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Taxonomical and chorological contribution to the Sardinian flora

Abstract

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Contributions to the taxonomy of some genera and species of the Sardinian flora are presented. In particular, one species (*Narcissus supramontanus*) and a sub-species (*N. supramontanus* subsp. *cunicularius*) are described as new for the Island. The status of two subspecies of *S. insularis* Sommier within the genus *Sesleria* has been changed. Other contributions concern typification of *Delphinium gracile* Moris, *D. cyatophorus* Moris and *Verbascum plantagineum* Moris and the report of the occurrence of *Bifora radians* Bieb. and *Bromus macrantherus* Hackel ex Enriques in Sardinia. Revision of the relevant material has allowed better definition of the occurrence on the Island of some taxa belonging to the genera *Delphinium*, *Aphanes* and *Sanguisorba*.

Introduction

The study of the Sardinian Flora is currently enjoying a period of in-depth study and taxonomic and chorological revision. On the one hand, many of the local floras compiled for the Island over the last half century furnish chorological information on about 1,700 species, but on the other they give a rather repetitive inventory obviously based on the most common or well-known species. But the number of species reported in the floristic literature of the Island is far higher. Thus there is still much work to be done if we are to define the real consistency of the Sardinian flora, polish our knowledge of the taxonomic groups, find neglected or misidentified species, define the distribution of the most rare species and generally disentangle any "inquirendae" knots. In this paper we give our contributions for improving our knowledge of some species.

Narcissus

Taxonomy of the *Narcissus* Genus is complicated everywhere by the presence of indigenous and naturalised cultivated species in the wild, of hybridising forms from the wild local population and escaped cultivars. Indeed, morphologically the most widespread

species, *Narcissus tazetta*, consists of fairly variable local populations. Moreover, many of the species or forms known on the Island in the past have never been found again.
The species reported can be divided into three groups:

1- the "tazetta" group - with well developed scapes, 25-80 cm, bulbs up to 4-5 cm, white flowers, usually numerous with well developed yellow trumpet.
Narcissus tazetta L. was reported by Moris (1827). Stirp. Sard. El., 1: 45. It grows in winter or late winter. Martelli (1904) Monoc. Sard: 124-128, described several forms of this polymorphic species, variable in the size of the bulbs, scape length and number of flowers on the umbel. Reports of *Narcissus canaliculatus* Guss, a coastal form with short scapes and deeply grooved leaves, can be assigned to this species.

2- the "pauciflor" group, with 1-5 white flowers and short scapes. This group comprises the following species:
Narcissus serotinus L. reported by Moris (1827) Stirp. sard. el., 1: 45. The species has 1(2) flowers, subnulla ring, autumnal flowering;
Narcissus elegans Spach ex Kunth reported by Macchiati (1882) Nuovo Giorn. Bot. Ital.: 144. It has 2-5 flowers and subnulla ring, autumnal flowered. Perhaps *N. patulus* Loisel reported by Bertoloni in Parlatore (1858) Fl. Ital., 3(1): 144 can be referred to this species. *Narcissus grandicrenatus* Parl. may also be included in this group, a species reported by Martelli (1904) monoc. Sard., 3: 122, Tav. 9, bi-floral with white flowers, but with a well developed trumpet and vernal flowering. Perhaps it was originally a "tazetta / serotinus" hybrid.

3- the "yellow or yellowish tepal" group. These narcissi, sporadic over the Island, have taxonomically been referred to several species:
- ***Narcissus sardous*** Martelli (1904) Monoc. sard., 3: 122; a generally bi-floral species with radiate tepals, lanceolate-pointed, patent, 23-24 mm, white to yellowish. Reported for Orune but never found again.
- *Narcissus grandicrenatus* form B (Martelli 1904, tab. 9) with tepals sulphureous oval-elliptical , 10-12 mm, the outer ones apicolate. Cyathiform or bell-shaped trumpet with crisped or smooth margin. Reported near S. Giovanni (Iglesias). Vernal flowering (II).
- *Narcissus grandicrenatus* form C (Martelli 1904, tab. 9) with scapes measuring 20-40 cm, 2-5 flora umbrella and short peduncles, trumpet 12-15 mm, tepals pale yellow, oval or oval-elliptical, 8-10 mm, outer ones apiculate. Late vernal flowering (IV). Reported on Monte Settefratelli.
- *Narcissus bertoloni* Parl. (1858) Fl. Ital., 3: 132. Fiori (Fl. Ital. Exs. n. 1643) reports this species from the surroundings of Tempio as variable in colour. It can be recognised by its yellowish perigonium and the darker yellow paracorolla. The description Parlatore gives of the species does not match the Sardinian form with yellow flowers.
- *Narcissus italicus* Sims, perhaps collected at Jerzu by Bornemann (Barbey, 1884, Fl. Sard. Comp. suppl. IV: 186). Apparently it has 10-12 fragrant flowers, with open, white to yellowish star-shaped laciniae and a pale yellow bell-shaped trumpet. Individuals with these characteristics have never been found in Sardinia.
Narcissus cupularis Bertol. (Fl. Ital., 5: 635) reported by Barbey (1884, Fl. Sard. Comp.:

57) and confirmed by Reverchon. It is generally considered a synonym of *N. bertolonii* on account of its characteristics.
- *Narcissus tazetta* subsp. *aureus* (Loisel.) Baker (1888) Handb. Amaryll.: 9. Species from Nizzardo and Provençe. It has wide, grooved leaves, yellow perigonium and golden trumpet, laciniae with small hairy mucro, 10-12 flower inflorescence. Like the previous species, the name is probably "male apposita".

