

TAXONOMIC STUDIES ON THE GENUS ECHIAM.
I. AN OUTLINE REVISION OF THE SPANISH SPECIES

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Resumen. En este trabajo, se perfila una revisión de las especies españolas del género *Echium*, incluyéndose una clave para la determinación de las 15 reconocidas para España, cada una de las cuales va acompañada de una descripción y citación detallada del material estudiado. Se han reunido en este trabajo los siguientes cambios nomenclatoriales que habían sido efectuados por diversos autores: el nombre *E. pomponium* Boiss. debe ser reemplazado por *E. boissieri* Steudel, y *E. maritimum* Willd. por *E. sabulicolum* Pomel. Además, en este trabajo se revalidan algunos nombres, varios de los cuales no habían sido utilizados en trabajos florísticos españoles; por ejemplo: *E. humile* Desf. (= *E. angustifolium* Lam.), *E. asperrimum* Lam. (= *E. pyrenaicum* Desf., *E. italicum* sensu Willkomm pro parte) y *E. creticum* L. (= *E. australe* Lam.). En esta última especie, se comprueba que *E. creticum* subsp. *coincyanum* (Lacaita) R. Fernandes es un taxon bastante variable y poco conocido hasta ahora, que se encuentra ampliamente distribuido en el Sur de España.

This contribution to the classification of the genus *Echium* is based on studies which were begun in 1969 and which are still in progress. The publication of a taxonomic revision at such an unfinished stage of a research programme requires some explanation since, ideally, a revision or monograph should culminate the investigation of a group of plants and so provide a synthesis of the available data.

In this case, however, I feel that it is worthwhile to attempt an outline revision of the Spanish *Echia* even though some of the data and conclusions are incomplete and the limits of one or two of the taxa are still critical. The alternative would be to delay publication for several years until current studies on cytology, breeding relationships and pollination ecology, all of

which necessarily make slow progress, are more complete. The reasons for this decision are twofold: First, the only previous extensive treatment of the Spanish species of *Echium* is that by WILLKOMM (1870) and since the publication of this work there have been numerous changes in the taxonomy and nomenclature of the genus. Moreover, the various publications which discuss some of these taxonomic and nomenclatural problems are virtually all scattered in non-Iberian journals and are thus not readily available to Spanish botanists. Secondly, the genus *Echium* has tended to suffer from a surfeit of short taxonomic notes devoted to various species, eg. COINCY (1900a & b, 1901, 1902), LACAITA (1919, 1923, 1925), KLOTZ (1962a, b & c); although these studies are individually very valuable they do lack many of the advantages which even a modest revision can provide in the way of keys, diagnoses and citation of specimens.

This first contribution, therefore, is simply an outline revision of the genus *Echium* in Spain which should allow ready identification of the Spanish species and which also provides a summary of much of the available exsiccata, distributional data and literature for the genus. The revision also aims to draw attention to remaining taxonomic problems and it is hoped that it will facilitate and encourage further studies on the genus within a framework of the current taxonomy and nomenclature of the group.

These studies on the genus *Echium* in Spain were greatly promoted by the award of a Visiting Research Fellowship by The Royal Society, London, which enabled me to spend seven months at the University of Sevilla in 1969. I am most grateful to The Royal Society and to the Consejo Superior de Investigaciones Científicas for the financial support of this Fellowship, and to Professor E. F. Galiano for extending to me the laboratory facilities of the Department of Botany at the University of Sevilla (SEV). I am further indebted to Professor Galiano for the generous provision of field excursion facilities during my stay, and to all of the staff of the Department of Botany at Sevilla for the benefit of their company and field experience during many enjoyable botanical excursions in Andalucía.

I am also indebted to the Directors of the following herbaria for the loan of specimens: Botanical Institute of the University of Coimbra (COI), Conservatoire et Jardin botaniques, Genève (G), Facultad de Farmacia, Universidad de Granada (GDA), The University of Leicester (LTR), Instituto Botánico «A. J. Cavanilles», Madrid (MA), The Manchester Museum, The University, Manchester (MANCH); and to the Directors of the Royal Botanic Gardens at Edinburgh (E) and Kew (K), and The Linnaean Society of London (LINN), for the use of library and herbarium facilities.

SOME GENERAL ASPECTS OF THE GENUS *ECHIUM*

It is intended that the infra-generic classification of the genus *Echium*, together with cytology and pollination ecology etc. will be considered in a separate publication. The notes included here are simply intended to provide a general background for the species treated in this revision.

Species diversity and Phytogeography.

The genus *Echium* contains two distinctive evolutionary nodes: the predominantly woody species of the macaronesian archipelago (comprising some 25 species), and the herbaceous species which are chiefly distributed in Europe and North Africa (totalling, perhaps, some 25 species). Within the latter group the main centres of species diversity are the Iberian peninsula with 16 or so species, and North-West Africa (particularly Morocco) with c. 20 species (*), whilst a secondary cluster of taxa occurs in the Eastern Mediterranean which includes the polymorphic *E. angustifolium* complex.

Growth habit.

Most of the Spanish species of *Echium* appear to be biennial plants but four species have been described as perennials, viz. *E. albicans*, *E. humile*, *E. lusitanicum* and *E. rosulatum*, and two species *E. arenarium* and *E. parviflorum* seem to be annuals. However, it is difficult to obtain reliable information and some species are likely to be variable in growth form; thus *E. flavum* and *E. vulgare* may behave as biennial or perennial plants, and likewise *E. arenarium* as an annual or biennial.

It seems reasonable to take as a working hypothesis the view that the perennial habit is ancestral with the annual species as evolutionarily advanced (at least in this growth characteristic), and with the European *Echia* there is some data which supports this view (see comments under floral morphology below). However, the perennial species of *Echium* in Spain form a rather heterogeneous group: whilst floral and vegetative morphology suggest that *E. albicans* and *E. humile* are perhaps related taxa (and possibly allied to the *E. angustifolium* complex in the Eastern Mediterranean), the species *E. rosu-*

(*) Excluding the 30 or so species described by SENNEN from the Rif mountains.

latum and *E. lusitanicum* are distinctive from this former pair and from each other.

Indumentum.

Species of *Echium* present the common boraginaceous characteristic of possessing two types of trichome: rather stout, tubercle-based setae, and simple hairs, the latter usually forming an underlayer when the setae are dense. The nature and relative abundance of these trichome types are of taxonomic importance since the indumentum imparts a distinctive appearance to many species.

Thus, in *E. albicans* the relatively sparse setae and very dense, whitish, appressed hairs give a distinctive whitish-cinereous aspect to this species. Likewise, the presence of dense, whitish, patent setae, particularly those of the calyx, contribute to the characteristic facies of *E. humile*.

The group of species which possess a very narrowly infundibuliform to hypocrateriform, generally flesh-coloured corolla, ie. *E. asperrimum*, *E. boissieri*, *E. flavum*, *E. italicum* and *E. lusitanicum*, also show a common pattern of leaf setae. In these species the generally conspicuous, more or less lanceolate basal rosette leaves have dense, appressed, softish setae. *E. plantagineum* is another species characterised by having soft, appressed setae on the basal leaves but this species is otherwise very distinct from the former group. On the other hand, species such as *E. gaditanum*, *E. creticum* and *E. vulgare* tend to have rather irregularly spreading, more or less harsh setae on the basal leaves.

The nature of the underlayer of simple hairs on the flowering stems also provides a character of taxonomic importance, and the Spanish species of *Echium* can be grouped as follows:

(a) Underlayer of hairs on the flowering stem forwardly or irregularly directed (*E. albicans*, *E. arenarium*, *E. humile*, *E. parviflorum*, *E. plantagineum* and *E. sabulicolum*).

(b) Underlayer of hairs on the flowering stem rather irregularly directed but mostly deflexed (*E. asperrimum*, *E. boissieri*, *E. flavum*, *E. italicum* and *E. lusitanicum*).

(c) Underlayer of hairs on the flowering stem uniformly appressed and deflexed (*E. creticum*, *E. gaditanum*, *E. vulgare* and *E. rosulatum*).

This character is of interest since in some cases it correlates with other characters in groups of putatively related species, eg. all the species of group (b) share the same corolla type and basal leaf indumentum as noted above. However, it is curious that the indumentum type apparently provides a reliable differential character between the species *E. creticum* and *E. sabulicolum*, some specimens of which are otherwise very similar in general morphology.

Calyx.

The extent to which the calyx teeth enlarge during fruiting varies considerably between taxa, eg. very little in *E. vulgare*, markedly in *E. creticum*, and to an extraordinary extent in *E. parviflorum* in which species the calyx segments may eventually equal the upper cauline leaves in size.

Corolla.

The shape and colour of the corolla, together with the degree of stamen exertion are taxonomic characters of prime importance in the European species of the genus *Echium*. The Spanish species fall into the following general groupings:

(a) Corolla very narrowly infundibuliform to hypocrateriform, with 4-5 long-exserted stamens; (*E. asperrimum*, *E. boissieri*, *E. flavum*, *E. italicum* and *E. lusitanicum*).

(b) Corolla broadly infundibuliform with 3-5 variously exerted stamens; (*E. albicans*, *E. humile*, *E. gaditanum*, *E. rosulatum*, *E. vulgare*).

(c) Corolla broadly infundibuliform with 1-2 stamens exerted; (*E. creticum*, *E. plantagineum*, *E. sabulicolum*).

(d) Corolla narrowly infundibuliform with all stamens included; (*E. arenarium*, *E. parviflorum*).

The differences in corolla morphology and stamen presentation presumably reflect differences in pollination syndrome within the genus. Studies by the present author are very incomplete but it is tempting to speculate that species of groups (b) & (c), which possess bluish to purplish coloured flowers, are pollinated by various insects (Hymenoptera ?) which enter the

broad funnel-like corolla tubes. On the other hand the species of group (a) have flesh-pink or bluish-white flowers and this combination of pallid flower colour together with a narrow corolla tube and long-exserted stamens suggests pollination by crepuscular, hovering Lepidopteran insects. Finally, the two species of group (d) with all the stamens included in the corolla tube are very likely to prove to be derived autogamous taxa, and this would certainly correlate with the annual habit of these species.

Clearly, all the above statements must be treated simply as speculative generalisations requiring observational and experimental verification. The significance of the variation in stamen exertion between species of groups (b) and (c) is not at all clear, but again perhaps a trend towards autogamy is involved here. Some taxa tend to bridge the corolla types as outlined above, eg. the broader, dilated corollas of *E. lusitanicum* subsp. *polycaulon* approach those of the *E. vulgare* type. Similarly, the rather narrowly infundibuliform corolla of *E. humile* approaches the condition found in group (a).

ECHIUM L., *Sp. Pl.*: 139 (1753).

Annual, biennial or perennial, usually stout, hispid herbs or shrubs, with an indumentum of tubercle-based setae and an underlayer of usually short, appressed or patent hairs. Inflorescence of spike-like or paniculate, unilateral cymes, often much enlarging in fruit. Calyx distinctly 5-toothed, sometimes accrescent. Corolla broadly to very narrowly infundibuliform, with a tapering tube and usually oblique, open throat, more or less hairy outside. An annulus of 10 minute, distinct or hair-tufted scales, or sometimes a collar-like membrane is usually present at the base of the corolla tube. Stamens 5, unequal, included or variously exerted from the corolla tube. Style exerted, stigma capitate or bifid. Nutlets 4, more or less triquetrous at the base, rugose.

Lectotype. *E. italicum* L. (fide BRITTON & BROWN, *Ill. Fl.*, ed. 2, 93, 1913).

KEY TO THE SPANISH SPECIES

- 1a All stamens completely included in the corolla tube 2
 1b At least 1-2 stamens exerted from the corolla tube 3
 2a Calyx 6-8 mm. at anthesis, enlarging up to 15 mm. in fruit with the teeth 3-6 mm. wide at the base 15. **parviflorum**
 2b Calyx 5-7 mm. at anthesis, enlarging up to 10 mm. in fruit with the teeth 2-3 mm. wide at the base 14. **arenarium**
 3a Corolla narrowly infundibuliform to hypocrateriform, flesh-coloured, or yellowish- or pinkish- to bluish-white (brown or blue-grey when dry) 4
 3b Corolla \pm broadly infundibuliform, blue, reddish-purple, or pink-carmine turning blue-purple (reddish to blue or purple when dry) 9
 4a Inflorescence intricately branched 5
 4b Inflorescence \pm spike-like 6
 5a Corolla 13-18 mm., stamen filaments dark pink-carmine; basal leaves usually \pm oblanceolate, \pm cuneate at the base, usually harshly setose 5. **asperrimum**
 5b Corolla 10-12 mm., stamen filaments pale; basal leaves \pm lanceolate, \pm attenuate at the base, softly setose 6. **italicum**
 6a Corolla 7-12 mm., yellowish-, or pinkish- to bluish-white 7
 6b Corolla 13-18 mm., flesh-coloured 8
 7a Plant biennial, usually with a single, erect flowering stem, and usually \pm yellowish-setose; corolla 10-12 mm. 6. **italicum**
 7b Plant perennial, with several to many ascending flowering stems, usually \pm greyish-setose; corolla 7-10 mm. 7. **lusitanicum**
 8a Plant usually with a single or at least a dominant, \pm massive flowering stem, 60-200 cm.; calyx 8-9 mm. at anthesis; corolla 16-18 mm. 3. **boissieri**
 8b Plant with 1- several, \pm slender flowering stems, 20-80 cm.; calyx 5-8 mm. at anthesis; corolla 13-16 mm. 4. **flavum**
 9a Corolla 7-10 mm. 10
 9b Corolla 11-40 mm. 11
 10a Basal leaves usually more than 250 mm.; flowering stems several to many, arising from beneath the basal rosette 7. **lusitanicum**
 10b Basal leaves usually less than 100 mm.; flowering stems 1- several arising from the centre of the basal rosette 8. **vulgare**
 11a Calyx 10-17 mm. at anthesis, densely villous with long, white hairs and sparse setae 1. **albicans**
 11b Calyx 5-10 mm. at anthesis, without long white hairs, \pm densely setose 12
 12a Corolla subglabrous, hairy on the veins and margins only; basal leaves usually broadly ovate to spatulate, with prominent lateral veins 9. **plantagineum**
 12b Corolla \pm uniformly hairy; basal leaves usually lanceolate to oblanceolate, without prominent lateral veins 13

- 13a Most flowers with only 1-2 exerted stamens 14
 13b Most flowers with 3-5 ± distinctly exerted stamens 15
 14a Stems with an underlayer of forwardly or irregularly directed, ± patent hairs; upper cauline leaves usually oblanceolate to spatulate, attenuate or petiolate
 10. *sabulicolum*
 14b Stems with an underlayer of uniformly deflexed, appressed hairs (at least in the lower third); upper cauline leaves usually narrowly elliptic, lanceolate or obovate, ± abruptly sessile
 11. *creticum*
 15a Leaves usually 1.5-3 mm. wide, linear-oblong to very narrowly lanceolate
 2. *humile*
 15b Leaves 5-30 mm. wide, narrowly lanceolate to broadly oblanceolate or obovate 16
 16a Plant usually with several to many robust, ascending stems which arise from a ± woody stock; upper cauline leaves ovate to broadly lanceolate; corolla usually with 3-4 variously exerted stamens 17
 16b Plant usually with 1- several, ± slender flowering stems, usually lacking a stout woody stock; upper cauline leaves ± narrowly lanceolate; corolla usually with 4-5 long-exserted stamens
 8. *vulgare*
 17a Biennial; corolla clear blue to bluish-violet, ± abruptly dilating at midlength; stems and particularly lower leaves usually with conspicuously white-pustulate setae
 12. *gaditanum*
 17b Perennial; corolla pinkish-violet, dilating uniformly; stems and leaves usually without conspicuously white-pustulate setae
 13. *rosulatum*

1. *Echium albicans* Lag. & Rodr., *Anal. Cien. Nat.* 5: 269 (1802).

Echium frutescens Coincy, *Morot Jour. Bot.* 8: 65 (1894).

Icon. Coincy, *Ecloga Pl. Hisp.*, t. 6 (1895) sub. *E. frutescens*; Webb, *Otia Hispanica*, t. 12 (1839); Boissier, *Voyage botanique dans le Midi de l'Espagne*, t. 125 (1839).

Erect, more or less softly hairy perennial, 10-75 cm., with 1 several flowering stems; leaves and stems with a dense layer of appressed, whitish hairs and setae which give the plant a distinctive whitish-cinereous appearance. Leaves 40-70 x 3.5-9 mm., linear-oblong to narrowly lanceolate. Flowers borne in loosely cylindrical cincinni. Calyx 10-17 mm. in flower, scarcely accrescent, with long white hairs and sparse setae. Corolla 16-21 mm., infundibuliform, uniformly hairy, pink-carmine to bluish-purple, with 3-4 exerted stamens. Nutlets c. 3.5 x 1.8 mm., triquetrous, with whitish-grey, irregularly anastomosing rugae on a black surface.

Type. Not traced.

Distribution. Endemic to the mountains of southern Spain. Rocky meadows and ledges (Map 1) (*).

Granada: Sierra Nevada, regionis subalpinis, 4000-6000', 28.VI.1851, *Ball* (E); Sierra Nevada a San Gerónimo, 28.VI.1851, *Bourgeau* (E); Sierra Nevada, rocaïlles calc. vers le Dornajo, 1650 msm, 1.VII.1926, *Jabandiez* 205 (E); Padul, 12.V.1942, *Muñoz Medina* (GDA); Sierra Nevada, c. S. Gerónimo et Trevenque, 3/12.VI.1895, *Porta & Rigo* 341 (MANCH); Sierra Nevada et Yunquera, *Willkomm* (E); Sierra Nevada in aridis calc. loco La Víbora, 25.VI.1845, *Willkomm* (E). **Málaga:** Serranía de Ronda, 1849, *Boissier & Reuter* (E); Mesas de Villaverde: Ardales, 11.VI.1930, *Ceballos & Vicioso* (MA); Sierra de las Nieves, 4.VI.1934, *Cuatrecasas* (GDA); Gobantes, above the Pantano del Chorro, 24.IV.1969, *Galiano, Gibbs, Silvestre & Valdés* 1367.69 (E, SEV); near Ronda on the road to San Pedro de Alcántara, 2.V.1969, *Galiano, Gibbs, Silvestre & Valdés* 1550.69 (E); c. 10 km. from Ronda on the road to Campillos, 20.VI.1969, *Gibbs* 69.402 (E); El Chorro, 14.IV.1969, *Gibbs, Silvestre & Valdés* 1171.69 (E, SEV); Alora, sierras above the town, 14.IV.1969, *Gibbs, Silvestre & Valdés* 1095A.69 (E); Sierra de Mijas et Alora, 3-15.V.1879, *Huter, Porta & Rigo* (E, MANCH); Torremolinos, 9.IV.1935, *Laza Palacios* (GDA); Sierra de Ronda, 29.VI.1889, *Reverchon* (E, MANCH); between Benaoján and Cueva de la Pileta, 10.V.1968, *Tutin* (LTR). **Cádiz:** rocky slopes below Grazalema (C.344), 1.VI.1969, *Gibbs* 69.259 (E); Sierra de Grazalema, 17.IV.1890, *Reverchon* (MANCH).

This distinctive and handsome species of *Echium* appears to be restricted to the calcareous mountains of the betic ranges, particularly the Sierra de Grazalema, Serranía de Ronda and Sierra Nevada.

