

NOTES ON *EPILOBIUM* (ONAGRACEAE) FROM THE WESTERN MEDITERRANEAN

by

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Resumen

NIETO FELINER, G. (1996). Notas sobre los *Epilobium* (Onagraceae) del Mediterráneo occidental. *Anales Jard. Bot. Madrid* 54: 255-264 (en inglés).

Aportaciones taxonómicas sobre el género *Epilobium* que son consecuencia de la revisión llevada a cabo para producir una síntesis genérica destinada a *Flora iberica*. En particular, se aclaran nombres tales como *E. mutabile* Boiss. & Reut., *E. carpetanum* Willk., *E. psilotum* Maire & Samuelsson o *E. salcedoi* Vicioso, así como varios creados por Sennen (*E. barcinonense*, *E. gredillae*, *E. losae*, *E. rigatum*, *E. barnadesianum*, *E. debile*, *E. costeanum*) y por Merino (*E. maciae*, *E. simulans*, *E. tudense* y *E. lucense*). Asimismo, se discute en detalle el problema de *E. lamyi* F.W. Schultz; en especial, se aclara el uso de dicho nombre por parte de botánicos que han trabajado en España y Portugal, y se rechazan las citas peninsulares del mismo. Se explican algunos problemas taxonómicos derivados de la variabilidad morfológica que exhiben *E. duriaei*, *E. montanum*, *E. lanceolatum*, *E. collinum*, *E. tetragonum* subsp. *tournefortii* y *E. obscurum*. De este último, adicionalmente, se aportan algunos datos de interés corológico.

Palabras clave: *Spermatophyta*, *Epilobium*, *Onagraceae*, taxonomía, corología, Mediterráneo occidental.

Abstract

NIETO FELINER, G. (1996). Notes on *Epilobium* (Onagraceae) from the western Mediterranean. *Anales Jard. Bot. Madrid* 54: 255-264.

The present taxonomic notes are part of the results of a revision of *Epilobium* carried out for the "Flora iberica" project. The identity of diverse names is clarified, including *E. mutabile* Boiss. & Reut., *E. carpetanum* Willk., *E. psilotum* Maire & Samuelsson, *E. salcedoi* Vicioso, and several ones by Sennen (*E. barcinonense*, *E. gredillae*, *E. losae*, *E. rigatum*, *E. barnadesianum*, *E. debile*, *E. costeanum*) as well as by Merino (*E. maciae*, *E. simulans*, *E. tudense*, *E. lucense*). Ample discussion is provided concerning the identity and use, particularly by authors working in Spain and Portugal, of *E. lamyi* F.W. Schultz; it is concluded that records for the Iberian Peninsula are erroneous. Morphological variability in various species (*E. duriaei*, *E. montanum*, *E. lanceolatum*, *E. collinum*, *E. tetragonum* subsp. *tournefortii*, *E. obscurum*) and its taxonomic implications are discussed as well. Additionally, some distributional data are provided for *E. obscurum*.

Key words: *Spermatophyta*, *Epilobium*, *Onagraceae*, taxonomy, plant distribution, Western Mediterranean.

INTRODUCTION

The present notes are part of the results of a revision of *Epilobium* for the "Flora iberica" project.

Material from the following public herbaria has been studied: BCF, BM, COI, G, GDA, GDAC, JACA, K, LOU, MA, MAF, MGC, RNG, SEV. The private herbaria of A. Pallarés (Almería), J. Patallo (Ponferrada,

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León) and O. Sánchez Pedraja (Liérganes, Cantabria) have been examined as well. The number of misidentified specimens found in most of them is too high for a genus that has been worked out so extensively in Europe (see references at the end of this paper and STACE, 1975: 250-251). Taxonomic difficulties are not primarily the result of species delimitation problems. Rather, following STACE (1975: 246), I think that misinterpretations are due to phenotypic plasticity of some characters and to "the failure of some botanists to examine critically the proven diagnostic characters, notably the quality of the indumentum". I fully agree with the latter assertion; the indumentum is highly informative but it must be examined in various organs at greater than 20X magnification. Similarly, the seeds provide good characters, such as size, shape and surface sculpture (SEAVEY & *al.*, 1977) but these features are not visible to the naked eye. Other characters, such as perennating structures, are also useful but should be examined carefully (KEATING & *al.*, 1982); the scheme proposed by HAUSSKNECHT in his excellent work (1884: 35) seems to be too rigid according to the present available evidence.

In contrast to the suggestion of STACE (*l.c.*: 246), I would also attribute some of the confusion between species in this genus to hybridization (NIETO FELINER, 1995). A particularly illustrative situation occurs in the Sierra Nevada, where 11 of the 16 native Iberian species occur. Opportunities for hybridization to take place are especially rich at higher elevations (above 2000 m) where *E. alsinifolium* (see table 1 for authorship), *E. anagallidifolium*, *E. atlanticum*, *E. collinum*, *E. palustre* and *E. obscurum* occur. The wet alpine pastures locally called 'borreguiles' are the richest part of the chain in terms of endemics; furthermore, due to the climate they include species whose nearest population is as far as the Spanish Central System or even the Pyrenees. Well known examples of this type of disjunct distribution are *Ranunculus angustifolius*, *Cerastium cerastoides*, *Gentiana boryi*, etc.