Clearly, all the yellow-flowered forms so far reported refer to continental species that have never been found to exist on the Island, either in the field or in herbaria material. Both Fiori (1923) and Pignatti (1982) treated the Sardinian material as *N. serotinus* and *N. tazetta* (including *N. bertolonii*).

These records do not include populations with small (2-2.5 cm) yellow flowers and perigonal laciniae reaching a maximum of 1 cm that we found on the Island. They are formally described as follows:

Narcissus supramontanus Arrigoni **sp. nova**

Diagnosis – *Herba bulbosa, scapis erectis, compressis acutangulis, 20-25 × 0.5 cm, sulcatis, foliis brevioribus vel ea subaequantibus. Folia viridi-glauca, leviter canaliculata, 10-30 × 0.5-1 cm. Bracteae lanceolatae, scariosae, ca. 2 cm longae, amplexicaules. Flores sessiles vel breviter pedicellati, 2-2.5 cm diametre, tube (excluding ovarium) cylindrical, 1.5-2 cm. Lobi perigoniales ovate, 0.8-1 × 0.8-1 cm, mucronulati, flavi vel lutei. Corona lutea, ca. 0,3 cm alta, scyphoides, ca. 0.7-0.8 cm diametre.*
Typus – Holotypus in FI: "Narcissus supramontanus Arrigoni sp. nov./Sardegna. Sopramonte d'Oliena. Su Cusidore 18.V.1979 leg. C. Ricceri".
DESCRIPTION – Bulbous herb with erect scapes, flat doubled-bladed (in elliptical section), 20-25 × 0.5 cm, sulcate, shorter or sub-equal to leaves. Leaves glaucous green, slightly canaliculate, 10-30 × 0.5-1 cm. Bracts lanceolate, scarious, about 2 cm, enwrapping axis and base of inflorescence. Flowers sessile or slightly pedicellate, 2-2.5 cm in diameter, with tube (excluding the ovary) cylindrical, 1.5-2 cm. Laciniae perigonial ovate, 0.8-1 × 0.8-1 cm, mucronate, pale yellow or yellow. Trumpet yellow about 0.3 cm long , dish-shaped, about 0.7-0.8 cm in diameter.

Icon. – Our Fig. 1, from material collected at Punta Cusidore, Oliena (Maury).
Num. Cromos. – 2*n* = 20 (Diana, ined.)
Form – Bulbous herb with scape.
Phenology – Late vernal. Fi: IV.
Distribution – Limestone mountains of central-east Sardinia.

Narcissus supramontanus subsp. ***cunicularium*** Arrigoni **subsp. nova**

Diagnosis – *A subspecies typica, floribus minoribus, lobis perigonialibus flavis, corona cyathiformi differt.*
Herba bulbosa perennis, scapis erectis, 15-25 × 0.2-0.3 cm, exilibus, compressis acutangulis, striatis. Folia erecta, viridia vel glaucescentia, 15-25 × 0.4-0.8 cm,

