

The Ecology of *Serapias perez-chiscanoii* C. Acedo in Alentejo Portugal

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Abstract: Pereira, M., Venhuis, C. & Gutierrez, F. *The Ecology of Serapias perez-chiscanoii* C. Acedo in Alentejo Portugal. *Lazaroa* (2008).

We present you results of the settlement of the orchid *Serapias perez-chiscanoii*, which we measured in the period from 2002 to 2007 in the region of Vila Nova de Baronia – Baixo Alentejo. After a short biophysical characterization of the area, we present the biology and phytogeographical distribution of the co-occurring flora. Further more, its reproduction is explained. We have classified the vegetation types in which it grows and we used the Braun-Blanquet method to do so. We point out the human influence that have affected this habitat for the past 6 years and analysed its consequences on the floral-structure and composition of the studied vegetation types in which it integrates the specie studied.

Resumen: Pereira, M., Venhuis, C. & Gutierrez, F. *La Ecología de Serapias perez-chiscanoii* C. Acedo en Alentejo Portugal. *Lazaroa* (2008).

Se presentan los resultados de la herborización de orquídeas *Serapias perez-chiscanoii*, realizados a partir de 2002 a 2007 en la región de Vila Nova da Baronia - Baixo Alentejo. Después de una breve caracterización biofísica de la área de trabajo, se analiza la biología y la distribución fitogeográfica de las comunidades estudiadas. Además, su reproducción se explica. En el análisis de las comunidades vegetales donde se ha incorporado, aplicamos el método de Braun-Blanquet o sigmatista clásico. Se señala la influencia humana que han afectado a este hábitat de más de 6 años y se analiza sus consecuencias en la composición de la flora y la estructura de las comunidades en la que se integra la especie estudiada.

INTRODUCTION

The rare orchid specie *Serapias perez-chiscanoii* stablish populations on the Iberian Peninsula that deserve our attention, not only for its rarity, but also by the particular beauty of the flowers. In fact the species *Serapias perez-chiscanoii* C. Acedo is found only in the Guadiana river basin of Extremadura (Spain) and adjacent Portugal. Though some authors have doubts about the taxonomic validity, VENHUIS & al. (2004) consider *Serapias perez-chiscanoii* as a distinct species because it has a very stable and uniform morphological appearance, a deviant habitat and reproductive behaviour.

The present paper aims at providing a contribute to the inventory, phytosociological and syntaxonomical classification and of the *Serapias perez-chiscanoii* C. Acedo in Portugal, particularly in Baixo Alentejo, based on the fieldwork and research literature, supplemented by comments of a personal nature.

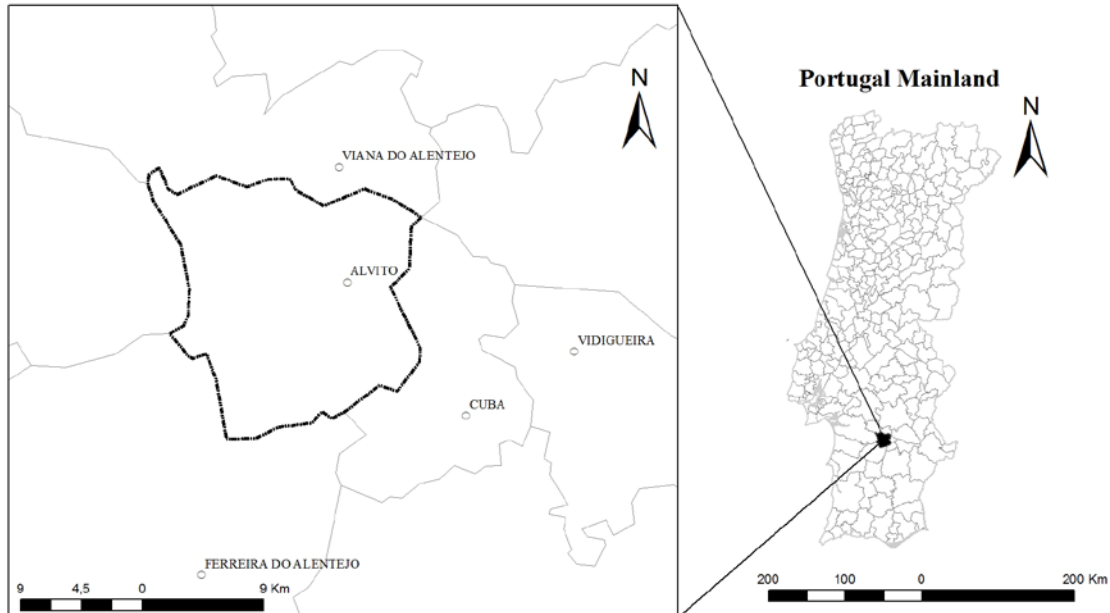
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STUDY AREA

