

**CONFIRMATION OF *CAREX PSEUDOBRIZOIDES* CLAUD (CYPERACEAE)
IN THE IBERIAN PENINSULA AND OTHER CONTRIBUTIONS
TO THE KNOWLEDGE OF THE IBERIAN *CAREX***

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ABSTRACT: This article shows some contributions to the knowledge of the genus *Carex* (*Cyperaceae*) in the Iberian Peninsula. Among them we highlight the confirmation of *C. pseudobrizoides* Clavaud for the Iberian Peninsula (Basque Country). The results of the morphological study carried out to differentiate this species from the closely related *C. brizoides* L., also present in the territory, are showed. A map of the Iberian distribution of *C. praecox* Schreb. is provided. *C. umbrosa* is cited for the first time for the Iberian System, the presence of *C. montana* L. in this mountain system is rejected, the distribution area of *C. riparia* in Eastern Andalusia is discussed, and a new chromosome number for *C. olbiensis* Jord. is reported.

Keywords: *Carex*; *Cyperaceae*; Iberian Peninsula; chorology; chromosome counts.

RESUMEN: Confirmación de *Carex pseudobrizoides* Clavaud (*Cyperaceae*) en la Península Ibérica y otras contribuciones al conocimiento de las cárices ibéricas. En el presente artículo se muestran algunas contribuciones al conocimiento del género *Carex* (*Cyperaceae*) en la Península Ibérica. Entre ellas destacamos la confirmación de la presencia ibérica de *C. pseudobrizoides* Clavaud. Se exponen también los resultados del estudio morfológico llevado a cabo para diferenciar la citada especie de la muy afín *C. brizoides* L., también presente en el territorio. Así mismo se aporta un mapa de la distribución ibérica de *C. praecox* Schreb.; se cita por primera vez *C. umbrosa* para el Sistema Ibérico; se rechaza la presencia de *C. montana* en dicho sistema montañoso; se llevan a cabo algunos comentarios sobre la distribución de *C. riparia* en Andalucía oriental; y se da a conocer un nuevo número de cromosomas para *C. olbiensis* Jord. **Palabras clave:** *Carex*; *Cyperaceae*; Península Ibérica; corología; recuentos cromosómicos.

INTRODUCTION

In the course of the works regarding the preparation of the *Field guide of the Spanish and Portuguese Cyperaceae* (LUCEÑO & al., in prep.), we have carried out a review of the taxa of this territory. Since the publication of *Flora iberica* (LUCEÑO & al., 2008) there have been relevant advances that have led to important taxonomic and nomenclatural changes. Such changes are due to many new collecting trips through the territory, to the revision of materials available in the main regional herbaria and, especially, to the recent phylogenetic works including the taxa of this region (GLOBAL *CAREX* GROUP, 2015; JIMÉNEZ-MEJÍAS & al., 2016; MARTÍN-BRAVO & al., 2019). We present here some of these novelties.

MATERIALS AND METHODS

The materials that have served as the basis for this work come from numerous field trips carried out in recent years, as well as those preserved in the herbaria ARAN, BC, BCN, MA, MGC, UPOS and VIT. The chromosome count of *C. olbiensis* has been done on metaphase I of the meiosis

of the pollen mother cells, following the methodology exposed by LUCEÑO (1988).

RESULTS

Carex pseudobrizoides Clavaud

SPAIN: GUIPÚZCOA, Pasajes de San Juan, 30TWN8798, 30-IV-1984, *I. Aizpuru* & *P. Catalán* (MA 342380). *Idem*, Jaizkibel, 30TWN8798, 5-20 m, coastal heaths, 30-IV-1984, *I. Aizpuru* & *P. Catalán* (ARAN 23006, MA823964). *Idem*, Hernani, 1895, *M. Gandoget* (MA 16768). *Idem*, Oiarzun, 30TWN9394, 40 m, wet meadows edges, 25-VI-1983, *X. Lizaur* (ARAN 4761). **NAVARRA,** Urdazubi, Dantxarinea, 30TXN2193, 70 m a.s.l., wet meadows, 24-IV-2006, *A. Balda* (VIT 78642).

