

A NEW SPECIES (*OROBANCHE LOSCOSII*), A PRIORITARY NAME FOR *O. ICTERICA* (*O. LEPTANTHA*) AND A NEW MEMBER OF THE SPANISH FLORA (*O. ELATIOR*)

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SUMMARY: In the light of recent research that has synonymized the parasites of *Echinops* described from France and Serbia to *Orobanche kochii* F.W. Schultz (a distinct southeastern European species, mainly parasitic on *Centaurea* and often confounded with *O. elatior* Sutton), we reassess the taxonomic status of the *Echinops* parasite from the Ebro basin and conclude that it must be described as a new species. By the way, we demonstrate that *O. leptantha* Pomel is a priority name for the species for which Pau coined the binomen *O. ictERICA*, a vicariant of *O. elatior* widespread in Spain, and we confirm the existence of the true *O. elatior* in Spain. **Key words:** *Orobanche*, *Echinops*, *Centaurea*, taxonomy, new species, priority name, Ebro basin, Iberian Peninsula, northern Africa.

RESUMEN: A la luz de recientes investigaciones que han sinonimizado a *Orobanche kochii* F.W. Schultz (una bien caracterizada especie de la mitad sureste europea principalmente parásita de *Centaurea* y frecuentemente confundida con *O. elatior* Sutton) las plantas parásitas de *Echinops* que se habían descrito de Francia y Serbia, reconsideramos el *status* taxonómico de la parásita de *Echinops* del valle del Ebro y concluimos que es preciso describirla como especie nueva. De paso, probamos que *O. leptantha* Pomel es un nombre prioritario para la especie para la que Pau acuñó el binomen *O. ictERICA*, vicariante de *O. elatior* muy extendida en España, y confirmamos la existencia de la propia *O. elatior* en España. **Palabras clave:** *Orobanche*, *Echinops*, *Centaurea*, taxonomía, especie nueva, nombre prioritario, depresión del Ebro, Península Ibérica, norte de África.

A recent and documented paper by ZÁZVORKA (2010) soundly establishes the existence in Central Europe of two *Centaurea* parasites within *Orobanche* s. str. The plant described as *Orobanche*

kochii by F. W. Schultz is there proven to be the same we found in southern France and whose singularity we had already recognised by labelling it as “*elatior* s.l.” in a phylogenetic survey that supports the

specific rank that Zázvorka's morphological approach warrants for the by him vindicated taxon (CARLÓN & al., 2008: 13, 15).

In the same paper, Zázvorka considers that the names so far coined for *Echinops* parasites (*Orobanche ritro* Grenier [from France] and *O. echinopsis* Pančić [from Serbia]) are synonyms of *kochii*, whilst the Spanish *Echinops ritro* parasite we have dealt with (CARLÓN & al., 2003: 31-32, 40) is far from being an *elatior* relative but rather belongs in the grex *Minores*. This subset of statements makes us almost duty bound to reassess the status of the Spanish *Echinops* parasite. By the way, several amendments and additions to the diagnosis, synonymy and chorology of *kochii* will be provided, a priority name for the most widespread member of the *elatior* group in Spain restored and the occurrence in Spain of the true *O. elatior* confirmed.

Like LOSCOS (1878-1880: 125) and WILLKOMM (1893: 188), when we first encountered an *Echinops* parasite in the Ebro basin we supposed it to be referable to the aforementioned *O. ritro*. In order to verify this suspicion, up to three attempts to study *in vivo* and photograph Grenier's plant in its *locus classicus* ("environs de Gap, en allant à Rabou et à la Grangette") were made, any of them being successful. However, the study of dried specimens and photos of *Echinops* parasites taken in several more or less nearby French localities (let's express our gratitude to Henri Michaud, Yves Morvant and Daniel Pavon) allows us to agree with Zázvorka when he considers the alluded *ritro* to be different from the Spanish plant and actually a mere synonym of *kochii*, both plants sharing unique dorsally straight flowers, with a flattened adaxial surface and with big, divergent, spathulate, concave lower-lip lobes and patent, wide upper-lip lobes. But as the French *Echinops* parasite is usually bright