The object of this study are Vila Nova da Baronia, a Portuguese parish of the Alvito County, located in Baixo Alentejo, with 124.54 km² of area, 1 328 inhabitants (2001) and a density of 10.7 per/ km². Is located around 175 km from the country's capital, Lisbon (Fig.1).



Source: Agência Portuguesa do Ambiente (2008).

Figure 1.—Study area.

According the biogeographic map of COSTA & *al.* (2002) and RIVAS-MARTÍNEZ & *al.* (2004), the territory studied is included in Mediterranean West Iberian Province (Lusitan-Extremadurean Subprovince, Marianic-Monchiquensean Sector and Baixo Alentejano-Monchiquense Subsector). The bio-climatic characterization of the studied area, according the terminology of RIVAS-MARTÍNEZ & *al.* (2002), can be considered on the Upper Mesomediterranean belt and Lower sub-humide ombrotype. The climate in this southern region of Portugal presents a strong Mediterranean feature. This is reflected especially in relatively low and concentrated rainfall in winter, high average temperatures, high thermal amplitude, relatively low humidity, low cloudiness and high insolation and solar radiation in summer.

Geologically speaking, the Alvito County, and subsequently the parish of Vila Nova da Baronia, is located in the boundary between the ancient Antemesozoic formations, belonging to the Western Edge of the Hesperic Massif, at the southwest zone of Ossa-Morena, and the modern Mesocenoic formations form the western edge, locally represented by the Cenozoic formations of the basin of the River Sado. In this basin occurs Litolitic soil, non-humic of microphyritic rocks and Lithosoils. The current land use is predominantly forest-pasture.

DATA AND METHODS

For the identification of regional flora and the species nomenclature follows ALCARAZ & *al.* (1991), CASTROVIEJO & *al.* (1986, 1990, 1993 a, 1993 b, 1997 a, 1997 b, 1998, 1999, 2000, 2001, 2003, 2005), FRANCO (1971, 1984), FRANCO & AFONSO (1994, 1998, 2003) and VALDÉS & *al.* (1987).

The analysis of the natural vegetation following the phytosociological method of the Zurich-Montpellier school or sigmatist method of Braun-Blanquet (BRAUN-BLANQUET, 1979; GÉHU & RIVAS-MARTÍNEZ (1981).

RESULTS

Two hundred and thirty-nine taxa were found in the settlements made in the survey area, and where it was identified the orchid *Serapias perez-chiscanoi*. Composition in terms of families and genus (50 families and 147 genus in all).