Remarkably, three species of *Epilobium* (*E. alsinifolium*, *E. anagallidifolium*, *E. atlanticum*) can be strictly sympatric in these borreguiles (the three were recently seen by the author in a patch no more than 2 m long) and do not occur in any other habitat within Sierra Nevada. Therefore, it is not surprising that herbarium sheets very often contain mixed material and sometimes hybrids. From the Sierra Nevada, I am aware of hybrids between *E. atlanticum* and *E. alsinifolium*, and between the former and *E. obscurum* (NIETO FELINER, 1995), but other combinations are likely to occur as well. Similar conditions for hybridization although less extreme occur in other Spanish mountain ranges like the Sierra de Guadarrama (Madrid-Segovia) or the Sierra de Urbión (Soria-Logroño). Here, several species are likewise 'forced' to coincide in sites where moisture as well as other ecological requirements are met.

Another feature of the Iberian material worth mentioning is the predominance of decumbent or prostrate habits and low stature specimens. Due to water availability, altitude, or both, such forms tend to predominate in certain taxa which in northern regions can develop relatively tall, erect habits. This is the case of *E. obscurum*, *E. palustre*, *E. alsinifolium*, and *E. parviflorum*, among others. The predominance of a decumbent habit in the Iberian populations of *E. obscurum* is responsible for considerable taxonomic confusion, including the incorrect use of several names to refer to such species: *E. gemmiferum* sensu Lange, p.p., *E. gemascens* auct., *E. anagallidifolium* auct., *E. nutans* auct.

RESULTS

A synopsis of the taxonomic treatment to be followed in *Flora iberica* is given in table 1. Comments on the taxonomy, chorology and nomenclature of various taxa follow. Throughout the paper, synonyms are not cited unless they are based on Iberian material or have not been previously established.

TABLE 1

SINOPSIS OF *EPILOBIUM* IN THE IBERIAN
PENINSULA AND BALEARIC ISLANDS

Sect. *Chamaenerion* Tausch, Hort. Canal. 1 (1823)

1. *E. angustifolium* L., Sp. Pl.: 347 (1753)

Sect. *Epilobium*

2. *E. hirsutum* L., Sp. Pl.: 347 (1753)
3. *E. parviflorum* Schreb., Spic. Fl. Lips.: 147 (1771)
4. *E. montanum* L., Sp. Pl.: 348 (1753)
5. *E. collinum* C.C. Gmel., Fl. Bad. 4: 265 (1826)
6. *E. lanceolatum* Sebast. & Mauri, Fl. Romana. Prodr.: 138, tab. I (1818)
7. *E. duriaei* Gay ex Godr. in Gren. & Godr., Fl. France 1: 501 (1849)
8. *E. roseum* Schreb., Spic. Fl. Lips.: 147 (1771)
subsp. *roseum*
9. *E. tetragonum* L., Sp. Pl.: 348 (1753)
 - a. subsp. *tetragonum*
 - b. subsp. *turnefortii* (Michalet) Rouy & E.G. Camus, Fl. France 7: 181 (1901)
10. *E. obscurum* Schreb., Spic. Fl. Lips.: 147 (1771)
11. *E. palustre* L., Sp. Pl.: 348 (1753)
12. *E. nutans* F.W.Schmidt, Fl. Boëm. 4: 82 (1794)
13. *E. alpestre* (Jacq.) Krock., Fl. Siles. 1: 605 (1787)
14. *E. alsinifolium* Vill., Prosp. Hist. Pl. Dauphiné: 45 (1779)
15. *E. atlanticum* Litard. & Maire in Mém. Soc. Sci. Nat. Maroc 26: 15 (1931)
16. *E. anagallidifolium* Lam., Encycl. 2: 376 (1786)

Sect. *Xerolobium* Raven in Ann. Missouri Bot. Gard. 63: 334 (1976)

17. *E. brachycarpum* C. Presl, Reliq. Haenk. 2: 30 (1831)

Epilobium angustifolium

One of the clues that hybridization has occurred in sect. *Epilobium* is the presence of abundant aborted seeds. In non-hybrids, most of the seeds in every capsule are well-formed because all the species are strongly self-compatible. In contrast, in the protandrous zygomorphic *E. angustifolium*, seed-set is much lower, at least within the Iberian material. RAVEN (1979: 578) had reported no

self-incompatibility within *Epilobium* and, previously, MOSQUIN (1966: 173) had explained cases of sterility in very northern regions as 'environmentally induced'. However, our observations suggest that either there is at least partial self-incompatibility in *E. angustifolium*, as indicated by CHEN & al. (1992: 20), or that protandry is quite effective in promoting outcrossing despite the fact that up to 15 flowers can be simultaneously open (ERHARDT & STÖCKLIN, 1993). If an important degree of self-incompatibility does occur, chances for fertilization via allogamy are reduced by the clone-forming capacity of this species through long horizontally spreading shoot-bearing roots.