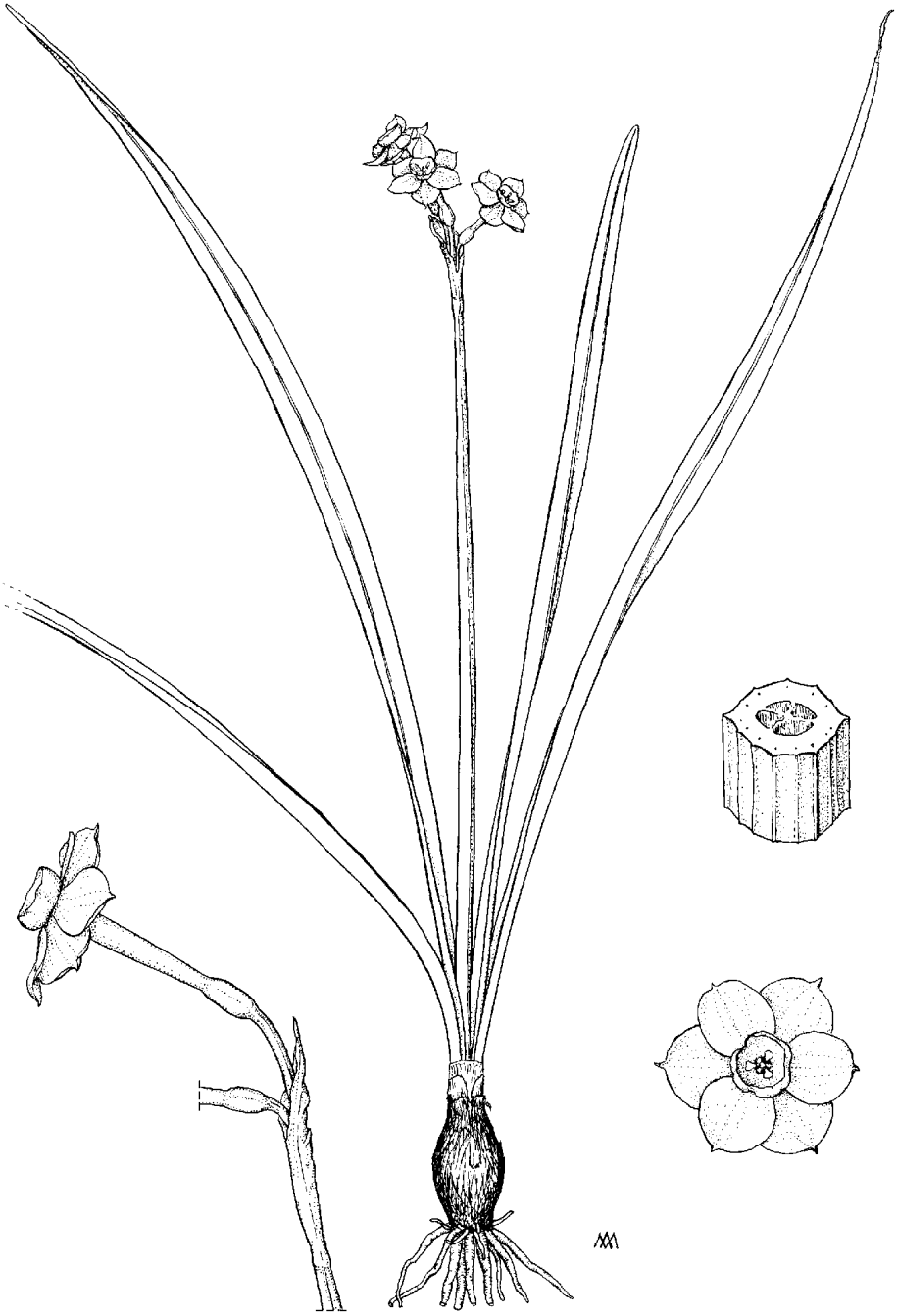

Fig. 1. *Narcissus supramontanus* Arrigoni. Stem × 0.51; scape section × 2.64; flowers × 0.97.

complanata vel subconcava superne, obtusa, scapis floriferis longiora vel eos subaequantia. Bracteae scariosae, ca. 1.5-2.5 cm longae. Inflorescentia 2-3 flora, floribus breviter pedicellatis, parvis, 1.5-1.8(2) cm diametro, sulphureis, fragrantibus. Lobi perigoniales ovati acuti, 0.7-1 cm, plus minusve deflexi, exteriores mucronulati, interiores acuti nervatura dorsali viridi peragrati. Corona aurea cyathiformis, 2-3 mm alta. Stylus inclusus, staminibus longior.

Typus. – Holotypus in FI: "Sardegna. Isola Maddalena/Punta Marginetto. (Coltivata in vaso e raccolta il 10.IV.85). E. Nardi, C. Ricceri/2.V.1982".

DESCRIPTION - Perennial bulbous herb with erect scapes, 15-25 × 0.2-0.3 cm, slender, flat double bladed, striated. Leaves erect, green or glaucous, 15-25 × 0.4-0.8 cm, flat or slightly concave on upper pages, ending in obtuse tip, sub-equal or longer than flower-bearing scapes. Bracts scarious 1.5-2.5 cm long. Inflorescence bi-trifloral, with small flowers briefly pedicellate, 1.5-1.8 (2) cm in diameter, sulphur yellow with ovate-sharp perigonal laciniae, 0.7-1 cm, the outer mucronate, the inner ones sharp pointed with green nervation on back, more or less reflexed on flowering. Trumpet golden yellow, cup shaped. 2-3 mm long. Styles and stamens enclosed in perigonium. Fragrant flowers. Style longer than stamens.

It differs from the type subsp. on account of smaller flowers, less than 2 cm in diameter, the pale yellow perigonial laciniae and cup-shaped trumpet.

Icon. – Our Fig. 2, from material collected from Punta Marginetto at La Maddalena (Maury).

Chromos. No. - 2*n* = 20 (Diana, ined.)

Form - Perennial bulbous herb with scape.

Phenology - Late vernal. Fi: IV.

Delphinium

Two distinct species are generally considered as pertaining to the binomial *D. halteratum* Sm. in Sardinia: *D. longipes* Moris and *D. gracile* DC. The first (Fig. 3), described by Moris (1837) "in arenis maritimis Pula", is a critical species to which the author attributed *D. peregrinum* Guss., Fl. Sic. Prodr., 2: 30, non Sibth. & Sm. and *D. junceum* Guss., Fl. Sic. Prodr. suppl.: 181, not DC.

D. longipes, Sardinian endemic, can be distinguished from similar species by the single-flowered stalks, longer than flower, by shape of sepals and tripartite basal leaves.

D. longipes frequently occurs along the coasts of: S. Gilla, S. Giovanni Suergiu a Mazzacara, S. Antioco, the coast between Sa Marigosa and Is Arenas, the Island of S. Pietro, Capo Manno (S. Vero Milis), etc.

Typification: Holotypus in TO (hb. Moris): "in arenis maritimis Pula, majo" here identified.