In addition to the materials studied, voucher BIO 50721 from Hernani, which we have not seen, probably also contains *C. pseudobrizoides*.

C. pseudobrizoides has already been reported from the Basque Country [Hernani, Oiarzun (Guipúzcoa) and Lesaka (Navarra)] by ASEGINOLAZA & al. (1984), and by CATALÁN & AIZPURU (1986) (Pasajes de San Juan, Guipúzcoa). However, AIZPURU & al. (1999), LUCEÑO (1994, 2008) and AIZPURU (2020) grouped these Basque populations under

the name of *Carex brizoides* L. In addition, KOOPMAN (2022) did not consider *C. pseudobrizoides* as an Iberian species. We have studied in detail the characters that distinguish *C. brizoides* from *C. pseudobrizoides* (table 1; figures 1 and 2) and we have verified that both species inhabit the Iberian Peninsula, although they are extremely rare. The measurements of the materials match, with light variations, with those provided by KOOPMAN & WIEKLAW (2016) in their study of the sect. *Ammoglochin* of the genus *Carex* in the Netherlands. We must also indicate that in the database by ALONSO (2022) the populations of Hernani and Oiarzun appear marked as *C. pseudobrizoides*.

Regarding *C. brizoides* L., its presence in the Iberian Peninsula is ensured by the following materials:

SPAIN: NAVARRA, Lesaka, Zalain, 30TXN0492, 30 m, meadows, 11-IV-1981, *I. Aizpuru* & *P. Catalán* (ARAN 23375). *Idem*, Bidasoa river, 43° 16' 26.43"N/1° 42' 34.75"W, roadside slopes in the *Fagus sylvatica* forest domain, 3-VI-2022, *I. Aizpuru*, *M. Luceño*, *R. Sánchez Villegas* & *M. Sánchez Villegas* (UPOS 16450).

There is also a voucher identified as *C. brizoides* from the highlands of Belate (Navarra; UPNA 14198) that we have not had the opportunity to confirm. The presence of this species in other parts of Northern Navarra is plausible. Nevertheless, the fact that the peat bogs appear as the habitat on the label, when the species prefers disturbed slopes and the edges of beech and oak groves, makes us be cautious when it concerns ensuring that it is not another species.

Table 1. Morphological differences between *Carex brizoides* and *C. pseudobrizoides*.

	<i>C. brizoides</i>	<i>C. pseudobrizoides</i>
Rhizome width (mm)	1-2.5(3.5)	(1.8)2.8-4.5(6)
Leaf width (mm)	1-2(2.5)	(2)2.5-3.7(4.3)
Inflorescence length (cm)	(1)2.5-3(3.5)	3.5-4
Upper spike	gynecandrous	usually androgynous
Utricle length (mm)	(2.8)3-3.2	3.5-4.8(5)
Utricle beak length (mm)	0.8-1.2(1.4)	1.5-2
Utricle veins	scarcely prominent	strongly prominent

Additional studied materials

Carex brizoides L.