Epilobium parviflorum

- E. mutabile* Boiss. & Reut. in Boiss, Diagn. Pl. Orient. ser. 2, 2: 54 (1856) [lectotypified by BURDET & al., 1988]
- E. costeanum* Sennen in Bol. Soc. Ibér. Ci. Nat. 27: 61 (1928), pro hybr. [type material seen: MA 84381, RNG]
- E. salcedoi* C. Vicioso in Anales Jard. Bot. Madrid 6: 61 (1946), pro hybr. [type material seen: MA 84313; lectotypified by BAYÓN, 1986: 111-112]
- E. parviflorum* var. *lanuginosum* Sennen in Bol. Soc. Ibér. Ci. Nat. 27: 38 (1928) [type material seen: MA 84411]

Despite the large amount of work in this genus, the identity of *E. mutabile* Boiss. & Reut. has not been clearly stated. The *Index Kewensis* places it as a synonym of *E. lanceolatum*, probably because of its whitish petals. HAUSSKNECHT (1884: 81), as BURDET & al. (1988: 328) point out, considered the plant from Sierra Nevada as a hybrid of *E. montanum* and *E. roseum*, but he based his decision on Boissier & Reuter's diagnosis rather than on the type specimens from the Betic chain, which he never saw. What the German author did see were the specimens cultivated from seeds mentioned as well in the protologue ('E seminibus Hispanicis in Hort. Valeyres a duobus annis colitur'). These specimens were placed, correctly, under *E. parviflorum* in another page of

HAUSSKNECHT's monograph (*l.c.*: 72). Now, the former decision, i.e. to consider *E. mutabile* the name for the hybrid *E. montanum* × *roseum*, followed by RAVEN (1968: 431) and SMITHIES (1984: 393), cannot be accepted because *E. roseum* does not occur in the Sierra Nevada. Besides, the type material –G, lectotypified in BURDET & *al.*, *l.c.*– does not show any sign of hybridity. In GREUTER & *al.* (1989), *E. mutabile* is not recorded.

Of all the characters indicated in the diagnosis by Boissier & Reuter, only the petal color deserves some attention. The reportedly versicolor petals (initially white, afterwards pink) are lighter than in most of the Iberian populations of *E. parviflorum*, which have pink to purple flowers. However, the light-colored petals are not exclusive to the Sierra Nevada but frequent all over Andalusia and, apparently, present also in China (CHEN & *al.*, 1992: 64). Consequently, I think that *E. mutabile* is merely a synonym of *E. parviflorum*.

Part of the confusion is due to the leaves of this species. Both the cauline leaves in the short specimens (< 30 cm) and the leaves on lateral shoots are shorter and wider and more elliptical in shape. The former are, in addition, spatulate and tapering toward the base.

Epilobium montanum

E. losae Sennen, Pl. Espagne, n.º 6957 (1929), in sched. [type material seen: MA 84022, G]

Reduced forms of this species can be misidentified not only as *E. duriaei* (see comments to *E. losae* under *E. duriaei*) but also as *E. collinum*. An example of the latter confusion affects specimens from high elevations in the Sierra de Guadarrama near Madrid. On the basis of their small leaves, flowers and fruits, these specimens have been identified as *E. collinum* (in sched. in several herbaria), but the abundance of patent glandular hairs in ovaries/capsules and stems, as well as the predominant leaf shape, strongly suggest that they are forms of *E. montanum* modified by the habitat. The elevation is not apparently the crucial point in

the habitat difference; in the surrounding pine woodlands we find relatively normal sized forms of *E. montanum*. The reduced forms occur on granitic rocks or gravel outside the woods. This is in fact the usual habitat of *E. collinum*; therefore there is no apparent environmental factor that could modify the typical morphologic characters if these forms belonged to *E. collinum*. We would expect a modification of the habit and size of various organs if a species normally occurring on montane woods appears on open rocky habitats at nearly 1900 m of elevation.

The interpretation of these dwarf specimens is obscured to some extent by the occurrence of *E. lanceolatum* at the same elevations (1800-2000 m or even more) and sites. This species does not normally occur at such high elevations. It also shows a reduction in most of its organs but can still be recognized by the leaves (cuneate and petiolate) and by the kind of perennating organs (rosettes). Furthermore, some of those specimens collected at 1900 m and cultivated under greenhouse conditions in Madrid have developed to a size which we consider normal in *E. lanceolatum*. Also, to further complicate the matter, I have detected a hybrid (*E. collinum* × *E. lanceolatum*). I think that, as in the Sierra Nevada, what we have in the Sierra de Guadarrama is a concentration of several species at high altitudes which provoke a modification of the habit and other characters in some of them.

Epilobium collinum

E. carpetanum Willk. in Flora (Regensburg) 34: 635 (1851) [type material seen: COI]

The type of *E. carpetanum* ("Puerto de la Morcuera") is not far from the sites where we have found reduced forms of *E. montanum* (see above) superficially similar to *E. collinum*. However, the type (COI) is not any of those problematic forms; instead it is a typical *E. collinum*.