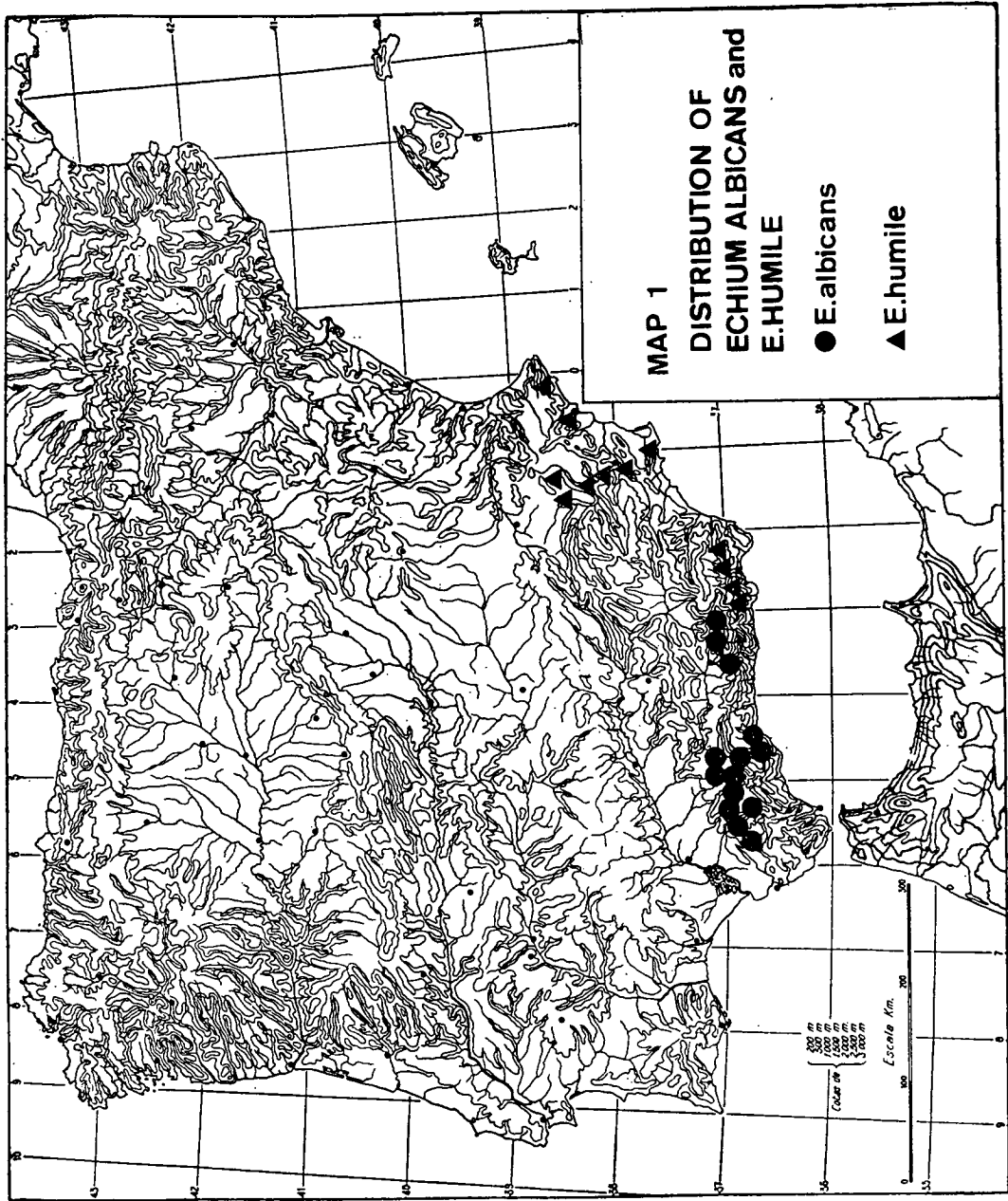
2. *Echium humile* Desf. *Fl. Atl.* 1: 165 (1799).

Echium angustifolium Lam., *Tabl. Encycl. Meth. Bot.* 1: 412 (1792) non Miller (1768).

? *E. eriobotrum* Pomel, *Nouv. Mat. Fl. Atl.*: 92 (1874).

? *E. pycnanthum* Pomel, *loc. cit.* fasc. 2: 296 (1876) (= *E. densiflorum* Pomel, *Nouv. Mat. Fl. Atl.*: 92 (1874) non DC. (1813).

(*) Maps are based only on Spanish specimens which have been seen (except where otherwise stated) and they do not, therefore, give the complete distribution of the species.



Icon. Fig. nostra no. 1.

Erect, hispid perennial 10-25 cm. with several flowering stems; leaves and stems, and especially the calyx, with dense, patent, white-translucent setae and an underlayer of short, whitish hairs. Leaves 20-40 x 1.5-3 mm., linear to very narrowly oblanceolate. Inflorescence of few flowered cincinni borne on short lateral branches. Calyx 6-8 mm. at anthesis, not elongating markedly in fruit. Corolla 12-14 mm., rather narrowly infundibuliform, densely appressed hairy, bluish-purple, with 4-5 more or less long-exserted stamens. Stamen filaments pale-carmine, pollen yellow-grey. Nutlets not seen.

Type. «In arenis deserti prope Cafsam» (Herb. Desfontaines, photo !).

Distribution. North Africa (Morocco, Algeria & Tunisia) and SE Spain. Arid slopes and semi-steppe (Map 1).

Alicante: Alicante, hills south of the town, 7.V.1928, *Ellman & Sandwith* 1051 (K); between Benidorm and Alicante, and Sierra de las Cabras, 9-25.V.1891, *Porta & Rigo* 354 (K, MANCH). **Murcia:** environs de Murcia en Fuente Alamo, 14.IV.1851, *Bourgeau* 1314 (E, K); Cerro de San Julián, between Cartagena and Escombreras, 10.V.1928, *Lacaita* 92/28 (BM); c. Abarán, 22.V.1928, *Lacaita* 216/28 (G); Cieza, 9.V.1928, *Lacaita* 67/28 (BM); Játiva and Hellín fide *Rouy* (1880). **Almería:** Sierra Alhamilla, foothills near Pechina, 22.IV.1928, *Ellman & Sandwith* 1224 (K); empalme de Berja a Adra, 25.IV.1921, *Gros* 14 (BM, MA); Almería occid. versus locis rupest. supra Muritriculum, 25.IV.1879, *Huter, Porta & Rigo* 422 (G, K); Gádor V.1922, *Pau* (BM, G, MA); Sierra Alhamilla, 300-400 msm, IV.1890, *Porta & Rigo* 49 (K, MANCH); Barranco del Caballar, 5.V.1934, *Ripley* 77 (K); Carretera de Cantoria, 23.V.1959, *coll unknown* (GDA).

Echium humile is a species with a limited distribution in SE Spain which has had a confused taxonomic and nomenclatural history. The species was first described by LAMARCK as *E. angustifolium*, and according to LACAITA (1919, 345) the type specimen in LAMARCK's herbarium is from Tobarra in Murcia province. Subsequently, DESFONTAINES described his species *E. humile* from North Africa without any reference to *E. angustifolium*.

COINCY (1900) originally maintained the Spanish plants as *E. angustifolium* Lam. and the North African *E. humile* as distinct species, but he subsequently (1902) treated *E. humile* as a variety of *E. angustifolium* Lam.

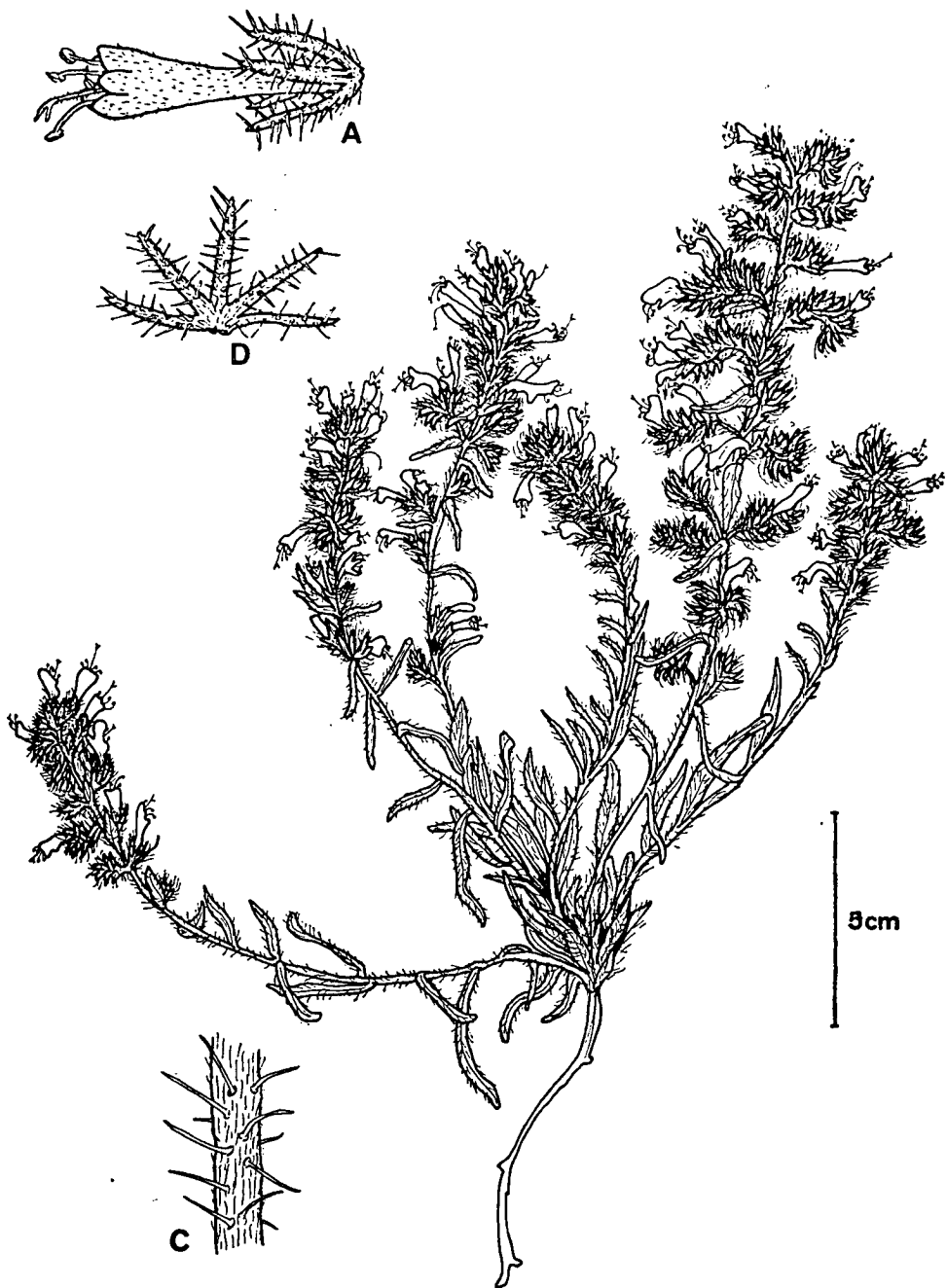


Fig. 1.—*Echium bumile* Desf. A: corolla (x 3,5); C: stem; D: calyx (x 3,5).
Murcia: Fuente Alamo, Bourgeau 1314 (E).

I have likewise compared specimens referable to these two species from North Africa and SE Spain and I cannot find any constant characters which warrant taxonomic separation at a formal taxonomic rank.

LACAITA (1919, 437) drew attention to the neglected *E. angustifolium* Miller (*Gard. Dict.* 1768), a distinct East Mediterranean species which renders LAMARCK's epithet a later homonym. Consequently, if the North African and Spanish plants are treated as conspecific the legitimate name for this species is *E. humile* Desf.

The names *E. pycnanthum* Pomel (originally described as *E. densiflorum*, but this is a later homonym of *E. densiflorum* DC.) and *E. eriobotrum* Pomel are very likely also synonyms of *E. humile* Desf. but I have not been able to examine type material of these taxa.

3. ***Echium boissieri*** Steudel, *Nomencl. Bot.*, ed. 2. 1: 540 (1840).

E. albicans Schott in Roem. & Schult., *Syst. Veg.* 4: 726 (1819)
non Lag. & Rodr. (1802).

E. lagascae Boiss., *Elenchus*: 67 (1838) non Roem. & Schult. (1819).

E. pomponium Boiss., *Voy. Bot. Midi Esp.* 1, t. 124 (May 1841);
Willk. in Willk. & Lange, *Prodr. Fl. Hisp.* 2: 483 (1870).

Icon. Boissier, *Voyage botanique dans le Midi de l'Espagne*, t. 124 (1841) as *E. pomponium*.

Large, erect, hispid biennial, 60-250 cm., usually with a single or at least one dominant flowering stem; indumentum of the stem of dense, whitish patent setae and an underlayer of dense, short hairs, indumentum of the leaves of more or less soft, appressed setae. Basal rosette leaves usually prominent, 100-350 x 40-50 mm., elliptical to lanceolate; cauline leaves c. 70-150 x 10-20 mm., narrowly elliptic to lanceolate. Inflorescence spike-like with short cincinni. Calyx 8-9 mm., densely white-hispid, not elongating markedly in fruit. Corolla 16-18 mm., very narrowly infundibuliform, finely hairy especially on the lobes, flesh-pink with 5 long-exserted stamens. Stamen filaments carmine, pollen grey-blue. Nutlets 3-3.5 mm., triquetrous, covered with irregular tubercles.

Type. «Provincia Malacitana prope Alhaurín, east. 1837», Herb. Boissier. Lectotypus fide SAUVAGE & VINDT (1956).

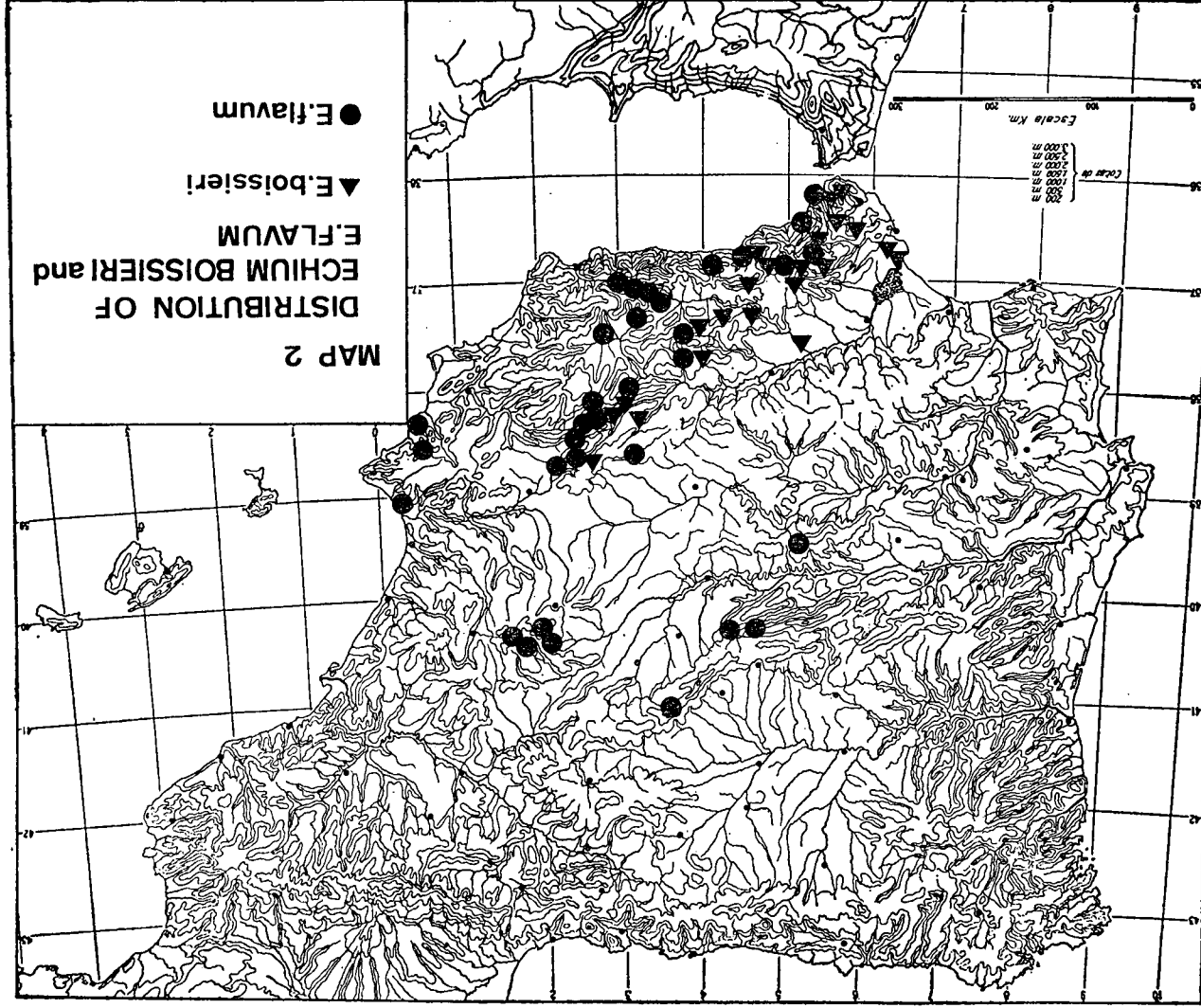
Distribution. S Spain, S Portugal, Morocco and Algeria. Commonly a species of roadbanks and disturbed habitats (Map 2).

Albacete: Alcaraz, 8-1000 msm, 1890, *Porta & Rigo* 421 (MANCH).
Jaén: Torreperogil, 10.IX.1951, *Galiano* 477 (MA); near Martos, 16.IV.1969, *Gibbs* 69.293A (E); Sierra de Cazorla, Cerro de los Carboneros, 13.VII.1951, *Heywood* 1270 (BM); Linares-Baeza station, 3.VI.1927, *Wilmott* (BM); Córdoba to Granada, 45 km. from Granada, 15.VI.1966, *Verdcourt* (K). **Córdoba:** Ecija, 16.V.1925, *Lacaita* 284/25 (BM). **Málaga:** Campillos to Ronda (C.341), 20.VI.1969, *Gibbs* 69.401 (E); Gaucín VI.1916, *Gros* (MA); Casarabonela, 2-3000 msm, 23.V.1879, *Huter, Porta & Rigo* 421 (MANCH); Torremolinos, VIII.1934, *Laza* (GDA); Jimena, Serranía de Ronda, 2-3000 msm, 4.VI.1895, *Porta & Rigo* (MANCH); Ronda, 15.VII.1889, *Reverchon* 325 (MANCH); Alora to Carratraca, 12.V.1968, *Tutin* (LTR); Antequera, Cañada del Madroño, 16.VI.1930, *C. Vicioso* (MA); Sierra de Antequera, coll. *unknown* (GDA). **Cádiz:** Los Barrios, V.1962, *Borja* (MA); Sanlúcar de Barrameda, 24.V.1849, *Bourgeau* 336 (BM); Grazalema, alrededores, 1.VI.1969, *Gibbs* 69.225 (E); Puerto de Santa María, *Gutiérrez* (MA); Grazalema, 26.VI.1890, *Reverchon* (E, MANCH); near Algeciras, 20.VI.1963, *Stocken* 224.63 (E).

This striking species of *Echium* is more commonly known under the name *E. pomponium* Boiss. Unfortunately, as has been noted by FERNANDES (1969), this name is predated by *Echium boissieri* Steudel.

The species was first described by SCHOTT (1819) as *Echium albicans* but this epithet is a later homonym of *E. albicans* Lag. & Rodr. Subsequently, it was described by BOISSIER (*Elenchus* 1838, 67) as *Echium lagascae* but this too is a later homonym of *E. lagascae* Roem. & Schult. In November 1840, STEUDEL published the second edition of the *Nomenclator Botanicus* in which he listed «*E. boissieri* Steud. Hispan.» with «*E. albicans* Schott ? (non Lagas.)» and «*E. lagascae* Boiss. (non R. & S.)» as synonyms. This undoubtedly constitutes valid publication of the name *E. boissieri* Steudel.

However, in the *Voy. Bot. Midi Esp.*, 424, which BAUM (1968) has recently dated as published in March 1841, BOISSIER apparently considered this species to be the same as *E. glomeratum* Poirlet, which is in fact a distinct East Mediterranean taxon. Then in May 1841 (cf. BAUM 1968) the plate for this species was published under the name *E. pomponium* Boiss., and this name was validly published with the plate since an analysis of important characters was figured. However, *E. pomponium* Boiss. of May 1841 is clearly pre-dated by *E. boissieri* Steudel. In his later publications, BOISSIER seems to have cited *E. boissieri* Steudel as a synonym of his own *E. pomponium* without reference to dates of publication.



Of the two synonyms listed by STEUDEL for *E. boissieri*, the earliest name, ie. *E. albicans* Schott, and therefore the name one would ordinarily choose for lectotypification, is cited with a query. It therefore seems reasonable to choose the other name, *E. lagascae* Boiss. in order to typify *E. boissieri*, and since *E. lagascae* Boiss. and *E. pomponium* Boiss. are based on the same material the lectotype chosen by SAUVAGE & VINDT (1956) for *E. pomponium* can stand for *E. boissieri* Steudel.

