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***Daphne oleoides* subsp. *sardoa* (Thymelaeaceae), a new subspecies from Sardinia (Italy)**

Abstract

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Daphne oleoides subsp. *sardoa* is a chamaephyte scrub described as a new subspecies occurring in the siliceous and limestone mountains of central Sardinia, characterised by cleistogamous flowers, purplish-purple hypanthium with generally erect short triangular segments.

Key words: vascular flora, taxonomy, endemism, Mediterranean islands.

Introduction

Daphne oleoides Schreber is a chamaephyte described “*in Crete montosis*”. Its range is widespread in the Mediterranean mountains area including the Balcanic peninsula, Albania, Bulgaria, Greece, Kriti, Turkey, Syria, Lebanon, Italy, Sicily, Sardinia, Corse, Algeria, Morocco, and Spain (Greuter & al. 1984). Consequently, to the large distribution range some synonyms, subspecies or varieties are described (WFO 2023): *Daphne buxifolia* Vahl., *D. euboica* Rech.f., *D. caucasica* M.Bieb., *D. glandulosa* Bertol., *D. oleoides* var. *glandulosa* (Bertol.) Keissl., *D. glandulosa* Spreng., *D. gnidioides* Szov. ex Meisn., *D. hispanica* Pau in Bol., *D. hispanica* var. *granatensis* Pau, *D. oleoides* var. *hispanica* (Pau) Cuatrec., *Daphne oleoides* subsp. *hispanica* (Pau) Rivas Mart., *Daphne jasminea* Sm., *Daphne lucida* Loisel., *Daphne sericea* Noë ex Meisn., *Daphne kurdica* Bornm., *Daphne oleoides* var. *brachyloba* Meisn.

Daphne oleoides is currently divided in four subspecies (Halda 2001): *D. oleoides* subsp. *oleoides*, *D. oleoides* subsp. *baksanica* (Pobed.) Halda, *D. oleoides* subsp. *transcaucasica* (Pobed.) Halda, and *D. oleoides* subsp. *kurdica* (Pobed.) Halda.

In Sardinia the species of Thymelaeaceae are: *Thymelaea hirsuta* (L.) Hendl., coasts and hills, *Thymelaea tartonraira* (L.) All., rather widespread from sea level to 1000 m high, *Daphne gnidium* L., very common in the siliceous macchia, *D. laureola* L., only at the top at the Limbara mountain. *D. oleoides* s. l. is rather rare and exclusive on the garrigues of the siliceous soils of Gennargentu and central-eastern limestone mountains (Moris 1827;

Camarda & Valsecchi 1990; Arrigoni 2010; Arrigoni & Camarda 2014; Pignatti 2017). Recent observations by the authors in the Sardinian population of Gennergentu (Camarda & Raimondo 2020) have highlighted unusual characters recurring in all plants hitherto referred to *D. oleoides* subsp. *oleoides*. The extension of observations in nature and the subsequent study of herbarium materials led the authors to distinguish the Sardinian populations of *D. oleoides*, recognizing it as a new subspecies.

Materials and methods

The study was conducted through observations in nature, analysis of the literature and herbarium materials reported below.

Specimens examined – Creste da Bruncu Spina a Punta La Marmora, 18.6.1996, I. Camarda (SS); Desulo. Da Rifugio CAI ad Arcu Gennargentu, 13.6.2006, I. Camarda (SS); Desulo. Gennargentu, da Ortu is Aragnos a Rifugio Lamarmora, is Miriagus, 7.5.2006, I. Camarda, (SS); Tuones, limestone slopes, at the bend before the end of the path to Scala Pradu, 28.7.2022, I. Camarda & D. Ruju (SS); Perda Liana on a limestone rock along path to the top, 28.7.2023, I. Camarda & U. Nieddu (SS).