Four Lusitanian endemic species have been recorded in the study área (*Ulex australis* Clemente subsp. *welwitschianus* (Planchon) Espírito-Santo, Cubas, Lousã, Pardo & Costa, *Myosotis lusitanica* Schuster, *Hyacinthoides vicentina* (Hoffmans. & Link) Rothm. subsp. *transtagana* Franco & Rocha and *Allium pruinaum* Link.), seven Iberian (*Rumex bucephalophorus* L. subsp. *hispanicus* (Steinh.) Rech. fil., *Adenocarpus complicatus* (L.) Gay, *Conopodium marianum* Lange, *Thapsia nitida* Lacaita, *Fritillaria lusitanica* Wikström, *Gladiolus illyricus* and *Serapias perez-chiscanoi* C. Acedo) and five Europeans (*Genista hirsuta* Vahl subsp. *hirsuta*, *Lavandula luisieri* (Rozeira) Rivas-Martínez, *Anarrhinum bellidifolium* (L.) Willd., *Linaria sparteae* (L.) Willd. subsp. *sparteae* and *Pulicaria paludosa* Link.)

The specie *Serapias perez-chiscanoi* C. Acedo, it was referenced to the Guadiana basin, and extended their distribution area to be collected in a region that belongs to the Sado basin. It is indifferent edaphic specie and has a preference for fresh and slightly flooded locations as well temporarily nitrified.

Here one can observe “in loco” the flowering period from April to May. The populations of this orchid specie was identified in cork oak (*Quercus suber*) woodlands and the highest number of this *taxa* was found in edges of the shrub community of *Ulex australis* subsp. *welwitschianus* and *Cistus ladanifer*.

Finally, a reference to the communities and associations, that takes place on the *Serapias perez-chiscanoi* habitats, from RIVAS-MARTÍNEZ & *al.* (2001, 2002).

Synthetic tables and releves of the most representative communities and associations are presented below:

EPHEMERAL WETLANDS VEGETATION

I. *Isoeto-Nanojuncetea* Br.-Bl. & Tüxen *ex* Westhoff, Dijk & Passchier 1946

1. *Junco pygmaei-Isoetetum velati* Rivas Goday 1956

Lusitan-Extremadurean Annual Grasslands, where *Juncus spp.* and *Isoetes velatum* dominates. This Grassland type contains limo-sandy soils, which are flooded in winter and spring and drying in the summer period.

Synthetic table of *Junco pygmaei-Isoetetum velati* Rivas Goday 1956, at Vila Nova da Baronia (38° 05' N e 07° 01' W), depression, SW, 2 m². **Characteristics:** 3 *Juncus pygmaeus*, 2 *Isoetes vellatum*, 2 *Juncus bufonius*, 2 *Juncus capitatus*, 2 *Solenopsis laurentia*, 1 *Illecebrum verticillatum*, 1 *Isolepis cernua*, 1 *Cicendia filiformis*, 1 *Juncus tenageia*, 1 *Chaetopogon fasciculatus*, 1 *Radiola linoides*, 1 *Isolepis pseudosetacea*, 1 *Exacullum pusillum*, 1 *Lotus hispidus*, 1 *Juncus hybridus*, 1 *Centaureum maritimum*, 1 *Lythrum hyssopifolia*. **Companions:** 2 *Pinguicula lusitanica*, 2 *Sagina apetala*, 1 *Serapias perez-chiscanoi*, 1 *Serapias strictiflora*, 1 *Myosotis welwitschii*, + *Pulicaria odora*.

2. *Periballio laevis-Illecebretum verticillati* Rivas Goday 1954

Micro-terophytic Grassland, Mesomediterranean and Lusitan-Extremadurean, with preference for oligotrophic soils, siliceous and soils poor in nutrients. Cover flooded depressions in winter and early spring and are dominated by *Centaureum maritimum*, *Chaetopogon fasciculatus*, *Illecebrum verticillatum*, *Juncus capitatus*, *Molineriella laevis* and *Silene laeta*.

3. *Loto hispidi-Chaetopogonetum fasciculati* Rivas-Martínez & Costa in Rivas-Martínez, Costa, Castroviejo & E. Valdés 1980 *nom. mut. propos.*

Association dominated by *Chaetopogon fasciculatus*, thermomediterranean and Lusitan-Extremadurean, in sandy soils pumped full during the winter.