D. gracile, on the other hand (Fig. 4), may be a western Mediterranean archaeophyte introduced into cultivated areas of southern Sardinia. The species, already considered distinct by Moris, can be distinguished from *D. longipes* on account of the following characters:

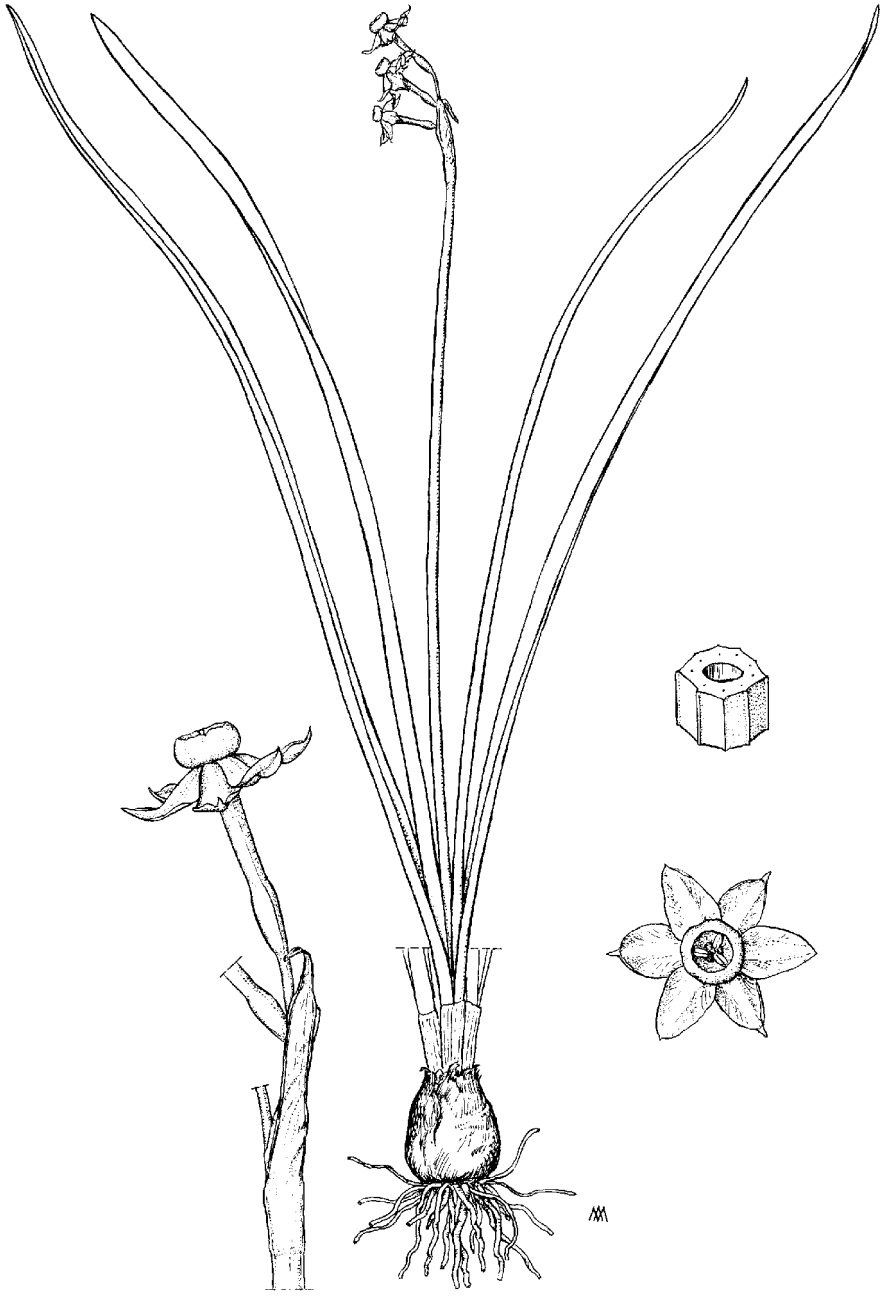

Fig. 2. *Narcissus supramontanus* subsp. *cunicularium* Arrigoni. Stem × 0.47; scape section × 2.84; flowers × 1.4.