yellow, a feature that ZÁZVORKA (2010: 81-82) explicitly excludes from *kochii*, this synonymization appears somewhat contradictory. Yellowish plants with the morphology of *kochii* can actually be seen throughout the area of the species, so we consider that it would be better to reduce the diagnostic value of the color of the plants (particularly superfluous when so clearly different species are concerned), adding in exchange to the list of diagnostic features those morphological details of the corolla that we have just mentioned. In France, from where also the plant parasitic on *Centaurea* was described from the vicinity of Fréjus (Dép. Var) under the infraspecific name *Orobanche elatior* var. *forojuliensis* Coss., Notes Pl. Crit.: 8 (1849), *O. kochii* is found not only in Hautes-Alpes but in several other southeastern French departments and is often parasitic on *Centaurea aspera*, which should thus be incorporated to the list of hosts provided by ZÁZVORKA (2010: 83). Likewise, the description and the very clear drawing of *Orobanche elatior* var. *tommassinii* Rchb. fil., Icon. Fl. Germ. Helv. 20: 118 [t. 216, f. I, 2-4] (1862), described from the islet of Pergarnik [Pregaznik], near the island of Zeča (Primorje-Gorski Kotar, Croatia), don't cast any doubts about its taxonomic identity with *O. kochii*, a species already known from Croatia (ZÁZVORKA, 2010: 116).

Our discrepancies with Zázvorka arise only when he not only categorically denies that the Spanish plant may be considered akin to the other European *Echinops* parasites but considers it a genuine member of the *Minores*. Three of his five morphological arguments can be refuted: a) the flowers are particularly short in the population of the road to Fuendetodos, but in other colonies lengths above 20 mm are usual and we have measured flowers of up to 24 mm; b) the corolla of the Spanish plants are rather variable in co-

lor, and may lack any purplish tone and appear yellowish; c) the shape of the corolla differs from that of *kochii* in the lack of a distinct straight segment in the dorsal line, but shows patent upper lip lobes and wide, spatulate, divergent lower lip lobes clearly reminding those of *kochii* and substantially different to all of the *Minores*.

Therefore, the long and profoundly bidentate calyx segments (particularly filiform at the tip in the population of the road to Fuendetodos, but not so different from *kochii* in other populations) and the never deep yellow but usually olive brown stigma remain as the two main traits among those mentioned by Zázvorka not only distinguishing the Spanish plants from their putative European relatives but justifying to some extent the alleged affinity with the *Minores*, also suggested by the much less marked concavity of the middle lower lip lobe of the corolla compared to *kochii*. Actually, these characters are far from being specific enough to unambiguously relate this plant to the *Minores*, something otherwise rejected by the available molecular data (CARLÓN & *al.*, 2008: 13), so we still feel that the Spanish plant is narrowly related to other European *Echinops* parasites. Nonetheless, its spatial and temporal variability, despite the few number of known populations and the relatively short distance between them, and its molecular similarity with an outlier accession of the sympatric and also very variable *O. santolinae* might be the trace of current or past hybridisation events between distantly related Composite parasites, turning Zázvorka's perception of morphological echoes of the phylogenetically supported grex *Minores* in the plants from the road to Fuendetodos into a suggestive conjecture.

We trust that the photos here published will dissipate any doubts about the occurrence in the Ebro basin of plants

clearly related to *kochii*. Even if further research ratifies that hybridisation has played a role in their make-up, the truth is that there are ecologically well circumscribed populations with a variable but unique arrangement of characters that prevents their assimilation to any of the so far described taxa. Thus we decide to lump them together in a new species, with an eponym honouring the illustrious Aragonian botanist Francisco Loscos, who first recorded the plant, correctly determined its host and suggested a well-targeted taxonomic adscription for it.

Orobanche loscosii* L. Carlón, M. Laín, G. Moreno Moral & Ó. Sánchez Pedraja, *sp. nov.

