



The genus *Plagi* (Compositae, Anthemideae)

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Source: *Willdenowia*, 36(1) : 47-68

Published By: Botanic Garden and Botanical Museum Berlin (BGBM)

URL: <https://doi.org/10.3372/wi.36.36104>

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ROBERT VOGT & CHRISTOPH OBERPRIELER

The genus *Plagi* (*Compositae*, *Anthemideae*)

Abstract

Vogt, R. & Oberprieler, C.: The genus *Plagi* (*Compositae*, *Anthemideae*). – Willdenowia 36 (Special Issue): 47-68. – ISSN 0511-9618; © 2006 BGBM Berlin-Dahlem.
doi:10.3372/wi.36.36104 (available via <http://dx.doi.org/>)

A comprehensive treatment of the small western Mediterranean genus *Plagi*, including morphological, anatomical and cytological details and distribution maps, is presented and the results of a phylogenetic analysis based on nrDNA internal transcribed spacer (ITS) sequence variation discussed. The three species of *Plagi* are found to form a monophyletic group with 88 % bootstrap support within the *Leucanthemum* group of genera, which is characterised by a specialised achene anatomy. The chromosome numbers of *P. maghrebinus* ($2n = 18$) and *P. grandis* ($2n = 36$) are reported for the first time. The basionym of *P. grandis* is lectotypified.

Key words: Mediterranean, taxonomy, chromosome number, lectotypification.

Introduction

The genus *Plagi* DC. was established by Candolle (1838) for three species of *Balsamita* Desf. (Desfontaines 1792), non Mill. (Miller 1754), excluding the type species *B. major* Desf. and including the species *B. grandiflora* Desf., *B. ageratifolia* Desf. and *B. virgata* Desf. (Alavi & Heywood 1976). While the first two species were already known to and described by Linné, *B. grandiflora* as *Cotula grandis* L. (Linnaeus 1763) and *B. ageratifolia* as *Chrysanthemum flosculosum* L. (Linnaeus 1753), and unproblematical in their circumscription, the third taxon was the victim of a long chain of taxonomic misconceptions and nomenclatural errors. Alavi & Heywood (1976) and Greuter & al. (2003) clarified these matters and arrived at the following points: (1) The correct name for *B. grandiflora* is *P. grandis* (L.) Alavi & Heywood. (2) Since Candolle (1838) included *Chrysanthemum flosculosum* L. (1753) in the synonymy of his *P. ageratifolius* (Desf.) DC., *P. flosculosus* (L.) Alavi & Heywood is the correct name for this taxon designated as the type of the genus *Plagi* (Alavi & Heywood 1976). (3) The N African populations of Desfontaines' *B. virgata* constitute a species independent from populations from the Sea Alps formerly known under the name *Leucanthemum discoideum* (All.) Lacaita or *L. discoideum* (L.) Coste, but correctly named *L. virgatum* (Desr.) Clos (Greuter & al. 2003). Despite several attempts to name the N African taxon (Boissier 1856, Vogt 1996), the species remained without a nomenclaturally correct name until the validation of Boissier's description under *P. maghrebinus* Vogt & Greuter (Greuter & al. 2003).

The taxonomic concept of the genus *Plagi* is mainly based on the combination of two morphological characteristics, the possession of discoid capitula and of arcuate achenes with longitudinal ribs being basally fused into an adaxial foot callus (Bremer & Humphries 1993, Oberprieler & al., in press). Since both characteristics are also found in representatives of closely related genera (e.g. discoid capitula in *Chlamydophora* and *Leucanthemum*, achenes with foot callus in *Coleostephus* and *Glossopappus*), it is the combination of these two features that define this generic entity. As a consequence, the phylogenetic relationships of *Plagi* were always considered to lie with *Leucanthemum* and its mentioned satellite genera. This was corroborated, first, by the phytochemical studies of Bohlmann & al. (1964) who found similar acetylene compounds in *Plagi flosculosus* and representatives of *Coleostephus* and *Glossopappus*, second, by a cladistic analysis of the subtribe *Leucantheminae* sensu Bremer & Humphries (1993) based on morphological, anatomical, and phytochemical characters (Bremer & Humphries 1993), and, third, by molecular phylogenies based on sequence information from the nuclear ribosomal internal transcribed spacer regions (nrDNA ITS) and the intergenic spacer region between the genes *trnL* and *trnF* of the chloroplast genome (Oberprieler & Vogt 2000).

The present paper contributes a formal taxonomic treatment of the genus *Plagi* and discusses its relationships based on a phylogenetic analysis of a comprehensive data set of nrDNA ITS sequence information.

Material and methods

The present study is based on cultivated material and field studies as well as herbarium specimens held at the following institutions (abbreviations according to Holmgren & Holmgren 1998-): B, BM, C, E, FI, G, GOET, JE, K, M, MA, MPU, MSB, P, RAB, S, W, WU, and the private collections of the authors.

Seed material and living plants were collected during a field trip of the authors to Tunisia organized by the Botanic Garden and Botanical Museum Berlin-Dahlem in 1994 and in Sardinia by L. Zedda (Bonn). Living plants have been cultivated in the greenhouses of the Berlin Botanic Garden. Vouchers are deposited in B and in the private collections of the authors.

Information on material and methods used in the phylogenetic analysis based on nrDNA ITS sequence information is given in Oberprieler & Vogt (2006).

Chromosome numbers were obtained from somatic mitoses of root tips of plants raised from seed. Root tips were pretreated with hydroxyquinoline (0.002 molar aqueous solution) for 2 hours, fixed in 96 % ethanol/glacial acetic acid (3:1) and refrigerated. Hydrolyzation was carried out with 1-2N hydrochloric acid for 10-15 minutes at 60 °C. For chromosome staining, root tips were squashed in aceto-orcein. Chromosome counts were made for several plants of a common seed origin. Five to ten metaphase stages were examined for every plant.

The descriptions are based on measurements made on dried plants. The variation ranges cited cover the total observed variation exhibited by a particular taxon. Extreme values have been placed in parentheses.

In the lists of specimens seen localities are given countrywise in the following order: France, Italy, Morocco, Algeria and Tunisia. Within each country, administrative districts (France: Département; Italy and Morocco: Province; Algeria: Wilaya; Tunisia: Gouvernorat) are listed in alphabetic order. Within each district, specimens are listed from N to S. Most of the specimens are given with longitude and latitude of the collecting locality, written as stated by the collector(s), or taken from various maps [then cited in square brackets]. The distribution maps were generated with the free Geographic Information System (GIS) software DIVA-GIS (Hijmans & al. 2005) using an adaptation of the global digital elevation model GOTOP030 (EROS Data Center 1996) created by Norbert Kilian (Berlin).

For comparative anatomical studies achenes were taken from herbarium specimens and soaked in a mixture (6:1) of 10 % aqueous solution of dioctyl sodium sulfosuccinate and 96 % ethanol for two days (Peterson & al. 1978). Following dehydration through a 20 % incremental series to absolute ethanol with changes every 24 hours, achenes were infiltrated with Technovit

7100 (Heraeus-Kulzer) for four to six weeks. After embedding, median-transverse sections (3-5 µm thick) of achenes were made using a rotary microtome, stained in toluidine blue and mounted in Vitroclud (Langenbrinck).

Systematic position of *Plagi*us

In a preliminary molecular phylogenetic study of Mediterranean *Anthemideae* aiming at the clarification of the taxonomic position of *Castrilanthemum debeauxii* (Degen & al.) Vogt & Oberprieler, Oberprieler & Vogt (2000) included the three species of *Plagi*us in their data set consisting of nrDNA ITS and cpDNA *trnL-trnF* intergenic spacer sequence information (*P. maghrebinus* under its synonym *P. fontanesii*). While in their maximum parsimony (MP) tree based on nrDNA ITS sequences these three species formed a moderately supported monophyletic group, the MP analysis of the chloroplast marker was not well resolved due to the scarcity of phylogenetically informative characters (Oberprieler & Vogt 2000).

The present molecular phylogenetic analysis of Mediterranean *Anthemideae* (Oberprieler & Vogt 2006) is based on a taxonomically very comprehensive data sampling for the nrDNA ITS marker and consists of 116 representatives from 59 genera. All 43 genera characterised by an apomorphic 15bp-deletion in ITS2 (the 'Circum-Mediterranean clade', Oberprieler 2005, Oberprieler & al., in press) were represented by at least one species, the large genera of this clade (*Achillea*, *Anthemis*, *Cota*, *Tanacetum*, *Tripleurospermum*) by a number of species from different subgeneric groups. In contrast to former analyses where phylogenetic reconstructions were accomplished using the maximum parsimony criterion, we were able to analyse this large data set with the (usually more time-greedy) model-based maximum likelihood (ML) approach, thanks to the software 'Treefinder' (Jobb 2004), which is extremely fast compared to other programs for phylogenetic reconstruction such as PAUP* (Swofford 2002). With this program, it was even possible to carry out a ML bootstrap analysis to get support values for the different monophyletic groups.

The ML search yielded the tree depicted in Fig. 1. The three *Plagi*us species form a monophyletic group with considerable bootstrap support (88 %). While the sister group relationships within the genus appear to be well resolved – the tetraploid *P. grandis* forming the sister to the diploid *P. flosculosus* with 88 % bootstrap support – the exact position of *Plagi*us within Mediterranean *Anthemideae* remains unclear due to lacking bootstrap support for a number of branches in the phylogenetic reconstruction. However, *Plagi*us is clearly a member of the clade including *Leucanthemum* (i.e. *Chrysanthoglossum* through *Daveaua*), which receives a bootstrap support of 75 %. With most members of this clade, i.e. all genera except *Daveaua*, *Heteromera* and *Otospermum* (the *Leucanthemum* group of genera sensu Bremer & Humphries 1993 and Oberprieler & al., in press), *Plagi*us shares the apomorphic condition of a specialised arrangement of vascular strands and resin ducts in the valleys between ribs of the pericarp wall (Fig. 2), while in the other *Anthemideae* both vascular strands and resin cavities or ducts are usually found in the pericarpic ribs. As discussed by Oberprieler (2004: 347), the transition between achenes with vascular strands and resin ducts in their ribs (as in *Daveaua*, *Heteromera* and *Otospermum*) and achenes with strands and ducts in the valley between ribs (as in the *Leucanthemum* group of genera) may have been easily realised by the formation of external ribs between the original ribs due to the growth of mesocarpic tissue.

