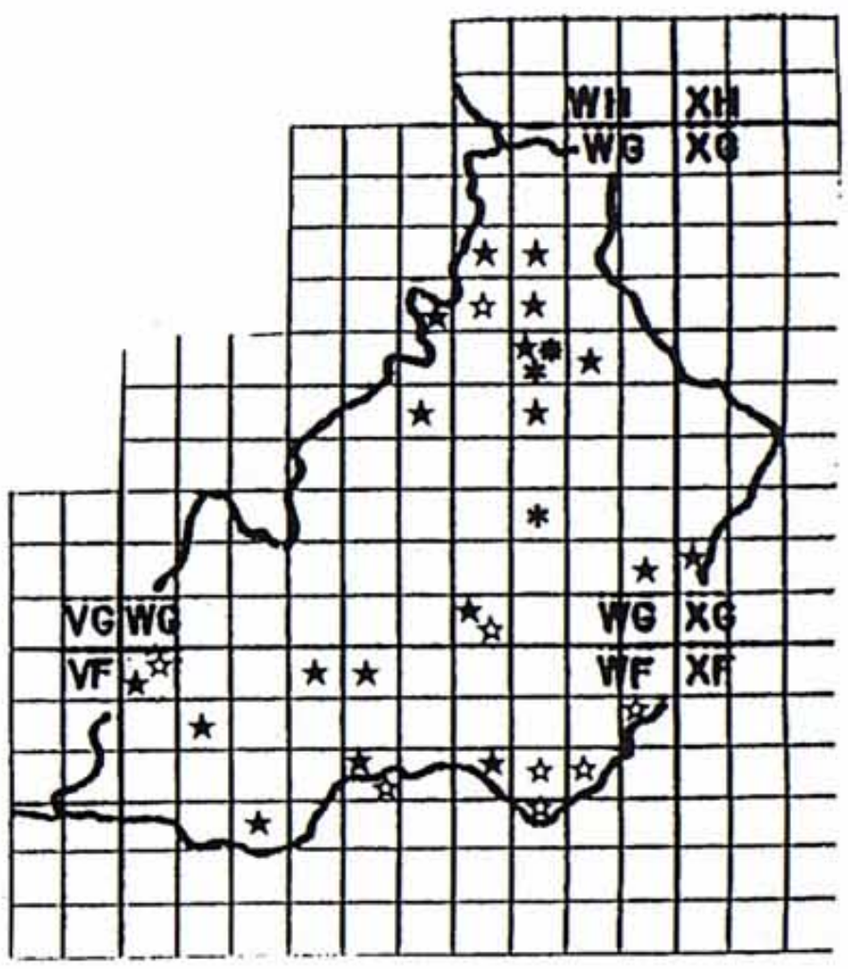
*O. ramosa* ●
*O. nana* ✱
*O. mutelii* ★
*O. schultzii* ◁
*O. laevis* ☆




**MAP 2**

Sect. *Orobanche*, Grex *Minores*

*O. amethystea* ★
*O. almeriensis* ✱
*O. loricata* ●
*O. minor* ☆




**MAP 3**

Sect. *Orobanche*

*O. cernua* ★
*O. alba* ◁
*O. haenseleri* □
*O. crenata* ■
*O. latisquama* ☆
*O. gracilis* ✱
*O. foetida* subsp. *broteri* ◀