= *Orobanche ritro* sensu Loscos, Tratado Pl. Aragón 2: 125 (1878-1880) et auct. hisp., non *O. ritro* Gren. in Gren. & Godr., Fl. France 2: 635 (1853)

= *Orobanche major* var. *ritro* sensu Willk., non *O. major* var. *ritro* (Gren.) Willk., Suppl. Prodr. Fl. Hispan.: 188 (1893)

DIAGNOSIS. A sympatrica *O. leptantha* Pomel (= *O. icterica* Pau, vide inferius!) differt species nova nostra foliis potius brevioribus et latioribus, bracteis plerumque flores non superantibus, calyce conspicuo (longitudine, saltem 60% longitudinis corollae attingenti), lobis inferioris labii corollini quadrangulatis multoque magis divergentibus, stigmatibus olivaceo-brunneo nec saturate flavo atque staminibus (tam adaxialibus quam abaxialibus) inferius corollae insertis; ab *O. elatior* Sutton differt praecipue floribus minus patentibus, stigmatibus non flavo atque staminibus inferius corollae insertis; ab *O. kochii* F.W. Schultz, floribus regulariter curvatis (dorsali recto intervallo carentibus), stigmatibus non flavo atque item staminibus inferius corollae insertis; ab omnibus denique speciebus gregis *Minores* aperte differt caule valido labioque inferiore corollino cruciformi (ratione lorum eius, multo magis divergentium).