Within the *Leucanthemum* group, however, both molecular and morphological/anatomical sources of evidence are still insufficient to clarify the relationships between species and genera. Following the cladistic analyses of Bremer & Humphries (1993), *Plagi*us is supposed to be a member of a monophyletic group together with *Chrysanthoglossum*, *Coleostephus* and *Glossopappus* based on the apomorphic character states of yellow ray florets (missing in *Plagi*us species), flabelliform involucre bracts (reversed in *Plagi*us) and disc corolla lobes with dorsal appendages (Fig. 3D). Within this group of four genera, *Plagi*us is considered to form a monophyletic group with *Coleostephus* and *Glossopappus* due to arcuate achenes and achene ribs that are basally fused into an adaxial foot callus (Bremer & Humphries 1993). However, due to the

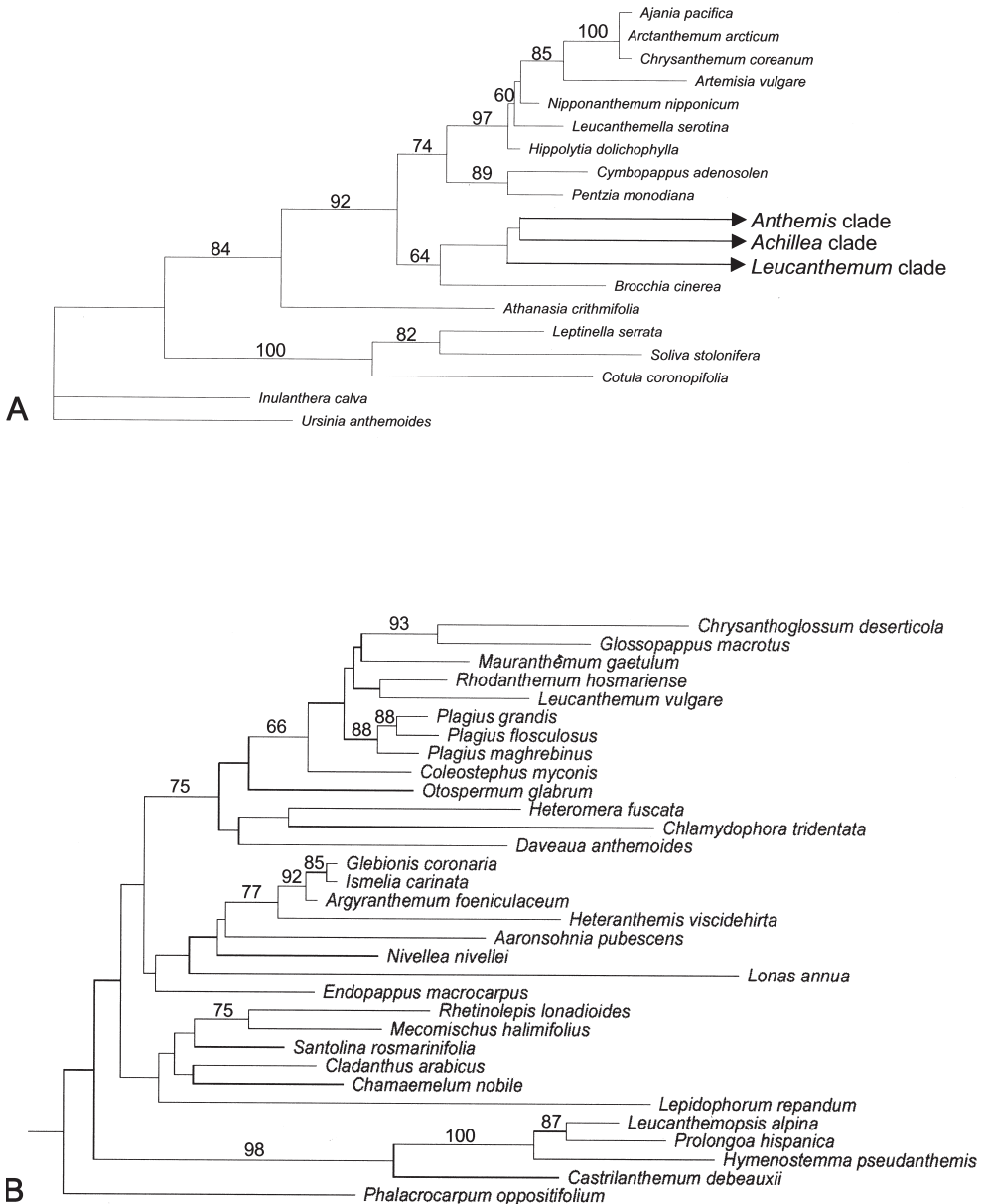


Fig. 1. Phylogenetic tree from a maximum-likelihood analysis of nrDNA ITS sequence data based on the TrN + A model of DNA substitution (Tamura & Nei 1993) with base frequencies, gamma distribution parameter α and substitution rate matrix given in Oberprieler & Vogt (2006). Numbers above branches denote bootstrap values based on 100 bootstrap replicates. – A: basal part of the phylogenetic tree; B: detailed representation of the *Leucanthemum* clade.

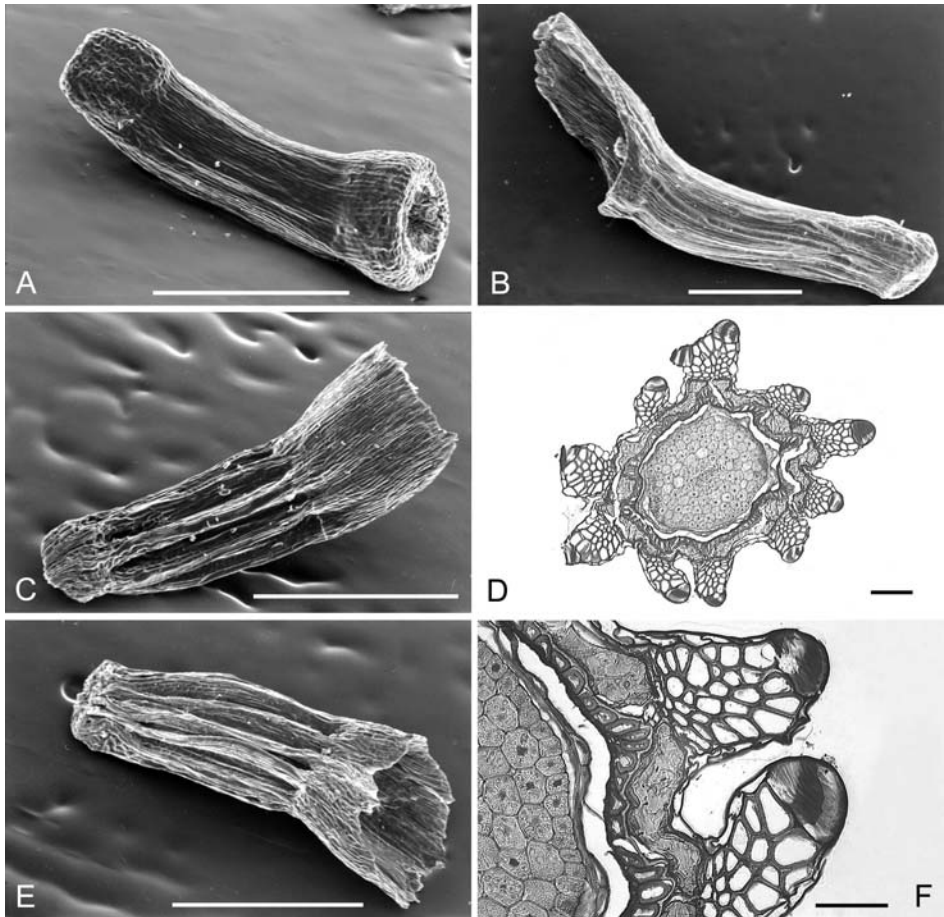


Fig. 2. Micrographs (SEM and LM) from *Plagius* achenes – A: *P. maghrebinus* (Vogt 13696 & Oberprieler 8001); B: *P. grandis* (4.6.1911, Faure); C-F: *P. flosculosus* (24.7.1906, Gysperger), view and transverse sections. – Scale bars: A-C, E = 1 mm, D = 0.1 mm, F = 0.05 mm.

inapplicability of character states (ray florets), the manifestation of reversals (shape of involuclral bracts), the occurrence of parallelism [disc corolla lobes with dorsal appendages are known from a number of unrelated *Anthemideae* genera, e.g., *Anacyclus* (Humphries 1979) and *Anthemis* (Oberprieler 1998)] and the poor and inconstant expression of some characters (shape of achenes, formation of a basal callus), these reconstructions have to be considered very vague and preliminary. Unfortunately, also the reconstructions based on nrDNA ITS sequence information are comparably weak and do not further elucidate the relationships among the entities of this closely-knit group of related species. Finally, only the lack of ray florets may serve as an apomorphic character state to morphologically support the relationship of the three species of *Plagius* seen in the molecular phylogeny. More detailed morphological/anatomical analyses and molecular studies based on alternative molecular markers are necessary to reach a stable and justified phylogenetic classification within the *Leucanthemum* group of genera.

Taxonomy of *Plagius*

Plagius L'Hér. ex DC., Prodr. 6: 135. 1838

≡ *Chrysanthemum* § *Plagius* (L'Hér. ex DC.) Batt. in Battandier & Trabut, Fl. Algérie: 464. 1889.

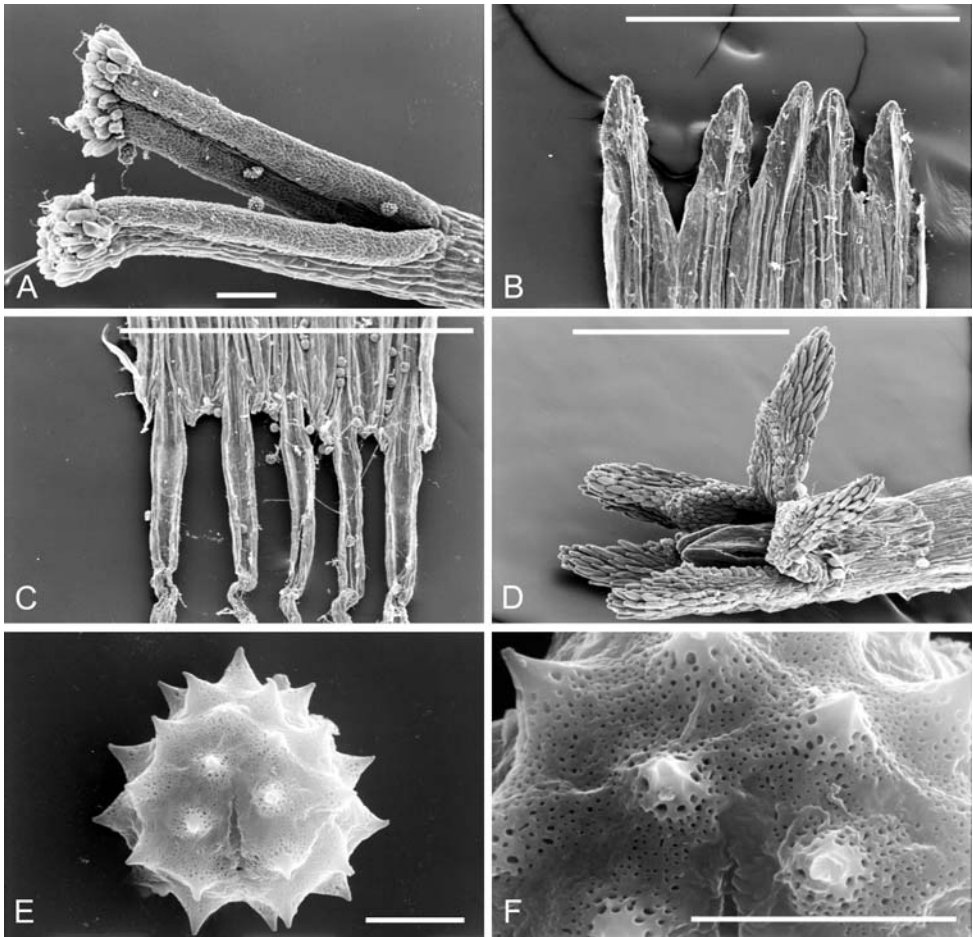


Fig. 3. Micrographs from *Plagius* florets (*P. grandis*, A & D: 10.5.1936, Maire; B-C: 4.6.1911, Faure; E-F: Vogt 13690 & Oberprieler 7995). – A: tip of style with the diverging branches; B: apical appendages of the stamens; C: basal part of the anthers and apical part of filaments; D: floret; E: pollen grain; F: detail of pollen grain. – Scale bars: A = 0.1 mm, B-D = 1 mm, E-F = 10 μ m.