LACUSTRIAN AND FONTINAL VEGETATION

II. *Isoeto-Littorelletea* Br.-Bl. & Vlieger in Vlieger 1937

4. Community of *Juncus bulbosus* and *Myosotis lusitanica*

Helophytic community of margins of ponds subject to periodic submersion by mesooligotrophic waters, dominated by *Juncus bulbosus* and *Myosotis lusitanica*, at 273 m.s.m. of average altitude. May belong to the *Isoeto-Littorelletea* class, to *Littorelletalia* order and to *Hyperico elodis-Sparganion* alliance.

Synthetic table of the Community of *Juncus bulbosus* and *Myosotis lusitanica*, at Vila Nova da Baronia (38° 05' N e 07° 01' W), ponds, 2 m². **Characteristics:** 3 *Juncus bulbosus*, 2 *Myosotis lusitanica*. **Companions:** 2 *Silene laeta*, 2 *Cicendia filiformis*, 2 *Pinguicula lusitanica*, 1 *Juncus bufonius*, 1 *Isolepis cernua*, 1 *Serapias lingua*, 1 *Serapias strictiflora*, 1 *Juncus capitatus*, 1 *Isolepis pseudosetacea*, + *Serapias cordigera*.

III. *Montio-Cardaminetea* Br.-Bl. & Tüxen ex Br.-Bl. 1948

5. *Myosotido stoloniferae-Ranunculetum omiophylli* Rivas-Martínez, Fernández-González, Pizarro, Sánchez-Mata & sardinero 2002 1980 (*ass. nova*)

Mesomediterranean community of small ponds little deeper, fed by an ephemeral cold and oligotrophic water nascent, dominated in the study area by *Ranunculus omiophyllus*. It is located at 272 m.s.m. of average altitude.

Synthetic table of the *Myosotido stoloniferae-Ranunculetum omiophylli* Rivas-Martínez, Fernández-González, Pizarro, Sánchez-Mata & sardinero 2002 1980 (*ass. nova*), at Vila Nova da Baronia (38° 05' N e 07° 01' W), brook, 4 m². **Characteristics:** 4 *Ranunculus omiophyllus*. **Companions:** 3 *Callitriche stagnalis*, 2 *Glyceria declinata*, 2 *Myosotis laxa* subsp. *caespitosa*, 2 *Juncus bufonius*, 2 *Isolepis cernua*, 1 *Lythrum hyssopifolia*, 1 *Juncus hybridus*.

TEROPHYTIC GRASSLANDS

IV. *Tuberarietea guttati* (Br.-Bl. *in* Br.-Bl., Roussine & Nègre 1952) Rivas Goday & Rivas-Martínez 1963 *nom. mut. propos.*

6. *Trifolio cherleri-Plantaginetum bellardii* Rivas Goday 1958

Terophytic and non-nitrophilous Lusitan-Extremadurean meadow, with a spring phenology that develop on oligotrophic siliceous soils. It is the most common association of the herbaceous stratum and is dominated by *Plantago bellardii*, *Vulpia bromoides*, *Xolantha guttata*, *Ornithopus pinnatus*, *Briza maxima* and *Tolpis barbata*.

MESOPHYTIC PERENNIAL GRASSLANDS

V. *Stipo giganteae-Agrostietea castellanae* Rivas-Martínez, Fernández-González & Loidi 1999

7. *Gaudinio fragilis-Agrostietum castellanae* Rivas-Martínez & Belmonte 1986

Mesomediterranean Grasslands, Mediterranean West, on slopes slightly sloping with rain water seepage, dominated by *Agrostis castellana* and *Gaudinia fragilis*.