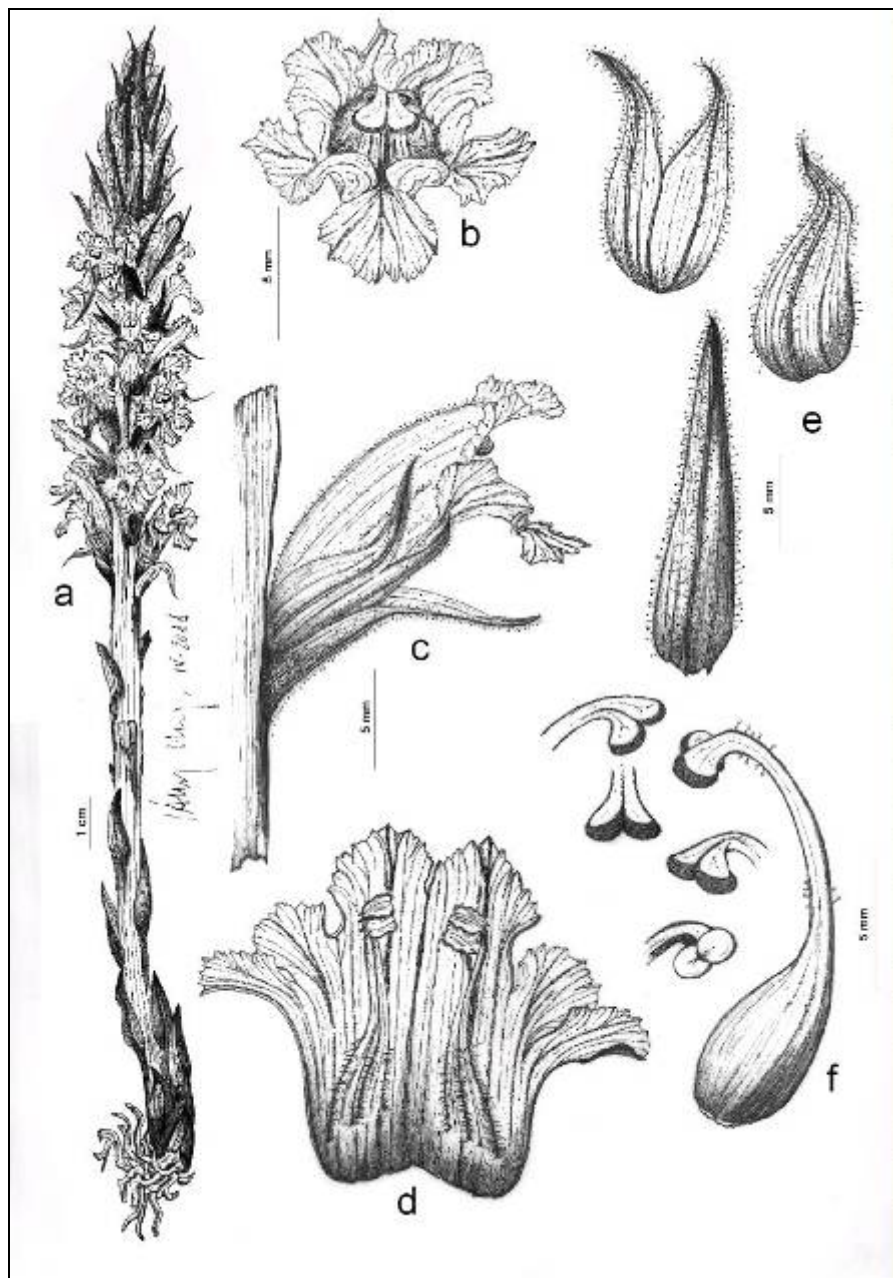


Fig. 1. *Orobanche loscosii*, **sp. nov.** (Sánchez Pedraja del.) coram holotypo: a) habit; b) corolla, frontal view; c) corolla, lateral view; d) opened corolla showing stamens; e) calyx segments and bract; f) pistil and stigma (the latter seen from different angles).

Orobanché loscosii differs from the sympatric *O. leptantha* Pomel (= *O. icterica* Pau, see below) in its rather shorter and wider leaves, in its bracts generally not exceeding the flowers, in its long and conspicuous calyx (its length being at least 60 % of that of the corolla), in its quadrangulate and much more divergent lower lip lobes, in its olive-brown instead of deep yellow stigma and in its stamens, both adaxial and abaxial, inserted at a relatively short distance from the base of the corolla. From *O. elatior* Sutton, mainly in its less patent flowers, in its not yellow stigma and in its lowly inserted stamens. From *O. kochii* F.W. Schultz, in its regularly curved flowers, with no straight segment dorsally, and also in its not yellow stigma and its lowly inserted stamens. From all of the species in the group *Minores*, it openly differs in the stouter stem and in the cruciform lower lip of the corolla, its lobes being much more divergent.

DESCRIPTION. **Stem** (17)26-47 (52) × (0,4)0,55-1,0(1,3) cm, usually stout, simple, ± yellowish cream in color (purple-tinged to some extent in the inflorescence), thoroughly covered with glanduliferous hairs (somewhat denser upwards). **Leaves** (10)11,5-22(24) × (3) 4-6 mm, triangular-lanceolate. **Inflorescence** (6)10,4-22,5(31) × (3,2)3,4-4,5(5) cm, mostly shorter than the rest of the stem [ratio length infl. / length stem = (0,29)0,33-0,50(0,60)] and oblong [ratio width infl. / length infl. = (0,16)0,21-0,53 (0,60)], dense, multiflorous [(13)29-69 flowers]; **bracts** (13)14-20(25) × (3,0)4-5 (6,5) mm, lanceolated, equalling or scarcely exceeding the corolla [ratio length corolla / length bract = 0,68-1,04], ± creamy yellow in color to the base, the rest pinkish, chestnut brown when dry, densely covered with glanduliferous hairs (yellowish gland). **Calyx** (9)11-16(18) × (3,1)5-6 (8) mm, with segments ± connivents in their abaxial side, usually bidentate, the pink-purplish hue and the yellow gland-bearing hairs being more abundant in the upper 2/3 and particularly in the teeth [(4)6,7-9(10) mm], which are unequal, narrowly lanceolate, longly acumi-

nated, usually longer than the tube [ratio calyx teeth / calyx tube = (0,88)0,98-1,33] and with the middle nerve distinctly dark.