AUSTRIA: Salzburg, Bramberg am Wildkogel, between Mühlbach and Gasthof Geisl, 47° 16' 53"N/12° 22' 23"E, 16-5-2001, 860 m, *E. Vitek* (MA 805305). *Idem*, Styria, Steiermark, ca. 9 km linear distance NE of the centre of Gratz, Hollergraben, 47° 06' 47"N/15° 32' 33"E, 540 m, lower part of a N-exposed slope with *Fraxinus excelsior*, *Alnus glutinosa* and *Picea abies* in the canopy, herb layer dominated by *Carex brizoides*, 5-VI-2003, *A. Drescher* (MA 922056). *Idem*, Stiria superior, in silvis prope urbem Murau, solo schistose, 850 m, V-1907, *B. Fest* (MA 16759). *Idem*, Graz-Mariatrost, Roseggerweg D, Mischwald, 20-V-1970, *F. Krendl* (MA 900568). **BELGIUM:** province of Namur, south of the village, *Quercus sessiliflora* forest, 19-VII-1984, *J. Duvineau* (MA 367568). **CROATIA:** Zagreb-Maksimir, in silvis *Carici brizoides-Alnetum*, 27-IV-1971, *I. Trinajstić* (MA 274254). **FRANCE:** dep. Pyrénées-Atlantiques, Arudy, Bager forest, YN0277, c. 350 m, roadside slope on the edge of an oak-beech forest exposed to north, 4-V-1989; *J.J. Lazare* (MA 489190, ARAN 24201). *Idem*, Forêt d'Issarx, 30TXN8864, 650 m, 7-VI-1975, *P. Montserrat* (ARAN 23374). *Idem*, dép. Haut-Rhin, Cant. Hirsingue, Oberwald, 405 m, *Quercus-Carpinetum*, 30-VI-1979. *P. Geissler* (MA 377519, 385802). *Idem*, Vosges, Verrière de Portieux forest, 4-VI-1891, *F. Gérard* (MA 16760). *Idem*, lagoons of Sologne, 14-VII-1957, *G. Gavelle* (MA 194248). *Idem*, Saint-André-de-Corcy, 8-VII-1888, *Mathieu* (MA 178270). **GERMANY:** Bavaria, Frieding, east of the Seefeld road, moraine, 8-V-1943, *W. Freiberg* (MA 385805). *Idem*, Roth district, on the Thal-mässing-Oblangen road, iron sandstones, 5-VIII-1986, *R. Vogt* (MA 520450). *Idem*, Oberbayern, damp depressions in the spruce forest between Dietramszell and Ascholding, 13-V-1964, *W. Lippert* (MA 194943). *Idem*, Brandenburg, Frankfurt a. O., Korabhsch., 18-V-1890, *Dr. Behrendsen* (MA 16762). *Idem*, Leipzig, in nemoribus, *M. Willkomm* (MA 143576). **ITALY:** Lombardia, Alto Milanese, near Limbiate (Milano). IV-1923, *L. Fenaroli* (MA 274253). **POLAND:** meridionalis districtus Cracoviensis, prope vicum Szczyglice, vallecula a latere dextro in vallem rivuli Rudawa, loco uliginoso intra silvam, 17-V-1973, *A. Palkowa* & *J. Necka* (MA 2356858). **ROMANIA:** In silvis Strachate prope

Transilvaniam, 10-V-1890, *Calliér* (MA 16761). *Idem*, Arger, Transfagarasan road, 4-VIII-2018, *M. Luceño* & *al.* (UPOS 15834). **SWITZERLAND:** Linthebene, Canton Schwyz, lower Buchberg, above Grinau Gastle, near Tuggen, 1-VII-1930, *W. Koch* (MA 385807).

C. pseudobrizoides:

GERMANY: Desden, Heide, *Reichenbach* (MA 848605). *Idem*, Bavaria, Roth district, Greiding, Kraftsbuch, Nordnang in the northern side valley of Heim, above the Heimbach, superficially acidified limestone, 6-VIII-1986, *R. Vogt* (MA 342707). **FRANCE:** Pyrenees, Guetarice, 30TXP1208, 1 m, slopes, 27-V-1988, *C. Aedo* (MA 622621). *Idem*, Landes, Roquefort, forming a meadow in an old growth *Quercus pubescens* forest, 15-V-1985, *J. Vivant* (ARAN 62377). *Idem*, Atlantic Pyrenees, between Sauveterre-de-Béarn and Pène de Mu, cultivated terraces near a chestnut forest, 6-V-1979, *J. Vivant* (ARAN 61702).

Carex praecox Schreb.