Specimens examined through images from Arrigoni's Sardinian Herbarium in Firenze – Sardegna: Gennargentu, 7 agosto 1960. Legit P.V. Arrigoni (FI); Sardegna: Orgosolo, Supramonte di Orgosolo, 1964, Legit P. Barba det. P.V. Arrigoni (FI); Gennargentu, 17.7.1966, Legit P.V. Arrigoni (FI); Sardegna: M.te Gennargentu, da B. Furau a P. Lamarmora, 17.7.1966, Legit P.V. Arrigoni. Sardegna: M.te Gennargentu, Parte alta del fianco sinistro di Riu Aratu a m 1350-1500, 23/7/ 1968, Legit. P.V. Arrigoni (FI); Sardegna: M.te Gennargentu, Pascoli da Bruncu Spina a Punta Paolina e dintorni del rifugio Lamarmora, 6.7.1969, Legit P.V. Arrigoni (FI); Sardegna: M.ti del Gennargentu. Versante Nord di Bruncu Allasi, m 1600-1699, 12.7.1970, Legit P.V. Arrigoni (FI); Sardegna: Baunei. Rupi calcaree, quota 815 m, a SE della regione di Scoroddine, 30.4.1971, Legit P.V. Arrigoni et E. Nardi (FI); Sardegna: M.te Gennargentu, dal Rio Paulinu, presso il Rifugio ad Arcu Gennargentu, Esp. S.O., m 1600-1650 ca., scisti paleozoici, 24.6.1971, Legit P. V. Arrigoni et C. Ricceri (FI); Sardegna: M.te Gennargentu, da Arcu Gennargentu a Bruncu Spina per la via di cresta che passa per Punta Paolina, m 1600-1800 ca., 24.6.1971, Legit P. V. Arrigoni et C. Ricceri (FI); Sardegna: M.te Gennargentu, da Arcu Gennargentu a Punta Lamarmora passando da su Sciusciu, 5.7.1972, Legit P.V. Arrigoni et E. Nardi (FI); Sardegna: Orgosolo, Rocce calcaree, Nord e Nord-Ovest di Mt. Fumai, 7.7.1972, Legit P.V. Arrigoni et E. Nardi (FI); Sardegna: Orgosolo, Rupi e falesie calcaree lungo la cresta P. Sa Pruna, Punta Lolloine, Sos Cuzzos, 7.7.1973, Legit P.V. Arrigoni, E. Sartoni et P.L. Di Tommaso (FI); Sardegna: Desulo, M.te Gennargentu tra Perda Grispa e Ortu is Aragnos, m 1660, Substr. porfidi, 5.7.1985, Legit P.V. Arrigoni, P.L. Di Tommaso, A. Mazzanti et C. Ricceri (FI); Sardegna: Oliena, Iscala de Pradu, una sola pianta, 7.1997, Legit A. Congiu (FI).

Results

The study of materials relating to the Sardinian population of *Daphne oleoides* together with the observation in nature of the populations of Sicily and that of Albania (Fig. 1) resulted in the establishment of a different taxonomic treatment for Sardinian populations. In fact, despite having a similar ecology, it differs from the nominal subspecies and from the other three mentioned subspecies, for some morphological characters and mainly for the shape and color of the corolla. So that we are inclined to treat this as subspecies of



Fig. 1. *Daphne oleoides*: a, b) in Sicily, on the Madonie Mountains; c, d) in Albania on the Qark Elbasan.

D. oleoides in addition to the nominal and the other three subspecies, because actually diverges for some characters that are lost in the dried material and the most obvious are the plant's habit, the color and shape of the flowers, that therefore escape the descriptions based on herbarium materials. So, we called it as *Daphne oleoides* subsp. *sardoa*.

***Daphne oleoides* subsp. *sardoa* Camarda & Raimondo subsp. nova**

Diagnosis – Differt a *Daphne oleoides* subsp. *oleoides* foliis adultis subspatulatis glabris, 4–15 mm longis, 3–5 mm largis (recurved triangular segments in subsp. *oleoides* of Sicilian specimens); floribus plerum cleistogamis ipanthio tubuloso 10–12 mm longo, rubente-purpurascetibus, dentibus 4–5 longis, 3–4 mm largis, erectis, extus purpurescetibus, vel atro-violaceis.

Typus – Bruncu Spina, Genargenti montibus, 1.589 m (a.s.l.), Coord. 40,017387 N 9°25'30.91"E, 13.6.2015, Camarda et Raimondo (SS) (*Holotypus*). *Isotypes* in FI and SS.

Description – Small evergreen shrub with numerous flexible branches 20–60 cm long, creeping or suberect to form a cushion up to 1 m wide and no more than 50–60 cm high. Leaves persistent and new apical twigs arising immediately after flowering, glabrous, linear-lanceolate, sub-spatulate, 6–20 mm long, 3–6 mm wide, closely spaced. Flowers cleistogamous with tubular hypanthium 10–12 mm long, narrowed at the insertion of the teeth, erect and rarely open, usually purplish with dense, minute hairs; teeth triangular sub-equal two by two, 4–5 mm long and 2–3 mm wide, erect or rarely open, purplish-red to purplish-dark outside; stamens 8 subsessile, arranged in two planes; ovary 2–3 mm long with sessile stigma; drupe 5–6 mm yellowish-orange, with pyriform seed 4×2.3 mm.