Corolla (16,8)18-24 mm, not much longer than the calyx [ratio calyx / corolla = (0,49)0,53-0,77(0,80)], erecto-patent (forming an angle of 35-50° with the axis of the inflorescence), campanulated or widely tubular, creamy yellow in color, with ± purplish veins and the outer surface densely covered with translucent yellow-gland bearing hairs which are particularly abundant in the upper side; **upper lip** bilobate, shallowly divided, with lobes ± erect or somewhat retrorse at anthesis, ± quadrangulate in contour and with undulated ± crenate margins; **lower lip** trilobate, with deflexed and very divergent lobes (the middle one somewhat larger), ± quadrangulate in contour and with undulated ± crenate margins. **Filaments** 7,6-11,95 mm, the abaxial inserted at (1,2)1,7-3(4) mm from the base and the adaxial at (2) 2,4-3,5(4,5) mm, densely covered with translucent, non-glanduliferous, relatively long hairs in the lower half and with shorter if any hair towards the apex, creamy throughout but with a yellowish hue in the base. **Anthers** 1,52-2,2 × 0,8-1,2 mm [beak of about 0,1-0,2 mm], creamy or straw in color, glabrous with the exception of a few hairs in the basal half of the sutures. **Ovary** glabrous, yellow throughout or creamy towards the apex. **Style** ± purplish, sometimes yellow in the base, glabrous or with a few short glanduliferous hairs. **Stigma** bilobate, usually ± olive brown or purplish at anthesis. **Fruit** 9,2-11 × 4,4-5 mm, globose-ovoid, chestnut brown, glabrous. **Seeds** 0,4-0,48 × 0,28-0,33 mm, from chestnut brown to grey in color.

The only known host is *Echinops ritro* L. subsp. *ritro* (*Compositae*), and its known distribution range (fully covered by the three provinces [Huesca, Teruel and Zaragoza] constituting the autonomous region of Aragón) is characterized



Fig. 2. *Orobanche kochii*, military maneuvers camp of Aglanet, pr. Orange (Vaucluse, France), 31TFJ4587, 50 m, beside *Centaurea aspera* in very dry and sunny sandy soils, L. Carlón, M. Laínz, G. Gómez Casares, G. Moreno Moral MM0106/2003 & J. M. Tison, 28-V-2003 (herb. Sánchez Pedraja 11371).



Fig. 3. *Orobanche loscosii*, **sp. nov.**, pr. Marivella (Calatayud, Zaragoza, Spain), 30TXL1781, 600 m, beside *Echinops ritro*, G. Moreno Moral MM0074/2008, 5-VII-2008 (herb. Sánchez Pedraja 13190).



Fig. 4. Distribution of *Orobancha loscosii*, sp. nov.

by a particularly warm, sunny and dry Mediterranean climate due to the rain shadow cast by the Pyrenees. Average annual rainfall is between 300 and 450 mm, average daily maximum temperature between 20 and 21°C, average minimum between 7 and 9°C and the sun shines between 2600 and 2700 hours per year.

Holotypus: Marivella, pr. Calatayud (Huesca, **SPA**), 30TXL1781, 600 m, beside *Echinops ritro* in *Genista* sp. scrub, in the northern slope of a small valley, G. Moreno Moral MM0074/2008, 5-VII-2008 (MA). *Isotypi* adsunt in JBAG-Lainz et in herb. Sánchez Pedraja 13190.

Otras recolecciones: **HUESCA:** 31TBG 6743, Monzón, western slope of the vértice Monzón, beside *Echinops ritro*, 340 m, 2-VI-2007, G. Gómez Casares & G. Moreno Moral MM66/2007 (herb. Sánchez Pedraja 12888). 31TBG6452, Barbastro, above the Valpregona ravine (pr. Torre Joaquina), beside *Echinops ritro* in the gaps of a disturbed holm oak forest, 360 m, 2-VI-2007, G. Gómez Casares & G. Moreno Moral MM67/2007 (herb. Sánchez Pedraja 12889).

TERUEL: “Castelserás no rara sobre *Echinops* 10 Jun. 1872 (Loscos)” (cf. LOSCOS, 1878-1880 [1986]: 125[317], sub “1.770. *O. ritro* Gr. Godr.”). “In Arag. austr. (pr. Castelserás ad rad. *Echinops ritro*. Losc. [Loscos])” [cf. WILLKOMM, 1893: 188, sub *Orobancha major* var. *ritro*].