Type (designated by Alavi & Heywood 1976: 273): *Plagius ageratifolius* (Desf.) L'Hér. ex DC., nom. illeg., based on *Balsamita ageratifolia* Desf., nom. illeg. [*Plagius flosculosus* (L.) Alavi & Heywood]

Note. – Alavi & Heywood (1976: 273) typified *Plagius* by *P. ageratifolius* (Desf.) DC. because Candolle (1838: 135) did not indicate a type when he established the genus for the species of *Balsamita* Desf. (1792), non Mill. (1754). Since Candolle included *Chrysanthemum flosculosum* L. (1753) as a synonym of *P. ageratifolius* the latter name is illegitimate and the correct name of the taxon is *P. flosculosus* (L.) Alavi & Heywood.

Herbaceous or suffruticose perennials. *Stems* solitary or branched, densely leafy, glabrous or hairy with basifixed, sometimes glandular hairs. *Leaves* alternate, obovate to spatulate or oblong, serrate-dentate, glabrous or hairy with basifixed, sometimes glandular hairs. *Capitula* solitary or laxly corymbose, discoid, homogamous. *Involucre* meniscoid to hemispherical. *Phyllaries* imbricate in 3-4 layers, ovate to oblong or obovate with pale to light brown or brown, scarious margins.

Receptacle flat to convex, glabrous, epaleate. *Florets* homomorphic, hermaphrodite, fertile. *Corolla* 5-lobed, actinomorphic, yellow, lobes with appendages. *Stamens* glabrous, anthers obtuse at the base, filament collar not enlarged, apical anther appendages triangular to ovate and blunt. *Pollen* tricolporate, spiny. *Style* terete, style branches truncate-penicillate at the tips. *Achenes* cylindrical to narrowly obovoidal, slightly curved to arcuate, c. 10-ribbed, adaxially at the base with a more or less prominent, whitish callus. *Pericarp* with myxogenic cells along the ribs and with resin canals as well as vascular strands between the ribs. *Pappus* an adaxially longer corona or absent.

Cytology. – Basic chromosome number $x = 9$; ploidy levels $2x$, $4x$.

Distribution. – In S Europe in Corsica and Sardinia (*Plagiush flosculosus*) and in N Africa in Morocco, Algeria, and Tunisia (*P. grandis*, *P. maghrebinus*) (Fig. 5, 8, 10).

Key to the species

1. Capitula 3-4.5 cm in diameter *P. grandis*
- Capitula less than 2.5 cm in diameter 2
2. Achenes without pappus *P. maghrebinus*
- Achenes with an adaxially longer pappus *P. flosculosus*

Plagiush flosculosus (L.) Alavi & Heywood in Bot. J. Linn. Soc. 71: 273. 1976 \equiv *Chrysanthemum flosculosum* L., Sp. Pl.: 890. 1753 \equiv *Leucanthemum flosculosum* (L.) P. Giraud in Ann. Univ. Grenoble, Sect. Sci.-Méd. 11: 201. 1936 \equiv *Leucanthemum montanum* var. *flosculosum* (L.) Mutel, Fl. Fr. 2: 155. 1835 \equiv *Balsamita ageratifolia* Desf. in Actes Soc. Hist. Nat. Paris 1: 2. 1792, nom. illeg. \equiv *Plagiush ageratifolius* (Desf.) DC., Prodr. 6: 135. 1838, nom. illeg. \equiv *Matricaria rigida* Desr. in Lamarck, Encycl. Méth. Bot. 3: 737. 1792, nom. illeg. – Ind. loc.: “Habitat in Africa”. – Lectotype (designated by Turland 1995: 157): “Bellis spinosa foliis agerati C.B.P. 262 sive Santolina, Chrysanthemum flosculosum”, Herb. Clifford: 417, *Chrysanthemum* 6 (BM, photo!).

= *Balsamita corymbosa* Salzm. in Flora 1821: 112. 1821. – Ind. loc.: “Corsica, 1820”. – Lectotype (designated here): “Corse, Salzmann” (MPU, photo!).

=? *Chrysocoma denticulata* Jacq., Pl. Hort. Schoenbr. 3: 62. 1798 [t. 368].

Illustrations. – Fig. 2 C-F, 4 A-E. – Conrad, Flora Corsicana Iconographia., Fasc. 9: Pl. 72. 1986; Coste, Fl. Fr. 2: 335. 1903; Fiori, Iconogr. Fl. Ital., ed. 3: 433, fig. 3463. 1933; Gamisans & Jeanmonod, Compléments au Prodrome de la Flore Corse. *Asteraceae* 1: 281, fig. 83D [fruit] 1998; Valsecchi, Boll Soc. Sarda Sci. Nat. 17: 325. 1978.

Exsiccata. – L. Kralik, Pl. Corses, no. 659 (sub *Balsamita ageratifolia* Desf.). – P. Mabile, Herbarium Corsicum, no. 146 (sub *Plagiush ageratifolius* Desf.). – A. Fiori & A. Béguinot, Flora Italica Exsiccata, ser. 3, no. 2769 (sub *Chrysanthemum flosculosum* L.). – Société Française, 1929, Exsicc. Ch. Duffour, no. 6045 (sub *P. ageratifolius* L’Hérit.). – Société Française, 1917, Exs. Ch. Duffour, no. 2426 (sub *P. ageratifolius* L’Hérit.).

Perennials with annual shoots arising from a woody stock formed by the bases of primary and subsequent annual shoots. *Stems* herbaceous, basally lignified, erect or ascending-erect, 30-100(-130) cm long, branched in the distal part and with 3-15(-20) capitula, densely leafy but often naked in the proximal part due to the withering and complete vanishing of leaves, sulcate, green or basally and on the ribs sometimes tinged with red, glabrous or in younger parts rarely sparsely hairy with basifixed hairs. *Leaves* alternate, green, serrate-dentate, glabrous, slightly succulent; basal and lower cauline leaves petiolate, lamina obovate, spatulate or elliptical in outline, petiole slightly winged, entire or dentate, basally slightly broadened and entire or dentate; middle cauline leaves slightly petiolate or sessile, obovate to elliptical or oblong in outline, basally slightly

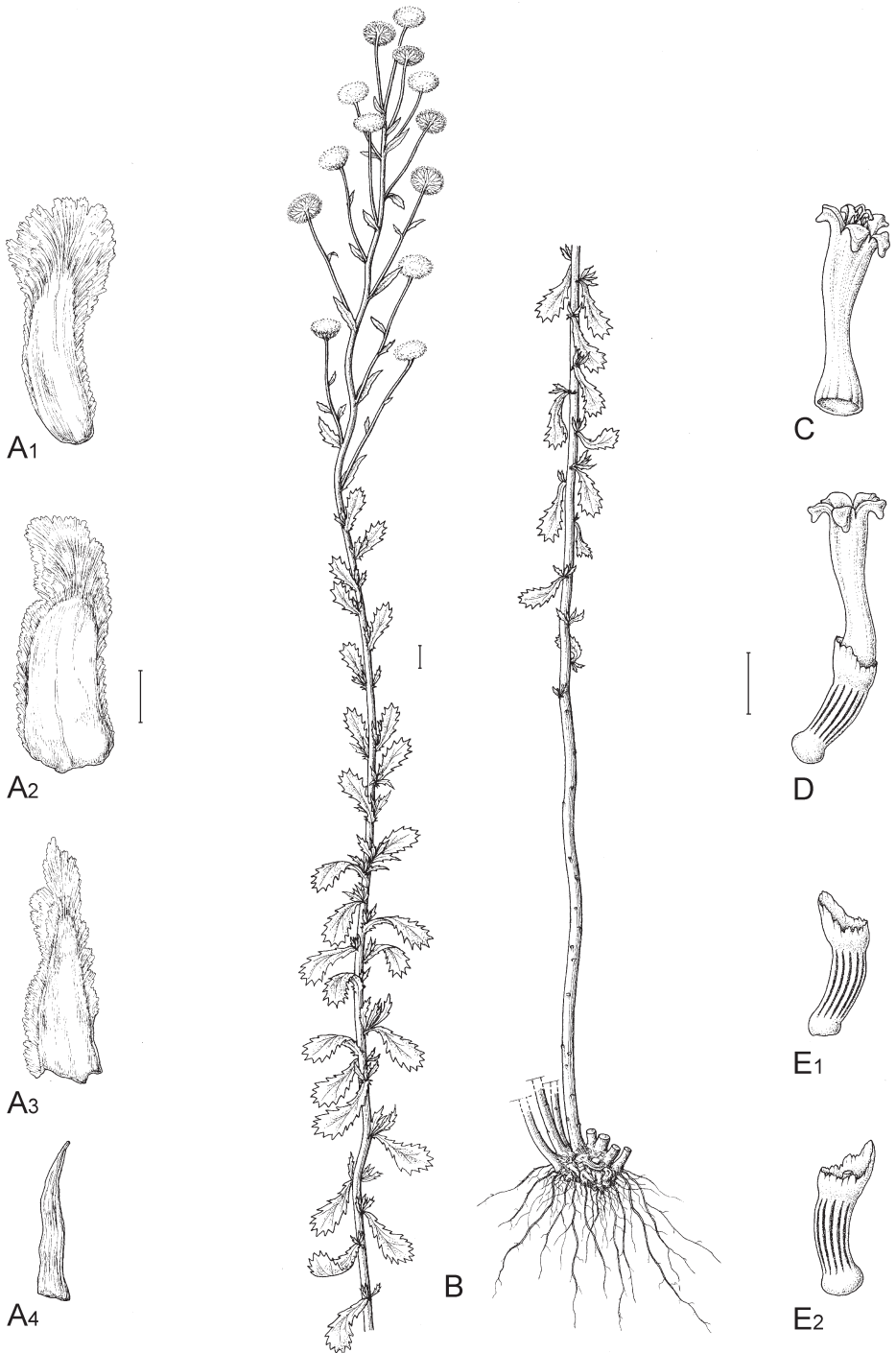


Fig. 4. *Plagius flosculosus* – A1-4: involucre bracts, from innermost to outermost; B: habit; C: corolla of tubular floret; D: tubular floret; E1-2: achenes. – Scale bars: A, C-E = 1 mm, B = 1 cm.

auriculate and dentate; upper cauline leaves sessile, oblong to elliptical, basally slightly auriculate, dentate or entire. *Capitula* terminal, pedunculate, solitary, (1)1.5-2 cm in diameter (measured from pressed specimens), homogamous and discoid. *Involucre* hemispherical. Involucral bracts imbricate, in 4 layers, glabrous, pale green, in the upper half with whitish to pale brown, scarious margins; outermost bracts narrowly triangular; middle ones oblong to obovate, 4-5.5 mm long and 1.5-2 mm wide, apically rounded with broad scarious margins; innermost ones obovate with scarious margins. *Receptacle* convex, epaleate. *Florets* hermaphrodite, fertile; corolla 2.5-3.5 mm long, apically 5-lobed, yellow. *Achenes* narrowly obovoidal to cylindrical, straight or slightly curved, 1.2-1.8 mm long, c. 10-ribbed, adaxially basally with a whitish callus; pericarp with myxogenic cells along the ribs and with resin canals between the ribs. *Pappus* an adaxially longer corona or an adaxial auricle, 0.5-0.8 mm long.