This species is distributed throughout most of Europe and Western Asia to Mongolia (POWO 2022). In the Iberian Peninsula it lives only in Catalonia, where it cannot be considered as common. It has been confused not infrequently with *C. divisa* Huds., from which it differs because the rhizomes of the latter are thicker and the spikes androgynous, compared to the gynecandra ones of *C. praecox*. In fig. 3 we present the Iberian distribution map based on the following materials:

BARCELONA: Valgorguina river, 1 km from the confluence of Valgorguina river with the Tordera river, 41° 39' 44"N/2° 28' 56"E, 190 m, 20-IV-1946, *P. Montserrat* (BC 629030). *Idem*, Sant Llorenç de Munt, near coll d'Estenalles, 41° 40' 12"N/1° 59' 42"E, 850 m, 10-IV-1998. *I. Soriano* (BCN 63344). Sant Sadurní d'Osona, La Cantina, forest track to the mill of Soler, 41° 53' 36.65"N/2°22'19.73"E, 543 m, sandy soils of the forest track in some shaded places, 1-V-2012, *A. Pérez* (herb. A. Pérez 17439). *Idem*, Miralpeix, 41° 54' 58"N/2° 24' 00"E, forest edges on sandy soils, 8-IV-2006, *A. Pérez* (Herb. A. Pérez 1110). *Idem*, Bojons, Can Faire, 31TDG5141, ca. 600 m, meadows in abandoned fields,



Fig. 1. *C. brizoides* from Lesaka, Navarra (left), and *C. pseudobrizoides* from Pasajes de San Juan, Guipúzcoa (right).

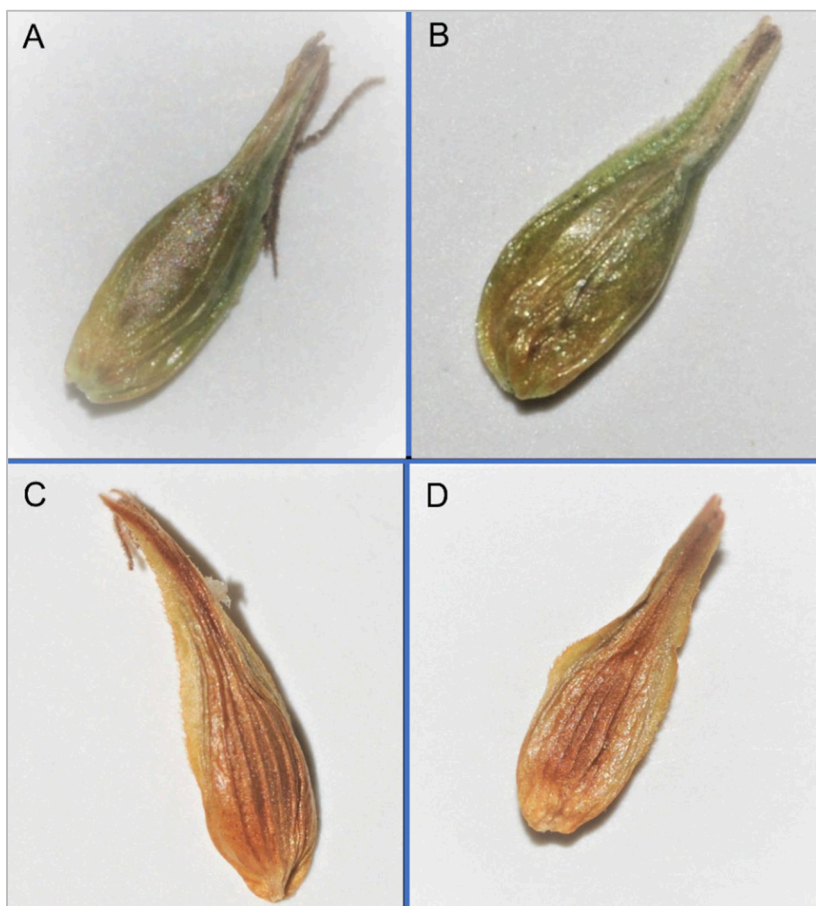


Fig. 2. A, B: utricles of *C. brizoides*; C, D: utricles of *C. pseudobrizoides*. A, C: abaxial side; B, D: adaxial side.