Etymology – *Sardoa*, from the island of Sardinia.

Phenology – Flowering May–July, fruiting July–August.

Iconography (Fig. 2) – by Camarda & Valsecchi (from Camarda & Valsecchi 1990).

Biological type - Chamaephyte, evergreen with prostrate branches (Fig. 3).

Range (Fig.4) – Gennargentu Mountain, siliceous substrate over 1500 m (a.s.l.) and very rare limestone mountain from Corراسi to Punta sa Pruna, at Perda Liana (Gairo), Scoroddine (Urzulei), Montarbu at Margiani Pubusa pick and nearby Nuraghe Ardasai (Ierzu) (*vide* G. Mereu, *in litteris*). Specimens are indicated at Sos Thuthurrelis near the Corراسi Mountain (Congiu 2006) and on the rocks along the path from Chelle to Palumbrosa sites (Putzu 2020). Doubtful at Monte Scova, Aritzo (Martinoli 1951).

Ecology (Fig.3) – Heliophilous and orophylous species of siliceous montane garrigues in the *Juniperetum (nanae)-sibiricae* and other associations of phytoclimatic stage of prostrate dwarf shrubs of the Gennargentu mountain (Carta & al. 2014). It commonly lives with *Astragalus genargenteus* Moris, *Thymus catharinae* Camarda, *Rosa seraphini* Viv., *Cerastium boissierianum* Greuter et Burdet, *Trisetum gracile* (Moris) Boiss. *Festuca morisiana* Parl. and other endemic species (Arrigoni & Camarda 2014). It is very rare on limestone rocks and always with only few isolated specimens.