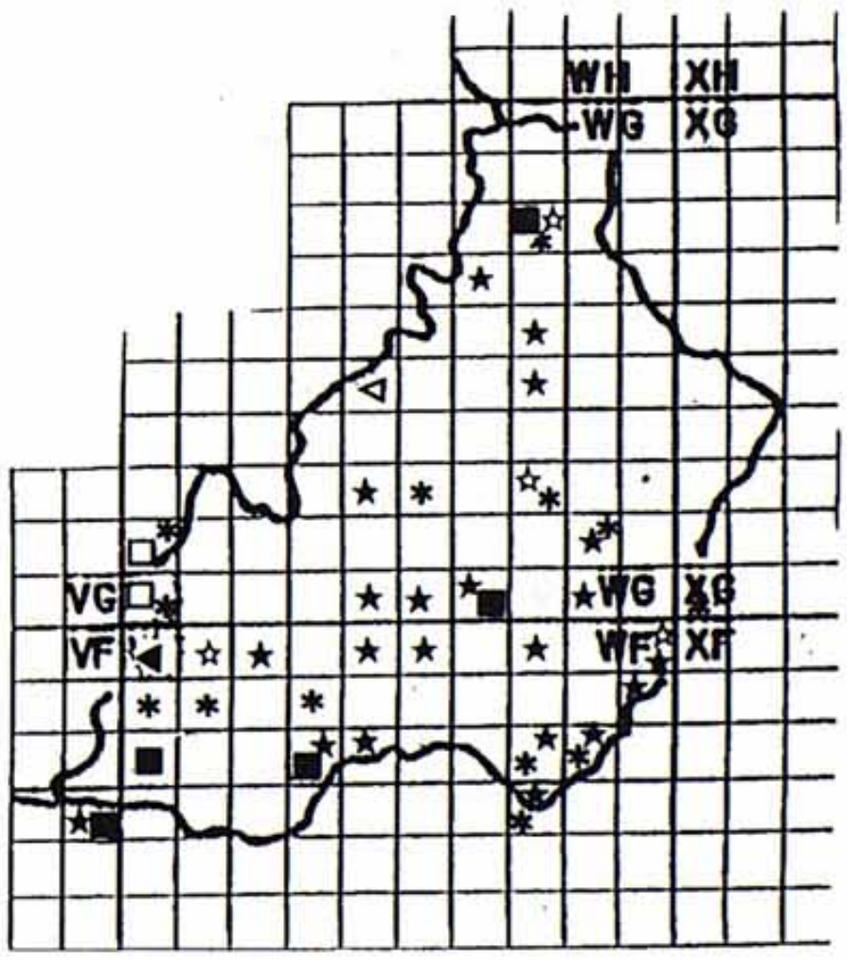



Fig. 1. Distribution in Almería province of the recognite taxa of *Orobanche*.

| Host | *Orobanche* |
|---|---|
| Compositae | |
| *Aetheorhiza bulbosa* (L.) Cass. | *O. nana* |
| *Andryala ragusina* L. | *O. almeriensis* |
| | *O. amethystea* |
| *Artemisia barrelieri Besser* | *O. cernua* |
| | *O. mutelii* |
| *Artemisia glutinosa* Gay ex Besser | *O. cernua* |
| | *O. laevis* |
| *Asteriscus maritimus* (L.) Less. | *O. cernua* |
| *Launaea lanifera* Pau | *O. cernua* |
| Labiatae | |
| *Ballota hirsuta* Bentham | *O. minor* |
| *Rosmarinus eriocalyx* Jordan ex Fourr. | *O. latisquama* |
| *Rosmarinus officinalis* L. | *O. latisquama* |
| Leguminosae | |
| *Anthyllis cytisoides* L. | *O. gracilis* |
| *Coronilla juncea* L. | *O. gracilis* |
| *Dorycnium pentaphyllum* Scop. | *O. gracilis* |
| *Erinacea anthyllis* Link | *O. gracilis* |
| *Genista baetica* Spach | *O. gracilis* |
| *Leguminosae* crops | *O. crenata* |
| *Trifolium repens* L. | *O. foetida* subsp. *broteri* |
| *Ulex parviflorus* Pourret | *O. gracilis* |
| Ranunculaceae | |
| *Helleborus foetidus* L. | *O. haenseleri* |
| Umbelliferae | |
| *Eryngium campestre* L. | *O. amethystea* |

Table 3. Hosts associed with different *Orobanche*, as indicators to facilitate identification.