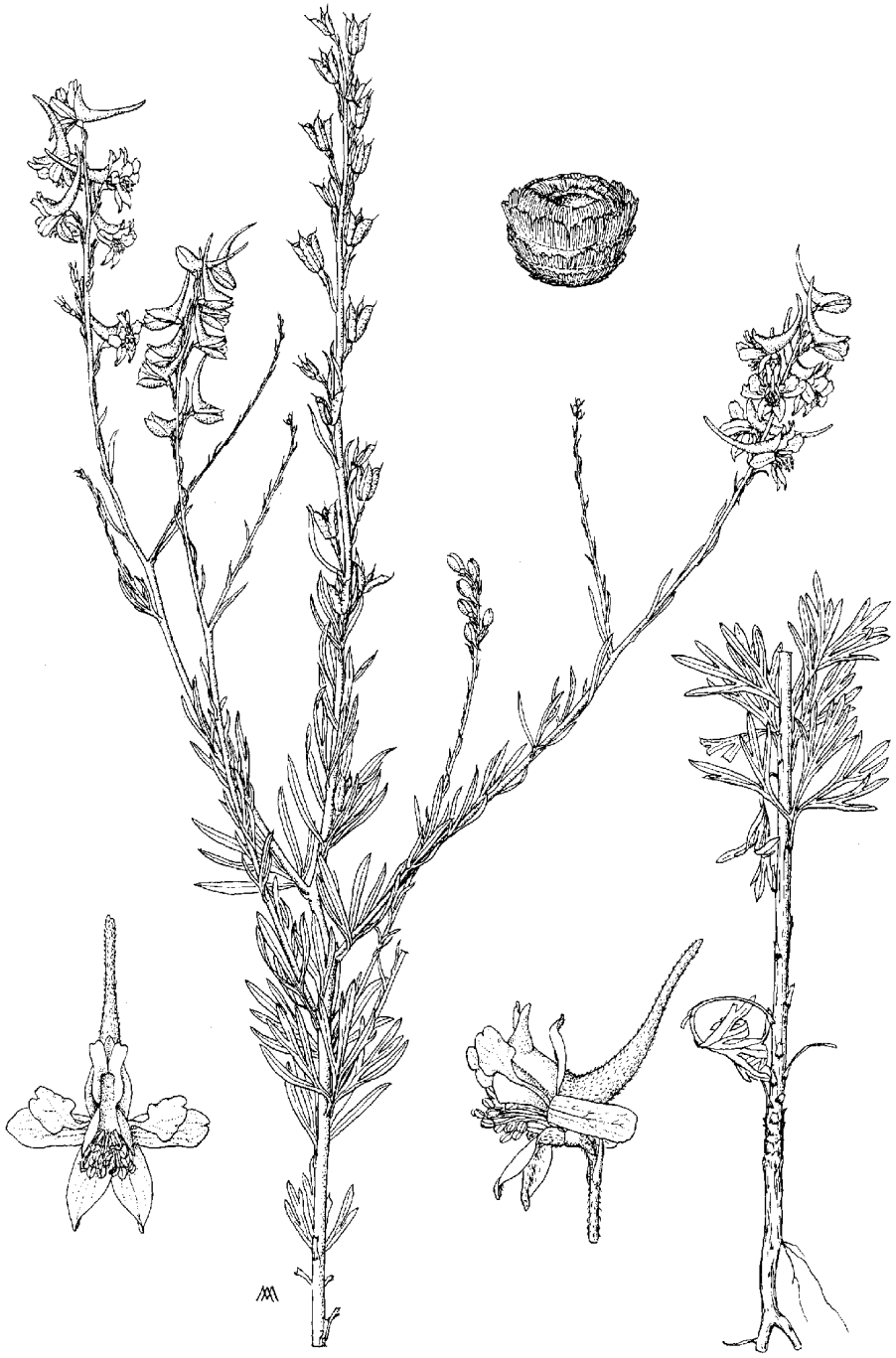

Fig. 3. *Delphinium longipes* Moris. Stem × 0.57; flowers × 0.17; seed × 11.4.

Fig. 4. *Delphinium gracile* DC. Stem × 0.68; flower × 2; seed × 13.6.

1. Slender plants 10-30(40) cm, with linear leaves, whole or divided, the basal leaves disappearing on flowering. Loose inflorescence with spur of flowers generally longer than pedicel. **D. gracile**
1. More hardy plants, 20-60 cm, leaves divided into flat, rather wide segments. Rich, elongated and thick inflorescence, with pedicels, at least on lower flowers, longer than spur. **D. longipes**

D. gracile grows in the surroundings of Cagliari, at Capo S. Elia, S. Gilla, etc.

Dianthus

In Sardinia, this Genus is represented by a group of isolated populations, often rock loving, sometimes lithophilous or psammophilous. Common characters are the perennial tufty base, linear leaves, outer calycine scales numbering (4) 6-8, triangular-pointed calycine teeth, colour of flowers varying from white to pinkish even within the same population, chromosome number $2n = 30$. These characters are shared with *D. siculus* Presl to which the Sardinian and Corsican populations have prevalently been referred ("Stirpe *D. siculus*").

On the basis of various combinations of other characters, local ecotypical complexes with microspecific or sub-specific valences can be recognised. On morphological, chorological and ecological grounds, distinct species have taxonomically been distinguished such as *D. cyatophorus* Moris (rock-loving calcicolous ecotype) and *D. morisianus* Valsecchi (psammophilous ecotype), *D. mossanus* Bacchetta & Brullo (rock loving), *D. stellaris* Camarda (lithophilous and chasmophilous). Chronologically the first species to be described was:

Dianthus cyatophorus Moris (1852) Enum. Sem. R. Horti Bot. Taurin.: 32.

Moris described this species as "In montanis Sardiniae orientalis, circa Dorgali, inter fissuras rupium calcarearum, legit oculatissimum Dominicus Lisa".