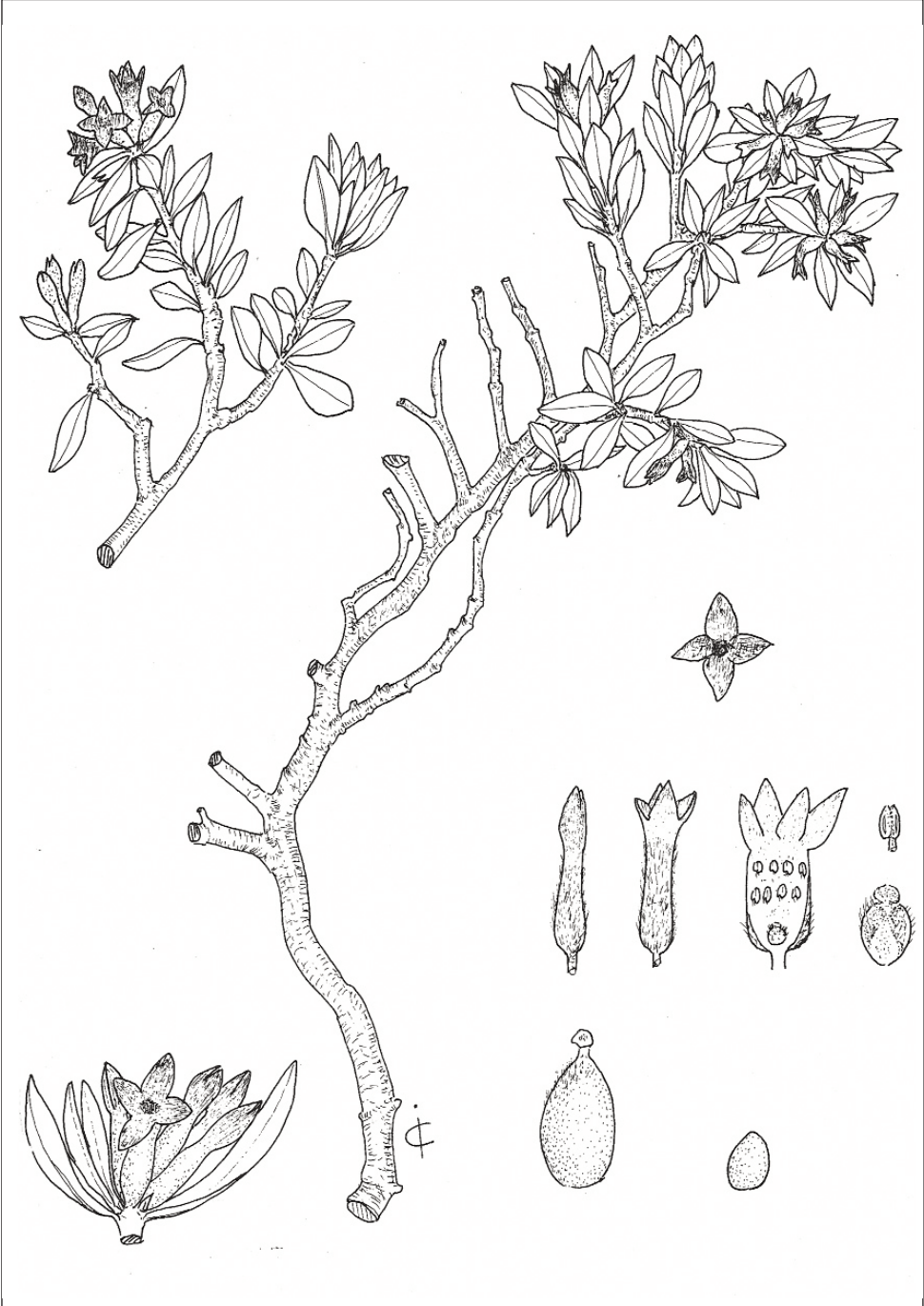


Fig. 2. Iconographia of *Daphne oleoides* subsp. *sardoa* (from Camarda & Valsecchi 2004, sub *D. oleoides* s.l.).