SUB- SHRUBS SERAL GRASSLANDS

VI. *Calluno-Ulicetea* Br.-Bl. & Tüxen *ex* Klika & Hadac 1944

8. *Halimio ocymoidis-Ericetum umbellatae* Rivas Goday 1964

Low shrub formations with “Estevais-urzais” (*Cistus ladanifer*, *Cistus salvifolius*, *Cistus crispus*), “urzes” (*Calluna vulgaris*, *Erica umbellata*, *Erica scoparia*), “tojos” (*Genista triacanthos*, *Ulex australis* subsp. *Welwitschianus*) and “rosmaninhos” (*Lavandula luisieri*), on low deep oligotrophic, beheaded, leachate soils and strongly acidified on the surface, Meso to Supra-Mediterranean, Sub-humid to Humid and Mediterranean West distribution.

VII. *Cisto-Lavanduletea* Br.-Bl. *in* Br.-Bl., Molinier & Wagner 1940

9. Community of *Ulex australis* subsp. *welwitschianus* and *Cistus ladanifer*

Shrub community on Litolic and Mediterranean soils, dominated by *Ulex australis* subsp. *welwitschianus* and *Cistus ladanifer*, accompanied by several

Nanophanerophytes. Is one of the advanced degradation stage of cork oak woodlands of *Asparago aphylli-Quercetum suberis*.

This community may belong to the *Lavanduletalia stoechadis* order and to *Ulici argentei-Cistion ladaniferi* alliance.

Synthetic table of the **Community of *Ulex australis* subsp. *welwitschianus* and *Cistus ladanifer***, at Vila Nova da Baronia (38° 16' N e 08° 00' W), slopes with low inclination, 60 m². **Characteristics:** 3 *Ulex australis* subsp. *welwitschianus*, 2 *Cistus ladanifer*, 2 *Lavandula luisieri*, 2 *Cistus salvifolius*, 1 *Cistus crispus*, + *Orchis morio* subsp. *champagneuxii*. **Companions:** 3 *Genista triacanthos*, 2 *Asphodelus fistulosus*, 2 *Elaoselinum foetidum*, 2 *Briza maxima*, 2 *Calluna vulgaris*, 2 *Daphne gnidium*, 1 *Pulicaria odora*, 1 *Leontodon taraxacoides* subsp. *longirostris*, 1 *Tolpis barbata*, 1 *Vulpia bromoides*, 1 *Arrhenatherum album*, 1 *Asterolinon linum-stellatum*, 1 *Hypochaeris glabra*, + *Thapsia villosa*, + *Urginea maritima*, + *Ornithogalum broteroi*, + *Serapias perez-chiscanoi*, + *Fritillaria lusitanica*, + *Conopodium marianum*.

MEDITERRANEAN CLIMATOPHYLLOUS VEGETATION

VIII. *Quercetea ilicis* Br.-Bl. ex A. & O. Bolòs 1950

10. *Asparago aphylli-Quercetum suberis* J.C. Costa, Capelo, Lousã & Espírito-Santo 1996

Mesomediterranean and silicicolous cork oak woodlands, Sub-humid to Humid, Gaditan-Algarvian and Lusitan-Extremadurean. They are the forest community dominant in the studied area, taking low-sloping, in natural recovery. The cork-oak formations themselves are rare and *Quercus suber* is found spread in the territory. These forests and their seral stages are usually submitted to intense anthropogenic pressure resulting in a severe degradation.

Synthetic table of the *Asparago aphylli-Quercetum suberis* J.C. Costa, Capelo, Lousã & Espírito-Santo 1996, at Vila Nova da Baronia (38° 16' N e 08° 00' W), slopes with low inclination, SW, 150 m². **Characteristics:** 4 *Quercus suber*, 3 *Arbutus unedo*, 3 *Phillyrea angustifolia*, 3 *Scilla monophyllos*, 2 *Daphne gnidium*, 2 *Quercus coccifera*, 2 *Olea europaea*, 2 *Osyris quadripartita*, 1 *Asparagus aphyllus*, 1 *Myrtus communis*; **Companions:** 3 *Ulex australis* subsp. *welwitschianus*, 3 *Lavandula luisieri*, 3 *Xolantha guttata*, 2 *Cistus salvifolius*, 2 *Pinus pinaster*, 2 *Cistus ladanifer*, 2 *Cistus crispus*, 2 *Erica umbellata*, 2 *Vulpia bromoides*, 2 *Genista triacanthos*, 2 *Genista hirsuta*, 2 *Hyacinthoides vicentina* subsp. *transtagana*, 1 *Asphodelus fistulosus*, 1 *Orchis morio* subsp. *champagneuxii*.