Cytology. – This species has formerly been investigated cytologically by Martinoli (1942 sub *Chrysanthemum flosculosum*), Chiappini (1967b sub *C. flosculosum*), and Villa (1978) in Sardinia and Contandriopoulos (1957, 1962 sub *Leucanthemum flosculosum*) in Corsica who all found the diploid chromosome number of $2n = 18$. We were able to confirm the diploid number in plants from a locality near Bacino Cuga in the vicinity of Sassari in Sardinia (*L. Zedda s.n.*): $2n = 18$.

Flowering period. – May-September (-October)

Distribution and habitat. – Endemic to Corsica and Sardinia (Fig. 5). In Corsica *Plagius flosculosus* is not very frequent and according to the studied material and the data given by Jeanmonod (1998) the collecting localities are mainly concentrated in three well defined areas, the valley of the river Rizzanese in the SW of the island, the vicinity of the Étang de Diane in the eastern plain, and the surroundings of Bastia in the NE. In Sardinia the species seems to be somewhat more common and according to the studied specimens and Chiappini (1964 & 1967a&b) and Valsecchi (1978) three principal areas of distribution are recognisable: the area between Porto Torres and Alghero W of Sassari in the NW of the island, the Gennargentu mountains in central Sardinia, and the area around Cagliari in the south.

Plagius flosculosus prefers moist places and is reported to grow along rivers and brooks, on edges of ditches, moist meadows, and coastal marshes from the littoral to the Mesomediterranean stage. It occurs in Corsica up to an altitude of 600 m and in Sardinia up to c. 900 m (Martinoli 1956). The species is edaphically indifferent and occurs on soils over calcareous or schistose substrate. According to Jeanmonod (1998) *P. flosculosus* is a hygrophilous, somewhat ruderal or nitrophilous species.

Specimens seen. – FRANCE: HAUTE-CORSE: Erba Longa, [42°46'N, 09°28'E], 17.7.1866, *P. Mabile* (BM; JE; K; P; W; WU); Cap Corse, village d'Herbalonga, [42°46'N, 09°28'E], 1823, *P. Thomas* (G-DC, microfiche); bords des ruisseaux près Erbalunga, [42°46'N, 09°28'E], 6.1958 (M); Bastia, [42°42'N, 09°25'E], 1824, *Soleirol* (G-DC, microfiche); *ibid.*, 1826, *Soleirol* 2482 (MPU, photo); *ibid.*, *Soleirol* 2480 (P); Bastia, vallée du Bevinco, au bord du torrent, [42°37'N, 9°26'E], 1.7.1867, *O. Debeaux* (P); lagune b. Biguglia, [42°36'N, 09°29'E], 16.7.1938, *Rauh* (B); inter Bastia et Pont de Golo, [42°31'N, 09°32'E], 4.1824, *P. Thomas* (K); Aleria, lieux incultes, [42°06'N, 09°31'E], 24.7.1906, *H. Gysperger* (B; JE; P; W); *ibid.*, 7.7.1905, *H. Gysperger* (B; JE; S); *ibid.*, 6.7.1905, *H. Gysperger* (M). — CORSE-DU-SUD: Talone, [42°14'N, 09°25'E], 3.1822, *Pouzols* (K); *ibid.*, 1822, *Req[uien]* (G-DC, microfiche); Pinetum Pinastris entre San Gavino di Carbini et Lévie, on bordure de la route, 690 m, [41°43'N, 09°09'E], 31.7.1929, *R. de Litardière* (BM; P); Cargiaca, [41°43'N, 09°03'E], 4.8.1905, *R. Rotgès* (P); Levie, bord de route à la sortie du village vers Zonza, [41°42'N, 09°07'E], 19.7.1991, *J. Lambinon* (MSB); *ibid.*, 20.7.1849, *L. Kralik* (P; W); *ibid.*, 1919, *P. Cousturier* (M); Sartène, route à Santa Lucia de Tallano, [41°41'N, 9°03'E], 6.1912, *P. Cousturier* (BM); *ibid.*, 6.1917, *P. Cousturier* (P); 2-3 km NE of Propriano, sea level, [41°40'N, 08°54'E], 4.7.1920, *B. Verdcourt* 4285 (K); Propriano a Sartène, lungo il fiume Rizzanese, [41°38'N, 08°55'E], 27.5.1901, *C. Bicknell* (FI); Östl. Portigliolo (südwestl. Propriano), landeinwärts vom Strandwall, [41°38'N, 08°52'E], 19.7.1979,

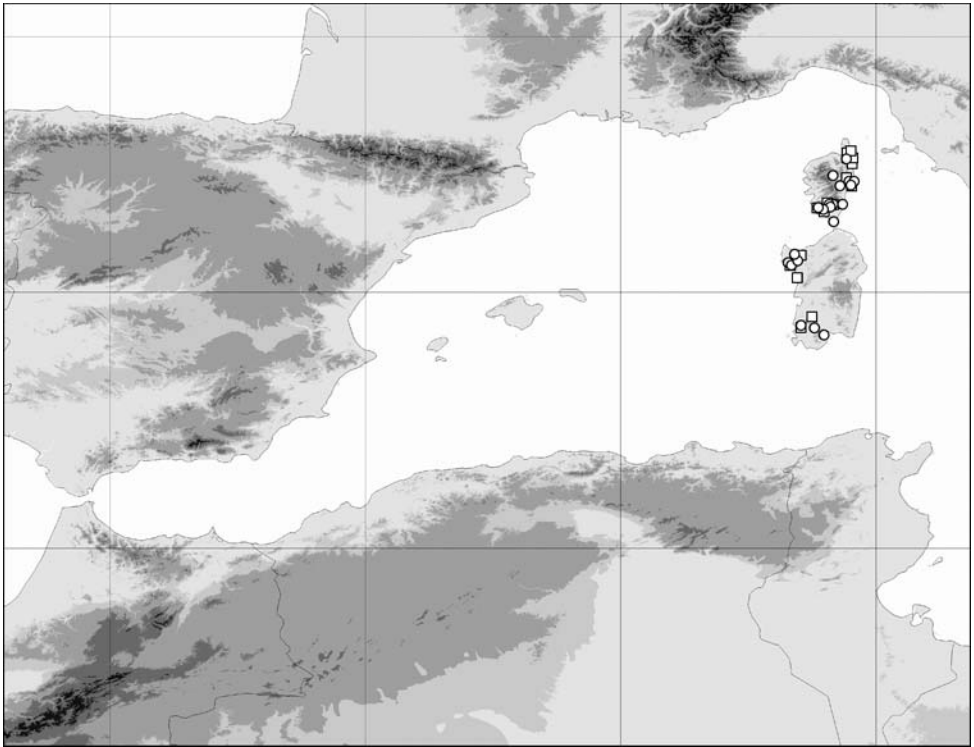


Fig. 5. Distribution of *Plagiopus flosculosus* according to revised material (□) and records cited in Jeanmonod (1998) and Valsecchi (1978) (○).

K. Lewejohann (GOET); Sartène, [41°37'N, 8°59'E], 7.7.1912, *R. J. Burdon* (BM); Cagna, Herb. Jordan (FI). — NOT LOCATED: Monts Corse, *Salzmann* (MPU, photo); Corse, 1827, *Soleirol* (K); France, *Leo of Metz* (E); Insula Corsica, 1831, *Mougeot* (E); E mont. Corsica, 1821, *Salzmann* (G-DC, microfiche); in montosis Corsica, *Salzmann*, Herb. Schultz-Bip. (P); Corse, Lagna, Herbar Jordan (M); Corsica, Herb. Zuccarinii (M); Korsika, Tavari..., 29.11.1883, *E. Petit* (S); Corse, 6.1850, d. *Requien* (P); Corse, Herb. Schultz-Bip. (P).

ITALY: CAGLIARI: Environs de Cagliari, Pulla, [39°30'N, 08°45'E], Juin, *Barla* (W); in collibus aridis prope Iglesias Sardiniae, [39°18'N, 08°32'E], Junio, *Müller* (BM; E; GOET; M; W). — SASSARI: Surroundings of Sassari, Ittiri, near Bacino Cuga, [40°43'N, 08°33'E], 19.8.1996, *L. Zedda* (B; Herb. Vogt); Eng- og Moseterran NV for Alghero, [40°33'N, 8°19'E], 12.6.1972, *N. Kaae* (C); Alghero, langs hovedvej NV, [40°33'N, 8°19'E], 12.6.1972, *N. Kaae* (C); Sassari, in arenosis secundum Rio Mannu prope locum Prado dictum, 20 m, solo vario, [40°17'N, 08°28'E], 11.10.1922, *A. Béguinot* (B; BM; P). — NOT LOCATED: Sardinien, *Reverchon* (B); Sardinia, in palustrib. marit., 1826, *Balbis* (G-DC, microfiche).

WITHOUT INDICATION: Herb. Schreber (M). Herb. Linnaeus (LINN, IDC microfiche #1012.26). Herb. Lamarck (P-LA, IDC microfiche #349-5). Herb. Clifford: 417, *Chrysanthemum* 6 (BM, photo).

CULTIVATED: Hort. Bot. Berlin., 1809, Herb. Treviranus (B); Hort. Berol., 1818-24, *Kuehne* (JE); Hort. Ber., Aug. Sept. 1870 (JE); Hort. Berolin. (B); Hort. Bot. Monc., 10.1845, Herbar Kummer (M); Ex horto propio (B-W 15290); Pisae et Florentia in hortis Magni Ducis, Herb. Burser (UPS-Burser, IDC microfiche #14(2)-81); ex h.b. Hafn. (C); 1812 (C); Giardino Botanico di Pisa in Toscana, 23.10.1813 (S); E horto Berol., 1829 (S); Culta, 8.1829 (S); Hort. Paris, 17.8.1847, *Spach* (P); Hort. Aven., 1851, d. *Requien* (P).

Plagiush maghrebinus Vogt & Greuter in Willdenowia 33: 42. 2003. – Holotype: “*Plagiush virgatus* D.C.”, [Algeria], “Le Gouraya de Bougie”, 600 m, 7.1896, Reverchon, Pl. Algérie 1896, no. 59 (B!; isotypes: B!, G!, JE!, M!, MPU!, P!, WU!). – Note: Elisée Reverchon distributed under no. 59 of his ‘Plantes d’Algérie’ plants collected in the years 1896, 1897 and 1898 at three different localities in the Petite Kabylie mountains, e.g. “Le Gouraya de Bougie”, “Kerrata”, and “Montagnes de Magris”. The type material of *P. maghrebinus* originates from the locality “Le Gouraya de Bougie” where Reverchon collected in July 1896.