sandy soils, 16-VI-2008, *A. Pérez* (herb. A. Pérez 4367). *Idem*, Vilanova de Sau, Pont de Malafogassa, 49° 56' 10"N/2° 24' 43"E, wet slopes, 25-V-2006, *A. Pérez* (Herb. A. Pérez-17240). *Idem*, Sant Celoni, roadsides, V-1949, *Losa* (MA 143602). *Idem*, DG4517, 110 m, grassy places near C-52 road, 3-V-2018, *P. Barnola* (BCN 156261). *Idem*, between Sant Celoni and Vallgorguina, 41° 39' 22"N/2° 29' 00"E, 175 m, meadows, 15-V-1949, *M. Losa*, *P. Montserrat* & *Canellas* (BCN 63354). *Idem*, Tordera, near Can Saleta, 41° 42' 16"N/2° 41' 14"E, 35 m, mixed forest edge, 15-IV-2014, *J. Calvo* (MA 884822). **GERONA:** Alp, Roca Castellana, 42° 21' 48.39"N/1° 53' 47.29"E, 1350 m, dry meadows on siliceous soil, 1-V-1987, *I. Soriano* (BCN 63343). La Sellera de Ter, 41° 58' 16"N/2° 37' 31"E, V-1908 (BCN 53353, MA 16769). *Idem*, El Ginonès, Canet d'Adri, ca. Can Nadal, 42°02' 25"N/2° 43' 0.5", 255 m, forest track edge in *Quercus ilex* forest, 18-III-2012, *J. Calvo* (MA 855402). *Idem*, Hostalric, meadow near Sant Llorenç de Gasarans church, 31TDG6521, 130 m, 10-IV-2019, *P. Barnola* (BCN 156260). *Idem*, 31TDG6921, 120 m, 12-IV-2019, *P. Barnola* (BCN 156256). *Idem*, Riudellots de la Selva, 41° 53' 42"N/2° 47' 1"E, 100 m, 22-IV-1934, *P. Font Quer* (BC 81849). **LÉRIDA:** Bor de Cerdanya, 42° 20' 30"N/1° 48' 15"E, ca. 1200 m, 23-V-1987, *I. Soriano* (BCN 57685). *Idem*, Montsec de Rúbies, to the Coll d'Hostal Roig, 31TCG3656, 1100 m, sandy soil, 23-IV-1981, *A.M. Romo* (BC 800775). *Idem*, Alt Urgell, Col de Vanses, 31TCG8085, 1485 m, mesophilic meadows, 21-VI-2010, *M. Guardiola* & *A. Petit* (BCN 103655). *Idem*, 1490 m, dry meadows, 12-VI-2009, *M. Guardiola* & *A. Petit* (BCN 103654).

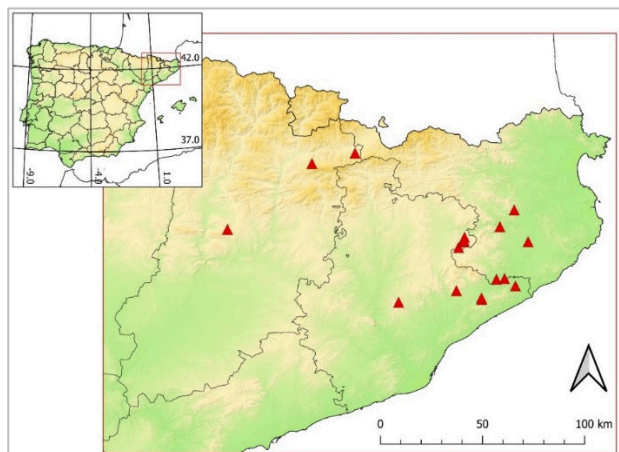


Fig. 3. Iberian distribution of *C. praecox* Schreb.

“*Carex montana* L.”