Epilobium duriaei

This species is not always easy to distinguish from *E. montanum* when mature seeds or perennating structures are not

available. This is particularly true when we have short specimens of *E. montanum* or tall specimens of *E. duriaei*. In such specimens one has to pay attention to the leaves. A close examination of their pattern of variation reveals the origin of the taxonomic confusion. The lower leaves (the first ones developed from the turions or soboles) in both *E. montanum* and *E. duriaei* are more or less elliptic, clearly obtuse and with a slightly toothed or entire margin. At the inflorescence, bracts are similar in the two species, lanceolate, acute and with a sharply toothed margin. The two ends of the range are therefore similar in the two species. The appearance of the foliage differs between the two species according to the kind of leaf which predominates. In *E. duriaei*, because its stems are usually shorter, the leaves closest to the base predominate. As stems grow higher, they are covered by leaves which look more and more similar to the bracts. Thus, in *E. montanum*, with stems up to 1 m tall, the leaves predominating are lanceolate-acute and more or less sharply toothed. Moreover, in the short specimens of *E. montanum*, the confusion comes not just from the higher percent of elliptic obtuse leaves but from the fact that the lower leaves are well preserved during anthesis, as in *E. duriaei*, while in the tall specimens the lowermost leaves are usually withered.

An example of a misinterpretation of a short-stemmed *E. montanum* seems to be what was described as *E. losae* Sennen, Pl. Espagne, n.º 6957 (1929), in sched. It is a short plant (15-30 cm) from the Sierra de la Demanda (Rioja-Soria) which Raven, in sched. (G), identified as *E. duriaei*. However, examination of mature seeds (< 1.3 mm, with prominent papillae) and turions leaves no doubt that it is a form of *E. montanum*. The opposite situation can be found in tall specimens belonging to *E. duriaei*, which are frequent in the Pyrenees.

Epilobium roseum

It reaches the Sierra del Maestrazgo (Castellón) (VIGO, 1968: 70; BC 261318)

several hundred kilometers apart from the other confirmed Iberian populations in the Pyrenees. What MERINO (1905: 484) called *E. roseum* is mostly *E. lanceolatum*. However, I found a single unlabeled specimen in Merino's herbarium (LOU 12661) which appears to be true *E. roseum*. The occurrence of this species in Galicia needs confirmation.

The intraspecific variability needs some further worldwide work. Two subspecies besides subsp. *roseum* (euroasiatic, type from Leipzig) are recognized, one from the Caucasus and another widely distributed in Asia. RAVEN (1962: 194) and CHAMBERLAIN & RAVEN (1972: 190) attributed eglandular ovaries and sepals to subspecies *roseum*. However, the presence of glandular hairs in the European material is constant, as one can deduce from reading the descriptions in every regional European flora as well as in the *Flora Europaea* (RAVEN, 1968: 310). In the latter work, the inflorescence is described as 'densely glandular-pubescent'. It seems that the quantity of the glandular indumentum varies depending on whether one is studying European or Asiatic material. In fact, more recently CHEN & al. (1992: 73) again reduce the importance of glandular hairs in the inflorescence of subsp. *roseum* when they describe it as "sometimes with glandular hairs". In the Iberian material studied, the above mentioned organs have abundant glandular hairs.

Epilobium tetragonum subsp. **tetragonum**
E. barcinonense Sennen in Bol. Soc. Ibér. Ci. Nat. 27: 43 (1928) [type material seen: MA 84136, 470779, SEV 77406]

The most relevant question to discuss in relation to this taxon is: what is *E. lamyi* F.W. Schultz? The characters invoked by different authors as diagnostic of *E. lamyi* do not show a clear correlation in the numerous specimens examined from the Iberian Peninsula. Additionally, there is not a complete agreement on which are the features of this taxon that distinguish it from *E. tetragonum*.

The recognition of *E. lamyi* has been

questioned by a number of authors starting with MICHALET (1855: 734). In addition to describing *E. tournefortii*, this French botanist made very accurate taxonomic remarks on several species of *Epilobium* thirty years before the publication of HAUSSKNECHT's work (1884). More recently, STACE (1975: 246) also questions the recognition of *E. lamyi*, by quoting the opinion of P. Raven, and later explicitly places Schultz's species as a synonym of *E. tetragonum* (STACE, 1991: 528). Others have been less conclusive but have expressed their doubts about the taxonomic value of this species. This is the case with SOLOMON (1982: 330) and CHAMBERLAIN & RAVEN (1972: 190). However, these are exceptions to the rule and *E. lamyi*, whether in the specific or subspecific rank, is usually admitted in most floras in Europe, such as CLAPHAM & al. (1987: 264); HEGI (1975: 843-844); DE LANGHE & al. (1983: 372); HESS & al. (1977: 781); JOVET & VILMORIN (1974: 115); RAVEN (1968: 310); WILLKOMM & LANGE (1874: 187).