- *Plagiush virgatus* auct. [non (Desr.) L’Hér. ex DC. 1838]: Battandier & Trabut, Fl. Algérie Tunisie: 184. 1904; Bonnet & Barratte, Expl. Sci. Tunisie, Cat. Pl.: 223. 1896; Debeaux, Fl. Kabylie: 192. 1894; Munby, Cat. Pl. Algeria: 17. 1859.
- *Leucanthemum fontanesii* auct. [non Boiss. & Reuter 1856]: Boissier, Diagn. Pl. Orient., ser. 2, 3: 26. 1856; Battandier & Trabut, Fl. Algérie 1: 460. 1889; Battandier, Fl. Algérie, Suppl. Phan: 54. 1910.
- *Plagiush fontanesii* auct. [non (Boiss. & Reuter) Vogt 1996]: Valdés & al., Cat. Pl. Vasc. N Maroc 2: 661. 2002; Vogt, Lagasalia 18: 303. 1996.
- *Chrysanthemum fontanesii* auct. [non (Boiss. & Reuter) Quézel & Santa 1963]: Quézel & Santa, Nouv. Fl. Algérie 2: 983. 1963; Pottier-Alapetite, Fl. Tunisie 2: 1001. 1981.
- *Leucanthemum discoideum* auct. [non (All.) Lacaite 1879]: Bremer & Humphries in Bull. Nat. Hist. Mus. London (Bot.) 23: 141. 1993; Fennane & Ibn Tattou, Bocconea 8: 42. 1998.
- *Leucanthemum brachyglossum* Gay in sched., nom. nudum
- *Plagiush amplexifolius* Schultz-Bip. in sched., nom. nudum
- *Plagiush elatus* Bové, Herbarium Mauritanie, 1837 [Exsicc.], nom. nudum
- *Leucanthemum vulgare* var. *discoideum* Gay in Jamin, Plantes d’Algérie, 1851, no. 170 [Exsicc.], nom. nudum

Illustrations. – Fig. 2A, 6A-E. – Quézel & Santa, Nouv. Fl. Algérie 2: 985, Pl. 98, fig. 2866 [leaf] 1963; Pottier-Alapetite, Fl. Tunisie 2: 1005, fig. 1454. 1981.

Exsiccata. – Elisée Reverchon – Plantes d’Algérie, Kabylie 1896, no. 59 (sub *Plagiush virgatus* DC.). – Elisée Reverchon – Plantes d’Algérie, Kabylie 1897, no. 59 (sub *Plagiush virgatus* DC.). – Elisée Reverchon – Plantes d’Algérie, 1898, Kabylie, no. 59 (sub *Plagiush virgatus* DC.). – Fragmenta Florae algeriensis exsiccata, no. 533 (sub *Plagiush virgatus*). – Reliquiae Maillianaee, no. 1302 (sub *Plagiush virgatus* DC.). – Société dauphinoise, no. 1255 (sub *Plagiush virgatus* DC.). – P. Jamin, Pl. d’Algérie, 1851, no. 170 (sub *Leucanthemum vulgare* var. *discoideum* Gay). – Dr. C. Baenitz, Herbarium Europaeum, no. ... (sub *Plagiush virgatus* DC.). – Société Française pour l’Échange des plantes Vasculaires, Exsicc. B. de Retz, no. 3095 (sub *Leucanthemum fontanesii* Boiss. & Reut.). – Battandier et Trabut, Pl. d’Algérie, no. 256 (sub *Plagiush virgatus* DC.). – C. Salle – Plantae Mospeliaco-Algerienses, no. 50 (sub *Plagiush virgatus* D.C.).

Perennials with annual shoots arising from a woody stock formed by the bases of primary and subsequent annual shoots. *Stems* herbaceous, basally lignified, erect or ascending-erect, 40-80(-100) cm long, branched in the distal half and with 1-7(-15) capitula, densely leafy, sulcate, green or basally and on the ribs sometimes tinged with red, glabrous or sparsely to densely hairy with basifixed glandular hairs. *Leaves* alternate, green, serrate, glabrous or hairy with basifixed glandular hairs; basal and lower cauline leaves petiolate, lamina obovate, spatulate or elliptical in outline, petiole slightly winged, entire or dentate, basally slightly broadened and entire or dentate; middle cauline leaves slightly petiolate or sessile, narrowly obovate to elliptical or oblong in outline, basally auriculate and dentate; upper cauline leaves sessile, oblong to elliptical, basally slightly auriculate, entire or dentate. *Capitula* terminal, pedunculate, solitary, 1.5-2.2 cm in diameter (measured from pressed specimens), homogamous and discoid. *Involucre* hemispherical. Involucral bracts imbricate, in 3-4 layers, glabrous or sparsely hairy, pale green with distal part sometimes slightly tinged with red, in the upper half with whitish to pale brown, scarious margins; outermost bracts narrowly triangular; middle ones oblong to obovate, 6.5-8 mm long

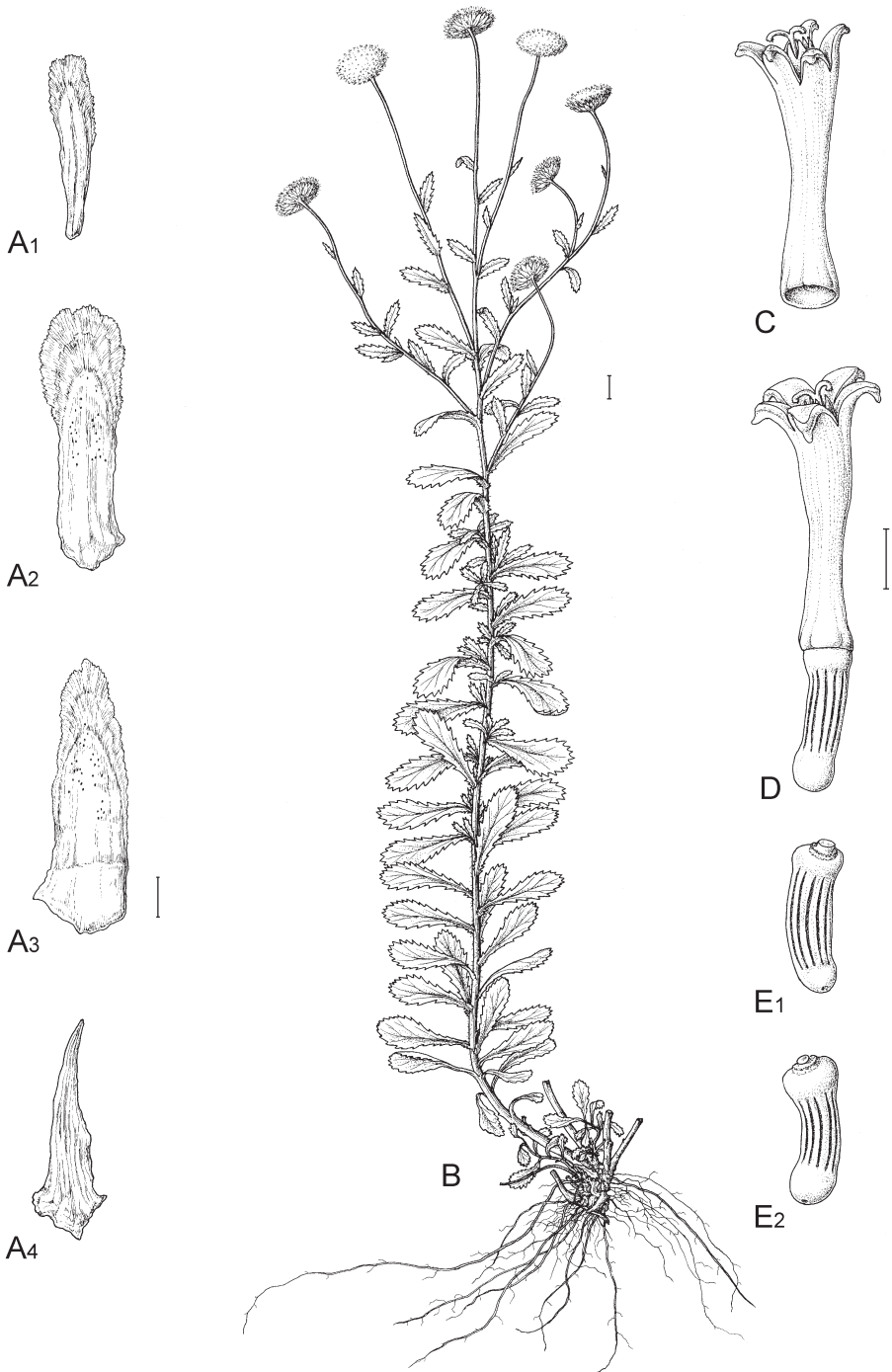


Fig. 6. *Plagius maghrebinus* – A1-4: involucral bracts, from innermost to outermost; B: habit; C: corolla of tubular floret; D: tubular floret; E1-2: achenes. – Scale bars: A, C-E = 1 mm, B = 1 cm.

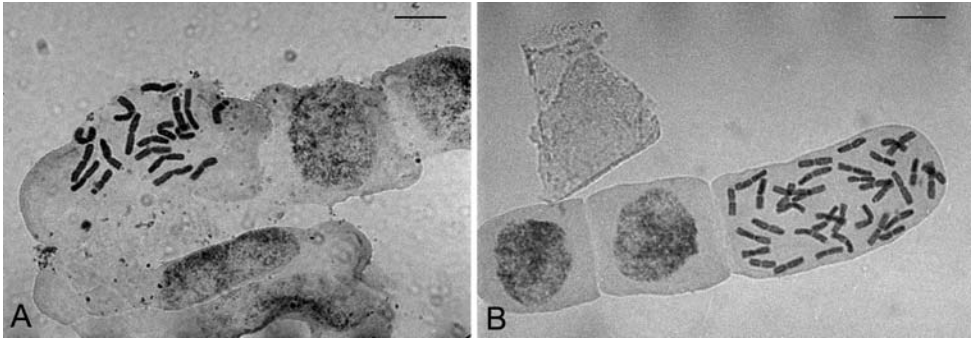


Fig. 7. Metaphase plates in *Plagius* – A: *P. maghrebinus*, $2n = 18$ (Vogt 13696 & Oberprieler 8001); B: *P. grandis*, $2n = 36$ (Vogt 13636 & Oberprieler 7941). – Scale bars = 10 μm .

and 1.7-2.5 mm wide, apically rounded with broad scarios margins; innermost ones obovate with scarios margins. *Receptacle* convex, epaleate. *Florets* hermaphrodite, fertile; corolla 3.5-4.5 mm long, apically 5-lobed, yellow, marginal florets rarely with short yellow ligules. *Achenes* narrowly obovoidal to cylindrical, straight or slightly curved, 1.5-2 mm long, c. 10-ribbed, adaxially at the base with a more or less prominent whitish callus; pericarp generally with myxogenic cells along the ribs and always with resin canals between the ribs. *Pappus* absent.

Cytology. – $2n = 18$ chromosomes (Fig. 7A); Vogt 13696 & Oberprieler 8001. *Plagius maghrebinus* has previously not been investigated cytologically.

Flowering period. – (April-) May-July

Remarks. – In some individuals minute ray florets, usually hidden behind the inner involucre bracts, have been observed [e.g. Forêt de Bainem, 6.1916, Battandier (MPU), Bone en Barbarie, Steinheil, 5.1833, Herb. Gay (K), Vogt 13696 (Herb. Vogt)]. These small ligulate florets are sterile, the ligules 5-8 mm long and yellow. Gay (in sched., 1850), Battandier (1910, 1919), and Emberger & Maire (1929) also reported on this phenomenon.

Distribution and habitat. – *Plagius maghrebinus* is confined to the Maghreb countries (Morocco, Algeria, Tunisia) and shows a scattered distributed from the Rif mountains in NW Morocco to the mountainous region of Kroumirie in NW Tunisia (Fig. 8). In Morocco it is recorded from few localities in the *Quercus suber* woodlands of the mountains Tizirène, Tmorrot, and Khzana. In Algeria it is more frequent and is distributed from the areas of Miliana, Blida and Alger in the west via the Grande and Petite Kabylie and the Annaba area to the Tunisian frontier. In Tunisia it is restricted to the Kroumirie area in the Gouvernorat Jendouba.