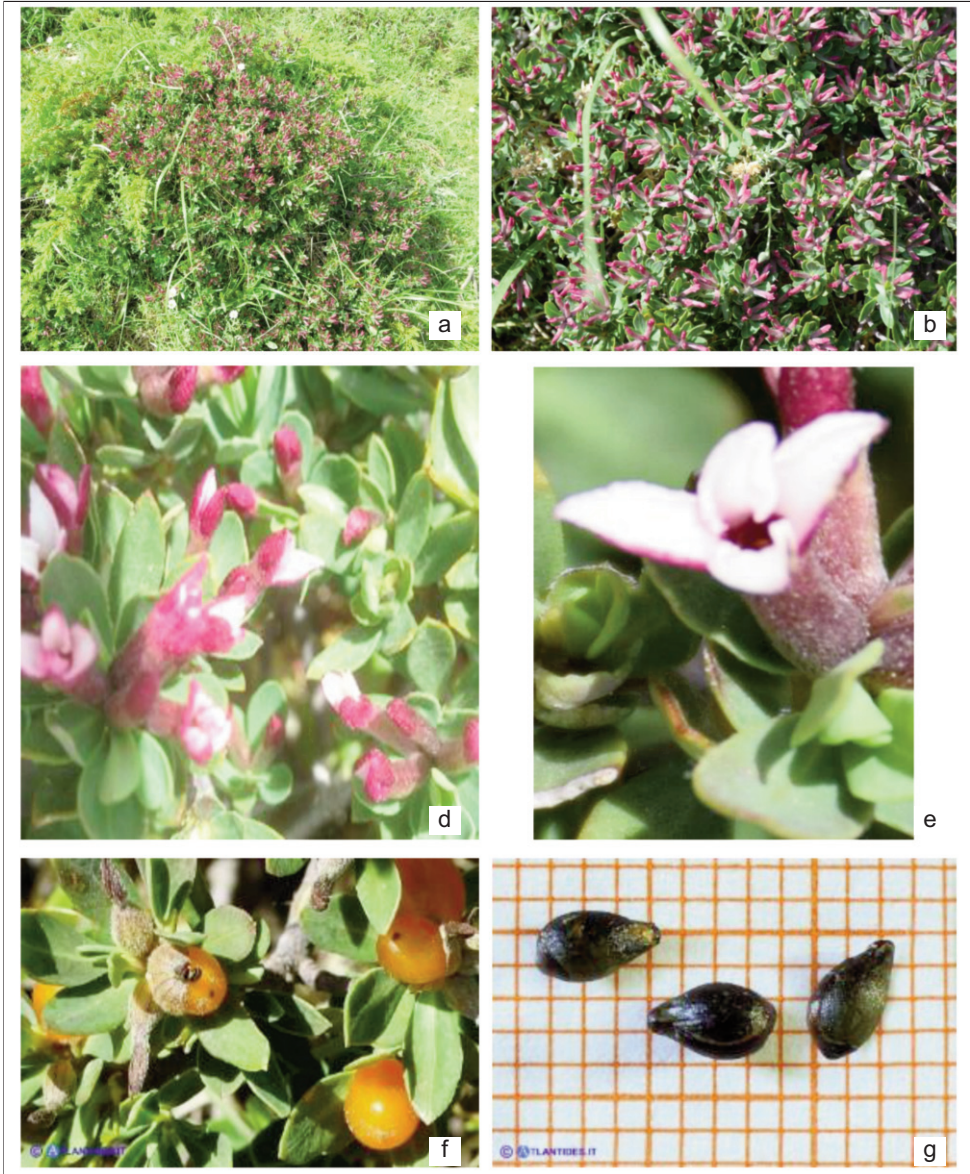


Fig. 3. *Daphne oleoides* subsp. *sardoa* (Gennargentu, Punta Orisa): a-d) flowering plant, e) detail of flower, f) fruits, g) seeds.

Discussion and Conclusions

Daphne oleoides Schreber, in Sardinia, was collected first by Moris (1827; 1858-59) sub *D. glandulosa* Bertol. and after by many Authors (Arrigoni & Camarda 2014). Our recent

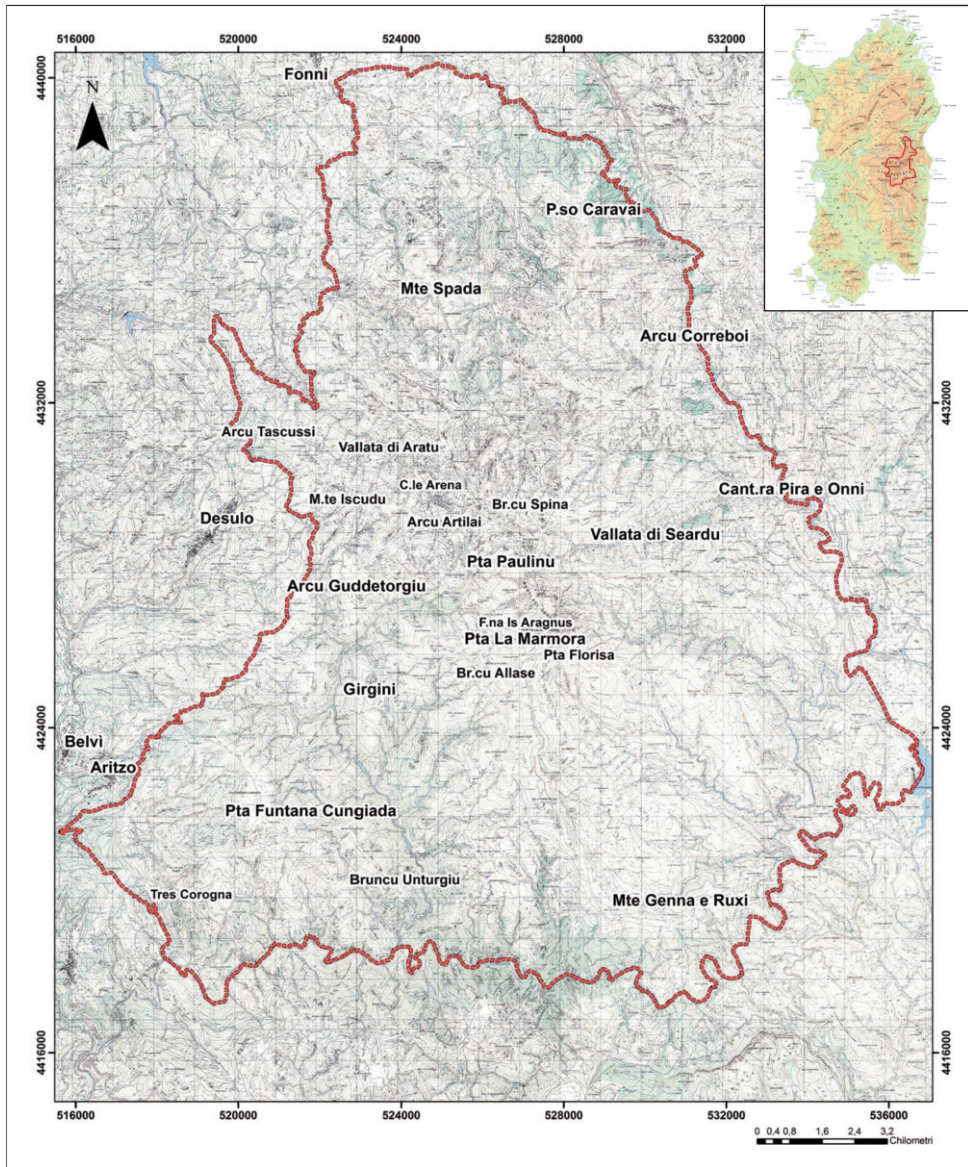


Fig. 4. Map of Gennargentu Mountain and locus classicus of *Daphne oleoides* subsp. *sardea*.