Typification: Holotypus in TO!: "Nelle fessure delle rupi monti di Dorgale VI. 1852" ("In the cracks of the crags of the Dorgale Mountains VI. 1852".(Lisa), here identified.
It is a thick, bushy, perennial, litho-chasmophilous, heliophilous and calcicolous herb. It grows exclusively on the limestone crags of the lower Flumineddu and Cedrino valleys, in the Municipalities of Oliena (Su Gologone) and Dorgali (M. Gutturgius, M. Oddeu). It can be recognised especially by the patent squamae that do not adhere to the base of the calyx (Fig. 5). Nyman (Consp. Fl. Eur.: 105) mistakenly attributed the species with the synonym *Dianthus arrostii* Presl from Sicily and it was interpreted as such by Fiori (1898 Fl. Anal. ital., 1: 379). See in this regard the *lectotypus* chosen for this species and illustrated in Camarda and Corrias (1987).
Material examined: Dorgali, above the Riu Flumineddu, Arrigoni and Di Tommaso, 22.V.1980 – Oliena, rocky garigue in fields crossed with cart tracks on limestone 30 m below the peak of Mount Ortu Camminu m 1300, Arrigoni, Di Tommaso, Mazzanti, 1.XII.1982.

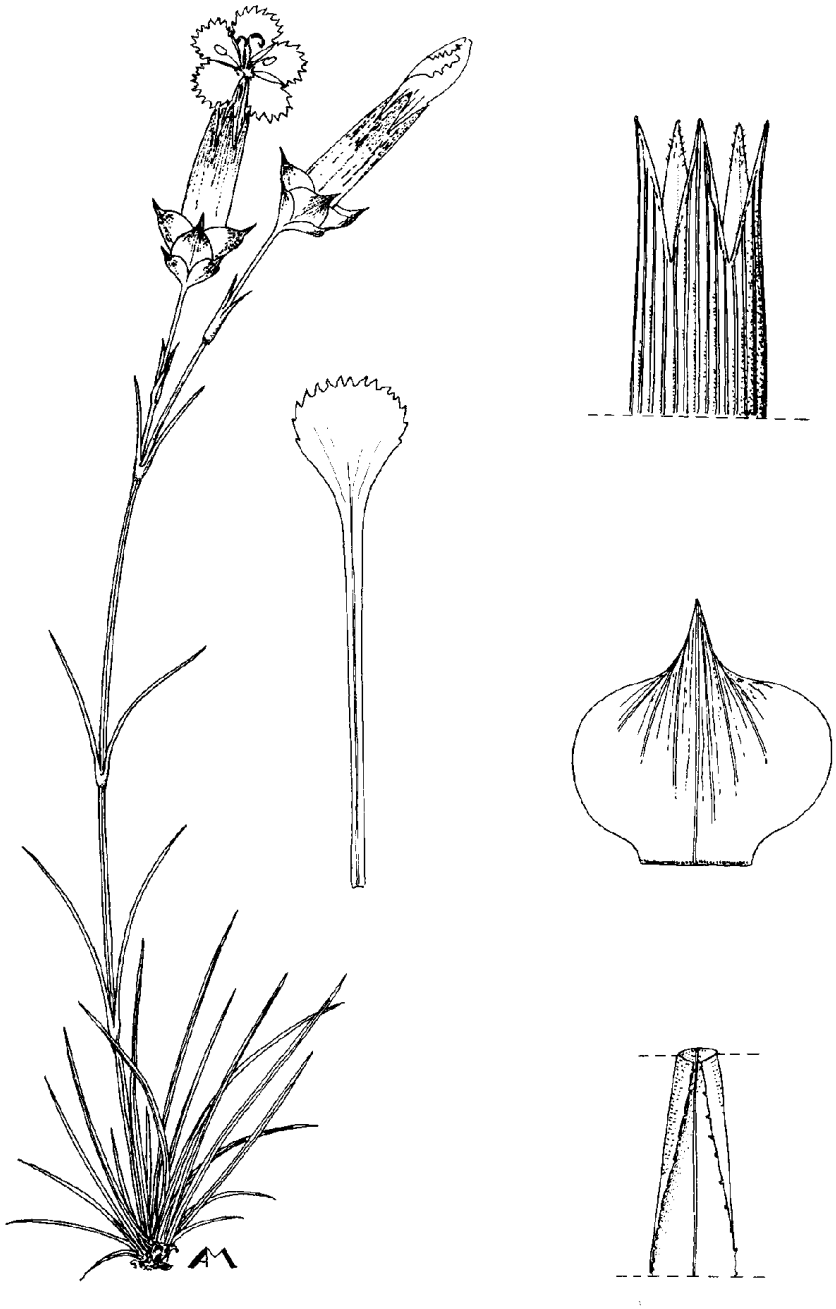

Fig. 5. *Dianthus cyatophorus* Moris. All plant × 0.89; petal × 1.78; calyx × 2.67; scales × 3.56; part of the leaf × 8.9.

Aphanes

The species reported for this genus in Sardinia are: *Aphanes floribunda* (FIORI, 1923, Nuova Fl. Anal. Ital., 1: 769), *A. microcarpa*, reported by Barbey (1884) Fl. Sard. Comp.: 32 on material collected by Reverchon at Tempio (FI!) and by (de) Sardagna (1885) Nuovo Giorn. Bot. Ital., 17: 139, *A. minutiflora* reported by Lippert (1984) Mitt. Bot. Staatssamml. Munchen, 20: 451-464, and finally *A. arvensis*, already reported in Allioni (1759) Misc. Philos. Math. Taurin.: 89.