Plagius maghrebinus generally prefers moist localities and grows around sources and in somewhat marshy places on road embankments, along field margins, and on stony slopes up to 1600 m above sea level.

Specimens seen. – ALGERIA: AIN DEFLA: Zaccar de Miliana, [36°18'N, 02°17'E], Herb. Pomel (MPU-Afrique du Nord). – Alger Alger, forêt de Bainem, [36°48'N, 02°59'E], 6.1916, Battandier (MPU-Afrique du Nord); Bainem, 30.5.1935, R. Gombault (P); Alger in sepibus passim, 5.6.1848, C. Salle (B; C; JE; P); *ibid.*, 1844 (K); *ibid.*, 5.-7.1854, G.-L. Durando (G); Env. d'Alger, G.-L. Durando (S); Alger, 19.6.1937, G. L'Hermite (P); *ibid.*, 22.5.1887, G. de Martelly (G); *ibid.*, Munby (G; JE); *ibid.*, Herb. Fauché in Herb. Boissier (G); *ibid.*, Monard (G); *ibid.*, 5. 1886, Battandier & Trabut (G; GOET; P); *ibid.*, 6.1884, Herb. F. Paeske (GOET); montagnes voisines, Alger, 15.7.1851, Herb. Boissier (G); environs d'Alger, 1851-52, H. Bordère (P); ravins ombragés à Alger, 5.1840, M. Durieu (P); Alger, Broussailles, frais vallon, 21.6.1862, G.-L. Durando (MPU-Afrique du Nord; P); Forêt de Bainem, Guyotville, [36°48'N, 02°55'E], 16.2.1954, Herb.

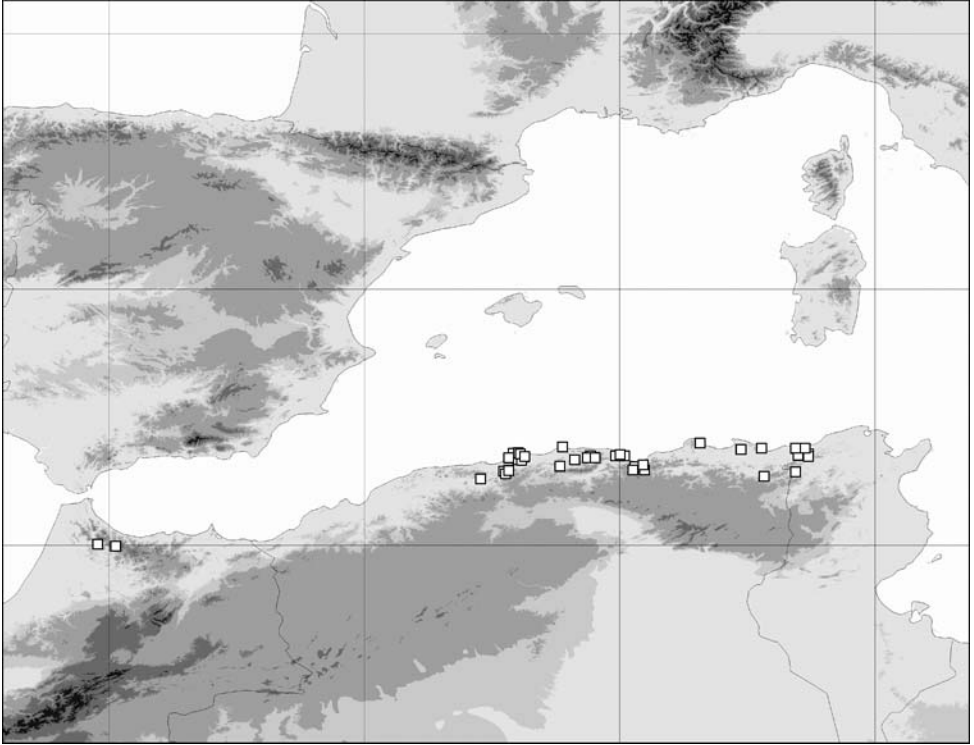


Fig. 8. Distribution of *Plagius maghrebinus* (□) according to revised material.

Cl. Weber (G); rochers humides et ombragés près Birmandreis, [36°47'N, 03°03'E], Juin, *J. Gay* (W); Ravin de Birmandreis, env. d'Alger, [36°47'N, 03°03'E], 17.6.1851, *P. Jamin* (G; MPU-Afrique Nord; P; W); Birmandreis, bois de la Colon, Voirot, [36°47'N, 03°03'E], 5.6.1894, *L. Chevallier* (P); champs, el Hamma près Alger, [36°47'N, 03°03'E], 6.6.1859, *C. Romain* (B; C; G; JE; K; MPU-Afrique du Nord; P; S; W); *ibid.*, 24.4.1853, *G.-L. Durando* (G; P); collines herbeuses au Boujaréah près d'Alger, [36°47'N, 03°01'E], 28.6.1863, *G.-L. Durando* (G; K; MPU-Afrique du Nord; P; S; W); Mustapha supérieure, environs d'Alger, [36°45'N, 03°01'E], 24.5.1854, *Gallerand* (P); Mustapha à El-Biar, [36°44'N, 03°02'E], 6.1916, *Battandier* (MPU-Afrique du Nord); coteaux à Mustapha près Alger, 8.6.1841 (P); El Biar, Bir Mandreis, [36°44'N, 03°02'E], 18.6.1882, *A. Roux* (MPU-Afrique du Nord); in collibus herb. et ad vias prope El Biar, [36°44'N, 03°02'E], 6.1894, *L. Chevallier* (C; S); Alger, commun dans les champs près de Kouba, [36°43'N, 03°05'E], 5.1837, *N. Bové* (G; K; P); Maison carrée près Alger, [36°43'N, 03°08'E], 10.7.1854, *E. Cosson* (P); in dumetis secus rivulos prope Zeralda, [36°42'N, 02°50'E], 2.6.1934, *R. Maire* (G); in dumetis secus rivulos prope Zeralda, solo arenoso, 50 m, [36°42'N, 02°50'E], 2.6.1935, *R. Maire* (MPU-Afrique du Nord); talus de la route entre Crescia et Saoula, [36°41'N, 03°00'E], 9.6.1953, *A. Dubuis & L. Faurel* (G; MPU-Dubuis; MPU-Sauvage; P; W); Gué de Constantine, 28.4.1902 (P); fosses humides au Gué de Constantine, près d'Alger, [36°40'N, 03°05'E], 12.6.1932, *Dubuis* (MPU-Dubuis). — ANNABA: Bone en Barbarie, derrière le blockhaus de la fontaine, Steinheil, [36°54'N, 07°46'E], 5.1833, *Herb. Gay* (K); *ibid.*, (G); Edough, prov. de Constantine, [36°53'N, 07°37'E], 18.., *Dukerley* (MPU-Afrique du Nord; P); bords ombragés du ruisseaux près du Camp du fauch... à La Calle, [36°53'N, 8°26'E], 24.6.1841, *M. Durieu* (P); La Calle, ravin, 1.6.1914, *Herb. A. d'Alleizette* (P); Oued Hiroug, front. de Tunisie, ouest de Ghardimaou, [36°27'N, 8°20'E], 6.1881, *A. Roux* (MPU-Afrique du Nord; P); in quercetis prope Laverdure, solo arenaceo, 800 m, [36°21'N, 07°50'E], 17.6.1937, *R. Maire* (MPU-Afrique du Nord). — BEJAIA: 5km W of El Kseur near

Bejaïa, 450-500 m, foot of marshy bank, [36°45'N, 05°05'E], 29.5.1971, *P. Davis* 52998 (BM, photo); in dumosis prope Bougie, [36°45'N, 05°00'E], 30.5.1889, *A. Letourneux* (C); Bougie - grand phare, ad viam, [36°45'N, 05°00'E], 30.5.1889, *A. Letourneux* (P); Kabylie, Le Gouraya de Bougie, lieux ombragés, sur le calcaire, 600 m, [36°45'N, 04°55'E], 7.1896, *E. Reverchon* (B; G; JE; M; MPU-Afrique du Nord; P; WU); Petite Kabylie, Kherrata-Schlucht 1 km S Bordj-Mira, 170 m, Kalk, 36°32'N, 05°17'E, 16.6.1984, *D. Podlech* 39385 (G; MSB); Djebel Tababor, prov. de Constantine, [36°32'N, 5°27'E], 25.6.1880, *E. Cosson* (P); versant du Tababor au dessus de Mechta Tezera, [36°32'N, 5°27'E], 27.6.1880 (P); Kabylie, Kerrata, lieux ombragés et frais, sur le calcaire schisteux, 800 m, [36°29'N, 05°16'E], 7.1897, *E. Reverchon* (WU; P); Djebel Babor, prov. de Constantine, [36°29'N, 5°28'E], 21.6.1880, *E. Cosson* (P). — BLIDA: Env. de Blidah, [36°28'N, 2°49'E], 13.7.1854, Herb. Cosson (P); P. de la Chiffa, [36°27'N, 02°44'E], 6.6.1820, *C. d'Alleizette* (MA); Gorges de la Chiffa, rochers de Cascades, [36°27'N, 02°44'E], 6.1852, *C. Naudin* (P); Gorges de la Chiffa, Sidi Madaji, [36°24'N, 02°46'E], 30.6.1930, *L. Faurel* (MPU-Dubuis); Gorges de la Chiffa, [36°24'N, 02°46'E], 27.4.1893, *T. Delacour* (P); *ibid.*, 28.6.1914, *G. Hibon* (P). — BOUMERDES: El Kettar, à 4 km de Dellys, bord de la mer, [36°55'N, 03°53'E], 20.6.1876, *A. Meyer* (G; P). — SÉTIF: Kabylie, montagnes de Magris, lieux boisés, sur le calcaire, 1000 m, 7.1898, *E. Reverchon* (B; G; P; W; WU). — SKIKDA: talus de la route au-dessus de Chéraïa, pres de Collo, Kabylie de Collo, [37°00'N, 06°34'E], 24.5.1944, *L. Faurel* (MPU-Dubuis). — TIZI OUZOU: Nördliche Djurdjura, 5 Km E Azazga, Quercus-Wälder an der Straße nach El Kseur, 620 m, Silikat, 36°45'N, 04°25'E, 13.6.1984, *D. Podlech* 39265 (G; MSB); prov. Alger, Kabylie, route d'Azazga à Iakouren, [36°44'N, 04°22'E], 18.7.1909, *Saint-Lager* (C; G; S; W); nördliche Djurdjura, 10 km E Yakouren, *Quercus afares*-Wälder und Felsen S der Straße nach El Kseur, 930 m, 36°43'N, 04°30'E, 4.6.1984, *D. Podlech* 39284 (G; MSB); Massif du Djurdjura, 18 km SE Tizi Ouzou an der Straße nach Ain El Hammam, Hänge unterhalb Tamarzit, 450 m, 36°40'N, 04°08'E, 11.6.1984, *D. Podlech* 39082 (G; MSB); province d'Alger, versant septentrional du Djebel Lamgout, montagnes du Djurdjura, cercle de Dra-el-Mizan, [36°32'N, 03°50'E], 9.7.1854, *E. Cosson* (G; P; S). — NOT LOCATED: Djurdjura, dans la forêt des ... Guabaje, 1700 m, 15.7.1935, *L. Faurel* (MPU-Dubuis); Algeria, 6.1836, Herb. Belanger (G); Aït Davud et Aït ... ad rivulum, 23.6.1888, *A. Letourneux* (P). Boug ..., 21.5.1911, Herb. Meslin (P); Algerie, 6.1836, *A. V. Roussel* (P); Forêt des Beni-Hamed, Constantine, 6.1895, *A. Julien* (P).