4. *Echium flavum* Desf., *Fl. Atl.* 1: 165 (1798).

Echium valentinum Lag., *Gen. et Sp. Nov.*: 10 (1816).

E. fontanesii DC., *Prodr.* 10: 24 (1846); Willk., in Willk. & Lange, *Prodr. Fl. Hisp.* 2: 484 (1870).

Icon. Desfontaines, *Flora Atlantica*, t. 45 (1798).

Erect, hispid biennial or perennial, 20-28 cm., with 1 or several ascending flowering stems; stems and leaves with more or less soft, dense, patent setae and an underlayer of short, spreading whitish hairs. Basal rosette leaves 40-150 x 8-27 mm., narrowly obovate to narrowly lanceolate; cauline leaves very narrowly elliptic; all leaves with dense, appressed, soft setae and an underlayer of fine hairs. Inflorescence more or less spike-like. Calyx 5-8 mm. at anthesis, c. 12 mm. in fruit. Corolla 13-16 mm., very narrowly infundibuliform, flesh-pink, rather sparsely short-hairy, with 5 long-exserted stamens; filaments carmine, pollen blue-grey. Nutlets c. 3 x 2.5 mm., triquetrous, whitish, irregularly contoured and minutely tuberculate.

Type. «Atlante prope Tlemsen» (Herb. Desfontaines, photo !).

Distribution. Mountains of Central, East and SE Spain; Moyen and Grand Atlas mountains of Morocco. Rocky meadows (Map 2).

Cuenca: Puente Vadillos, 12.V.1933, *Caballero* (MA); Tobar, Prados de S. Bartolomé, 6.VII.1932, *Caballero* (MA). **Teruel:** Villar del Cobo, VII.1894, *Reverchon* (K, MANCH); Griegos, VI.1896, *Reverchon* 966 (MANCH). **Valencia:** Mondúber, 7.VI.1923, *Font Quer* (BM). **Madrid:** Dehesa de Somo-sierra, 18.VI.1918, *Vicioso* (MA). **Avila:** Desde Hoyos del Espino hasta la Laguna de Gredos, 14.VIII.1944, *Caballero* 96900 (MA); Pinar de Hoyo-quesero, 24.VII.1924, *Gros* (BM); Sierra de Gredos, N. slope of Marayon, 2.VII.1927, *Wilmott* (BM). **Cáceres:** Las Altamiras, Guadalupe, 23.VI.1948, *Rodríguez & Aterido* (MA). **Ciudad Real:** La Mohata, 2.VII.1934, *Albo*

(MA). **Albacete:** Sierra de Alcaraz, V.1961, *Borja* (MA); Sierra de Alcaraz, in pinetis versus El Chorro del Mundo, 26.V.1925, *Lacaita* (BM); Sierra de Alcaraz, 1000-1700 msm, 30.VI.1891, *Porta & Rigo* 306 (K). **Alicante:** 'Novelda, Alicante', V.1791, *Cavanilles* (MA); Castillo de Santa Bárbara, 1.VI.1961, *Rigual* (fide *Escarré*, in litt.). **Granada:** Sierra Nevada, 8 km. north of Laroles, 1800 msm, 12.VI.1967, *Ball, Chater, Ferguson & Valdés* 1613 (LTR); 'in pinguibus montium Granat.', 300-8000', 1837, *Boissier* (E, K); Sierra de Baza, 20.VI.1851, *Bourgeau* (E, K); Peñones de San Francisco, 19.VIII.1935, *Cortés* (GDA); Sierra Nevada, Albergue Universitario, 12.VII.1948, *Davis & Heywood* 696 (BM); Sierra Nevada, Peñones de San Francisco and Pico Veleta, 9.VII/1.VIII.1879; *Huter, Porta & Rigo* (E, K, MANCH); Sierra Nevada, Capileira, south of Mulhacén, 1900 msm, 25.VI.1926, *Jabandiez* (E); Sierra Nevada, supra Dornajo, VIII.1848, *Munby* (K); Sierra del Pinar, VII.1900, *Reverchon* (E, MANCH); Sierra Nevada, Pico de Veleta, 30.VII.1876, *Winkler* (K). **Jaén:** Bois de la Sierra del Segura, 19.V.1850, *Bourgeau* (K); Montes de Cazorla, Barranco de Guadalentín, 26.VI.1948, *Davis & Heywood* 181 (BM); Los Villares to Valdepeñas de Jaén, 17.VI.1969, *Gibbs* 69.322 (E); El Pozo, VI.1905, *Reverchon* (BM, MA); Sierra de Castril, 1900 msm, *Reverchon* (MA); Sierra de Jabalcuz, 11.VI.1927, *Wilmott* (BM). **Málaga:** Sierra de las Nieves, 4.VII.1849, *Bourgeau* 338 (K); Sierra Tejada, VI.1916, *Gros* (MA); Estepona, 16.V.1919, *Gros* (MA); Sierra Bermeja, Mijas, 4.V.1931, *Vicioso* (MA). **Cádiz:** Sierra de Grazalema, 10.VI.1890, *Reverchon* (E, MANCH).

Echium flavum is a widespread if somewhat disjunctly distributed species which appears to be largely restricted to calcareous substrates although the localities in the Sierra de Gredos would seem to be an exception to this. Rather harshly setose specimens from SE & S Spain have been described as var. *setosum* WILLKOMM, *loc. cit.*, 484: «int. Novelda et Valldigna Cav. ! et Granat. Sierra Bermeja Wk.». Since at least in southern Spain *E. flavum* is sympatric with the much more strigose *E. boissieri* Steudel, which is probably a closely related species, this taxon probably merits further detailed field studies.

5. *Echium asperillum* Lam., *Tabl. Encycl. Méth. Bot.* 1: 412 (1792).

E. italicum var. β L., *Mant.*: 334 (1771) non L. 1753 et 1762 per syn.

E. pyrenaicum Desf., *Fl. Atl.* 1: 164 (1798) non Pourr. (1788).

E. pyramidale Lapey., *Abr. Pyr.* 1: 90 (1813).

E. pyramidatum DC., *Prodr.* 10: 23 (1846) excl. syn.

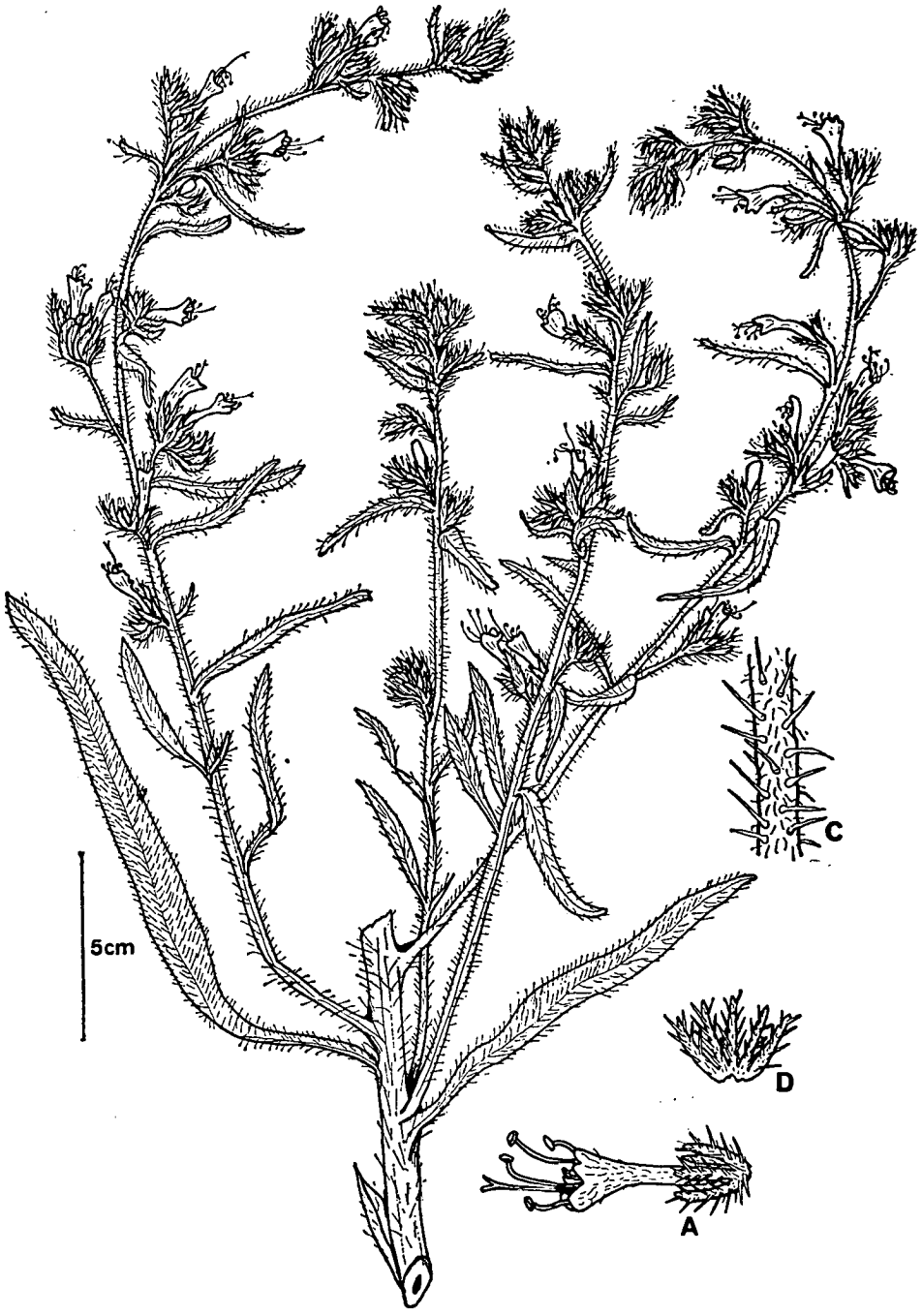


Fig. 2.—*Echium asperimum* Lam. A: corolla (x 1,4); C: stem; D: calyx (x 1,4).
Almería: Vélez Rubio, Reverchon 1102 (E).

- E. italicum* sensu Willk. in Willk. & Lange, *Prodr. Fl. Hisp.* 2: 486 (1870) pro parte.
E. balearicum Porta in *Nuov. Giorn. Bot. Ital.* 19: 312 (1887).
E. pyrenaicum var. *balearicum* (Porta) Lacaïta, *Jour. Linn. Soc. London (Bot.)* 44: 414 (1919).
E. hispidissimum Litard. in *Bull. Soc. Hist. Nat. Afr. Nord* 32: 319 (1942).

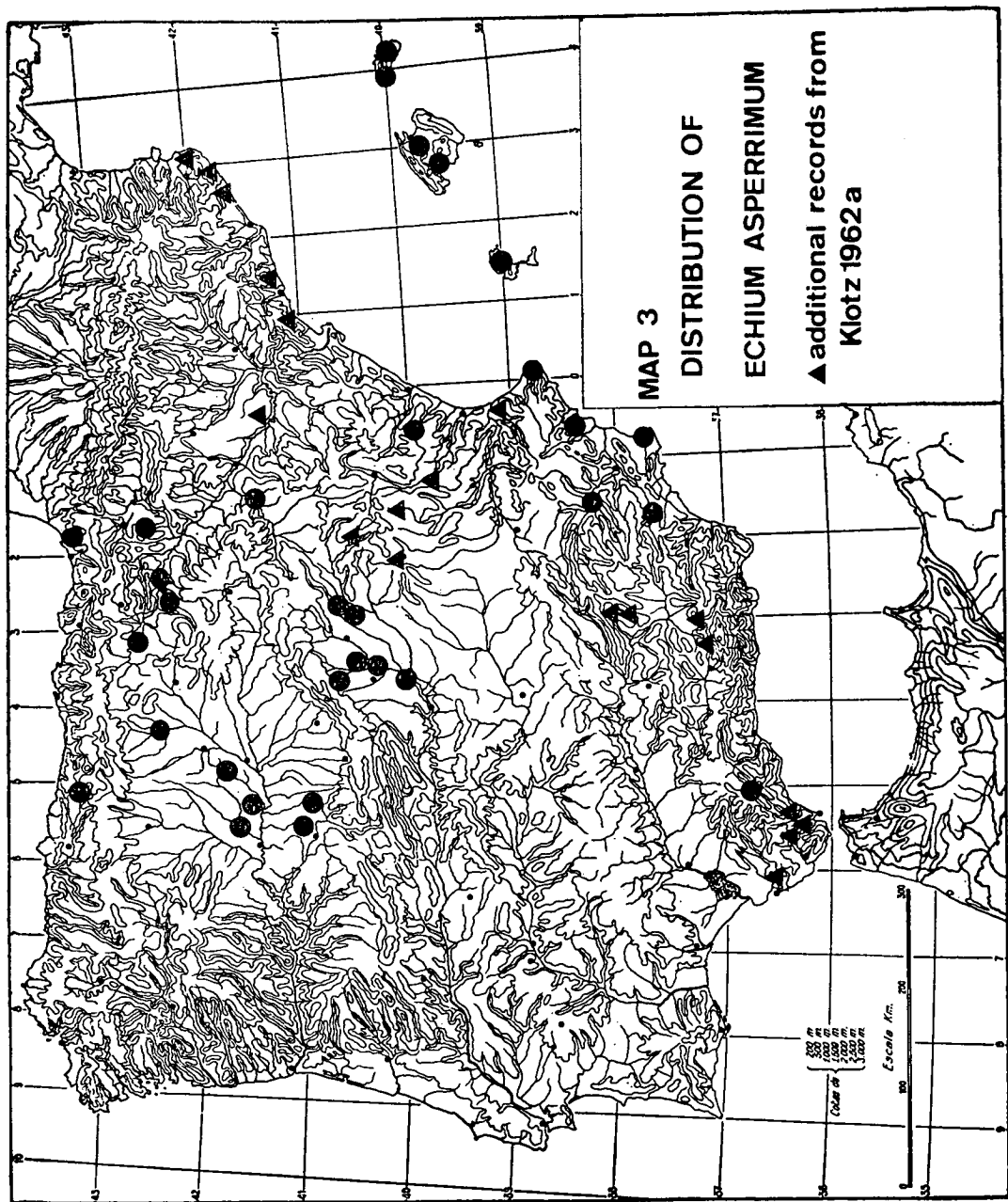
Icon. Fig. nostra no. 2.

Erect biennial up to 100 cm., much branched from near the base and with an indumentum of dense, white-grey, patent, stinging setae and an underlayer of short appressed hairs. Basal rosette usually persisting until flowering, leaves 120-250 x 30-50 mm., broadly lanceolate, with more or less harsh setae; cauline leaves narrowly lanceolate. Inflorescence intricately branched, broadly pyramidal. Calyx 6-7 mm. at anthesis, c. 8 mm. in fruit. Corolla 13-18 mm., very narrowly infundibuliform, flesh-pink, hairy, with 4-5 long-exserted stamens; filaments carmine, pollen blue-grey. Nutlets c. 4 x 3 mm., triquetrous, brown rugose.

Type. Ile de Pomegue, pr. Marseille (P-LAM) fide LACAÏTA (1919) & KLOTZ (1962a).

Distribution. North Italy; Southern France; Islas Baleares; most of Spain except for the NW and SW. Roadsides and uncultivated slopes (Map 3).

Gerona: El Ampurdán, VII.1880, *Tremols* (MA). **Zaragoza:** Calatayud, 2.VII.1907, *B. & C. Vicioso* (MA). **Navarra:** between Tafalla and Carrascal, 28.VI.1958, *Sandwith* 5229 (K). **Guipúzcoa:** Rentería, VI.1895, *Gandoger* 958 (K). **Logroño:** Camino de Navarrete, 25.VI, *Zubía* (MA); Camino de Laguardia, 5.VII, *Zubía* (MA). **Burgos:** Miranda de Ebro, VI.1954, *Losa* (GDA, MA). **Palencia:** N of Santillana de Campos, 9.VII.1969, *Gibbs* 69.443 (E, SEV). **Oviedo:** Near Covadonga, IX.1880, *Ball* (E). **Zamora:** Valderaduey, 1.VII.1922, *coll. unknown* (MA). **Valladolid:** Finca de las Casas Nuevas, Quintanilla de Trigueros, VII.1962, *Cruz* (MA); Fiedra, *García* (MA). **Guadalajara:** Trillo, VII.1821, *Conde* (MA); Sacedón, VII.1925, ? *Guchot* (MA); Rivas de Jarama, VI.1918, *C. Vicioso* (MA); Loeches, 28.V.1927, *Wilmott* (BM). **Valencia:** «Valencia», *Cavanilles* (MA); Barracas, 1000 msm, 29.VI.1930, *Moroder & Pau* (MA). **Toledo:** Ontígola, VI.1960,



Borja (MA). **Madrid**: Alberche, 10.VI, *Cutanda* (MA); Torrelaguna, *C. Vicioso* (MA); Carabaña, VI.1919, *C. Vicioso* (MA). **Salamanca**: Salamanca, roadside, 10.VII.1961, *Harrison* (LTR). **Alicante**: Novelda, 28.V.1933, *Pau* (MA); Benitachel, *Pau* (MA). **Murcia**: Moratella to Caravaca, 19.VI.1969, *Gibbs* 69.398 (E, SEV); Sembrados de Los Nietos, Cartagena, 27.V.1902, *Jiménez* (MA). **Almería**: Vélez Rubio, 500 msm, VI.1899, *Reverchon* (E). **Málaga**: San Pedro de Alcántara to Ronda, km. 46, 5.IV.1966, *Smythies* 63 (E). **Baleares**: Mallorca: Torrent del Pont d'Inca, 30.V.1946, *Ferrer* (MA); Puig de Inca, 30.V.1946, *Ferrer* (MA); Puig de Ronda, IX.1933, *Pau* (MA); between Palma and S. Ponsa, 21.VII.1885, *Porta & Rigo* (K). Menorca: Mahón, 10.V.1900, *Pons & Gueran* (MA); Cueva prope Ciudadela, 21.VII.1885, *Porta & Rigo* (K, MANCH). Ibiza: Santa Gertrudis, 6.V.1968, *Bowden & Sims* 1699 (BM); near Santa Eulalia, 28.V.1968, *J. F. M. & M. J. Cannon* 3219 (BM); «Ibiza», IV.1899, *Pau* (MA).

LACAITA (1919, 402 *et seq.*) clearly distinguished between *Echium asperimum* Lam. and *E. italicum* L., two taxa which had been confused by most previous authors. Unfortunately, LACAITA referred to the former species as *E. pyrenaicum* Desf. and he attempted to reject the name *E. asperimum* Lam. as a *nomen confusum*. However, the nomenclatural grounds for such rejection are very slender: LAMARCK (1792) provided an adequate description and according to LACAITA (1919) and KLOTZ (1962a) there is a good specimen of this species in the LAMARCK herbarium at Paris.

Echium asperimum can usually be distinguished from *E. italicum* by the following characters:

<i>E. asperimum</i>	<i>E. italicum</i>
plant much-branched from near the base	plant usually with erect, scarcely branched flowering stems
setae harsh and stinging (greyish-white on dried specimens)	setae more or less soft (usually yellowish on dried specimens)
corolla 13-18 mm., flesh-pink	corolla 10-12 mm., bluish-, yellowish- or pinkish-white
stamen filaments deep carmine	stamen filaments pale-coloured

Not all specimens are as unambiguously distinct as this tabulation suggests: some plants of *E. italicum* have branched stems, and occasionally

the flower size of some specimens of *E. asperrimum* can be within the range of *E. italicum*. A detailed study should be made of these two species in the region where they are sympatric, ie. NE Spain, the Balearic Islands and SE France.

KLOTZ (1962a, 301) has provided a distribution map of *E. asperrimum* in Spain which partially complements that given in the present study (Map 3) since the present map adds records for Salamanca and Oviedo provinces which are lacking in KLOTZ's distribution, but the latter records many more localities in southern Spain. Indeed, the distribution of *E. asperrimum* in the region of Andalucía appears to be rather under-recorded since in the herbarium material which has been studied for this species there is only one specimen (SMYTHIES 63) from the provinces of Cádiz, Málaga, Jaén and Granada. WILLKOMM (1870) cites Puebla de Don Fadrique and La Sagra (Granada) and Alhaurín (Málaga), and GALIANO & HEYWOOD (1960) record this species from the Sierra de Cazorla (Jaén). KLOTZ (1962a) does not cite the specimens on which his distribution maps are based.