This taxon was recently reported for de Iberian System (Soria, Puerto de Santa Inés) by JIMÉNEZ-MEJÍAS & al. (2020). We have had the opportunity to study the voucher on which this report was based (UPOS 13958), and it belongs to *C. pilulifera* L., which is a very common species in the Northern Iberian System. Therefore, the presence of *C. montana* in the Iberian System must be rejected.

Carex umbrosa Host

***SORIA:** Vinuesa, Zorraquín, headwaters of the river Revinuesa, 42° 0' 36"N/2° 51' 29"W, 1825 m, small spring edges with *Carex nigra* and *Erica tetralix*, 18-VI-2022, *C. Molina* (UPOS 16914).

First record of this species for the province of Soria and the whole Iberian System. The locality we now provide occupies an intermediate location between the southernmost Iberian population (Peñalara lake, Sierra de Guadarrama, Madrid) and those in the north of the Iberian Peninsula (LUCENO, 2008). It is worth noting that there is a

voucher (VIT 5595; Ezcaray, La Rioja), that was identified by P. Uribe as *Carex umbrosa*, but this material belongs to *C. caryophyllea* Latorurr., which explains the absence of *C. umbrosa* in the checklist of the Riojan vascular plants (ALEJANDRE & al., 1986; J.A. ALEJANDRE, pers. comm.).

Carex riparia Curtis

MÁLAGA: Málaga, San Julián, Los Viveros, between the garden Center of the Junta de Andalucía and the industrial park, 30WUF6758, 5 m, flooded clay soil, 29-III-2017, *F. Soriguier* & *J. García-Sánchez* (MGC 84815). *Ibidem*, 17-V-2016, *F. Soriguier* (MGC 82708).

We confirm the presence of this species, which is very rare in the south of the Iberian Peninsula, in the province of Málaga. It has already been reported for Málaga (mouth of the Guadalhorce river) by CASIMIRO-SORIGUER & GARCÍA-SÁNCHEZ (2017). From Andalusia, LUCEÑO (2008) considered it only for the province of Huelva, while SALAZAR & QUESADA (2011) reported it from Sierra de Tejada (Málaga), however, the voucher on which Salazar & Quesada (o.c.) based the record belongs to the recently described *C. camposii* subsp. *tejedensis* Sánchez-Villegas, M. Escudero & Luceño (SÁNCHEZ-VILLEGAS & al., 2022). Consequently, as far as we know, only three small populations have been reported from Andalusia, two of them located in the province of Huelva, one in Doñana National Park (CASTROVIEJO & al., 1980) and the other one in the Andévalo area (SÁNCHEZ GULLÓN & al., 2006), and the third population in the province of Málaga. This last population inhabits a small pond of 0,2 ha, and it is highly threatened by urban expansion (CASIMIRO-SORIGUER & GARCÍA-SANCHEZ, 2017). On the basis of the available data, and following UICN (2012), we propose *C. riparia* as "Critically Endangered" (CR) for the Andalusian territory, under criteria B2ab(iii).

Carex olbiensis Jord.

We have performed meiosis chromosome counts on 5 individuals from the following population (LUCENO & al., 2022):

CÁCERES: Sierra de Gredos, Jaráz de la Vera, 40°4'32.34" N, 05° 43'24.08"W, 425 m asl, shady places in *Quercus pyrenaica* Willd. forest, with *Carex depauperata* Curtis ex Woodw. and *Hieracium sabaudum* L., 8-X-2021, *R. Sánchez-Villegas*, 234RSV21, *M. Sánchez-Villegas* & *M. Luceño*.