MOROCCO: CHAOUËN: Rif SW, Massif du Khzana, versant SW suberaï de l'pist du Khelifa, au bord d'un ruisseau, 1250 m, [35°01'N, 5°13'W], 14.7.1958, *C. Sauvage & al.* (MPU-Sauvage; RAB); Beni Khaled, chênaies de *Q. suber* dégradées sur grès le long de la piste de Tmorrot à Ankoud, 1000 m, [34°59'N, 04°53'W], 18.6.1928, *L. Emberger* (RAB); in Atlante rifano, in quercetis suberis inter Montem Tiziren et Tmorrot, solo arenaceo, 1000-1200 m, [34°59'N, 04°51'W], 18.6/7.1928, *R. Maire* (MPU-Afrique du Nord; P; RAB).

TUNISIA: JENDOUBA: Kroumerie orientale, Bab-Abrik, [36°54'N, 8°38'E], 2.7.1888, *E. Cosson, G. Barratte & C. Duval* (P); Jendouba, Kroumirie, Col des Ruines NW Ain Draham, source and moist slopes in *Quercus* forest, 950 m, 20.5.1994, 36°47.454'N, 8°40.950'W, *R. Vogt* 13696 & *C. Oberprieler* 8001 (B; Herb. Oberprieler; Herb. Vogt); *ibid.*, cult. hort. bot. Berol., 26.9.1994, *R. Vogt & C. Oberprieler* (B); *ibid.*, cult. hort. bot. Berol., 15.6.1995, *R. Vogt* (B; M; MA; Herb. Oberprieler; Herb. Vogt); Ain Draham, [36°46'N, 08°41'E], 10.6.1905, *A. Cuenod* (G); Ain Draham, dans le camp, [36°46'N, 08°41'E], 10.6.1889, *J.-F. Robert* (P); Ain Draham, forêt de chênes, [36°46'N, 08°41'E], 6.1908, *A. Cuenod* (G); fontaine au nord d' Ain Draham, 8.7.1883, [36°46'N, 08°41'E], *E. Cosson, Doumet-Adanson, C. Letourneux, V. Reboud, G. Barratte & E. Bonnet* (P); vallée au dessous et à l'ouest de Ain Draham, [36°46'N, 08°41'E], 2.7.1883, *E. Cosson, Doumet-Adanson, C. Letourneux, V. Reboud, G. Barratte & E. Bonnet* (P); NW-Tunisia, Hammam Bourguiba, Kroumirie mountains, 800 m, undergrowth of dense deciduous (cork oak) forest, [36°45'N, 08°30'E], 21.7.1969, *M. J. Tomkinson* (BM); Fedj El-Saha ou Camp de la Santé, nord de Fernana, Kroumerie, [36°39'N, 8°41'E], 30.6.1883, *E. Cosson, Doumet-Adanson, C. Letourneux, V. Reboud, G. Barratte & E. Bonnet* (P).

N AFRICA: Numidia, Herb. Poirer (P).

CULTIVATED: Hortus Avenniensis, 1836, *Requien* (G).

Plagi *grandis* (L.) Alavi & Heywood in Bot. J. Linn. Soc. 71: 273. 1976 \equiv *Cotula grandis* L., Sp. Pl., ed. 2: 1257. 1763 \equiv *Matricaria grandis* (L.) Desr. in Lamarck, Encycl. 3: 738. 1792 \equiv *Leucanthemum grandis* (L.) P. Giraud in Ann. Univ. Grenoble 1934, Sect. Sc.-Méd. 11: 198. 1935 \equiv *Kremeria grandis* (L.) Maire in Jahandiez & Maire, Cat. Pl. Maroc. 3: 777. 1934 \equiv *Chrysanthemum flosculosum* var. *grandis* (L.) L., Mant. Pl.: 473. 1771 \equiv *Chrysanthemum discoideum* All., Fl. Ped. 1: 190. 1785, nom. illeg. \equiv *Leucanthemum discoideum* (All.) Lacaite in Nyman, Consp. Fl. Eur., Suppl. 2(2): 367. 1890 \equiv *Tanacetum discoideum* (All.) Rchb. f. in Reichenbach & Reichenbach fil., Icon. Fl. Germ. Helv. 16: 51. 1853 \equiv *Leucanthemum pallens* var. *discoideum* (All.) Nyman, Consp. Fl. Eur. 2: 370. 1879 \equiv *Tanacetum chrysanthemoides* Gaertn., Fruct. Sem. Pl. 2: 396. 1791, nom. illeg. – Ind. loc.: “Habitat in Barbaria”. – Lectotype (designated here): Algir., Herb. Linn. No. 1012.28 (LINN, IDC microfiche #1012-28!).

\equiv *Balsamita grandiflora* Desf. in Actes Soc. Hist. Nat. Paris 1: 1. 1792 \equiv *Plagi* *grandiflorus* (Desf.) L’Hér. ex DC., Prodr. 6: 135. 1838 \equiv *Chrysanthemum grandiflorum* (Desf.) Batt. in Battandier & Trabut, Fl. Algérie 1: 464. 1889 [non Willd.] \equiv *Tanacetum grandiflorum* (Desf.) Poir. in Lamarck & Poiret, Encycl. 7: 530. 1806. – Ind. loc.: “Cette belle plante croît et fleurit en mai, au milieu des moissons, dans les environs d’Alger. On la cultive au jardin des plantes de Paris.” – Lectotype (designated here): “*Balsamita grandiflora*”, Herbarium de la Flore Atlantique (P-Desf.!; isolectotype: P-Desf.!). – Note: The specimen bearing the plant with the peduncle bent to the right is designated as the lectotype.

Note. – *Cotula grandis* L. has been neotypified by Humphries (in Jarvis & Turland 1998: 359) in the belief that there is no original material available for that name. Obviously the specimen No. 1012.28 in the Linnaean herbarium has been overlooked in the procedure of the “Linnaean Plant Name Typification Project” probably because it is filed within *Chrysanthemum* rather than *Cotula*. Since there is original material available Humphries’ neotype choice is invalid and the specimen No. 1012.28 from the Linnaean herbarium (LINN) is here designated as the lectotype.

Illustrations. – Fig. 2B, 3A-F, 9A-E. – Desfontaines, Actes Soc. Hist. Nat. Paris 1: pl. 1. 1792; Quézel & Santa, Nouv. Fl. Algérie 2: 985, pl. 98, fig. 2867 [leaf, involucre bracts, floret] 1963.

Exsiccata. – Elisée Reverchon – Plantes d’Algérie, Kabylie 1897, no. 209 (sub *Plagi* *grandiflorus* L’Hér.). – P. Jamin, Pl. d’Algérie, 1850, no. 45 (sub *Plagi* *grandiflorus* L’Hér.). – P. Jamin, Pl. d’Algérie, 1851, no. 45bis (sub *Plagi* *grandiflorus* L’Hér.). – Battandier & Trabut, Pl. d’Algérie, no. 257 (sub *Plagi* *grandiflorus* L’Hér.). – Plantes de Tunisie, no. 855 (sub *Plagi* *grandiflorus* L’Hér.). – Société Cénomane d’Exsiccata, no. 1702 (sub *Chr. grandiflorum* (Desf.) Batt.). – C. Salle, Plantae Monspeliano-Algerienses, no. 51 (sub *Plagi* *grandiflorus* DC.). – Société dauphinoise, 1879, no. 2111 (sub *Plagi* *grandiflorus* L’Hér.). – Munby, Plantae Algerienses exsiccatae, Centuria tertia 1856, no. 16 (sub *Balsamita grandiflora* Desf.).

Herbaceous perennials. *Stems* herbaceous, erect, (20)-30-80(-110) cm long, solitary or rarely branched in the distal part and with 2-3 capitula, obtuse-angled, green, in the proximal part densely leafy and hairy by basifixed hairs, in the distal part sparsely leafy and usually glabrescent. *Leaves* alternate, green, slightly succulent, serrate, glabrous or hairy with basifixed hairs; basal and lower cauline leaves petiolate, lamina obovate or elliptical in outline, petiole slightly winged, entire, basally slightly broadened and entire or rarely dentate; middle cauline leaves slightly petiolate or sessile, narrowly obovate to elliptical or oblong in outline, basally broadened and long dentate; upper cauline leaves sessile, narrowly ovate to triangular, basally broadened and long dentate. *Capitula* terminal, solitary, 2.8-4.5 cm in diameter (measured from pressed specimens), homogamous and discoid. *Involucre* hemispherical. Involucral bracts imbricate, in 3-4 layers, glabrous, pale green, in the upper half with pale brown to brown, scarious margins; outermost bracts narrowly triangular; middle ones oblong to obovate, 7-10 mm long and 2-3.2 mm wide, apically rounded with broad scarious margins; innermost ones obovate with scarious margins. *Receptacle* flat to convex, epaleate. *Florets* hermaphrodite, fertile; corolla 4-5.5 mm



Fig. 9. *Plagius grandis* – A1-4: involucral bracts, from innermost to outermost; B: habit; C: capitulum; D: tubular floret; E1-2: achenes. – Scale bars: A, D-E = 1 mm, B = 1 cm, C = 0.5 cm.

long, apically 5-lobed, in marginal florets sometimes 4-lobed, yellow; lobes upright, with long, papillose dorsal appendages. *Achenes* cylindrical, slightly curved to arcuate, 2-3 mm long, c. 10-ribbed, adaxially at the base with a whitish callus; pericarp with myxogenic cells along the ribs and with resin canals between the ribs. *Pappus* an oblique, adaxially up to 2.5 mm long corona.

Cytology. – $2n = 36$ (Fig. 7B); Vogt 13636 & Oberprieler 7941. This is the first report of a chromosome number for *Plagiuss grandis* and the first tetraploid set found in the genus.

Flowering period. – (April)May-June(July)

Distribution and habitat. – Endemic to Algeria and Tunisia. *Plagiuss grandis* shows a scattered distributed from the Wilayas of Oran and Sidi-bel-Abbès in western Algeria to the Kroumirie and Béja area in northwestern Tunisia (Fig. 10). It prefers moist meadows around sources or muddy grounds and grows along road embankments, field margins, and stony slopes up to 800 m above sea level.