Revision of the material collected on the Island has allowed us to confirm *A. floribunda* as frequent and abundant, whilst the other species reported, in any case rare, should be referred to *A. pusilla* (Pomel) Batt. The two species can be distinguished from each other and from *A. arvensis* by the following characters:

1. Intercalycine (epicalyx) segments clearly visible, about 1/3 of the sepals. Stipules 4-6 mm with 5-7 teeth per side incised along about 1/3-1/5 of same **A. floribunda**
1. Intercalycine segments absent or barely visible. Stipules with 3-6 teeth incised for 1/4-1/2 along same **2**
2. Hypanthium 0.8-1.2 mm. Sepals 0.2 mm, glabrous or with ciliated edge, but with cilia shorter or sub-equal to sepal **A. pusilla**
2. Hypanthium 1.8-2.3 mm. Sepals 0.4-0.7 mm, with ciliated margin, but cilia longer than sepals. **A. arvensis**

It should be underlined that Ascherson in Barbey (1885, Fl. Sard. Comp., Add. Alt.: 225) had already expressed his opinion that *A. arvensis* did not occur on the Island.

Sesleria

Of this genus, one species, Sesleria insularis Sommier, occurs in Sardinia, divided into three allopatric subspecies:
subsp. ***insularis***, on crags and coastal limestone cliffs (Tavolara, Capo Figari);
subsp. ***barbaricina*** Arrigoni, endemic lithophyte on limestone mountains of central-eastern Sardinia;
subsp. ***morisiana*** Arrigoni, chasmophyte and lithophyte on limestone mountains of Iglesiente and Sulcis.

After considering the distinct morphological characters (see description and illustrations in Arrigoni, 1983), geographical isolation and the various ecological requirements that characterise these species, we are convinced that these subspecies should be treated as separate and independent species; it is therefore necessary to carry out the following changes to their status:
Sesleria barbaricina (Arrigoni) Arrigoni **stat. novus**
Basionym: **Sesleria insularis** subsp. **barbaricina** Arrigoni (1983) Boll. Soc. Sarda Sci. Nat., 22: 270.
Sesleria morisiana (Arrigoni) Arrigoni **stat. novus**
Basionym: ***Sesleria insularis*** subsp. ***morisiana*** Arrigoni (1983) Boll. Soc. Sarda Sci. Nat., 22: 274.

Notes on other species

Sanguisorba minor Scop. (1772) Fl. Carniol., ed. 2, 1: 110.
Poterium sanguisorba L. (1753) Sp. pl., 2: 994.
Poterium agrimonifolium Cav. *sensu* Moris (1829) Stirp. sard. el., 3: 8.

Highly variable species on account of characters of hypanthium, but also due to environmental factors. Several subspecies have been reported in Sardinia that can be referred to the following biotypes:

1. Hypanthium sharp-cornered , ribbed, not winged at corners, faces reticulate-rugose.
   subsp. *minor*
   Poterium sangusorba var. *garganicum* (Ten.) Fiori (1924) Nuova Fl. Anal. Ital., 1: 772.
   Sanguisorba polygama (Waldst. & Kit.) Ces. (1842) Stirp. Ital. Rar., 2.
   $2n = 28$.

1. Hypanthium ellipsoidal, four-cornered, faces cristate-locular, with enlarged, winged keels, sometimes wavy-rugose.
   subsp. *balearica* (Bourg. ex Nyman) Munoz Garm. & C. Navarro (1998) Anal. Jard. Bot. Madrid, 56(1): 176.
   Poterium spachianum subsp. *balearicum* Bourg. ex Nyman (1878) Consp. Fl. Eur., 1: 240
   Sanguisorba minor subsp. *muricata* (Spach ex Bonnier et Layens) Briq. (1913) Prodr. Fl. Corse, 2(1): 210.
   Poterium muricatum Spach (1846) Ann. Sci. Nat., Bot., ser. 3, 3: 36.
   Sanguisorba muricata Spach ex Gremli (1874) Excurs. Fl. Schweiz ed. 2: 180.
   Sanguisorba minor subsp. *rupicola* auct. fl. sard. non (Boiss. et Reuter) Nordborg .
   $2n = 28$ and 56.

Verbascum plantagineum Moris (1827) Stirp. Sard. El., 1: 33.

Verbascum thapsus var. *plantagineum* (Moris) Béguinot in Fiori & Paol. (1900-1902) Fl. Anal. Ital., 2: 408.

The species is biennial, rarely perennial, and endemic to Southern Sardinia on the Pula, Domusdemaria and Teulada mountains (fig. 6). According to Moris (1827) "crescit in pascuis collinis aridis Cala d'Ostia Pula, et circa Teulada". We found it in the Pixinamanna Forest (Arrigoni, 1964) and considered it distinct from *V. thapsus* s. l. Because of some doubts regarding identification of the species, it was not included in the Sardinian endemics considered by Arrigoni et al. (1977-1991).