Which are the alleged differences between *E. lamyi* and *E. tetragonum*? There seems to be only one character for which there is agreement among all the authors who recognize *E. lamyi*. It is the leaf base, shortly petiolate in *E. lamyi* vs. sessile and decurrent in *E. tetragonum*, one of the features mentioned by F.W. Schultz in the original diagnosis. However, apart from this character, there is not much agreement as to which others supposedly help to distinguish the former taxon. For instance, HAUSSKNECHT (1884: 36) selects, in the key to the species, the color of the plant, the shape of the flower bud and the petal color. OREDSSON & SNOGERUP (1976), are probably the authors who had supported more convincingly the recognition of two entities, providing detailed descriptions and indicating characters such as the relative size of the bracts as compared to the leaves, the leaf margin, the pubescence of the upper leaves, the pedicel length, and the seed size, as diagnostic. Unfortunately, erroneous figure legends (figs. 113, 114) in their paper label the plant with more deeply toothed leaves, larger bracts and longer

pedicels as *E. lamyi* instead of *E. tetragonum*, as would follow from the detailed descriptions. Another manifestation of apparent confusion in the interpretation of those two supposed entities is the drawings in HESS & al. (1977: 781); the leaf margin and shape attributed there to *E. lamyi* are exactly what other authors would consider typical of *E. tetragonum*, and viceversa.

What is the basis for this variety of opinions with regard to the distinguishing features? There is an explanation which one can easily grasp after revising the identification of many specimens kept in several herbaria (see list in the introduction). Many of the plants identified as *E. lamyi* or *E. tetragonum* subsp. *lamyi* are in fact *E. obscurum*. This was also the identification (under the synonym *E. virgatum* Fries) given to *E. lamyi* by 'one of the best botanists in Europe'—*einem der ausgezeichnetsten Botaniker Europas*—to which F.W. Schultz, the author of the name, sent the type material (cf. SCHULTZ, 1844: 806). This frequent misidentification could be due to the fact that (1) some characters of *E. obscurum* such as the leaf margin and pubescence are similar to what several authors attribute to *E. lamyi*; (2) most keys facilitate the confusion when working from dried specimens of *E. obscurum* without visible stolons. Such a misidentification is by no means restricted to the Iberian material. Even LÉVEILLÉ, who worked intensely on the *Onagraceae*, as one can judge from his sound identifications in several herbaria and from his revision (LÉVEILLÉ, 1910-11) misinterpreted *E. lamyi* (in sched.); very recently the same misidentification has been corrected for an exsiccata from Belgium [cf. *Bull. Soc. Éch. Pl. Vasc. Eur. Bassin Médit.* 23: 25 (1991)]. I will not enumerate here the differences between *E. tetragonum* and *E. obscurum*, which will be treated in my account of the genus to be published in *Flora iberica*. I must add, however, that for some reason a significant number of the misidentified specimens belonging neither to *E. obscurum* nor to *E. tetragonum* s.l., bear the identification '*E. lamyi*'.

The situation described above might suggest that the type of *E. lamyi* was actually *E. obscurum* as well. But such is not the case. Schultz's material was widely available by the middle of the XIX century, since for years he kept growing the original seeds sent to him by P.M.E. Lamy from Limoges. To my knowledge, he distributed the plant twice in his famous *exsiccata*: once, in 1847 (cf. STAFLEU & COWAN, 1985: 376), as no. 854 of his "*Flora Galliae et Germaniae exsiccata*"; the second time, years later in 1858 (cf. STAFLEU & COWAN, *l.c.*), as no. 271 of the "*F. Schultz, herbarium normale. Cent. 3*". Although both *exsiccata* are posterior to the protologue and thus technically cannot be considered type material, they are perfectly reliable as belonging to the type population, kept in cultivation for years by the author of the name (both bear in their labels the same locality and collector, Limoges/Lamy).

What is then *E. lamyi*, as judged from Schultz material? If we consider perennating structures (rosettes and roots), flower buds, and capsule indumentum, the material should be identified clearly as *E. tetragonum*. If we look at characters like shape, margin and base of the leaves, or capsule length, these specimens appear to be intermediate between the common form of *E. tetragonum* and *E. obscurum*. Therefore, I am strongly tempted to hypothesize that *E. lamyi* has a hybrid origin. This would explain the common misidentification of many true *E. obscurum* specimens. There is one more argument in favor. The specimens closest to Schultz's concept which I have seen in various herbaria (mainly G, K and BM), obviously including the material from Limoges, have a few glands in the calyx tube; this is one of the characters distinguishing *E. obscurum* from *E. tetragonum*. That such an entity is highly fertile is also clear when one examines the seed set. Therefore, for my hypothesis to be true, the hybrid should have undergone stabilization by some mechanism. If hybridization was not involved, i.e. implying that *E. lamyi* is a race differentiated from *E. tetragonum*, it would require several characters to have all shifted in the direction of those in *E. obscurum*; this hypothesis is not without difficulties either.

But the second point to discuss is whether or not it deserves recognition. Before studying a large amount of Central-european and British material, I believe it did not. Now, after having sorted out lots of specimens, I find that a number of them would still fit in Schultz concept. I think that in such areas *E. lamyi* cannot be sunk as a synonym until its origin is elucidated. With respect to Iberian Plants, I have not been able to find specimens that match the concept of *E. lamyi*. Some of the records for the latter, are referable to *E. obscurum*, others to the common *E. tetragonum*. Within *E. tetragonum* in the Iberian Peninsula, what one observes is a moderately wide variability involving several characters which do not show strong correlation and which never obscure the identity of the species.