Specimens seen. – ALGERIA: AIN DEFLA: Oued Damous entre Ténès et Cherchell, [36°30'N, 1°19'E], 5.6.1875, *E. Cosson* (K; P); Cherchell, 2.6.18.., *L. Kralik* (P); Cherchell, champs del' oued ..., 27.5.1888 (P); Environs de Cherchell, 10.6.1962, *G. G. Aymonin* (P); Miliana, [36°18'N, 2°17'E], 20.6.1856, *A. Pomel* (MPU-Afrique du Nord); in clivis argillaceis prope Adelia infra oppidum Miliana, [36°18'N, 02°17'E], 10.5.1936, *R. Maire* (G; MPU-Afrique du Nord; S). – ALGER: Vagkant 5 km söder Pont de l'Isser, [36°50'N, 03°40'E], 11.5.1936, *E. Wall* (S); ravine route de Chéragas à Guyotville, [36°49'N, 2°55'E], 3.5.1892, *L. Chevallier* (P); environs d'Alger, [36°47'N, 03°03'E], *G.-L. Durando* (W); *ibid.*, Birtraria, 28.4.1853, *G.-L. Durando* (P); *ibid.*, coteaux boisés, printemps [36°47'N, 03°03'E], 1853, *G.-L. Durando* (G); in arenosis ad Sidi-Ferruch, [36°45'N, 02°50'E], 14.6.1848, *C. Salle* (B; C; JE; P); Rouiba, [36°44'N, 3°17'E], 5.1887, *Battandier & Trabut* (G; P); Souk el Djemma, vallée de l'Isser, [36°43'N, 3°40'E], 21.6.1854, *E. Cosson* (P); env. d'Alger, 1. & 17.6.1854 (BC-139070); Alger, Durieu (P). Algiers, *Munby* (FI-W); environs d'Alger, prairies, 1861-62, *G.-L. Durando* (MPU-Afrique du Nord); *ibid.*, champs argil., 5.1840, *M. Durieu* (P); *ibid.*, lieux incultes, 6.5.1881, *A. Roux* (MPU-Afrique du Nord); *ibid.*, 29.5.1914, *G. Hibon* (P); *ibid.*, Bely Ibrahim, 7.6.1897, Herb. Joly (MPU-Afrique du Nord); vallée de l'Isser, prov. d'Alger, 21.6.1854, *E. Cosson* (MPU-Afrique du Nord); broussailles, près la Maison carrée au bord de l'oued El Harrach, [36°43'N, 03°08'E], 6.1849, *P. Jamin* (P); *ibid.*, 6.1850, *P. Jamin* (C; G; P); *ibid.*, 1854, *G.-L. Durando* (JE); *ibid.*, printemps 1855, *G.-L. Durando* (P); *ibid.*, 4.1879, Herb. Battandier (MPU-Afrique du Nord); *ibid.*, 14.5.1940, *R. Maire* (MPU-Afrique du Nord); *ibid.*, 25.5.1951, *P. Jamin* (G; K; MPU-Afrique du Nord; P; W); *ibid.*, broussailles sur l'alluvion argileuse dans la vallée de l'Oued Smar, 16.5.1923, *R. Maire* (MPU-Afrique du Nord; S); environs d'Alger, Oued Smar, [36°43'N, 03°08'E], 5.1923, *H. Humbert* (P); *ibid.*, 6.5.1882, *A. Roux* (MPU-Afrique du Nord); Maison-Carrée, à 13 km d'Alger, près de la voie ferrée, [36°43'N, 03°08'E], 15.5.1878, *A. Meyer* (K; P); Algir, [36°47'N, 03°03'E] (LINN, IDC microfiche #1012-28); dans les champ à Alger, 5.1838, *Bové* (P); *ibid.*, 6.1837, *N. Bové* (G); pente nord de la Bouzareh près Alger, [36°46'N, 03°01'E], 25.5.1840, *Ravergie* (P). — ANNABA: in calvitiis quercetorum supra Laverdure, solo argillaceo-arenoso, 700 m, [36°21'N, 07°50'E], 17.6.1937, *R. Maire* (MPU-Afrique du Nord); pentes herbeuses de Souk Harras, [36°17'N, 7°57'E], 1864, *Reboud* (P). — BEJAIA: 5 km W of El Kseur (near Bejaïa), 450-500 m, foot of marshy bank, [36°45'N, 5°05'E], 29.5.1971, *P. Davis* 52998 (E); Kabylie, Kerrata, lieux boisés, sur le calcaire, 800 m, rare, [36°29'N, 05°16'E], 7.1897, *E. Reverchon* (B; E; G; JE; M; P; S; W; WU). — BLIDA: Prov. d'Alger, Blida, [36°28'N, 02°49'E], 5.1909, *M. Weiller* (MPU-Weiller); *ibid.*, 4./5.1862, *J. Lefèhvre* (W); Blidah, coteaux du pied ... terrains argileux, 186., *J. Lefèhvre* (P). — BOUIRA: Ravins humides d'El Berda, environs d'Aumale, [36°09'N, 3°41'E], 16.6.1856, *A. Charoy* (P). — CONSTANTINE: Plaine d'El-Aria, prov. de Constantine, [36°19'N, 6°49'E], 10.6.1880, *E. Cosson* (P); *ibid.*, 5.1876, Ruzé (P). — GUELMA: Taya près Guelma, [36°27'N, 7°06'E], 9.6.1910, *C. d'Alleizette* (P). — MÉDÉA: In campis argillosis planitei Mitidja, [36°36'N, 03°00'E], 10.6.1932, *R. Maire* (MPU-Afrique du Nord); *ibid.*, 31.5.1890, *M. Brichi* (S); in

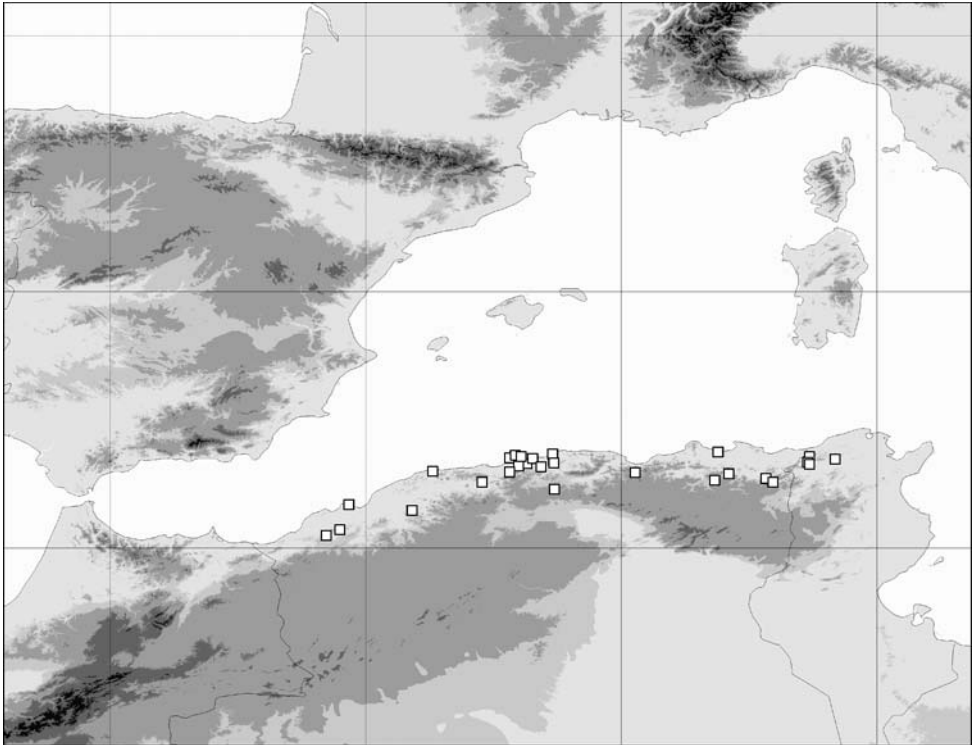


Fig. 10. Distribution of *Plagius grandis* (□) according to revised material

pascuis montis Bou Zegza, solo argillaceo, 700 m, [36°35'N, 03°26'E], 22.5.1932, *R. Maire* (MPU-Afrique du Nord). — ORAN: près Arzew, [35°51'N, 0°32'W], 4.5.1875, *E. Cosson* (P); in pratis argillosis, aux Andalous, Oran, [35°44'N, 00°54'E], 5.1856, *Munby* (C; K; P). — SIDI-BEL-ABBÈS: Col de l'Oued Imbert, [35°21'N, 00°30'W], 25.5.1904, *Doumergue* (G); Oran, Oued Imbert, bords des canaux, [35°21'N, 00°30'W], 4.6.1911, *A. Faure* (G); *ibid.*, 14.5.1914, *A. Faure* (S); *ibid.*, 23.5.1915, *A. Faure* (M); *ibid.*, bords de champs, 12.6.1910, *A. Faure* (E; JE); Dj. Tessala près Sidi-bel-Abbès, prov. d'Oran, [35°14'N, 00°46'W], 5.1863, *Lefranc* (P). — SKIKDA: Philippeville, bords de ruisseaux, [36°52'N, 6°54'E], 6.1869, *A. Faure* (P). — NOT LOCATED: Algeria (WU). ..oudja, in collibus, 1.6.1889, *A. Letourneux* (C; P); Algeria inter segetes, *R. L. Desfontaines* (G).

TUNISIA. BÉJA: Beled Béja, au nord de la station de Béja [36°43'N, 9°10'E], 1881, *A. Roux* (P); Beled Béja, 6.1881, *A. Roux* (MPU-Afrique du Nord); Béja, *A. Roux* (P). — JENDOUBA: Aïn Draham, [36°46'N, 08°41'E], 1908, *A. Cuenod* (G); Aïn Draham, in arvis humidis, [36°46'N, 08°41'E], 5.1910, *C. J. Pitard* (G); *ibid.*, 6.1909, *C. J. Pitard* (E); Kroumerie, road P 17 between Fernana and Aïn Draham, source and slopes c. 4 km SE Aïn Draham, 680 m, 36°45'N, 08°41'E, 20.5.1994, *R. Vogt 13690* & *C. Oberprieler 7995* (B; Herb. Vogt); Kroumerie, road P 17 between Jendouba and Tabarka, c. 2 km N Fernana, road embankments and field margins, 270 m, 36°40'N, 08°40'E, 19.5.1994, *R. Vogt 13636* & *C. Oberprieler 7941* (B; Herb. Oberprieler; Herb. Vogt); c. 10 km südlich Fernana, an der Straße nach Jendouba, 220 m, stauunasse Sumpfflächen, Ödland, [36°39'N, 08°41'E], 12.4.1968, *G. Wagenitz 1156* (B). — NOT LOCATED: Tunis, *Desfontaines* (W).

N AFRICA: Barbarie, *Desfontaines* (G-DC, microfiche); Barbarie, Herb. A. N. Desvaux (P); Mauritania, *Bové* (W); Barbaria, *Desfontaines*, Herb. Lamarck (P-LA).

WITHOUT INDICATION: Bové (B); (G-DC, microfiche); Herb. Schreber (M); Herbar de la Flore Atlantique (P-Desf.); Frais Vallon, 5.1911, Herb. Meslin (P); Herb. E. Fournier (P); *Desfontaines*, Herb. Richard (P).

CULTIVATED: Hort. Ber., Sept. 1871 (JE); H. Bonn (B); Hort. Paris, 19.6.1877, Herb. T. Delacour (B); Semin. Mauritanicis, h. Paris, 1849 (P); Semin. Mauritanicis, h. Paris, 1851 (P).

Acknowledgements

We would like to thank Charles Jarvis (London), Carlos Aedo (Madrid), Luziana Zedda (Bonn) and Norbert Kilian (Berlin) for various kinds of assistance during the study and the preparation of the manuscript. The technical assistance of Jana Bansemer, Monika Lüchow and Michael Rodewald (all Berlin) is gratefully acknowledged as well as the drawing of the illustrations by Ingo Haas (Berlin).

The present contribution is dedicated to Prof. Dr. W. Greuter on the occasion of his 68th birthday and his retirement from the position as Leading Director of the Botanic Garden and Botanical Museum Berlin-Dahlem.

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