## Conclusions

1, A very high floristic diversity occurs in the province with a total of 16 species, if compared with the 14 species existing in the British Isles (RUMSEY & JURY, 1991), the 22 species in Andalusia (PUJADAS & al., 1994), the 31 species in the Iberian Peninsula (CHATER & WEBB, 1972), the 30 species in Middle Europe (KREUTZ, 1995) or the 48 species in the rest of Europe (CHATER & WEBB, 1972).

2, The fact of finding a new species for science (*O. almeriensis*) and two new species for the territory (*O. foetida* subsp. *broteri* and *O. schultzii*) allows us to point out that the genus *Orobanche* has not been studied in detail from a taxonomic and chorollogical point of view. Moreover these species are rarely collected and poorly represented in the Herbaria.

3, As a consequence it is necessary to continue collecting material and to further study the taxonomy of these species.

**Acknowledgements**

Research partially granted by PB93-1211 of DGICYT, Ministerio de Educación y Ciencia, Spain.

**References**

BECK VON MANNAGETTA, G. (1890). Monographie der Gattung Orobanche. *Bibliotheca Botanica* **19**: 1-275

—— (1930). Orobanchaceae. In: A. ENGLER (ed.), *Das Pflanzanreich* **96 (IV-261)**: 1-348. Berlin.

CHATER, A. O. & D. A. WEBB (1972). Orobanche. In: T. G. TUTIN & al. (eds.), *Flora Europaea* **3**: 286-293. Cambridge.

FERNÁNDEZ, C., Mª. C. CRUZ, M. LÓPEZ PULIDO, C. AMEZCUA & D. CASADO (1991). *Flora de Andalucía. Catálogo bibliográfico de las plantas vasculares*. Jaén.

GREUTER, W. R., H. M. BURDET & G. LONG (1989). *Med-Checklist* **4** *(Lauraceae-Rhamnaceae)*. Genève.

KREUTZ, C. A. J. (1995). *Orobanche. The European broomrape species. Central and Northern Europe*. Maastricht.

PUJADAS, A. & A. LORA (1995). Orobanche almeriensis A. Pujadas (oroban chaceae), nueva especie del sureste de la Península Ibérica. *Anales Jard. Bot. Madrid* **53(1)**: 47-53.

PUJADAS-SALVO, A., E. HERNÁNDEZ-BERMEJO & J. A. R. OLIVEIRA-VELLOSO (1994). The Genus Orobanche in Andalusia (southern Spain): Taxonomical, chorological & Ecological aspects. In: A. H. PIETERSE, J. A. C. VERKLEJ & S. J. TER BORG (eds.), *Biology and management of Orobanche*: 132-137. Amsterdam.

RUMSEY, F. J. & S. L. JURY (1991). An account of Orobanche L. in Britain and Ireland. *Watsonia* **18**: 257-295.

SAGREDO, R. (1987). *Flora de Almería*. Almería.

TUTIN, T. G., V. H. HEYWOOD, N. A. BURGES, D. M. MOORE, D. H. VALENTINE, S. M. WALTERS & D. A. WEBB (eds.) (1964-1980). *Flora Europaea* **1-5**. Cambridge.

VALDÉS, B., S. TALAVERA & E. FERNÁNDEZ-GALIANO (eds.) (1987). *Flora Vascular de Andalucía Occidental* **1-3**. Barcelona.

WILLKOMM, H. M. (1870). Orobanchaceae. In: H. M. WILLKOMM & J. LANGE (eds.), *Prodromus Florae Hispanicae* **2**: 620-632. Stuttgart.

—— (1893). *Supplementum prodromi florae hispanicae*. Stuttgart.

**Adrress of the authors:**

Dr. A. Pujadas Salva & Dr. A. Lora González, Departamento de Ciencias y Recursos Agrícolas y Forestales, E.T.S.I.A.M., Universidad de Córdoba, and Jardín Botánico de Córdoba, Avda. de Linneo, s/n, 14004 Cordoba, Spain.