Epilobium tetragonum* subsp. *tournefortii
E. gredillae Sennen & Elías in Bol. Soc. Ibér.
 Ci. Nat. 27: 42 (1928) [type material seen:
E. gredillae: MA 84097, 84099; RNG]

This plant consistently maintains a number of characters related to both vegetative and reproductive features. For RAVEN (1968: 310) this subspecies is normally cross-pollinated, unlike the other two he recognizes. Distinction of this taxon is supported by a previously neglected character, the anther length, which is clearly longer in this subspecies $-(1.3)1.5-2.4(2.7)$ mm vs. $0.7-1.1(1.3)$ mm-, thus with a greater amount of pollen. This character alone suggest that the occurrence of subsp. *tournefortii* in the Balearic Islands reported in GREUTER & al. (1989) but not in KNOCHE (1922: 221) is erroneous; BOLÒS & VIGO (1984) mention that the taxon has been recorded for the islands while SMITHIES (1984: 394) questions its occurrence there.

RAVEN (*l.c.*) comments that *E. tetragonum* subsp. *tournefortii* intergrades with the other subspecies. I was not able to detect clear intermediates within the Iberian Peninsula; however, certain identification is not always possible when flowers or buds are lacking. In such instances, one distinguishes subsp.

tournefortii by vegetative characters: its stem is more robust, the roots are normally thicker, and the seeds are slightly longer (1.1-1.3 mm).

The distribution of subsp. *tournefortii* is quite scattered throughout the Mediterranean Region: Iberian Peninsula, S France, North Africa, Corsica, Sardinia, Italy, Malta, Turkey, Lebanon, Palestine. Within the Iberian Peninsula, it is more frequent in the southwest region but also occurs in the north-centre (Navarra, Rioja, Cantabria, part of the Basque Country, and Burgos). When comparing an outcrossing subspecies with such a scattered distribution to a much more widely distributed mainly self-pollinated relative—subsp. *tetragonum*—, one is tempted to think that the former distribution is relict and that the selfer subspecies arose from the outcrossing one. But this hypothesis has difficulties in a genus in which most of the taxa (i.e. those in section *Epilobium*) are mainly self-pollinated.

Epilobium obscurum

E. rigatum Sennen in Bol. Soc. Ibér. Ci. Nat. 27: 40 (1928) [type material seen: BM, MA 84177]

E. lucense Merino in Brotéria, Sér. Bot. 11: 34 (1913), pro hybr. [type material seen: LOU 12651]

E. lamyi auct. pl., non F.W. Schultz in Flora (Regensburg) 27: 806 (1844)

E. tetragonum subsp. *lamyi* auct. pl., non (F.W. Schultz) Nyman, Consp. Fl. Eur.: 247 (1879)

E. tudense Merino in Brotéria, Sér. Bot. 11: 39 (1913), p.p., pro hybr. [material seen: LOU 10352/1; 10352/3; 10352/3]

This taxon is extremely variable in habit and dimensions of vegetative organs. Three factors combined result in a variety of habits: the degree of development of the axillary shoots which bear small leaves, the degree of conservation of the basal leaves (tapering to a petiole at the base), and the position of the stem with respect to the substrate (creeping to erect). In the Iberian Peninsula, the erect plants with mostly undivided stems (the one best fitting the description of the synonym

E. virgatum Fries) are rarer than the short, creeping branched ones. This variability probably explains why the plant has not been recorded in many parts of Spain where it actually occurs. In fact, it is probably the most abundant species in the Peninsula after *E. hirsutum* and *E. parviflorum*. I am not aware of previous records from provinces such as Almería, Málaga, Huelva, Granada and Jaén in Andalusia. A few specimens follow:

ALMERÍA: Sierra de Bacares, 18-VII-1929, Gros, MA 84184. Sierra Nevada, los Olivillos, WG10, 16-VII-1985, G. & J.M. Montserrat, JACA 155686. Sierra Nevada, Bayárcal, laderas del Chullo, 2000 m, 5-VIII-1994, A. Pallarés, MA s/n. Puerto de la Ragua, humedales, 5-VIII-1994, A. Pallarés, MA s/n. MÁLAGA: Sierra Tejada, Canillas de Albaida, subida a Picaricos, 10-VI-1982, J.M. Nieto & Cabezudo, MGC 13137. Ronda, Igualeja, la Fuenfria, VF1657, 1110 m, 21-VII-1987, A.V.P. La Torre, MGC 23171. HUELVA: Sierra de Aracena, entre Puerto Moral y el pantano de Aracena, 7-VII-1978, J. Rivera, SEV 47393. Valdelamusa, 21-VII-1979, J. Rivera & Cabezudo, SEV 47396. GRANADA: Sierra Tejada, Alhama de Granada, Hoya de las Llamadas, VF1084, 26-VI-1982, J.M. Nieto & Cabezudo, MGC 23138. Sierra Nevada, Trevélez, VF7695, 1500 m, 17-VII-1979, Molero Mesa, GDA 11227. Carretera del Mulhacén a Capileira, 30SVF7293, 2400 m, 23-VII-1984, Luceño, MA 396976. JAÉN: Andújar, río Vavalajeta, UH8851, 3-VII-1987, E. Cano, GDAC 28276.