6. *Echium italicum* L., *Sp. Pl.*: 139 (1753).

E. altissimum Jacq., *Fl. Austr.* 5: 35 (1778).

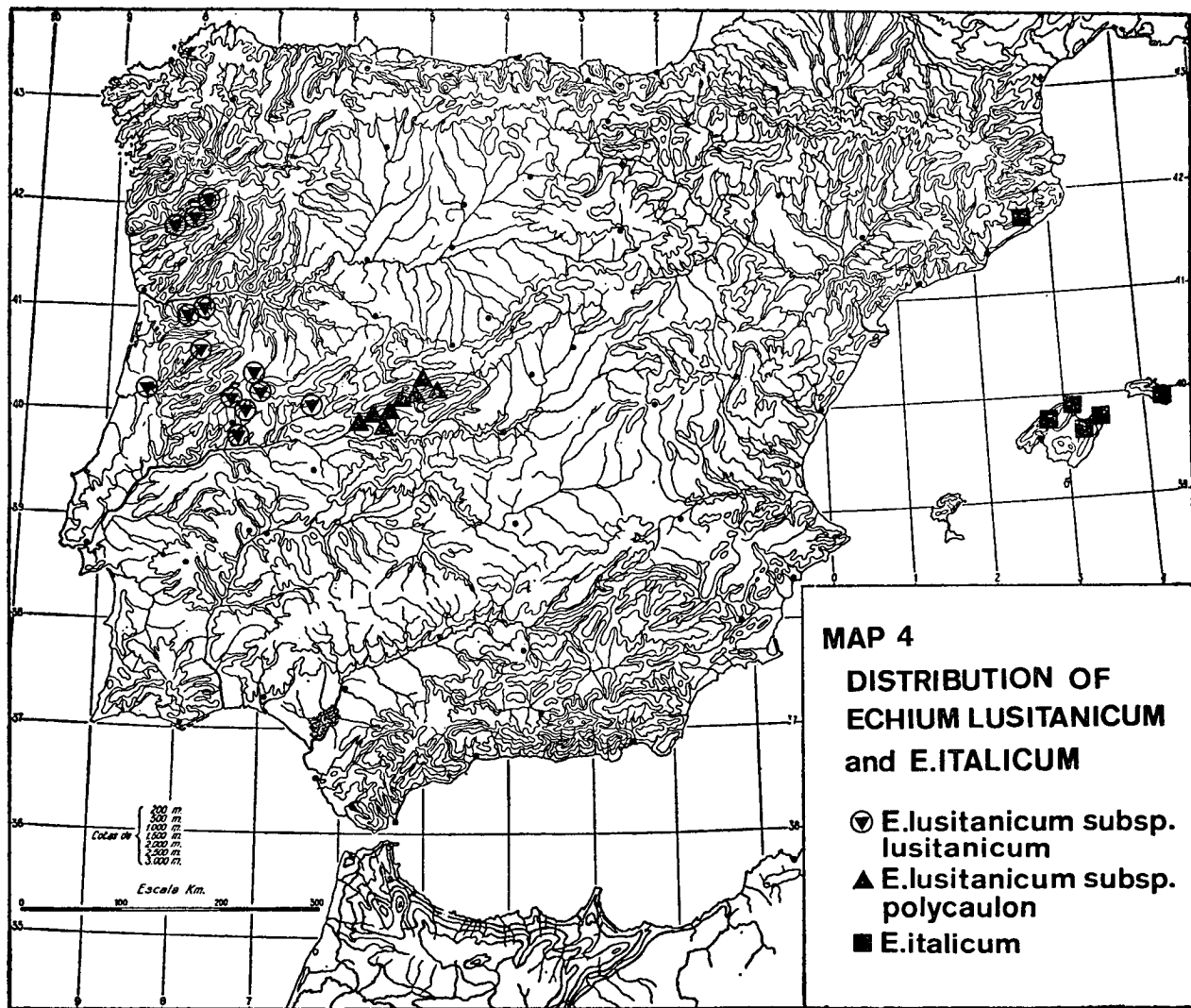
Icon. Jacquin, *Florae Austriacae*, t. 16 (1778).

Erect, hispid biennial, 40-100 cm., usually with a single, unbranched flowering stem but sometimes much-branched. Basal leaves 200-350 x 15-40 mm., lanceolate, with appressed, soft setae; cauline leaves more or less narrowly elliptic. Inflorescence usually more or less spike-like but sometimes branched. Calyx 6-7 mm. Corolla 10-12 mm., very narrowly infundibuliform, yellowish- or bluish- or pinkish-white, sparsely hairy, with 4-5 long-exserted stamens; filaments white-translucent, pollen yellowish. Nutlets c. 3 x 2.5 mm., triquetrous, whitish-grey, irregularly tuberculate.

Type. Specimen in the Linnaean herbarium no. 191.17 (LINN).

Distribution. Widespread in south and central Europe but restricted to the NE coastlands and Balearic Islands in Spain (Map 4).

Gerona: Catalogne, Cabañas, pelouse, 4.VI.1908, *Sennen* 572 (E), sub. *E. pomponium* var. *pau*. **Baleares:** Mallorca: Cala Ratjada, 5.VI.1966, *Bowden & Sims* 373 (BM); Puerto de Pollensa, 2.VII.1968, *L. F. & I. K. Ferguson* 2145 (BM); Puig Mayor, 2.VI.1966, *Bowden & Sims* 290 (BM);



Artá, 9.V.1903, *White* (E). Menorca: San Luis, 14.IV.1967, *Bowden & Sims* 1170 (BM).

Echium italicum has been confused with *E. asperrimum* in a number of earlier floristic works; see observations under the latter species.

7. ***Echium lusitanicum*** L., *Sp. Pl.*: 140 (1753).

Echium broteri Samp. in *Lusitano* (1900); ex Coutinho in *Bol. Soc. Brot.* 21: 113 (1905).

Icon. Fig. nostra no. 3.

Erect or ascending, more or less softly setose-hairy perennial with several to many flowering stems. Basal leaves 250-450 x 15-70 mm., broadly lanceolate, with appressed soft setae; cauline leaves narrowly lanceolate. Inflorescence spike-like. Calyx 5-7 mm. Corolla 7-10 mm., narrowly to more or less dilated infundibuliform, sparsely hairy, bluish-white to dark blue-grey, with 5 long-exserted stamens; filaments pale carmine, pollen blue-grey. Nutlets c. 2.5 x 1.8 mm., triquetrous, greyish to black with scattered and more or less anastomosing rugae.

Type. See discussion below.

Distribution. C & N Portugal; W & WC Spain (Map 4).

Two subspecies are recognised:

corolla bluish-white, very narrowly infundibuliform (a) subsp. **lusitanicum**.
corolla dark bluish-grey, infundibuliform but dilated towards the apex
(b) subsp. **polycaulon**.

(a) subsp. **lusitanicum**.

Corolla usually 7-8 mm., very narrowly infundibuliform, white flushed pink turning white flushed blue; upper cauline leaves usually finely appressed setose.

Distribution. C & N Portugal; NW & W Spain.

Orense: Alrededores de Bande, *Merino* (MA); San Carme, *Merino* (MA).
Salamanca: Sierra de Gata, Puerto Perales, 17.VI.1956, *Lainz* (E).

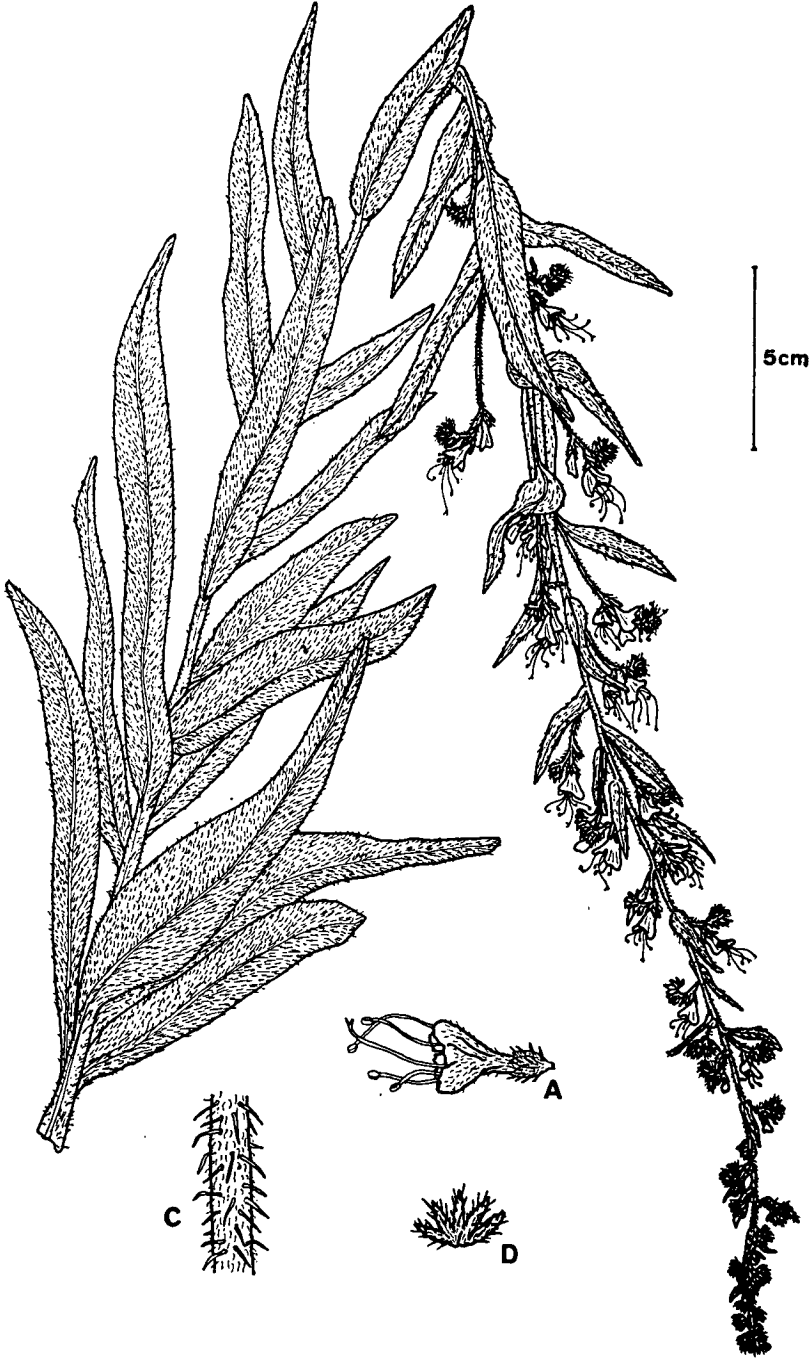


Fig. 3.—*Echium lusitanicum* subsp. *polycaulon* (Boiss.) P. Gibbs. A: corolla (x 1,4); C: stem; D: calyx (x 1,4). Toledo: Talavera de la Reina, *Smythies* 351 (E).

(b) subsp. **polycaulon** (Boiss.) P. Gibbs *Bot. Journ. Linn Soc.* 64: 379 (1971).

Echium polycaulon Boiss., *Diagn. Pl. Or. Nov.*, ser. 1, 11: 92 (1849).
? *E. salmanticum* Lag., *Gen. Sp. Nov.*: 10 (1806).

Corolla usually 8-10 mm., infundibuliform but rather broadly dilated towards the apex, clear blue to dark bluish-grey; upper cauline leaves more or less densely spreading setose.

Type. Extremadura, valley of Plasencia, *Herb. Pavon* (Herb. Boiss. G ?).

Distribution. WC Spain.

Avila: Sierra de Gredos, Poyales del Hoyo, 11.VIII.1962, *Adshead & Scott* 452A (BM); entre Adrada y Arenas de San Pedro, 26.VI.1928, *Cuatrecasas* 2249 (MA) Sierra de Gredos, El Arenal, 31.VII.1956, *Deverall & Flannigan* (E); Candeleda, 27.VI.1927, *Lacaita* 362/27 (K). **Salamanca:** 'Bordes de los Caminos', VII.1964, *Bellot, Borja & Monasterio* (G, MA). **Cáceres:** Valle de Jerte, 18.VI.1967, *Borja, Ladero & Izco* (LTR); Bords de la rivière près Plasencia, 21.V.1883, *Bourgeau* 2467 (G, MA); Tornavacas, 12.VII.1924, *Gros* 2 (BM); Jerte, 23.V.1923, *Lacaita* 162/23 (BM); La Bazagona, between the station and the river Tiétar, 2.VI.1923, *Lacaita* 231/23 (G, MA); Valle de Plasencia, entre Tornavacas y Cabezuela del Valle, VII.1803, *coll. unknown* (MA).

This species has had a somewhat confused taxonomic history. BROTERO (*Fl. Lusit.* 1: 290, 1804) considered that the name *E. lusitanicum* L. referred to a variant of *E. vulgare*, and he treated the plants of *Echium lusitanicum* from Portugal as conspecific with *E. italicum* L. HOFFMANNSEGG & LINK (*Fl. Port.* 1: 185, 1810) likewise referred this taxon to *E. italicum* as var. *lusitanicum*. This early confusion was perhaps in part due to the fact that in the protologue for *E. lusitanicum* Linnaeus used the misleading phrase «*corollis stamine longioribus*» (*).

SAMPAIO (*Lusitano* 1900) subsequently attempted to correct BROTERO's

(*) LACAITA (1919, 419) suggested that this inept diagnosis by LINNAEUS could be explained by supposing that «*longioribus*» was a slip of the pen for «*brevioribus*». However, FERNANDES (1970) has much more reasonably suggested that the error possibly lay in writing «*stamine*» instead of «*staminibus*». Thus, «*Echium staminibus corollis longioribus*» would apply to the floral morphology of *E. lusitanicum*.

error by referring the Portuguese plants to the new specific name *E. broteri* Samp. LACAITA (1919, 414 *et seq.*) and more recently FERNANDES (1970) have clarified the nomenclatural situation with regard to *Echium lusitanicum*, and these authors are in agreement that there is no reason why the Linnaean name should not be applied to this species.

However, there are some remaining problems concerning the typification of *Echium lusitanicum*. The protologue for this taxon does not cite any earlier Linnaean sources, but the following synonyms are listed:

«*Echium caule simplici, foliis caulinis lanceolatis sericeis, floribus spicatis lateralibus*. Roy. Lugdb. 407».

«*Echium amplissimo folio, lusitanicum*. Tournef. inst. 135 ?».

There is a specimen of *E. lusitanicum* in the Linnaean herbarium (LINN) no. 191.23 but it bears the inscription «*Echium lusitanicum folio amplissimo* Tcurn.» in the handwriting of JAN BURMAN, and «*lusitanicum*» added in the hand of LINNAEUS FIL. The lack of any species number (ie. «6 *lusitanicum*») on this specimen indicates that LINNAEUS did not have it before him at the time that he drafted the entry for the *Species Plantarum*, and this is supported by LACAITA (1919, 417) who has stated that the Burman herbarium was not received by LINNAEUS until 1760.

LACAITA (*loc. cit.*) has noted that LEHMAN (*Plantae e familia asperifoliorum nuciferae*, 452, 1818) reported that there are several specimens of *E. lusitanicum* in the herb. Vahl which were given by VAN ROYEN. FERNANDES (1970) has suggested that since it is very possible that LINNAEUS saw such VAN ROYEN specimens during his stay in Holland then they could serve to typify *E. lusitanicum*. However, the I.D.C. microfiche of the Vahl herbarium at Copenhagen does not appear to include any specimens of *E. lusitanicum*, but the Van Royen herbarium at Leiden does contain three specimens labelled *E. lusitanicum* and through the courtesy of the Director of the Rijksherbarium I have been able to examine these specimens. All three examples are certainly *E. lusitanicum* and since these specimens could well have formed the basis for VAN ROYEN's «*Echium caule simplici... Lugdb. 407*» they have been chosen as lectotype material for *Echium lusitanicum* L.

8. **Echium vulgare** L., *Sp. Pl.*: 139 (1753).

Echium tuberculatum Gilib., *Exerc. Phyt.*: 41 (1792) *nom. illeg.* (*)
non Hoffmanns. & Link (1809).

E. hispanicum Asso, *Syn. Arag. Mant.*: 162 (1781).

E. pustulatum Sibth. & Sm., *Fl. Graec. Prodr.* 1: 125 (1806).

E. vulgare var. *pustulatum* (Sibth. & Sm.) Rouy in Rouy & Foucaud,
Fl. Fr. 6: 113 (1900).

E. asturicum Lacaita, *Cavanillesia* 1: 8 (1928).

E. lacaitae Sennen, *Cavanillesia* 2: 26 (1929) in obs.; et *Bol. Soc.*
Iber. 29: 43 (1930).

E. vulgare subsp. *asturicum* (Lacaita) Klotz, *Wiss. Zeitschr. Univ.*
Halle 11(5): 704 (1962).

Icon. Ross-Craig, *Drawings of British Plants* 21: plate 21 (1965).

Erect, hispid biennial 20-90 cm. with 1- several flowering stems; indumentum of appressed to patent, more or less soft setae and an underlayer of short, usually deflexed, appressed hairs. Basal and lower cauline leaves 50-150 x 10-20 mm., narrowly oblanceolate, attenuate to petiolate at the base; upper cauline leaves narrowly elliptic to lanceolate, sessile. Inflorescence more or less spike-like or branched. Calyx 5-7 mm. at anthesis, not enlarging markedly in fruit. Corolla 10-19 mm., infundibuliform, blue to bluish-violet, usually with 4-5 long-exserted stamens; filaments pale, pollen bluish. Nutlets 2.5 x 1.5 mm., more or less triquetrous, rugose, brownish.

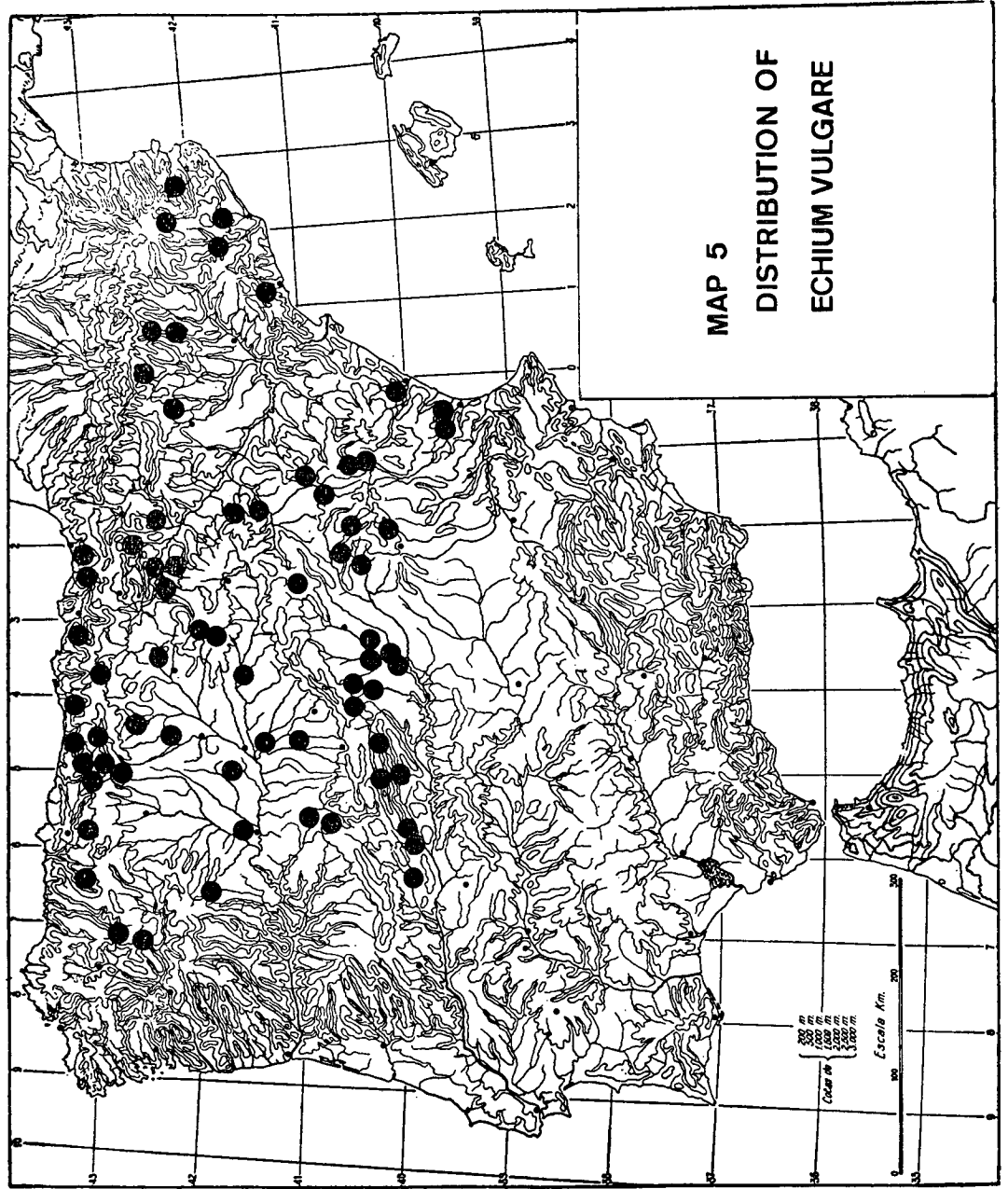
Type. Specimen no. 191.19 in the Linnaean herbarium (LINN).