investigations of the natural populations of *D. oleoides* from Albania and Sicily and confrontation with plants of Criti Mountains, with typical yellow whitish flowers and long triangular white teeth, have allowed to appreciate any diagnostic characters of the Sardinian plants in the Gennargentu siliceous mountain and the population of Monte Corrasi,

Supramonte and Monte Perda Liana, living on limestone substrate. The populations are well distinguished, according to the images of this taxon also reported in the illustrated floras of these countries.

White flowers and recurved triangular segments are confirmed by original description of Criti specimens, and by the direct observation of the populations living in Sicily and Albania. The white color also results from the images of this species reported in the most recent illustrated floras of other countries such as Lebanon and references to even purple flowers are not rare. All this led the authors to critically examine the population so far attributed to the taxon described by Schreber (1776).

Leaves of Sardinian plants are lanceolate to obovate shaped of 4–15 mm long and 3–4 mm large, and clearly hairless. Flowers are covered by minute silky hairs, color of hypanthium is markedly dark-violet or red-purple outside, even more accentuated on the teeth of calyx, while they are white inside; teeth are shorter and erect. Flowers soon appears cleistogamous and mostly infertile. Segments are triangular-shaped much shorter compared to that of the populations of Crete, Sicily and Albania. The length and indumentum of leaves are very important characters to discriminate the subspecies.

On the morphometric investigations we have been undertaken which have meanwhile allowed us to establish that these are characters uniformly distributed in the same population in order to establish whether the observed variation could lead to a different taxonomic treatment. On this basis, morphometric investigations have been undertaken which have meanwhile allowed us to establish that these are characters uniformly distributed in the same population which has suggested to establish a different taxonomic treatment.

So that we are inclined to treat the Sardinian population as subspecies of *D. oleoides* in addition to the nominal, because actually diverges for some characters that are lost in the dried material and the most obvious are the plant's habit, the color and shape of the flowers, that therefore escape the descriptions based on herbarium materials.

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References

- Arrigoni, P. V. 2006: Flora dell'isola di Sardegna, **3**. – Sassari.
 — & Camarda, I. 2014: La Flora del Gennargentu (Sardegna centrale). – *Quad. Bot. Amb. Appl.* **25**: 3-109.
 Carta, L., Brunu, A. G., Brundu, G. & Camarda I. 2014: Habitat e vegetazione del Gennargentu (Sardegna centrale). – *Quad. Bot. Amb. Appl.* **25**: 111-123.
 Conti, F. & al. 2005: An annotated Checklist of the Italian Vascular Flora. – Roma.
 Camarda, I. & Raimondo, F. M. 2020: Taxonomic remarks of *Daphne oleoides* s.l. (Thymelaeaceae) from Sardinia. – P. 123 in: Bareka, P., Domina, G. & Kamari, G. (eds), XVI OPTIMA Meeting, Abstracts. – Athens.
 — & Valsecchi, F. 1990: Piccoli arbusti, suffrutici e liane della Sardegna. – Sassari.

- Congiu, A. 2006: Monte Corrasi. Guida alla flora e ai sentieri. – Olbia.
- Greuter, W., Burdet, H. M. & Long, G. 1984: Med-Cheklis, **1**. – Genève & Berlin.
- Halda, J. J. 2001: The Genus *Daphne*. – Acta Mus. Richnov., Sect. Nat. **8(1)**: 32.
- Martinoli G., 1951: Profilo fitogeografico del monte Scova del gruppo del Gennaegentu. – Rend. Sem. Fac. Sci. Univ. Cagliari **21**: 72-102.
- Pignatti, S. 2017: *Daphne*. – P. 1044 in: Flora d'Italia, 2° ed, **2**. – Milano.
- Moris, G. G. 1827: Stirpium sardoarum elenchus, **1**. – Carali
- Putzu, M. 2020: La Flora e l'importanza naturalistica del Monte di Oliena. – Nuoro.
- Schreber, J. C. D. von 1776: Icones et Descriptiones Plantarum minus cognitarum, **1**. – Halae.
- WFO 2023: Word Flora Online, Plant List/World Flora Online. – <https://www.worldfloraonline.org> [accessed 1.9.2023].

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