With respect to its type, SOLOMON (1982: 327) reports it as “apparently lost”. However, in M-Schreber there is one specimen which could be type material. It bears three labels, two of them handwritten presumably by Schreber. The toponyms are not coincident with “In humidis ad Schoenfeld, Abtnauendorf” (SCHREBER, 1771: 146) but those on the labels appear to be more local, viz. “In einer kalten Quelle am Carslbade nach der Mariencapelle rechter Hand. 1771”. Its identity coincides with the traditional use of the name.

E. tudense Merino, described as a hybrid of *E. lanceolatum* and *E. tetragonum* “raza” *gilloti* is actually a mixture of *E. obscurum* and *E. lanceolatum*. Besides the three herbarium sheets mentioned above containing just *E. obscurum*, one (LOU 10352/2) displays a mixture of the two species while the fifth sheet (LOU 10352/4) has only *E. lanceolatum*.

Epilobium palustre

E. barnadesianum Sennen in Bol. Soc. Ibér. Ci. Nat. 27: 63 (1928), pro hybr. [type material seen: MA 84321, 84322]

E. debile Sennen in Bol. Soc. Ibér. Ci. Nat. 27: 63 (1928), pro hybr. [type material seen: MA 84305]

E. maciae Merino in Brotéria, Sér. Bot. 11: 34 (1913), pro hybr. [type material seen: LOU 566bis]

E. simulans Merino in Brotéria, Sér. Bot. 11: 34 (1913), pro hybr. [type material not seen, but cf. lám. II in Merino (*l.c.*) and Lafnz (1968)]

E. palustre var. *angustifolium* Willk. ex Debeaux in Rev. Bot. Bull. Mens. 15: 149 (1897) [type not seen, but other materials from the same locality checked]

Epilobium alsinifolium

E. psilotum Maire & Samuelsson in Ark. Bot. 29A(11): 26 (1938) [Typus: in stillicidiis rupium ad septentrionem versis montium Atlantis Majoris Regni Maroccani prope Tachdirt, solo porphyrico, circ. 2100 m.s.m. (BALLS n.3117 in Hb. Stockholm)]

Besides two isotypes (from K and BM, respectively), I have seen two other herbarium specimens from the Atlas Mountains identified as *E. psilotum*: [Gbel Tistout, 9500', 20-VIII-1955, *J. Newbould 211*, BM 18422. Great Atlas Mountains: N face Djebel Augour, 21-VIII-1951, *O. Polunin 2200*, BM 18423]. Moreover, I have seen other recent collections [Marrakech, Oukaïmedene, 2750-2900 m, 12-VII-1984, *G. López 9082* & *F. Muñoz Garmendia*, MA 404626] which support my opinion that all of these specimens fall within the variability of *E. alsinifolium*, except for the entire glabrescence of the stems. The latter is probably not a serious consideration since the indument in *E. alsinifolium* is reduced to two very sparse longitudinal lines of eglandular hairs. Nor is the disjunction a strong obstacle to referral of these moroccan specimens to *E. alsinifolium*. The closest populations to the Atlas are in the Sierra Nevada (S Spain) but northwards from this

chain the distribution of *E. alsinifolium* shows an even larger gap from the Sierra Nevada to the Pyrenean-Cantabrian chain.

Epilobium brachycarpum

E. paniculatum Nutt. ex Torr. & A. Gray, Fl. N. Amer. 1: 490 (1840)

Introduced about 15 years ago in the surroundings of Madrid (IZCO, 1983). It is a weedy, late-flowering annual from North America which has become locally very abundant within a 30 km radius from the capital city. This was the only record known from Europe but Peter Hoch (*in litt.*) informs me that a specimen collected in Brest (Brittany, France) has arrived at MO.

Despite the long use of Nuttall's name, a proposal to reject *E. brachycarpum* C. Presl by HOCH & RAVEN (1981) was rejected (BRUMMITT, 1984). Therefore, the correct name for this species, for reasons of priority, is the one by C. Presl.

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REFERENCES

- BAYÓN, E. (1986). Contribución al conocimiento de la obra botánica de Carlos Vicioso. Apuntes biográficos. Bibliografía. Nombres nuevos por él propuestos o a él atribuidos y tipificación de los mismos. *Ruizia* 4.
- BOLÓS, O. & J. VIGO (1984). *Flora dels Països Catalans*. Vol. 1. Barcelona.
- BRUMMITT, R.K. (1984). Report of the Committee for Spermatophyta: 27. *Taxon* 33: 297-300.
- BURDET, H.M., A. CHARPIN & F. JACQUEMOUD (1988). Types nomenclaturaux des taxons décrits par Boissier ou Reuter. VIII. Légumineuses à Oenothéracées. *Candollea* 43: 293-329.
- CHAMBERLAIN, D.F. & P.H. RAVEN (1972). Onagraceae. In: P.H. Davis (ed.), *Flora of Turkey and East Aegean Islands* 4: 183-196. Edinburgh.