Distribution. Most of Europe, from Scandinavia and S Britain to C Portugal eastwards to the Urals (Map 5).

Gerona: Llers, 13.VI.1908, *Sennen* 571 (MANCH). **Barcelona:** Sierra de Cadí, 1-2 km. from Castellar de Nuch, 8.VII.1966, *Chater & Moore* 53

(*) LITARDIERE (1942), KLOTZ (1960) and FERNANDES (1969) have treated *Echium tuberculatum* Gilib. as a validly published name, and as such it would be an earlier homonym of *E. tuberculatum* Hoffmanns. & Link, a distinct species from Portugal. However, in both the *Flora Lithuanica* (1782) and the *Exercitia Phytologica* GILIBERT did not consistently follow the binomial system and thus, under Art. 23 sub (3) of the International Code for Botanical Nomenclature all names published in these works must be rejected. Consequently, *E. tuberculatum* Hoffmanns. & Link remains the legitimate name for the Portuguese species.

(LTR, MANCH); Manlleu, 4.VII.1925, *Gonzalo* (MA); San Cugat, 5.VIII.1925, *Sennen* (MA); Sarriá, 3.V.1912, *Sennen* 2751 (MA). **Lérida:** Val d'Arán, route de Viella, 15.VIII.1934, *Estival* (MA); Bellver, 4.VII.1920, *Font Quer* (BM). **Huesca:** Bielsa, VI, *Campo* (MA); San Cosme de Guara, 8.VII.1902, *Pau* (MA). **Zaragoza:** Nombrevilla, 18.VI.1897, *Bernal* (MA); San Martín del Moncayo, 7.VI.1946, *Rivas Goday* (MA); Calatayud, 4.VI.1907, *B. Vicioso* (MA). **Navarra:** Tafalla, 1.VI.1936, *Escrudie* (MA); Pamplona, 25.V.1927, *Wilmott* (BM). **Vizcaya:** Gachaneta, Gorbea, 19.VII.1946, *Guinea* 821 (MA); Aterra, nr. río Ansa, V.1850, *Willkomm* (MA). **Logroño:** Sierra de la Hoz, 2.VII.1928, *Cámara* (MA); between Viniegra de Arriba and Montenegro, Sierra de Urbión, 17.VII.1960, *Dresser* 618 (E); Ribera del Ebro, 9.VI, *Zubia* (MA); Hormille, 26.IX, *Zubia* (MA); orilla del Ebro, 30.VI, *Zubia* (MA). **Burgos:** Aranda del Duero, VI.1942, *Caballero* (MA); Espinosa de los Monteros, 24.VI.1926, *Font Quer* 25 (BM); Quintanilla, 19.V.1914, *Font Quer* (MA); Orduña, Cantera de Yeso, 10.VII.1947, *Guinea* 1440 (MA). **Santander:** Peña Vieja, by Chalet, 28.VIII.1956, *Dresser* 312 (E); Picos de Europa, NW of Espinama, 23.VIII.1956, *Dresser* 105 (E); San Vicente de la Barquera, VII.1919, *Espada* (MA); Potes to Cervera de Pisuegra, 2.VII.1969, *Gibbs* 69.490 (E); near Novilles, 11.VII.1969, *Gibbs* 69.409 (E); Laredo, 22.III.1927, *Lacaita* 658/27 (K, MA); Puerto de Piedrasluengas, 26.VI.1954, *C. Vicioso* (MA). **Palencia:** N of Santillana del Campo, 9.VII.1969, *Gibbs* 444.69 (E). **León:** Oseja de Sajambre, 11.VII.1945, *C. Vicioso* (MA). **Oviedo:** Près Cangas de Tineo, 27.VII.1864, *Bourgeau* (G); Sama de Langreo, 18.V.1864, *Bourgeau* (MA); Covadonga, 14.VII.1927, *Lacaita* (MA); Oseja, 13.VI.1923, *Lacaita* (MA); Onís and Cabrales, 11.VII.1927, *Wilmott* (BM). **Lugo:** Nogales, between Becerreá and Piedrafita, 16.VII.1928, *Lacaita* (G); Santalla to Courel, 1900, *Merino* (M). **Zamora:** Puebla de Sanabria, *Losa* (MA); Parque de Valoria, 26.VI.1922, *Lucheno* (MA). **Valladolid:** Montes Torozos, Quintanilla de Trigueros, VII.1962, *Cruz* (MÁ); Casas Nuevas, VI.1963, *Cruz* (MA); Olmedo, *Gutiérrez* (MA). **Soria:** Cumbres de Urbión, VI.1925, *Caballero* (MA); near Medinaceli, 6.V.1961, *Stace* 439 (BM). **Guadalajara:** «Regni Guadalajara», 29.V.1878, *Fernández* (MA); Loeches, 28.V.1927, *Wilmott* (BM). **Teruel:** Valacloche, 15.VII.1962, *Adshead & Scott* 133 (LTR); Monreal del Campo, VII.1896, *Benedicto* (MA, MANCH); Teruel, 14.VI.1923, *Lacaita* (BM); Puerto de Escandón, above Teruel, 14.VI.1923, *Lacaita* 368/23 (BM, MA); Orihuela del Tremedal, VI.1924, *Pau* (MA); Valacloche, VII.1892, *Reverchon* (MANCH). **Tarragona:** Ribazos graníticos de Duesaigües, 23.V.1954, *Font Quer* Hb. (GDA, MA). **Castellón:** Segorbe, VII.1896, *Pau* (MA). **Valencia:** Castelló,



Gandía, *García* (MA); Bicorp, VI.1915, *C. Vicioso* (MA). **Cuenca**: Puente Vadillos, 16.VI.1935, *Caballero* (MA); Hoz de Beteta, 13.VII.1932, *Caballero* (MA); Laguna de El Tobar, 22.VI.1935, *Caballero* (MA); Poveda, 16.V.1901, *Reyes* (MA); Uña to Tragacete, 24.V.1968, *Smythies* 268 (E). **Madrid**: Sierra Guadarrama, Cercedilla, VI.1912, *Beltrán & C. Vicioso* (MA); Ciempozuelos, 8.IX.1960, *Gibbs* 100 (MANCH); Navacerrada, Dehesa de Majaserrones, VII.1911, *Pau* (MA); Buitrago, 1.VI.1918, *Vicioso* (MA); Arganda, V.1915, *C. Vicioso* (MA); near Aranjuez, 30.V.1927, *Wilmott* (LTR). **Avila**: Sierra de Gredos, Hoyo del Espino, 3.VIII.1962, *Adshhead & Scott* 347 (LTR); Sierra de Gredos, El Arenal, 16.VII.1956, *Deverall & Flannigan* 171 (E); Sierra de Gredos, near Navarredonda, 28.VI.1927, *Wilmott* (BM). **Salamanca**: La Alberca, 27.VI.1946, *Caballero* (MA); Salamanca, 5.VII.1961, *Harrison* (LTR); Salamanca, 17.V.1923, *Lacaita* 72/23 (BM, MA). **Cáceres**: Puerto de Béjar, Baños de Montemayor, 6.VI.1945, *Caballero* (MA); Jerte, 8.VII.1924, *Gros* 5 (BM).

Echium vulgare is a very variable species which requires detailed study throughout its area of distribution. In the present revision a rather wide species concept has been adopted. Plants with sparsely setose, rather conspicuously white-tuberculate stems and leaves which have been referred to under the names *E. pustulatum* Sibth. & Sm. or *E. hispanicum* Asso, have been included under *E. vulgare*; in the material which has been studied, although there are occasional plants with these characters, which when singled out certainly seem to be distinctive, such plants are connected by intermediate forms to others with more typical *E. vulgare* facies.

Likewise, *E. asturicum* Lacaita, which was distinguished largely on the basis of its growth habit, has also been treated as conspecific with *E. vulgare*. Future cultivation or transplant studies may well confirm that certain forms of *E. vulgare* from the Northern provinces of Spain are distinctive in forming a basal rosette of leaves in the first year of growth, and subsequently producing lateral flowering stems in successive years (cf. the studies on *Prunella vulgaris* by BÖCHER, 1963). However, it is difficult to treat such physiological variation in growth habit in a formal taxonomic study.

9. *Echium plantagineum* L., *Mant.* 2: 202 (1767).

E. maritimum Willd., *Sp. Pl.* 1(2): 788 (1798) *sens. str.*

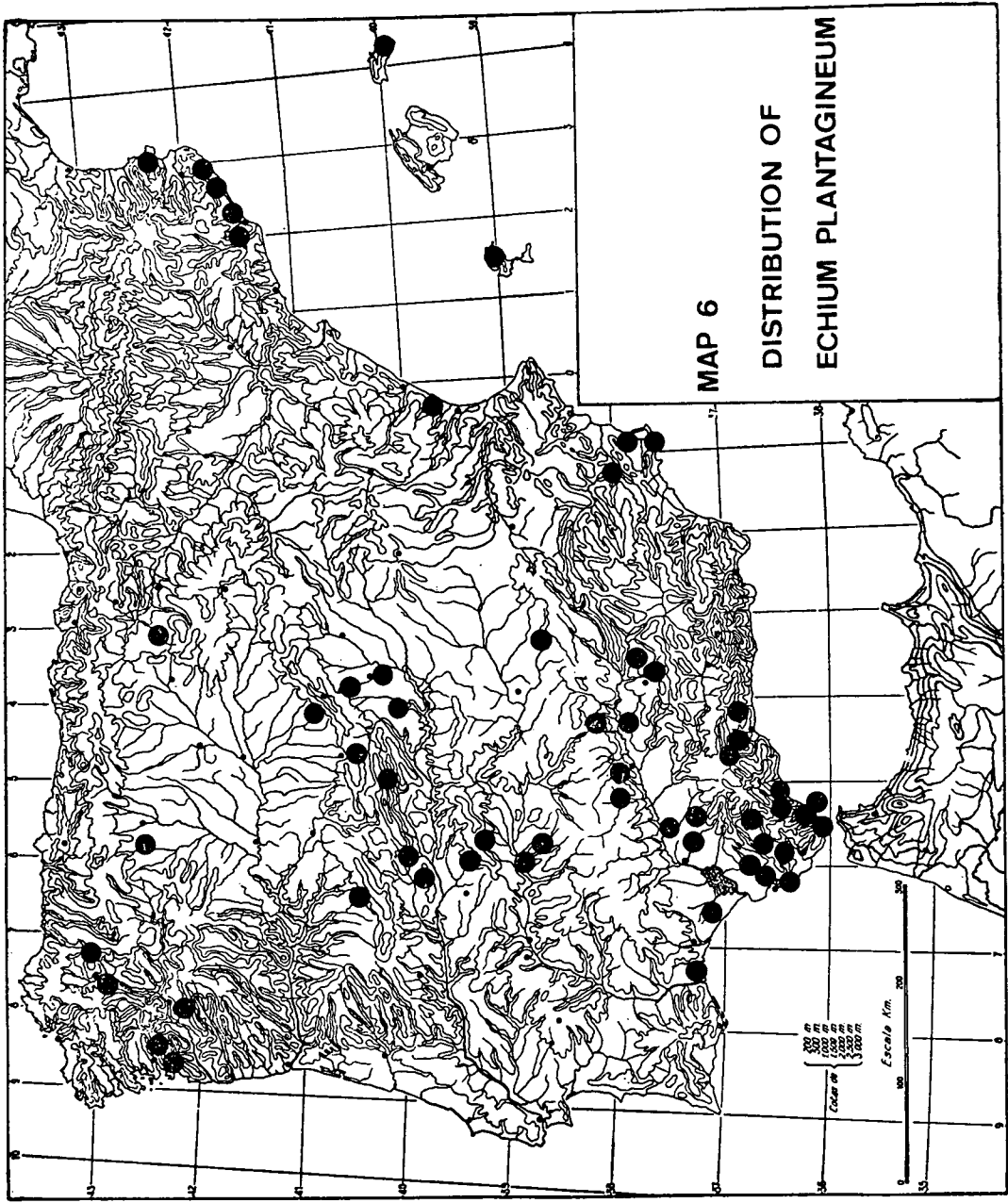
Icon. Butcher, *A New Illustrated British Flora* 2: t. 995 (1961); Hegi, *Illustrierte Flora von Mittel-Europa* 5(3): p. 2192, fig. 3139 (1927).

Erect, softly hairy biennial, 20-60 cm., with 1- several flowering stems; indumentum of soft, appressed setae and an underlayer of sparse hairs. Basal leaves 50-140 x 15-40 mm., broadly ovate, petiolate, with prominent lateral veins; cauline leaves oblong to lanceolate, the uppermost more or less caudate at the base. Inflorescence usually branched. Calyx 7-10 mm. at anthesis, up to 15 mm. in fruit. Corolla 18-30 mm., broadly infundibuliform, purple, hairy only on the veins and margins, usually with 2 more or less exerted stamens; filaments rather sparsely hairy, pollen bluish. Nutlets c. 2.5 x 2 mm., triquetrous, tuberculate, pale brownish-grey.

Type. Illustration in Jacques Barrelier *Plantae per Galliam, Hispaniam et Italiam observatae, iconibus exhibitae* 145, t. 1025 (1714).

Distribution. S Europe extending into C Europe and locally naturalised in N Europe (Map 6).

Barcelona: Vallgorguira, 15.V.1949, *Losa* (MA); San Antón de Vilamayor, 20.V.1923, *Montserrat* (BM); St. Peres Manti, IV.1897, *Bourgeau* 467 (K); Mt. Tibidabo, V.1910, *Sennen* (MA). **Logroño:** Haro, 23.VI, *Zubia* (MA). **León:** Priaranza del Bierzo, Ponferrada, 28.IV.1933, *Rothmaler* (MA). **Lugo:** Villardíaz to Fonsagrada, VIII.1954, *Carreira* (MA); Lugo, 1851-52, *Lange* (K); near Villagarcía, IV.1921, *Weekes* (K). **Oviedo:** Cangas de Tineo, 2.VII.1835, *Durieu* (K). **Pontevedra:** Pontevedra, near Vigo, 1935, *Schafer* 186 (BM). **Orense:** Celanova, VI.1905, *Bescansa* (MA). **Segovia:** Segovia, 14.V.1943, *Jiménez* (MA). **Valencia:** Sagunto, 5.V.1896, *Pau* (MA). **Toledo:** Velada, near Talavera, 3.V.1968, *Tutin* (LTR). **Madrid:** cercanías de Madrid, V.1912, *Aterido* (MA); Sierra de Guadarrama, Cercedilla, V.1914, *C. Vicioso* (MA). **Salamanca:** Ciudad Rodrigo, 4.V.1932, *Pau* (MA); de Poveda a Moral de Castro, VII.1922, *Pau* (MA). **Cáceres:** Près Plasencia, 25.V.1863, *Bourgeau* (BM); Baños de Montemayor, 13.V.1944, *Caballero* (MA); Guadalupe, 19.V.1949, *Caballero* (MA); Alía, c. río Guadarranque, 25.V.1949, *Caballero* (MA). **Badajoz:** Esparragosa de Lares, 17.IV.1943, *Guerrero* (MA); Campanario, 6.IV.1912, *Lagares* (MA). **Ciudad Real:** Sierra de Alhambra, 30.IV.1933, *Albo* (MA). **Murcia:** Murcia, 12.IV.1852, *Bourgeau* (E, K); Cartagena, la Esperanza, VII.1953, *Esteve* 1431 (GDA); San Javier, IV.1952, *Esteve* 1335 (GDA); Cartagena to Los Blancos, 22.III.1903, *Jiménez* (MA); near Cartagena, Escombreras, 10.V.1928, *Lacaita* 76/28 (BM); c. Heredias, III.1890, *Porta & Rigo* 103 (E, K, MANCH). **Jaén:** Sierra de Mágina, 8.VI.1926, *Cuatrecasas* (MA); Jódar, Las Hermanas, 4.VI. 1926, *Cuatrecasas* (MA); Andújar, 30.IV.1954, *C. Vicioso* (MA); Sierra Mo-



MAP 6

DISTRIBUTION OF
ECHIAM PLANTAGINEUM

rena, Venta de Cárdenas, 30.IV.1930, Cuatrecasas (MA). **Córdoba:** c. 2 mls NW of Córdoba, 4.V.1924, *Ellman & Hubbard* 86 (K); Córdoba, 28.IV.1964, *Gilson* (LTR); Trespuentes, 20.V.1920, *Pau* (MA). **Málaga:** Pizarra to Alhaima, 14.IV.1969, *Gibbs, Silvestre & Valdés* 1076.69 (E, SEV); Torre del Mar, 1.V.1925, *Lacaita* 132.25 (BM); Almoja, 29.III.1966, *Smythies* 54 (E); near Vélez Málaga, 25.III.1966, *Smythies* 47 (E); San Diego, W of Estepona, 11.IV.1965, *Smythies* 82 (E); Benhavis, «La Romera», 28.IV.1931, *C. Vicioso* (MA); Manilva, 9.V.1932, *C. Vicioso* (MA). **Sevilla:** near Carmona, 27.V.1967, *Chater, Moore & Tutin* (LTR); Lora del Río to Constantina, 7.IV.1969, *Gibbs* 69.114 (E, SEV); Morón de la Frontera, 25.IV.1933, *C. Vicioso* (MA). **Cádiz:** Puerto de Santa María, 29.III.1849, *Bourgeau* 385 (K); c. Cádiz, *Fauché* Hb. (K); Montegil, nr. Jerez de la Frontera, 27.III.1969, *Galiano, Gibbs, Silvestre & Valdés* 433.69 (E, SEV); Jerez de la Frontera, 10.IV.1925, *Gros* 16 (BM); San Roque, IV.1880, *Mathews* (E); Grazalema, 14.VI.1890, *Reverchon* (MANCH); Medina Sidonia, 18.IV.1966, *Smythies* (E); Arcos to Bornos road, 2.III.1966, *Smythies* 26a (E); Río Guadiaro, nr. San Pablo, 11.V.1908, *Tutin* (LTR); Algeciras, 19.V.1907, *B. Vicioso* (MA); near Algeciras, 17.IV.1961, *Walker* (BM). **Huelva:** Ermita del Rocío, 25.V.1967, *Chater, Moore & Tutin* (LTR); Ayamonte, 8.V.1943, *C. Vicioso* (MA). **Baleares:** Mallorca: Marratxi, 24.XI.1947, *Ferrer* (MA); Menorca: c. Mahón and Cala Serja, *Bowden & Sims* 688 (BM); Mahón, Isla del Rey, 16.III.1910, *Font Quer* (MA); Cala de San Esteban, 19.V.1913, *Font Quer* (MA); Ibiza: Santa Eulalia, 5.V.1968, *Bowden & Sims* 1630 (BM); San Antonio Abad, VII.1954, *Hedge* 57.54 (E); San Juan, *Ferrer* (MA).