11. *Phillyreo angustifoliae-Arbutetum unedonis* Rivas Goday & Galiano in Rivas Goday, Borja, Esteve, Galiano, Rigual & Rivas-Martínez 1960

Siliceous and thermomesomediterranean "Medronhal", Sub-humid to Humid with Mediterranean West distribution.

This scrub was characterized by abundance of *Arbutus unedo* and *Phillyrea angustifolia*, represent the first substitution stage or the edge of the cork-oak of *Asparago aphylli-Quercetum suberis*.

SYMPHYTOSOCIOLOGY

In the study area was identified the climatophilous thermomediterranean series *Asparago aphylli-Querceto suberis sigmetum*, Gaditan-Algarvian and Lusitan-Extremadurean, Sub-humid to Humid and silicicolous of *Quercus suber*.

In this territory, the potencial and seral stages of the *Asparago aphylli-Querceto suberis sigmetum* are *Asparago aphylli-Quercetum suberis* (mature forest), was formed by cork oak (*Quercus suber*), and others high-shrubs (*Arbutus unedo*, *Quercus coccifera*, *Myrtus communis*, *Phillyrea angustifolia* and *Olea europaea*), which formed a dense groups, at the bottom of valleys and slopes with low inclination.

The first substitution stages was the scrub of *Phillyreo angustifoliae-Arbutetum unedonis*, that was the sub- wood or the edge of copse. In an advanced regression stage, occurs the bush of *Halimio ocymoidis-Ericetum umbellatae*, on dry soils at the bottom of valleys and the community of *Ulex australis* subsp. *welwitschianus* and *Cistus ladanifer* on the humid slopes. In the herbaceous stratum predominates the therophytic Grasslands of *Trifolio cherleri-Plantaginetum bellardii*.

CONCLUSIONS

Based on the recognition and analysis of flora and vegetation of the study area, where it was found the orchid specie *Serapias perez-chiscanoi*, will be justify consider the following points:

- (1) The studied specie is a geophyte with a tuberous root, green stalk and linear-lanceolate leaves. The inflorescence is short, thick (3 to 10 flowers) and yellowish-white, presents two forms: green clear (flowers, pubescence, ovary, stem and leaves) or red (green clear, red pubescence in the flowers, nerves, ovary, stems and leaves), that may occur simultaneously, or just one and in some cases, intermediate forms of color.
In flowers, was observed the Cleistogamy and Autogamy processes. The insectivorous Pollination is rare.
In measurements to 200 species of *Serapias perez-chiscanoi* of 11 Spanish and Portuguese communities, 92% of pseudocapsules produced seeds. The 8% of insuccess may be related with the drying of external segments of Periant and the presence of Ants.
At the end of the Fructification, the aerial parts of plants dies and the tuberous roots pass the unfavourable season (Summer, Autumn and part of Winter) under the ground. It also produces sprouts (1 to 6), an approximate distance 1 to 5 cm of the parent plant.
- (2) It is considered endemic for the Guadiana basin. The settlement in Sado basin extends its distribution area. In Portugal is rare and needs legal protection.