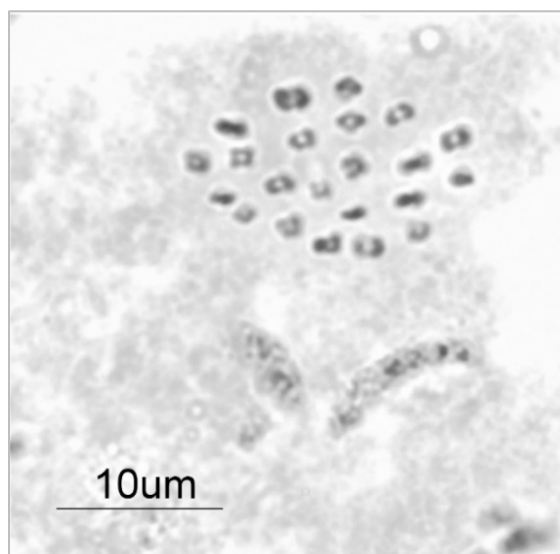


Fig. 4. Metaphase I of pollen mother cells showing regular pairing with $2n = 22II$ of *Carex olbiensis*.

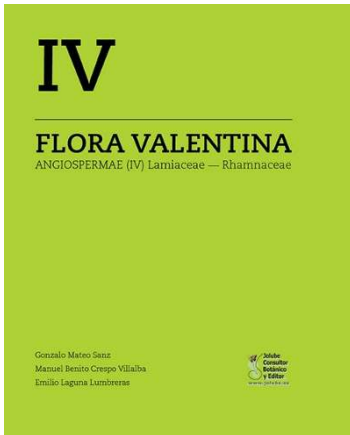
The chromosome number obtained was $2n=44$ (22II in metaphase I). Regular chromosome pairing was observed in all five specimens studied (figure 4). The only previously known chromosome number for this Western Mediterranean endemic (DIETRICH, 1972) is $2n=46$ (23II in metaphase I), on materials from southeast of France.

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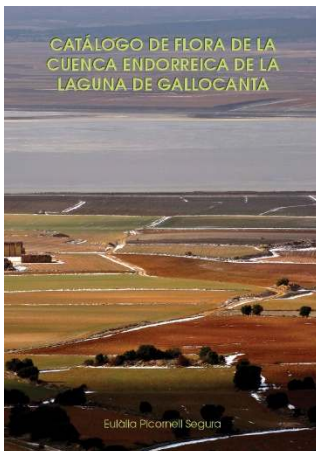
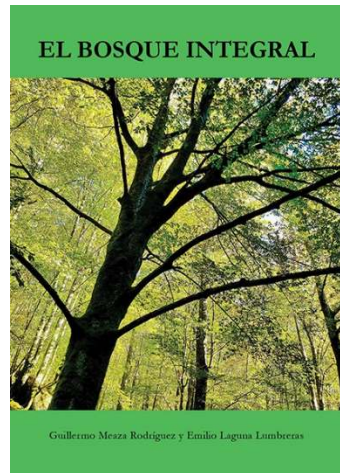
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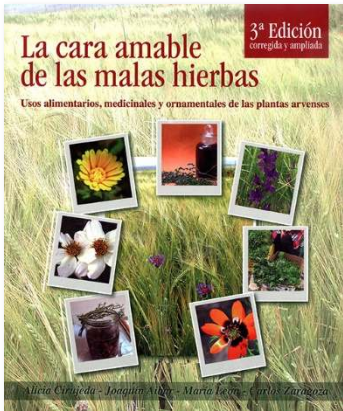
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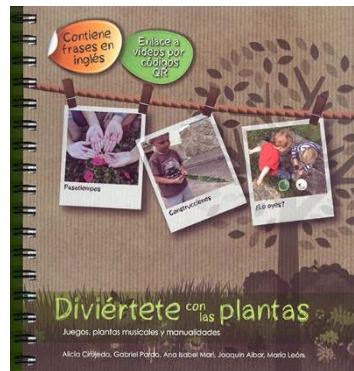
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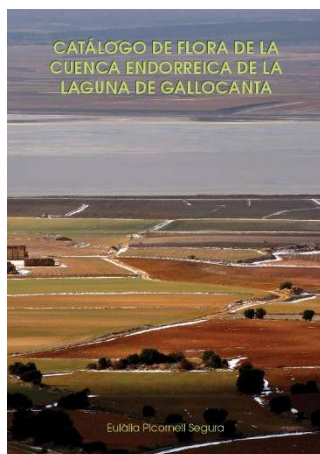
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