The name *Echium lycopsis* has been used by some authors, eg. DANDY (1958) and KLOTZ (1960) for this species. *Echium lycopsis* L. was originally published without a description in *Flora Anglica* 12 (1754) but with the figures «227.2» which are a reference to Ray, *Syn. Meth. Stirp.*, ed. 3, 227 (1724). Now circumstantial evidence suggests that the plants which RAY referred to are the same as were later described under the name *Echium plantagineum* L., for RAY recognised his *lycopsis* as different from the common British *Echium* (ie. *E. vulgare*) and he recorded it as growing at St. Hillary, Jersey (Channel Islands).

However, RAY likewise did not provide a description but simply listed several references; for one of these references, *Echii altera species* Dod. p. 680, RAY noted, «*cujus icon hanc nostram bene representat*» so that the plant figured by DODONAEUS is the obvious choice as lectotype. Unfortunately,

tre figure in Dodonaeus *Stirp. Hist. Pempt.* 630 (l. c. not 680 (1616), which is merely a reproduction of a plate in Lobel *Stirp. Observ.* 312 (1576) titled *Lycopsis altera anglica*), depicts a plant which fairly clearly resembles *Echium vulgare*, particularly by the corollas with four long-exserted stamens. Thus, a strict attempt to typify *Echium lycopsis* L. leads to the conclusion that the name must be referred to a figure in DODONAEUS or LOBEL which almost certainly depicts *E. vulgare* L.

In the *Mantissa*, LINNAEUS cited a single reference to «Barr. rar. 145, t. 1025». This illustration certainly depicts a plant with *plantagineum*-facies and has been chosen as lectotypus for *E. plantagineum*.

10. *Echium sabulicolum* Pomel, *Nouv. Mat. Fl. Atl.* 90 (1874).

E. maritimum auct. non Willd. sens. str.

E. confusum Coincy, in *Morot Journ. Bot.* 14: 298 (1900).

E. prostratum Camb., Enum. Pl. Balear. in *Mem. Mus. Hist. Nat.* 14: 284 (1827) non Tenore nec Delile.

Icon. Fig. nostra no. 4.

Procumbent, ascending or erect, hispid biennial 15-50 cm., usually with several to many flowering stems. Indumentum of whitish setae and an under-layer, of short, spreading hairs. Basal leaves c. 25-60 x 11-15 mm, obovate to ovate; cauline leaves oblanceolate to spatulate, attenuate and subpetiolate at the base; all leaves with more or less dense, whitish, appressed to spreading setae. Inflorescence more or less branched, laxly paniculate. Calyx 12-25 mm., broadly infundibuliform, uniformly hairy, dark blue to pinkish to bluish-purple, usually with 1-2 exserted stamens; filaments sometimes sparsely hairy, pollen bluish. Nutlets 2-3 x 1.5-2.5 mm., triquetrous, brown or greyish, tuberculate.

Type. Algeria, sables maritimes environs d'Alger, *G. L. Durango* (AL fide SAUVAGE & VINDT, 1954; isotypes at MPU, P, P-CO, W fide KLOTZ, 1962c).

Distribution. W Mediterranean region; coastlands.

Gerona: North of Puerto de la Selva, 17.VI.1959, *Chamberlain* 814 (BM); Cadaqués, 19.IV/27.V.1907, *Sennen & Septimin* 328 (MANCH); Rosas, 22.VI.1905, *Sennen* (MA); Puerto de la Selva, 11.V.1966, *Smythies* 87 (E); Llansá near Figueras, 10.IV.1884, *Thompson* (E). **Valencia:** Sagun-

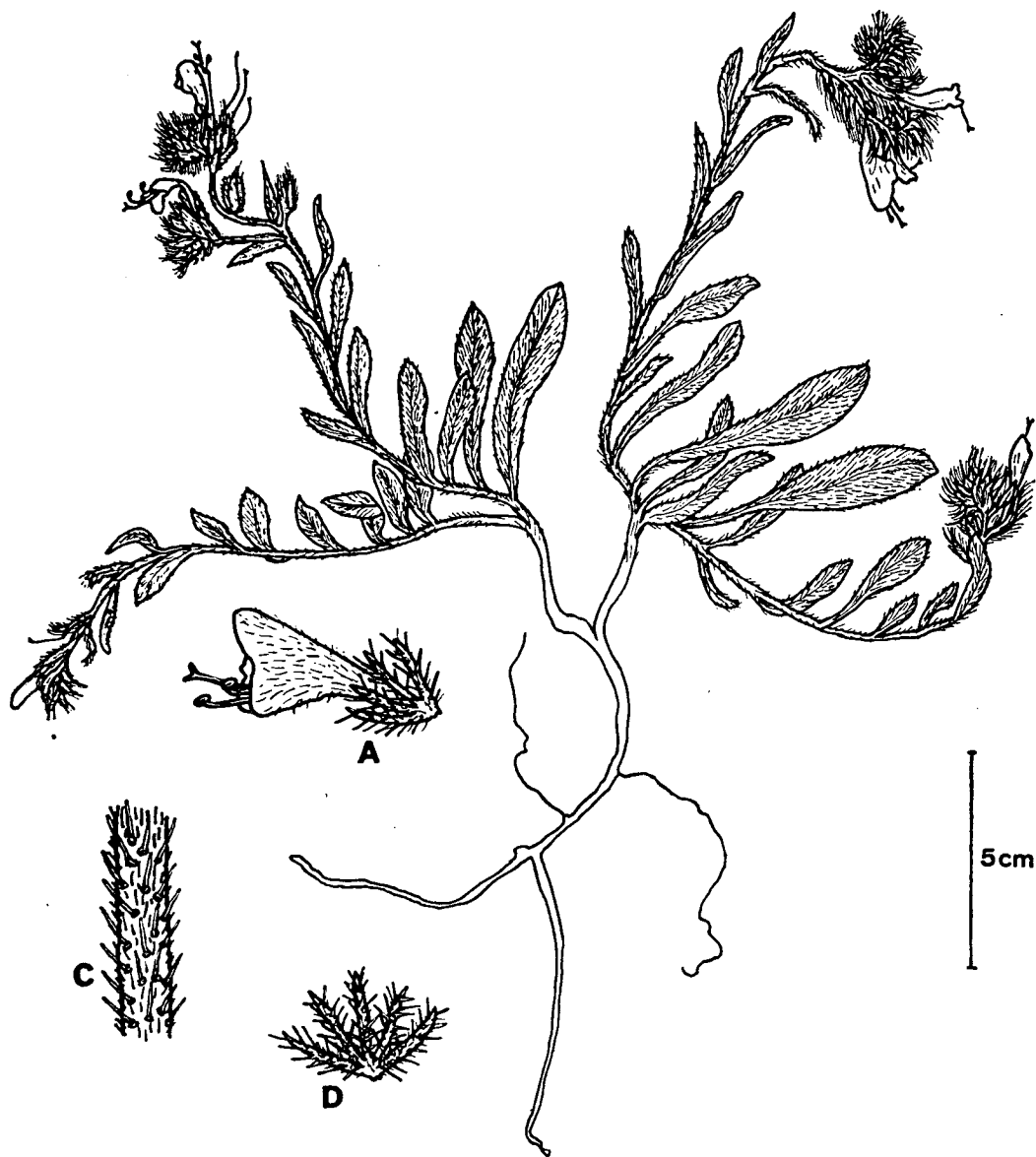


Fig. 4.—*Ecbium sabulicolum* Pomel. A: corolla (x 1,4); C: stem; D: calyx (x 1,4).
Murcia: Cartagena. Bourgeau.

to, Torre la Mala, *Lacaita* (MA); Albufera, 31.III.1877, *Joad* (K); Sagunto, IV.1894, *Reverchon* (E, MANCH). **Alicante:** Guardamar del Segura, 17.VI.1970, *Escarré* (E); Cabo de Santa Pola, 13.VII.1970, *Escarré* (E); arenas marítimos de Santa Pola, *Esteve* (GDA). **Murcia:** Cartagena, 14.IV.1850 & 10.IV.1852, *Bourgeau* 1629a (E, K, MA); Cartagena, IV.1890, *Porta & Rigo* (MANCH); Fuente Alamo, V.1954, *Esteve* 1278 (GDA); Los Nietos, V.1953, *Esteve* 1647 (GDA). **Almería:** near Cabo de Gata, entrada del Barranco del Sabinar, 12.IV.1969, *Gibbs, Silvestre & Valdés* 861.69 (E, SEV); El Aquían, 12.IV.1969, *Gibbs, Silvestre & Valdés* 820.69 (E, SEV); Alhama de Almería, 31.I.1960, *Partridge* 36 (LTR). **Málaga:** Torrox to La Caleta, 14.IV.1969, *Gibbs, Silvestre & Valdés* 1075.69 (E, SEV); near Málaga, coast road, 14.IV.1955, *Jermy* 14411 (LTR); Marbella, 5.VIII.1963, *Simpson* (LTR); Málaga to Motril road, 11.III.1966, *Smythies* 40 (E). **Baleares:** Mallorca: Près de Puerto de Sóller, 4.VII.1869, *Bourgeau* (K); Ciudad de los Lagos, coastal road to Artá, 9.VI.1966, *Bowden & Sims* 522 (BM); near Palma, II-III.1921, *Brown* (K); Alcudia, between Barcarets and Mal Pas beaches, 5.VIII.1967, *J. F. & M. J. Cannon* (BM); Puerto Pollensa, 3.IV.1929, *Edmonds* (K); Puerto Sóller, Santa Catalina, IV.1910, *Sennen* (MA); Moragues, 19.IX.1947, *Ferrer* (MA); Menorca: 5 km. N of Mercadal, 20.IV.1967, *Bowden & Sims* 1350 (BM); between Fornells and Cabo Cavallería, 8.V.1885, *Porta & Rigo* (K, MANCH); Formentera: SE of Cala Sabina, between Estang Pudent and Estang del Peix, 9.V.1968, *Bowden & Sims* 1814 (BM).

This species has commonly been referred to as *Echium maritimum* Willd. Unfortunately, this name must be rejected since WILLDENOW (1798) commented that he had only seen a single specimen of his *E. maritimum* and according to COINCY (1900a) the specimen in question in WILLDENOW's herbarium is a fragment of *Echium plantagineum*. Thus, *E. maritimum* Willd. must be referred to this latter species, and another name must be found for *E. maritimum* sensu auct.

On this basis COINCY (1900a) substituted the new name *E. confusum* and this epithet has been taken up by a number of authors, eg. SAUVAGE & VINDT (1954b) and FERNANDES (1969). However, the name *E. sabulicolum* must also be taken into account since COINCY considered *E. sabulicolum* to be synonymous with his *E. confusum* (according to SAUVAGE & VINDT, 1954b). Likewise, KLOTZ (1962c) has recently presented a detailed revision of this species complex in which he unites a number of infra-specific taxa under the name *E. sabulicolum* Pomel.

SAUVAGE & VINDT (1954a & b) have questioned whether *E. confusum* Coincy and *E. sabulicolum* Pomel are in fact conspecific and they cited two differential characters, viz. the nature of the coronal scales and the type of indumentum of the stems and leaves. However, although SAUVAGE & VINDT certainly examined type specimens of *E. sabulicolum* from the Pomel herbarium they otherwise studied little material and these authors concluded their observations with the comment: «Mais nous ne pouvons prendre parti au sujet d'une plante que nous connaissons trop mal».

I have dissected corollas from a number of specimens referable to *E. confusum* - *E. sabulicolum* from the coastlands of S & SE Spain and Algeria and have found the degree of fusion of the coronal scales to be very variable, as is the nature of the indumentum, ie. the prominence of the tubercules and degree of harshness of the setae. There does not seem to be any clear-cut morphological discontinuity in these characters correlated with geographical distribution which would warrant the separation of *E. confusum* from Europe and *E. sabulicolum* from North Africa as distinct species. The present account therefore follows KLOTZ (1962c) in using the name *E. sabulicolum* Pomel for the species *E. maritimum* auct. non Willd. *sens. str.*

11. *Echium creticum* L., *Sp. Pl.*: 139 (1753).

? *Echium spinescens* Medikus, *Bot. Beob.* 1783: 36 (1784).

E. grandiflorum Desf., *Fl. Atl.* 1: 166 (1798).

E. macranthum Roem. & Schult., *Syst.* 4: 20 (1819).

Icon. Fig. nostra no. 5.

Erect, hispid biennial, 25-90 cm. with 1- several flowering stems; indumentum of sparse to dense, patent setae and an underlayer of short, appressed, uniformly deflexed hairs. Basal and lower cauline leaves 60-180 x 10-25 mm., narrowly oblanceolate; cauline leaves usually narrowly elliptic or oblong. Inflorescence branched. Calyx 7-9 mm. at anthesis, 12-18 mm. in fruit. Corolla 15-40 mm., infundibuliform, uniformly hairy, persistently reddish-purple, or pink-carmine turning bluish, or bluish-purple, with 1-2 exerted stamens; some or all of the filaments usually sparsely hairy, pollen blue-grey.

Type. Specimen no. 191.21 in the Linnaean herbarium (LINN) lectotypus according to FERNANDES (1969).

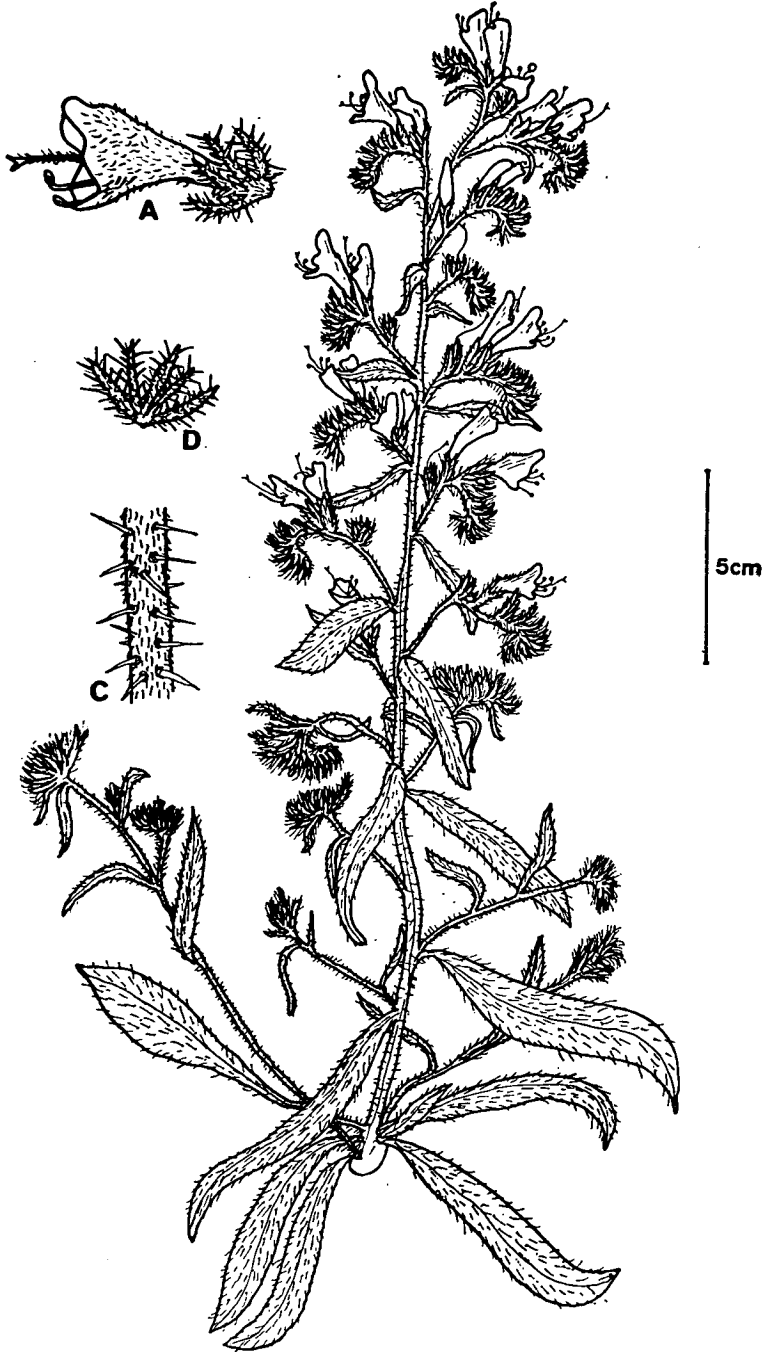


Fig. 5.—*Echium creticum* L. A: corolla (x 1,4); C: stem; D: calyx (x 1,4).
Albacete: Villaverde de Guadalimar to Riópar, Gibbs 69.334 (E).

Distribution. W Mediterranean region and S Portugal. Roadsides and grassy slopes (Map 7).

Two subspecies are recognised:

corolla 23-38 mm., usually reddish-purple; all stamen filaments usually sparsely hairy (a) subsp. **creticum**.
 corolla 15-26 mm., bluish-purple or pink-carmine turning bluish; stamen filaments scarcely hairy (b) subsp. **coincyanum**.

(a) subsp. **creticum**.

E. australe Lam., *Tabl. Encycl. Méth. Bot.* 1: 413 (1792).

E. grandiflorum Desf., *Fl. Atl.* 1: 166 (1798).

E. macranthum Roem. & Schult., *Syst. Veg.* 4: 20 (1819).

Corolla 23-38 mm., reddish-purple (colour often persisting in dried specimens); all stamen filaments more or less sparsely hairy.

Distribution. S France, NE Spain, Corse, Sardinia & N Africa.

Gerona: North of Puerto de la Selva, 17.VI.1959, *Chamberlain* 814 (BM); Cadaqués, 19.IV/27.V.1907, *Sennen & Septimin* 328 (MANCH); Rosas, 22.VI.1905, *Sennen* (G, MA); Puerto de la Selva, 11.V.1966, *Smythies* 87 (E); Cadaqués, IV.1883, *Tremols* (MA); Station at Llansa, near Figueras, 10.VI.1884, *Thompson* (E).

(b) subsp. **coincyanum** (Lacaita) R. Fernandes, *Bol. Soc. Brot.* 43: 153 (1969).

Echium argenteae Pau, *Not. bot. fl. Esp.* 1: 22 (1887) non *E. argenteum* L.

E. granatense Coincy, *Morot Journ. Bot.* 14: 300 (1900).

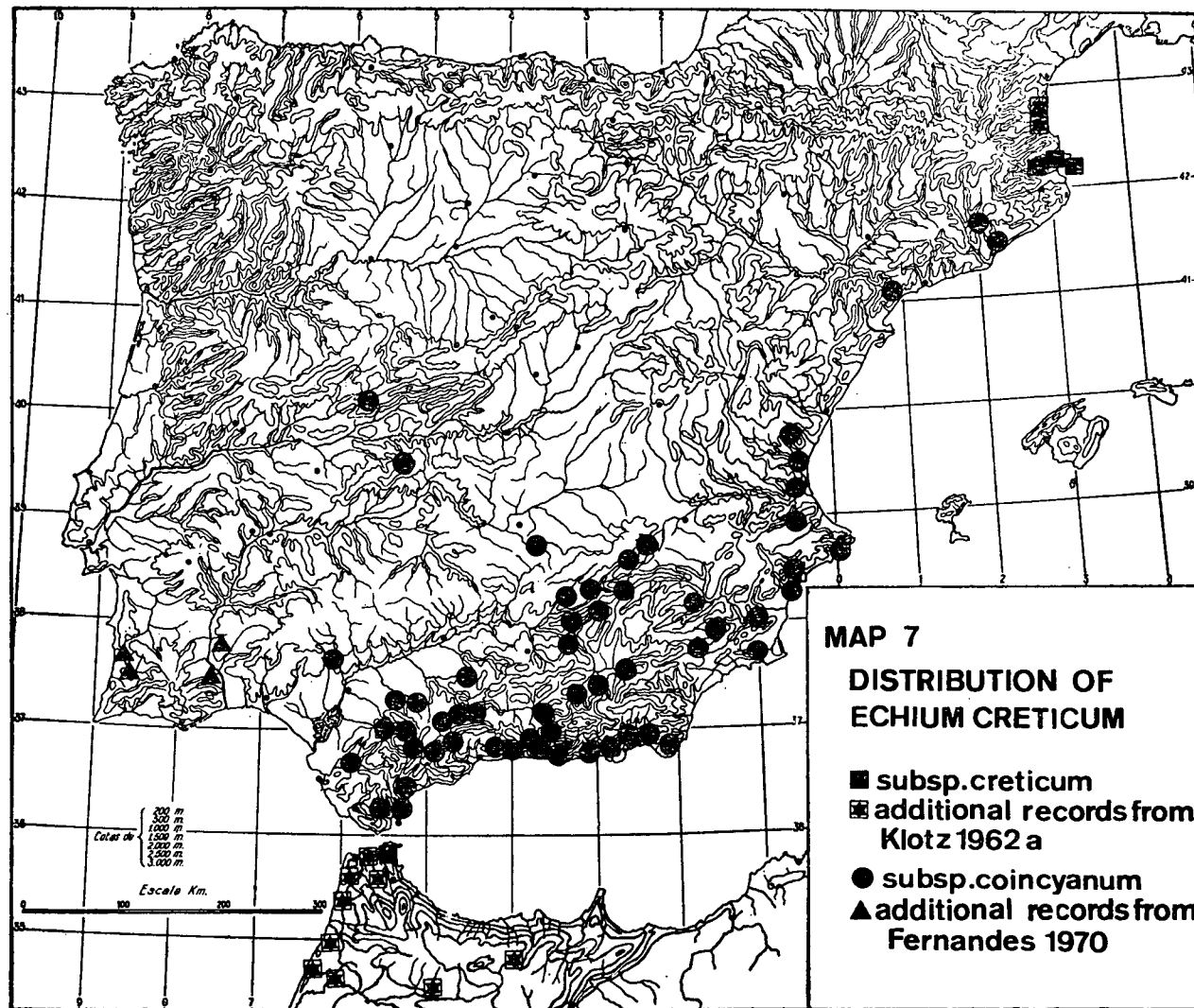
E. coincyanum Lacaita, *Jour. Linn. Soc. London (Bot.)* 44: 374 (1919).