- (3) Although they have been observed in the study area species of *Serapias perez-chiscanoi* with more than 10 years, the vulnerability of the habitat is quite high, because it was on waste land and subject to negative anthropogenic action.
- (4) In the territory studied, it was identified the climatophilous series of cork oak (*Asparago aphylli-Querceto suberis sigmetum*) and their seral stages: *Asparago aphylli-Quercetum suberis* → *Phillyreo angustifoliae-Arbutetum unedonis* → *Halimio ocymoidis-Ericetum umbellatae* and/or community of *Cistus ladanifer* and *Ulex australis* subsp. *welwitschianus* → *Trifolio cherleri-Plantaginetum bellardii*. In the depression zones were found typical communities of wet soils (*Junco pygmaei-Isoetetum velati*, *Periballio laevis-Illecebretum verticillati*, *Loto subbiflori-Chaetopogonetum fasciculati*), of pumped full soil (*Myosotido stoloniferae-Ranunculetum omiophylli* and community of *Juncus bulbosus* and *Myosotis lusitanica*).
- (5) The fire, the grazing, the garbage and rubble have been the anthropogenic factors identified in the habitat of *Serapias perez-chiscanoi*.

REFERENCES

- Alcaraz, J., Tellez, T., Benítez, M., Olivencia, A., Molina, R. & Claver, J. – 1991 – Las Gramíneas de Extremadura. Serie Monografías Botánicas. Servicio de Publicaciones de la Universidad de Extremadura, Badajoz.
- Braun-Blanquet, J. – 1979 – Fitossociologia. Bases para el estudio de las comunidades vegetales. Ed. Blume, Madrid.
- Castroviejo *et al.* (Eds.) – 1986, 1990, 1993 a, 1993 b, 1997 a, 1997 b, 1998, 1999, 2000, 2001, 2003, 2005 – Flora Iberica. Plantas vasculares de la Península Ibérica e Islas Baleares, 1-8, 10, 14, 21. Real Jardín Botánico de Madrid, C.S.I.C, Madrid.
- Costa, J. C., Capelo, J., Espírito Santo, M. D. & Lousã, M. – 2002 – Aditamentos à vegetação do Sector Divisório Português. *Silva Lusit.* 10 (1): 199-128.
- Géhu, J. & Rivas-Martínez, S. – 1981 – Notions fondamentales de phytosociologie in Syntaxonomie. J. Cramer, Vaduz.
- Franco, J. – 1971, 1984 – Nova Flora de Portugal (Continente e Açores). 1, 2. Ed. do Autor, Lisboa.
- Franco, J. & Afonso, M. – 1994, 1998, 2003 – Nova Flora de Portugal (Continente e Açores). 3 (fasc. 1, 2, 3). Escolar Editora, Lisboa.
- Tomaselli, R. – 1982 – Degradación de la maquia mediterránea in Quezel, P.; Tomaselli, R. & Morandini, R. – 1982 – *Bosque y maquia mediterráneos. Ecología, conservación y gestión.* Ediciones del Serbal, Barcelona.

- Rivas-Martínez, S., F. Fernandez-González, J. Loidi, M. Lousã & A. Penas – 2001 –
Sintaxonomical checklist of vascular communities of Spain and Portugal to
association level. *Itinera Geobot.* 14.
- Rivas-Martínez, S., T.E. Díaz González, F. Fernandez-González, J. Izco, J. Loidi, M.
Lousã & A. Penas – 2002 – Vascular Plant communities of Spain and Portugal.
Addenda to Sintaxonomical checklist of 2001. *Itinera Geobot.* 15 (2).
- Rivas-Martínez, S., A. Penas & T.E. Díaz – 2004 – Biogeographic and bioclimatic maps
of Europe. Serviços Cartográficos da Universidade de León.
- Valdés, B., Talavera, S. & Galiano, F. (Eds.) – 1987 – Flora vascular de Andalucía
Occidental. 1, 2, 3. Ketres Editora, S. A., Barcelona.
- Venhuis, C., Oostermeijer, J.G.B., Tonk, J.Th.P. – 2004 – Conservation biology of
Serapias perez-chiscanoi Acedo in the Guadiana river basin in Extremadura.
Eurorchis 16 49-63.