ZARAGOZA: “B. et C. Vicioso Herbarium Aragonense / Calatayud (España) / *Orobancha caryophyllacea* Sm / = (*O. Galii* Vauch.) / In vineis / Calatayud [N 41° 21' 0" W 1° 38' 0", c. 564 m] 28-5-1910 / Leg. Vicioso. C.” (MA 115042; rev. ut *Orobancha ritro* Gren., Carlón, Moreno Moral & Sánchez Pedraja, 2003). “A) “Caroli Pau - Herbarium hispanicum” // B) “B. et C. Vicioso Herbarium Aragonense” / nº 17 Calatayud (España) / *Orobancha* / viñas de Marivella / Junio 1911 / B. Vicioso” (MA 435793; rev. ut *Orobancha ritro* Gren., Carlón, Moreno Moral & Sánchez Pedraja, 2003). 30TXL7677, Fuendetodos, Valdeamigo (road A-220, km 51), beside *Echinops ritro*, 630 m, 30-V-2003, G. Gómez Casares & G. Moreno Moral MM116/2003 (herb. Sánchez Pedraja 11381). 30TXL8076, Almonacid de la Cuba, near the balsete Segarra (road A-220, km 54,500), parasitic on (!)

Echinops ritro in the banks and ditches of the road, 580 m, 30-V-2003, G. Gómez Casares & G. Moreno Moral MM117/2003 (herb. Sánchez Pedraja 11382); *ibid.*, 26-V-2004, G. Gómez Casares & G. Moreno Moral (obs.); *ibid.*, 23-VI-2004, G. Gómez Casares & G. Moreno Moral (obs.). *Ibid.*, 4-VI-2005, G. Gómez Casares & G. Moreno Moral (obs.). 30TXL1881, Calatayud, Marivella (crossing of the track leading to the Planas de Anchís with the former N-II), beside *Echinops ritro* in a stony slope, 620 m, 5-VI-2007, G. Gómez Casares & G. Moreno Moral MM81/2007 (herb. Sánchez Pedraja 12908). 30TXL1781, Calatayud, above Huérmeda (track leading from Huérmeda to the Marivella plateau), beside *Echinops ritro* in waysides, 600 m, 4-VII-2008, G. Moreno Moral (obs.). 30TXL1780, Calatayud, Marivella, beside *Echinops ritro* in sunny embankments of ancient vineyards, 600 m, 5-VII-2008, G. Moreno Moral (obs.).

Orobanche leptantha Pomel in Bull. Soc. Climatol. Alger 11: 110 (1874)

- = *O. ictérica* Pau, Not. Bot. Fl. Españ. 3: 5[-6] (1889) [CARLÓN & *al.* (2010, *on line*)]
- = *O. major* subsp. *ictérica* (Pau) A. Pujadas in Flora Montib. 11: 16 (1999)
- = *O. elatior* subsp. *ictérica* (Pau) A. Pujadas in Flora Montib. 17: 11 (2001)
- *O. alba* auct. hisp. [p.p. min.], non *O. alba* Stephan ex Willd., Sp. Pl. 3: 350 (1800) [e.g. BOLÒS & VIGO (1996: 511)]
- *O. elatior* auct., non *O. elatior* Sutton in Trans. Linn. Soc. London 4: 178, t. 17 (1798) [e.g. CHATER & WEBB (1972: 363); UHLICH & *al.* (1995: 137); FOLEY (2001: 71); DOMINA & RAAB-STRAUBE (2010)]
- *O. major* auct., non *O. major* L., Sp. Pl.: 632 (1753), nom. rej. (e.g. BECK (1890: 172); WILLKOMM (1893: 188); VICIOSO (1911: 101); BECK (1930: 251); CADEVALL (1932: 296); GREUTER & *al.* (1989: 260))

Lectotypus, hic designatus: MPU 004861 (leftmost, almost complete specimen beside the label indicating MPU number).