E. norbetii Sennen, *Plantes d'Espagne exsic.* no. 6438 (1927).

E. permutatum Pau, *Cavanillesia* 4: 53 (1931).

E. australe var. *coincyanum* (Lacaita) Sauvage & Vindt, *Fl. Maroc* 2: 177 (1954).

E. spinescens subsp. *coincyanum* (Lacaita) Klotz, *Wiss. Zeitschr. Univ. Halle* 11(2): 296 (1962a).



Corolla 15-26 mm., bluish-purple or pink-carmine turning bluish; only the ventral stamen filaments with sparse, straggling hairs or sometimes all filaments glabrous.

Type. Málaga, Tajo de Ronda, 29.VI.1849, *Bourgeau* 334 (G); Granada, Sierra de S. Felipe de Játiva, 28.V.1852, *Bourgeau* 1625 (E, G); Sierra de Segura, 1850, *Bourgeau* 989, *syntypes*.

Distribution. E, SE & S Spain, S Portugal.

Barcelona: near Barcelona, 9.VIII.1851, *Ball* (E); Artés, 18.VI.1912, *Font Quer* (MA); Montroig, 12.V.1926, *Font Quer* 26 (BM). **Castellón:** Segorbe, 6.VII.1924, *Pau* (BM, MA, MANCH); Segorbe, *Reverchon* (MANCH). **Valencia:** Corbera de Alcira, V.1945, *Borja* (MA); Játiva, in monte castelli, 19.IV.1896, *Pau* (MA); supra Calpe, V.1891, *Porta & Rigo* 142 (K, MANCH); prope Valencia, 8.V.1841, *Willkomm* (E); Murviedro, castle walls, V.1844, *coll. unknown* (K). **Cáceres:** Jerte, 24.V.1923, *Lacaita* 164/23 (BM); Sierra de Guadalupe, near Guadalupe, 26.VI.1927, *Wilmott* (BM). **Ciudad Real:** 7 km. south of Valdepeñas, 2.VI.1927, *Wilmott* (BM). **Albacete:** Villaverde de Guadalimar to Fábricas de Riópar, 18.VI.1969, *Gibbs* 69.334 (E, SEV); nacimiento del Río Mundo, 18.VI.1969, *Gibbs* 69.381 (E). **Alicante:** Castillo de Santa Bárbara, 12.VII.1970, *Escarré* (E); San Vicente del Raspeig, 16.VI.1970, *Escarré* (E). **Murcia:** Cartagena, El Gorguela, *Esteve* 1260 (GDA); San Félix, V.1953, *Esteve* 1671 (GDA); Moratella to Caravaca, 19.VI.1969, *Gibbs* 69.397 (E); Cartagena, Huelva, 6.VI.1931, *Gros* (MA); Sierra de Espuña, Coto de Santa Eulalia, 18.VI.1927, *Jerónimo* (BM, MA); Cartagena, Cerro de San Julián, 10.V.1928, *Lacaita* 99/28 (K); Fuensanta, V.1891, *Porta & Rigo* 142 (K, MANCH); Cartagena, IV.1890, *Porta & Rigo* (K); Puerto Lumbreras, 14.III.1966, *Smythies* 45 (E). **Almería:** Sierra de Cabo de Gata, Barranco del Sabinar, 2.VI.1967, *Ball, Chater, Ferguson & Valdés* (LTR, SEV); sands 15 mls. E of Almería, 30.V.1924, *Ellman & Hubbard* 929 (K); between El Ejido and Dalías, 13.IV.1969, *Gibbs, Silvestre & Valdés* 961.69 (E, SEV); Sierra de Enix, 12.V.1932, *Hno. Jerónimo* (BM); Rambla del Moromoro, 16.V.1928, *Lacaita* 163/28 (BM); Cabo de Gata, 17.V.1928, *Lacaita* 185/28 (BM); Aguadulce, IV.1890, *Porta & Rigo* (MANCH). **Granada:** Guadix to Granada, 20.VI.1969, *Gibbs* 69.417 (E); between Purullena and Diezma, 4.VI.1927, *Lacaita* 187/27 (K); Baza, 13.VI.1927, *Lacaita* (K, MA); Motril - Almería road, nr. Castell de Ferro, 11.IV.1967, *Smythies* 176 (E); Parque de Invierno, above Alham-

bra, Granada, 27.III.1966, *Smythies* 52 (E); Almuñécar, III.1907, *B. Vicioso* (MA). Jaén: Sierra de Cazorla, cliffs of Escalaruela, 6.VII.1951, *Heywood* 1009 (BM); near Baeza, 13.VI.1927, *Lacaita* 276/28 (K); Ubeda, 22.V.1925, *Lacaita* 327/25 (BM); Barranco de Valentina (del Guadalentín), VI.1904, *Reverchon* 643 (MA, MANCH); Sierra de Calar, *Reverchon* (MA); Sierra de Bedmar, Serrezuela, 3.VI.1927, *Wilmott* (BM); Belmez de la Moraleda, 3.VI.1927, *Wilmott* (BM). Córdoba: Cabra, 4.V.1918, *C. Vicioso* (MA). Málaga: Arriate, arroyo de la Ventilla, 18.V.1932, *Ceballos* (MA); Vélez Málaga, 16.V.1927, *Ellman & Helmes* 201 (K); Gobantes, above the Pantano del Chorro, 24.IV.1969, *Galiano, Gibbs, Silvestre & Valdés* 1372.69 (E, SEV); Ronda to Algodonales, 1.VI.1969, *Gibbs* 69.274 (E); between Alora and El Chorro, Sierra de Pizarra, 14.IV.1969, *Gibbs, Silvestre & Valdés* 1129.69 (E, SEV); Archidona, Monte del Castillo, 11.IV.1969, *Gibbs & Valdés* 790.69 (E, SEV); Sierra Tejada, VI.1915, *Gros* (MA); above Alora, 4.V.1929, *Lacaita* (K); Cuevas del Becerro, 4.V.1923, *Lacaita* (MA); Gibralfaro, 3.III.1935, *Laza* (GDA, MA); San Antón, VI.1934, *Laza* (GDA); above El Burgo, 12.V.1968, *Tutin* (LTR); Sierra Blanquilla, Yunquera, 10.VII.1930, *Vicioso* (MA). Sevilla: Estepa, Pico Becerrero, 10.IV.1969, *Galiano, Gibbs, Silvestre & Valdés* 747.69 (E, SEV); Morón de la Frontera to Pruna, Finca de la Hontanilla, 23.IV.1969, *Galiano, Gibbs, Silvestre & Valdés* 1233.69 (E, SEV); Sevilla to Santa Olalla, 29.III.1969, *Gibbs, Silvestre & Valdés* 508.69 (E, SEV); Morón, Pico Esparteros, 24.IV.1933, *C. Vicioso* (MA). Cádiz: Prope San Roque, 16.VI.1871, *Ball* (E); near Zahara, 29.IV.1966, *Brinton-Lee* (LTR); N of Algeciras, Castellar de la Frontera to Almoraima, 19.V.1924, *Ellman & Hubbard* 711 (K); Villamartín to Algodonales, base of Sierra de la Nava, 1.V.1969, *Galiano, Gibbs & Silvestre* 1483.69 (E, SEV); Algodonales to Grazalema, 1.VI.1969, *Gibbs* 69.236 (E, SEV); Bornos, 5.VII.1925, *Gros* 20 (BM); Almoraima, 19.VI.1968, *Molesworth-Allen* (LTR).

Echium creticum is yet another species which has been a source of considerable taxonomic and nomenclatural confusion. Fortunately, however, FERNANDES (1969) in a recent lucid paper has considerably clarified the situation and rehabilitated the Linnaean name for this species; the present writer is in complete agreement with the nomenclatural argument put forward by FERNANDES (*loc. cit.*).

As accepted in the present revision, *Echium creticum* L. is a very variable W Mediterranean species with two widely distributed subspecies: the typical element, subsp. *creticum* which occurs in the coastlands of SE

France and NE Spain, Corsica, Sardinia and North Africa from Morocco to Tunisia; and a second taxon, subsp. *coincyanum* which occurs in E, SE and S Spain and S Portugal. FERNANDES (loc. cit.) has described a third subspecies, *algarbiense* which is restricted to S Portugal and Morocco.

It is the second, predominantly Spanish taxon, subsp. *coincyanum* which is particularly variable and which has caused most taxonomic confusion, as is reflected in the synonymy listed above. Thus, although WILLKOMM (1870) correctly used the name *E. creticum* L. for this species, COINCY (1900b) referred the Spanish populations to *E. australe* Lam. and used the name *E. grandiflorum* Desf. for the southern French and North African populations. LACAITA (1919, 368 et seq.) attempted to correct COINCY's error by distinguishing the Spanish plants under a new name, *E. coincyanum*, and he restored the name *E. australe* Lam. for the populations from the catalan coastlands of France and Spain and from North Africa. In fact, however, LACAITA further confused the situation since, on the one hand he rejected on very dubious grounds the name *Echium creticum* L. as a *nomen confusum*, and on the other he introduced a superfluous species name since two epithets (*E. argenteae* Pau and *E. granatense* Coincy) were already available for the Spanish forms of *E. creticum* if it was considered necessary to recognise them as a distinct species.

KLOTZ (1962a) partially restored the taxonomy of the group by recognising *coincyanum* at the subspecies level, but he further confused the nomenclature of the group by accepting LACAITA's rejection of *E. creticum* L. and proposing instead of *E. australe* Lam. the obscure name *E. spinescens* Medikus. On this view, the plants from S France, NE Spain, Corsica, Sardinia and North Africa were referred to *E. spinescens* subsp. *spinescens*, and the Spanish and Portugese plants to *E. spinescens* subsp. *coincyanum* (Lacaita) Klotz. FERNANDES (1969) has pointed out that there are no strong grounds for rejecting the original Linnaean name *E. creticum* for this species, whilst in comparison the nomenclatural claims of the name *E. spinescens* Medikus are in fact considerably more suspect.

With the nomenclature of this species now clarified it is hoped that future studies will be able to concentrate on the problem of the variability of the plants referred in this revision to *E. creticum* subsp. *coincyanum*. Examples of this taxon are very variable in such characters as corolla size and colour, degree of exertion of the stamens, degree of hairiness of the stamen filaments and morphology of the leaves. Detailed field studies on subsp. *coincyanum* in S & SE Spain would make a welcome contribution to the taxonomy of this species complex.

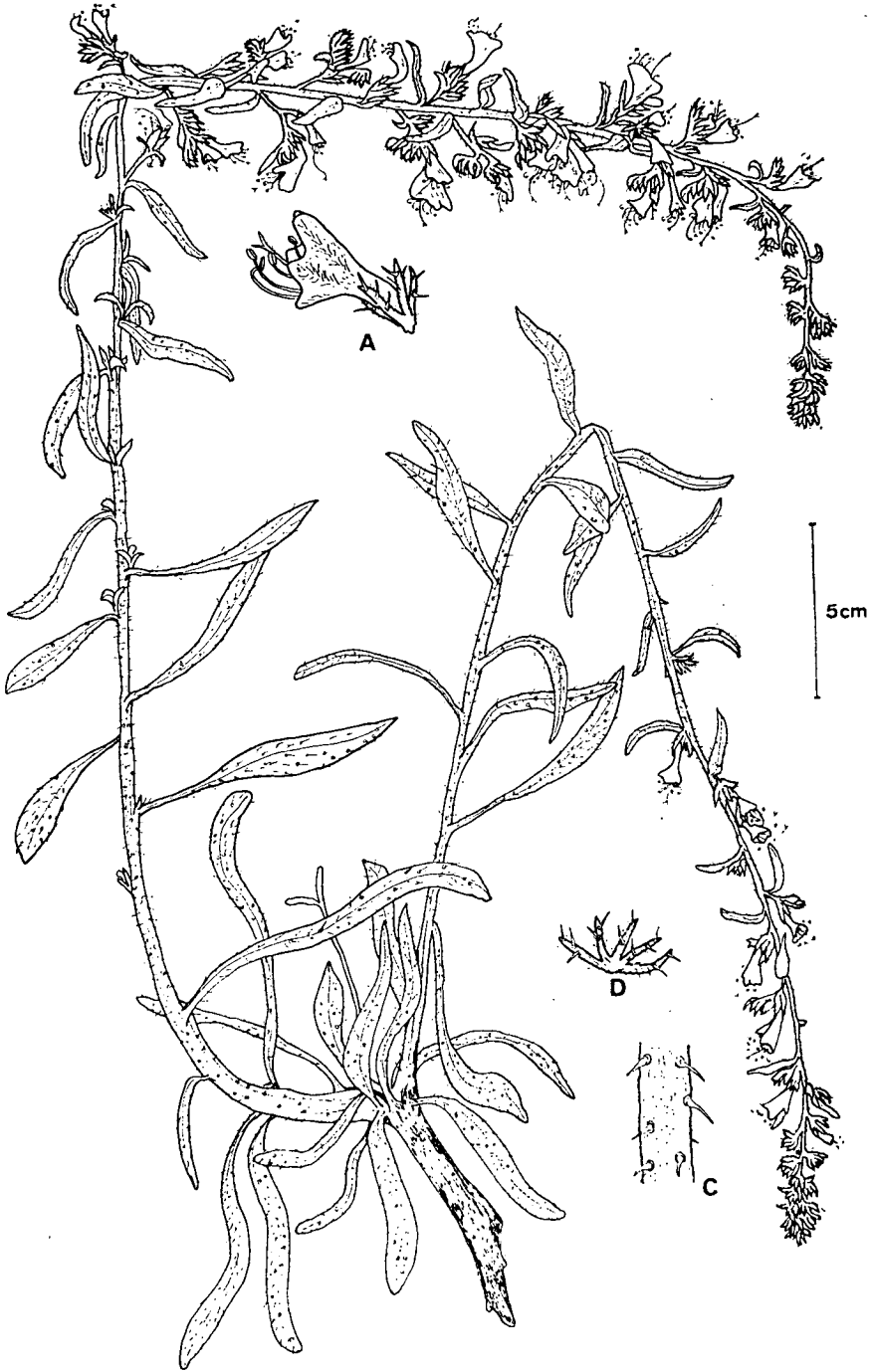


Fig. 6.—*Echium gaditanum* Boiss. A: corolla (x 1,4); C: stem; D: calyx (x 1,4).
Huelva: near La Rábida, Gibbs 69.128 (E).

12. *Echium gaditanum* Boiss., *Voy Bot. Midi Esp.* 2: 422 (1841).

Icon. Fig. nostra no. 6.

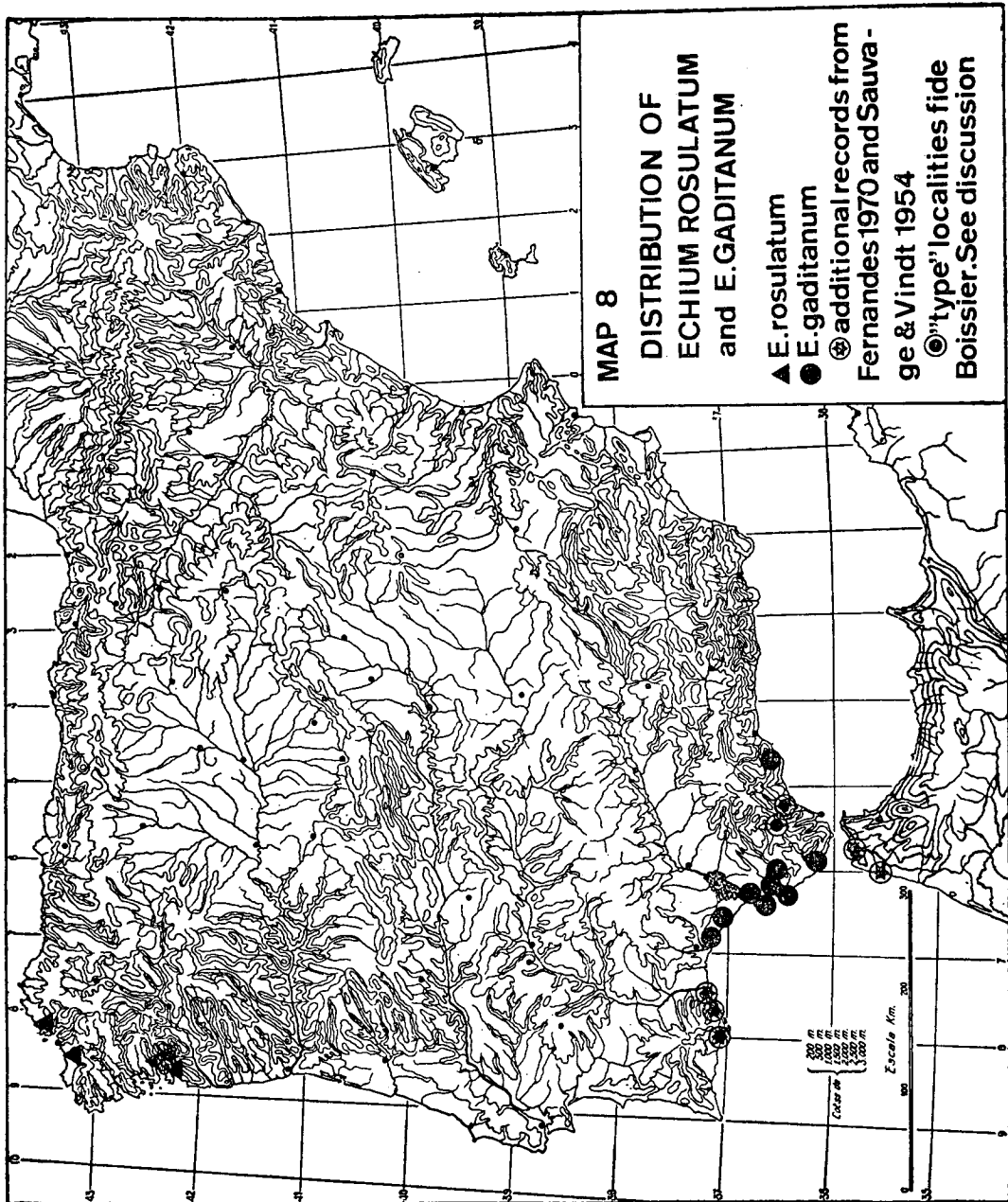
Erect or ascending, roughly hispid biennial 20-75 cm. with several to many usually robust flowering stems arising from a more or less distinctly woody stock. Indumentum of rather sparse, harsh setae, often with conspicuous white tubercles, and an underlayer of fine, deflexed, appressed hairs. Basal and lower cauline leaves 30-110 x 5-30 mm., lanceolate to oblanceolate, attenuate at the base and long petiolate; upper cauline leaves ovate to lanceolate, sessile. Inflorescence rather laxly branched. Calyx 6-8 mm. at anthesis, scarcely enlarging in fruit. Corolla 11-20 mm., clear blue to bluish-violet, infundibuliform, rather abruptly dilated and obliquely cut towards the apex, uniformly hairy, with 3-4 exerted stamens; filaments glabrous, pollen bluish-grey. Nutlets c. 2.5-3 x 2 mm., triquetrous, brownish, irregularly tuberculate.