- CHEN, C.-J., P.C. HOCH & P.H. RAVEN (1992). Systematics of *Epilobium* (Onagraceae) in China. *Syst. Bot. Monogr.* 34: 1-209.
- CLAPHAM, A.R., T.G. TUTIN & D.M. MOORE (1987). *Flora of the British Isles*, ed. 3. Cambridge, etc.
- DE LANGHE, J.E., L. DELVOSALLE, J. DUVIGNEAUD, J. LAMBINON & C. VAN DEN BERGHE (1983). *Nouvelle flore de la Belgique, du Grand Duché de Luxembourg, du Nord de la France et des régions voisines (Ptéridophytes et Spermatophytes)*, ed. 3. Meise.
- ERHARDT, A. & J. STÖCKLIN (1993). Dichtung und Wahrheit in der Naturwissenschaft: die Bestäubung von *Epilobium angustifolium* und *Scrophularia nodosa*. *Diss. Bot.* 196: 95-106.
- GREUTER, W., H.M. BURDET & G. LONG (eds.) (1989). *Med-Checklist 4. Dicotyledones (Lauraceae-Rhamnaceae)*. Genève.
- HAUSSKNECHT, H.C. (1884). *Monographie der Gattung Epilobium*. Jena.
- HEGI, G. (1975). *Illustrierte Flora von Mittel-Europa*. Ed. 2, vol. 5(2). Berlin & Hamburg.
- HESS, H.E., E. LANDOLT & R. HIRZEL (1977). *Flora der Schweiz*, ed. 2. Vol. 2. Stuttgart.
- HOCH, P.C. & P.H. RAVEN (1981). Proposal to reject the name *Epilobium brachycarpum* Presl (1831) (Onagraceae). *Taxon* 30: 666.
- IZCO, J. (1983). *Epilobium paniculatum* nueva adventicia para Europa. *Candollea* 38: 309-315.
- JOVET, P., R. DE VILMORIN (1974). In: H.J. Coste, *Flore Descriptive et Illustrée de la France*, second supplément. Paris.
- KEATING, R.C., P.C. HOCH & P.H. RAVEN (1982). Perennation in *Epilobium* (Onagraceae) and its relation to Classification and Ecology. *Syst. Bot.* 7: 379-404.
- KNOCHÉ, H. (1922). *Flora Balearica. Étude Phytogéographique sur les Îles Baléares*. Vol. 2. Montpellier.
- LAÍNZ, M. (1968). *Aportaciones al conocimiento de la flora gallega, VI*. Madrid.
- LÉVEILLÉ, H. (1910-11). *Iconographie du genre Epilobium*. Le Mans.
- MERINO, B. (1905). *Flora de Galicia*. Vol. 1. Santiago de Compostela.
- MICHALET, E. (1855). Sur la végétation des *Épilobes*, et description de quelques espèces nouvelles, critiques ou hybrides de ce genre. *Bull. Soc. Bot. France* 2: 726-735.
- MOSQUIN, T. (1966). A new taxonomy for *Epilobium angustifolium*. *Brittonia* 18: 167-188.
- NIETO FELINER, G. (1995). Hybridization in the genus *Epilobium* (Onagraceae) in the Iberian Peninsula. *Anales Jard. Bot. Madrid* 52: 241-247.
- OREDSSON, A. & S. SNOGERUP (1976). Drawings of Scandinavian plants 113-114. *Bot. Not.* 129: 193-197.
- RAVEN, P.H. (1962). The genus *Epilobium* in Turkey. *Notes Roy. Bot. Gard. Edinburgh* 24: 183-203.
- RAVEN, P.H. (1968). *Epilobium*. In: T.G. Tutin, V.H. Heywood, N.A. Burgues, D.M. Moore, D.H. Valentine, S.M. Walters & D.A. Webb (eds.), *Flora Europaea*. Vol. 2: 308-311. Cambridge.
- RAVEN, P.H. (1979). A survey of reproductive biology in Onagraceae. *New Zealand J. Bot.* 17: 575-593.
- SCHREBER, J.C.D. (1771). *Spicilegium florum lipsicae...* Leipzig.
- SCHULTZ, F.W. (1844). Einige neue Pflanzenarten. *Flora (Regensburg)* 27: 806-809.
- SEAVEY, S.R., R.E. MAGILL & P.H. RAVEN (1977). Evolution of seed size, shape, and surface architecture in the tribe Epilobieae (Onagraceae). *Ann. Missouri Bot. Gard.* 64: 18-47.
- SMYTHIES, B.E. (1984). Flora of Spain and the Balearic Islands. Checklist of Vascular Plants. II. Cruciferae-Rutaceae. *Englera* 3(2): 213-486.
- SOLOMON, J.C. (1982). The systematics and evolution of *Epilobium* (Onagraceae) in South America. *Ann. Missouri Bot. Gard.* 69: 239-335.
- STACE, C.A. (ed.) (1975). *Hybridization and the Flora of the British Isles*. London & New York.
- STACE, C.A. (1991). *New Flora of the British Isles*. Cambridge.
- STAFLEU, F.A. & R.S. COWAN (1985). Taxonomic literature Ed. 2, vol. V: Sal-Ste. *Regnum Veg.* 112.
- VIGO, J. (1968). *La vegetació del massís de Penyalgosa*. Barcelona.
- WILLKOMM, H.M. & J. LANGE (1874-1880). *Prodromus Florae Hispanicae*. Vol. 3. Stuttgart.