It is not hard to notice that Pomel's description (later amplified by BATTANDIER, 1890: 663]) matches the one publi-

shed by Pau 15 years later. In addition to the common host that awaked our suspicions, Algerian and Spanish plants share stout stems, narrow leaves ("Squammes lâches linéaires lancéolés"), characteristically long bracts exceeding the flowers ("Bractées linéaires dépassant de beaucoup les fleurs") and forming an apical tuft, pinkish flowers, yellow stigma and filaments hairy in the base. Pomel's original materials (MPU 004861) fully corroborate this taxonomic unification, which results even sounder if one considers that Spanish botanists have recently found plants referable to *ictérica* in Tunisia (PUJADAS & *al.*, 2007: 112) and that *ictérica* is well known along Spanish Mediterranean coasts in localities analogous in every respect to the sea cliffs around Oran from where *leptantha* was described.

BECK (1890: 264; 1930: 303) supposed as well that *leptantha* was akin to *elatior*, the entire calyx segments he suggested as potentially diagnostic being in fact the most frequent condition in *ictérica*.

***Orobanche elatior** Sutton

Spain/España. LÉRIDA: 31TCH2930, Naut Aran, Solan de Salarú e Tredòs (pr. Tredòs), parasitic on (!) *Centaurea scabiosa* in a sunny meadow, 1450 m, 22-VI-2004, L. Carlón, G. Gómez Casares & G. Moreno Moral MM0163/2004 (herb. Sánchez Pedraja 11943); *ibid.*, 16-VI-2005, L. Carlón, G. Gómez Casares & G. Moreno Moral MM71/2005 (herb. Sánchez Pedraja 12267); *ibid.*, 1400 m, 16-VI-2005, L. Carlón, G. Gómez Casares & G. Moreno Moral (obs.).

So far we have established the occurrence in Spain of two species that in our previous papers were subsumed into a wide (CARLÓN & *al.*, 2003: 30-32, 37-39) or even narrow (CARLÓN & *al.*, 2005: 54-55) concept of *O. elatior*. The plants by us cited as "*O. major* L. β *Ritro*" correspond to the aforescribed *O. loscosii*, while almost the totality of those



Fig. 5. *Orobanche leptantha*, west from Loma Cabrera, pr. Segorbe (Castellón, Spain) –loc. class. of *O. icterica* Pau–, 30SYK1211, 430 m, beside *Centaurea aspera*, G. Gómez Casares & G. Moreno Moral MM0113/2004, 25-VI-2004 (herb. Sánchez Pedraja 11870).



Fig. 6. *Orobanche elatior*, Solan de Salardú e Tredòs, pr. Tredòs (Naut Aran, Lèrida, Spain), 31TCH2930, 1450 m, parasitic (!) on *Centaurea scabiosa* in a sunny meadow, L. Carlón, G. Gómez Casares & G. Moreno Moral MM0163/2004, 22-VI-2004 (herb. Sánchez Pedraja 11943).

cited as “*O. elatior* s. l.” or simply as “*O. elatior*” are to be referred to *O. leptantha*, widespread in the Eastern half of the Iberian Peninsula (where it abounds in markedly dry areas with annual precipitations below 600 mm and, eluding the wetter massifs, generally remains below 1000 m a.s.l.) and that we now consider specifically recognisable by the above cited traits and by the usually rounded and convergent or overlapping lower lip lobes despite being both morphologically and sequence-wise very closely related to *elatior*. The only exception is the plant collected in the middle of the Pyrenees near Tredòs (Val d’Aran, province of Lérida), which is to be considered the first definite, reliable Spanish record of the true *O. elatior*. We seize the opportunity to publish a photograph taken in this locality, repeatedly visited by us these last years. The plant is there parasitic on *Centaurea scabiosa* and lives in sunny meadows on a steep slope at over 1400 m a.s.l. with precipitations evenly distributed throughout the year, amounting to about 1000 mm and providing a thick and long lasting snow cover in winter. In the very same locality, other biogeographically significant species of *Orobanche* like *O. bartlingii*, *O. teucarii* and *O. haenseleri* are found.

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