Type. See discussion below.

Distribution. S Spain and S. Portugal, Morocco. Usually coastal sands (Map. 8).

Málaga: Marbella to Fuengirola, 20.V.1919, *Gros* (MA). **Cádiz:** c. Gades, 1849, *Boissier & Reuter* (K); arenales prope Puerto de Santa María, IV.1961, *Borja & Rodríguez* (MA); sands at Santa Catalina near Puerto de Santa María, 8.VIII.1853, *Bourgeau* (E); in arenosis Torregorda prope Cádiz, 29.V.1921, *Font Quer* (K, MA); Barbate de Franco, sands, 2.V.1969, *Galiano, Gibbs, Silvestre & Valdés* 1676.69 (E, SEV); inter Cádiz et San Fernando, 12.V.1925, *Lacaita* (MANCH); Medina Sidonia, hillside below the town, 13.V.1925, *Lacaita* 266/25 (K); Chipiona, 8.IV.1968, *Smythies* (E, LTR). **Huelva:** Sandy areas beside the new road to the Coto Doñana, 28.VII.1969, *Galiano, Gibbs & Silvestre* 2307.69 (E); La Rábida, sandy areas beside the new road to the oil refinery, 9.V.1969, *Gibbs* 69.128 (E).

SAUVAGE & VINDT (1956) have examined the material of *Echium gaditanum* in the BOISSIER herbarium and they have chosen a specimen collected by HAENSELER «Prov. Malacitana» as lectotype for this species. SAUVAGE & VINDT (*loc. cit.*) point out that BOISSIER cited some six collections in the original circumscription of *E. gaditanum* but they rejected these other specimens on the grounds that they consist of fragments which do not allow



for an accurate impression of the species. In any case the HAENSELER collection(s) were given prominence by BOISSIER and they would normally represent first choice of specimens for the purposes of lectotypification.

According to SAUVAGE & VINDT, the HAENSELER specimen has the localities «circa Gaucín, Casares etc.» written in another hand (which tallies with BOISSIER's note: «In sterilibus regionis calidae, circa Gaucín, Casares, Isat, legit. cl. Haenseler») but these authors do not say whether the additional localities were in fact written by BOISSIER. The localities on the HAENSELER specimen pose a problem because *Echium gaditanum* is a species of maritime sands and only one specimen from an inland locality (*Lacaita* 266/25) has been seen. The LACAITA specimen is from below Medina Sidonia and is this a lowland area although some 20 km. from the coastal region near San Fernando where *E. gaditanum* is fairly plentiful. However, Gaucín and Casares are montane localities in the Serranía de Ronda and Sierra Bermeja, and until the occurrence of *E. gaditanum* in these areas can be validated it must be open to doubt as to whether the localities cited on the HAENSELER specimen are in fact those in which the plants were originally collected.

13. *Echium rosulatum* Lange, *Ind. Sem. Hort. Haun.*: 22 (1857); *Pugillus*: 190 (1863).

? *Echium vulnerans* Merino, *Bol. Soc. Arag.* 3: 189 (1904).

E. gaditanum sensu Samp., *Bol. Soc. Brot.* 10: 245 (1935); *Fl. Port.*: 534 (1947) non Boiss.

Icon. Lange, *Descriptio Iconibus illustrata*, fasc. 2, tab. 12 (1864).

Erect, hispid perennial, 30-70 cm., with 1- several flowering stems which arise from beneath the basal rosette of leaves. Leaves 20-80 x 5-25 mm., ovate to lanceolate, sessile, with appressed to patent setae. Inflorescence laxly branched, often with conspicuous leaf-like bracts. Calyx 6-9 mm. at anthesis, 10-14 mm. in fruit. Corolla 11-20 mm., infundibuliform, pinkish-violet, uniformly hairy, with 3-4 exerted stamens; filaments pale, pollen bluish-grey. Nutlets c. 2 x 1 mm., brownish, irregularly rugose.

Type. Spain, Galicia, Cobas, 16.IX.1851-52, Lange (COI, K).

Distribution. C & N Portugal; NW Spain. Meadows and sandy fields (Map 8).

La Coruña: Cape Finisterre, 12.VII.1926, *Lacaita* 611.28 (BM, G); La

Coruña, 10.VIII.1851-52, *Lange* (K). **Pontevedra:** Marín, 19.VIII. 1932, *Albo* (MA); Cangas, near Vigo, VIII.1926, *Exell* 32 (BM); near Marín on the road to Ría de Pontevedra, 9.VII.1928, *Lacaita* 597.28 (BM). **Orense:** Castrelo de Miño, 16.VII.1935, *Rodríguez* (K).

On the basis of the very few specimens which they had available, WILLKOMM (1893) and SAMPAIO (1935) referred *E. rosulatum* to *E. gaditanum*. FERNANDES (1970) has recently studied these two species and drawn attention to some of their differential characters; however, FERNANDES (loc. cit.) has also pointed out the specimens of *E. rosulatum* from Cangas de Tineo in the Asturias (which were cited by WILLKOMM under *E. gaditanum*) do indeed approach *E. gaditanum* in corolla size and shape, and degree of exertion of the stamens.

Very little material of *E. rosulatum* from Spain has been available during the preparation of this revision, and it is obviously desirable that this species should be studied in detail throughout its geographical range in Spain and Portugal. Until such studies are undertaken, the status of *E. rosulatum* in NW Spain must remain rather problematical.

14. *Echium arenarium* Guss., *Ind. Sem. Boccad.*: 5 (1825).

Icon. Fig. nostra no. 7.

Hispid annual (?) or biennial, 10-25 cm., with several to many ascending flowering stems. Basal and lower cauline leaves 30-60 x 5-14 mm., spatulate, long petiolate; upper cauline leaves spatulate or elliptic or oblong, sessile; stems and leaves with whitish, short, more or less appressed setae and an underlayer of fine hairs. Inflorescence little branched. Calyx 5-7 mm. at anthesis, up to 10 mm. in fruit, with the segments remaining narrow. Corolla 6-11 mm., dark blue, uniformly hairy, with all stamens included. Nutlets 2-2.5 x 2 mm., triquetrous, brownish. rugose.

Type. Not traced.

Distribution. E Mediterranean area and some W Mediterranean islands. Dunes and sandy fields near the sea.

Baleares: Mallorca: Cala Ratjada, northernmost beach, 4.VI.1961, *Bowden & Sims* 351 (BM); entre Valldemosa y El Estrecho, 22.II.1947, *Ferrer* (MA); Etabliments, 6.III.1947, *Ferrer* (MA); Ibiza: Town, cathedral

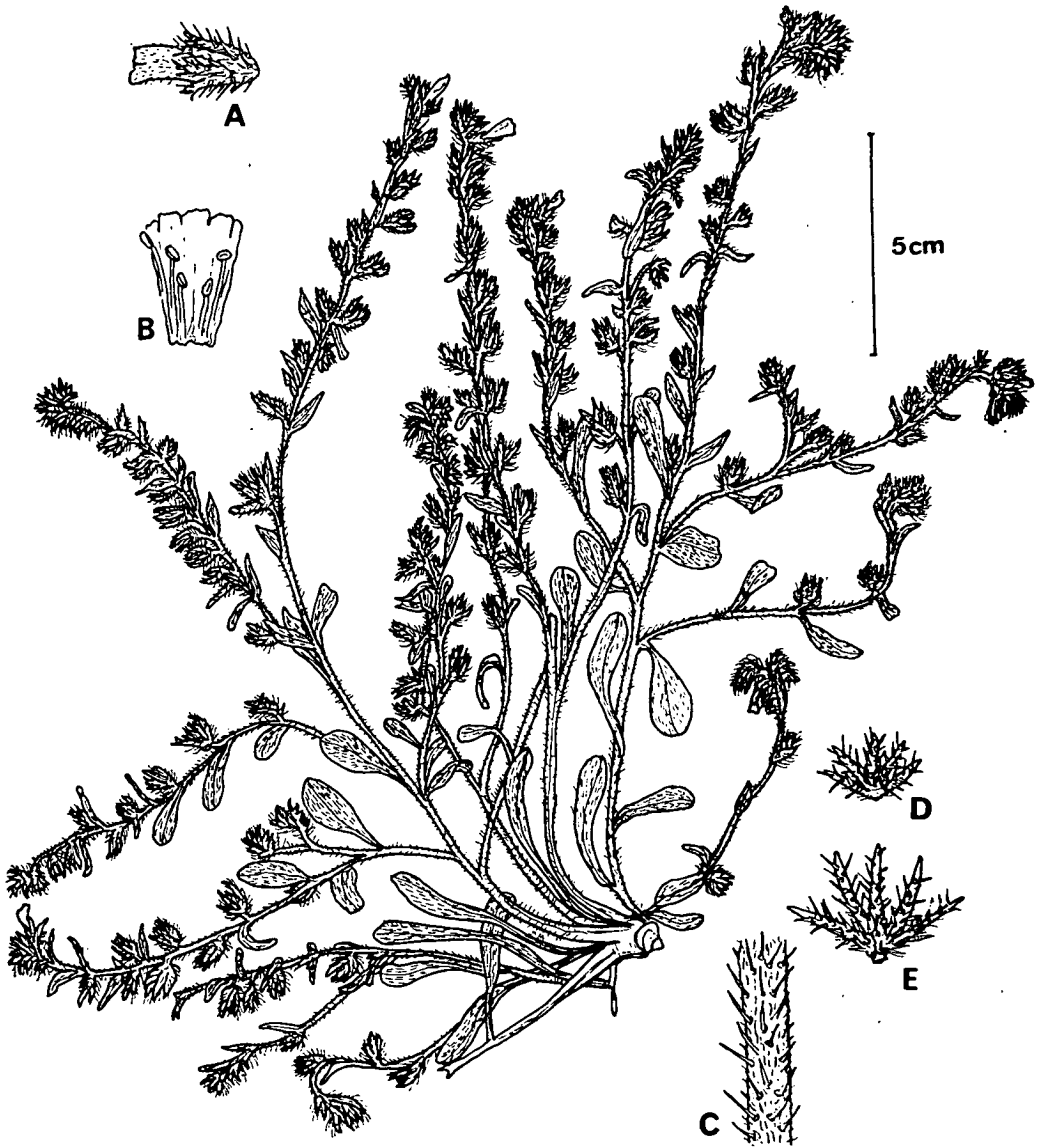


Fig. 7.—*Echium arenarium* Guss. A: corolla; B: dissected corolla; C: stem; D: calyx; E: fruiting calyx (All x 2). Crete, Kissamos, *Reverchon* 113 (E).

and fortress yard, 11.V.1968, *Bowden & Sims* 1951 (BM); «Ibiza», IV.1899, *Pau* (MA); Formentera: La Mola, 24.IV.1918, *Font Quer* (BM).

15. *Echium parviflorum* Moench., *Meth.*: 423 (1794).

Echium calycinum Viv., *Ann. Bot.* 1, 2: (1802).

Icon. Fig. nostra no. 8.

Hispid annual or biennial 10-40 cm., with several to many ascending or erect flowering stems. Basal and lower cauline leaves 55-120 x 5-25 mm., spatulate to oblanceolate, long petiolate; cauline leaves obovate or oblong, the uppermost sessile; with sparse to dense, appressed setae and a dense underlayer of fine hairs. Inflorescence scarcely branched. Calyx 6-8 mm. at anthesis, up to 15 mm., with broad segments, 4-5 mm. wide at the base, in fruit. Corolla 10-13 mm., infundibuliform, dark blue, uniformly hairy, with all the stamens included. Nutlets 3-3.5 x 2.5-3 mm., brownish, with anastomosing tubercles.

Type. Not traced; see discussion below.

Distribution. Mediterranean region. Pathsides, dry slopes.

Barcelona: Esparraguera près Montserrat, 6.V.1847, *Bourgeau* 510 (K); Costas de Garraf, 16.V.1929, *Sennen* 7044 (MA); Premier Ocata, bords de la mer, 29.III.1932, *Sennen* 8216 (BM, MA). **Tarragona:** Tarragona, 3.IV.1917, *Sennen* (MA). **Castellón:** Benicarló et Peñíscola, IV.1909, *Sennen* (E, MA, MANCH). **Valencia:** Sagunto, 23.IV.1895, *Pau* (MA); Sagunto, IV.1894, *Reverchon* (MANCH). **Alicante:** Denia, track leading to Cabo de San Antonio, 17.V.1928, *Ellman & Sandwith* 1200 (K); Jávea, VI.1898, *Pau* (MA, MANCH). **Murcia:** Champs à Cartagena, 21.IV.1850, *Bourgeau* 793 (E, MA); bords des chemins à Cartagena, 6.IV.1851, *Bourgeau* 1313 (K); Cartagena, Barrio de Perol, IV.1951, *Esteve* (MA); Cartagena, 19.IV.1901, *Jiménez* (MA); Elche, IV.1903, *Prat & Sylva* 19 (BM). **Baleares:** Mallorca: Sóller, 3 km. along footpath from Biniaraix to L'Ofre, 1.VI.1966, *Bowden & Sims* 127 (BM); Puig Mayor, Sóller - Pollensa road, 2.VI.1966, *Bowden & Sims* 284 (BM); Pollensa, 26.III.1931, *Edmons* (K); Deyá, 29.III.1929, *Edmonds* 64 (K); Bellver, 25.VI.1943, *coll. unknown* (GDA); Menorca: Mahón to Ciudadela, 4 km. from Mahón, 4.IV.1967, *Bowden & Sims* 870 (BM); Mahón, Isla de Rey, 16.IV.1913, *Font Quer* 888 (MA); Mahón, Villa-

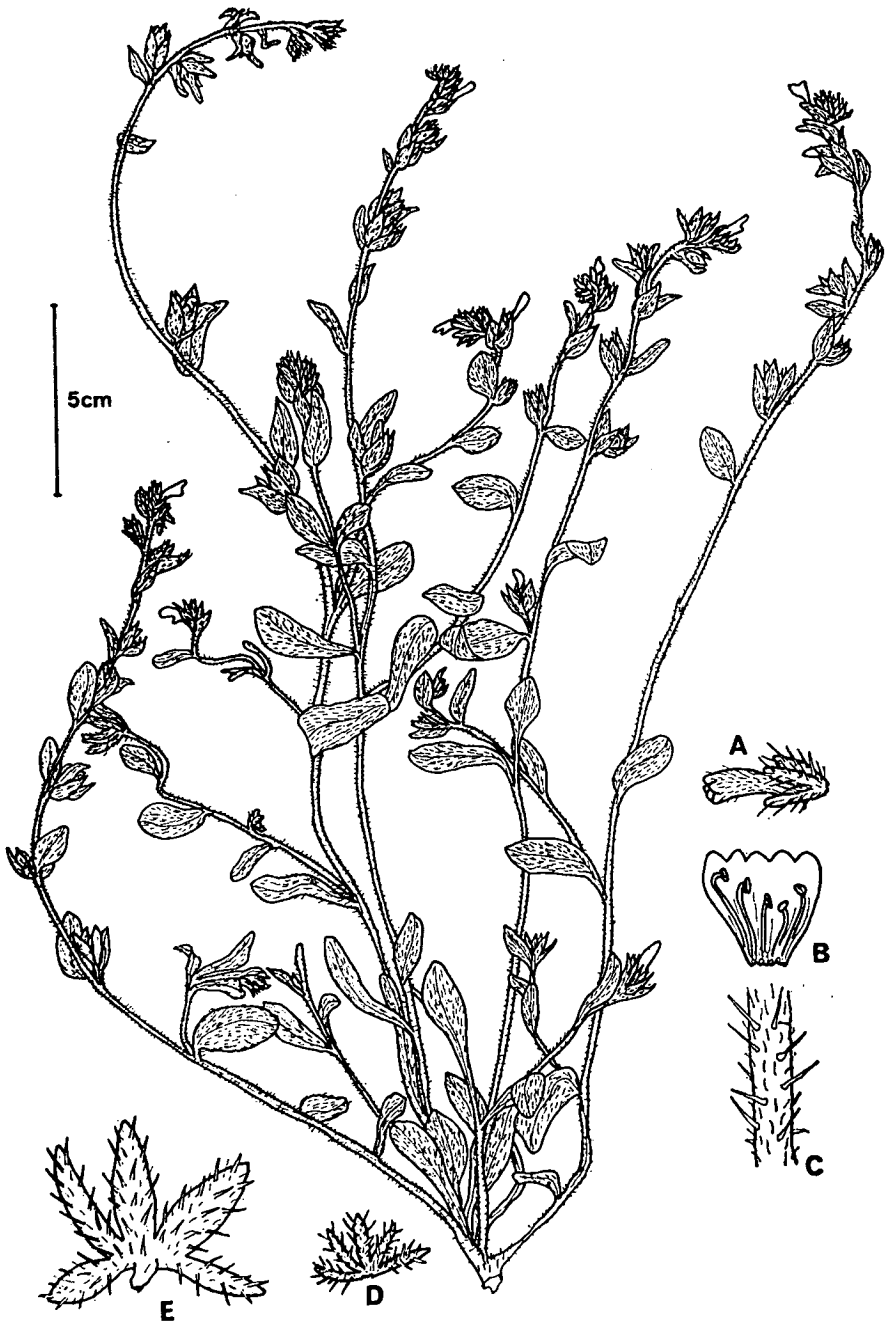


Fig. 8.—*Echium parviflorum* Moench. A: corolla; B: dissected corolla; C: stem; D: calyx; E: fruiting calyx (All x 1,4). Murcia: Cartagena, Bourgeau 1628 (E).

carlos, 26.IV.1903, *White* (E); Ibiza: Santa Eulalia, 5.V.1918, *Bowden & Sims* 1617 (BM); 'Ibiza', IV.1899, *Pau* (MA).

GREUTER (1967) has maintained that the name *Echium parviflorum* Moench is illegitimate since the original circumscription of the species included the type of *E. lycopsis* L. Thus, according to this reasoning, since in the protologue of *E. parviflorum* MOENCH included the synonym «*E. italicum* Linn. β », and since this latter and *E. lycopsis* L. can both be interpreted as being based on the *Lycopsis* of C. BAUHIN (*Pinax* 255, 1671), then it can be argued that MOENCH effectively included the type of an earlier name at the same rank; under Art. 63 of the International Code of Botanical Nomenclature this would render *E. parviflorum* illegitimate.

However, although it is certainly possible to argue a case for typifying both *E. lycopsis* L. and *E. italicum* L. β by the *Lycopsis* of C. BAUHIN, this is not the only option available. An alternative line of reasoning is as follows: For his *E. italicum* β Linnaeus cited the single synonym *Lycopsis* Bauhin, and since the latter lacks a description, *E. italicum* β must be typified by one of the five elements cited by C. BAUHIN under his *Lycopsis*. These were as follows: «*Cynoglossum* Matth. Lac. Lugd.; *Echii altera species* Dod.; *Lycopsis, vel Lycopsis degener Anchusa, Aeginetae*, Lob. Ad.; *Lycopsis altera Anglica*, Lob., Lugd.; *Echion*, Caes.». As noted in the discussion under *E. plantagineum* L., *Echium lycopsis* L. must be typified via the elements cited by RAY (*Syn. Meth. Stirp.*, ed. 3, 227, 1724) which are: «*Lycopsis* C. B. *Pinax* 255; *Park*. 519; *Lyc. Dioscoridis quibusdam* J. B. III 584; *Echii altera species* Dod. p. 680».

Thus it can be seen that the elements cited by RAY for *E. lycopsis* do not include all the elements cited by C. BAUHIN under *Lycopsis*. It would be possible, for example, to attempt to typify *E. lycopsis* sensu RAY with J. BAUHIN's *Lycopsis Dioscoridis quibusdam*. DANDY (British Museum, Natural History) has clearly expressed the situation (*in litt.*) in the following terms: «A name is either legitimate or illegitimate at the time of its publication: it cannot become illegitimate later because of some decision, say, about typification». Consequently, in the present revision the view has been taken that the name *Echium parviflorum* Moench is not illegitimate under Art. 63 of the Code and that it must be maintained.

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