Typus: Of the 4 syntypes in the Moris Herbarium (TO) we designate the following as lectotypus: "Verbascum plantagineum Nob./ jam Verbasc. crassifolium DC. n° 349 3° vice/ V. dense luteo-lanatum caule simplici foliis crassi subtus nervosis radicalibus inferioribusque ovalibus in petiolum attenuatis caeteris decurrentibus confertis acutis, spica densa floribus subsessilibus filamentis omnibus croceo-barbatis/ absque specimine quod amplius nova inveni sed proximo vere logm". On another label is written "Verbascum plantagineum/confer cum /Verbasco Link & Hoffm. Fl. port."

Fig. 6. *Verbascum plantagineum* Moris. Stem, inflorescence and basal leaf × 0.51; flower and calyx × 2.55; hairs × 25.5.

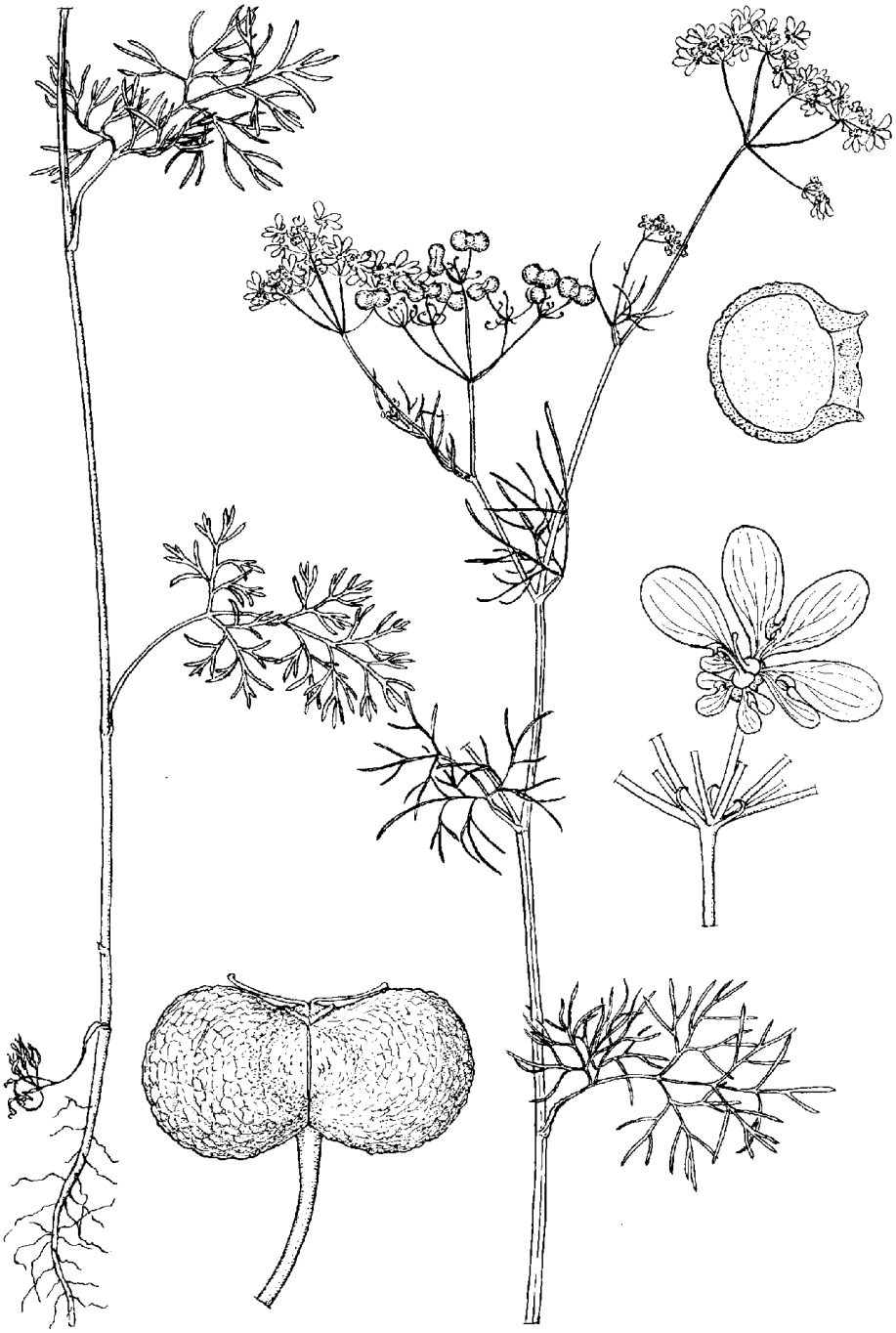

Fig. 7. *Bifora radians* Bieb. All plant × 0.77; flower × 3.85; fuit and section × 6.16.

Fig. 8. *Bromus macrantherus* Hackel ex Enriques. Stem × 0.48, glume and fertile bracts (lemma and palea) × 0.96; ligule × 2.4; pedicel × 4.8; anther × 2.4.

Bifora radians Bieb. (fig. 7).

Annual herb, rare, not yet reported for Sardinia. We found it in the fields of Sarcidano.

Bromus macrantherus Hackel ex Enriques (1903) Bol. Soc. Brot., 20: 145.

Annual gramineous herb, headed, with erect culms (fig. 8).We found it on coastal plains on the Island of Tavolara.

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