

SEDUM TENUIFOLIUM (SIBTH. & SM.) STROBL SUBSP. IBERICUM NOV. SSP.*

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SUMMARY

Within *Sedum tenuifolium* (Sibth. & Sm.) Strobl two morphologically distinct forms can be recognised. These forms, characterised by the presence of long-stalked and short-stalked propagules, respectively, have different areas. The diploid of *S. tenuifolium* belongs to the short-stalked form, the hexaploid to the long-stalked form. The short-stalked form is newly described as ssp. *ibericum*, the name referring to its main area.

INTRODUCTION

Among the species belonging to the series *Rupestria* Berger of the genus *Sedum*, the well-defined *Sedum tenuifolium* (Sibth. & Sm.) Strobl is certainly the most remarkable. Being well adapted to the mediterranean climate, it is the only species of this series with a definite resting stage in summer. Early in the beginning of the flowering period (June) all vegetative parts of the plant die, except for the last 0.5–2.5 cm at the tips of the non-flowering shoots. These parts swell to about twice their original thickness and then stop growing. Simultaneously the withered and dry leaves are all shed, except those attached to the thickened ends of the non-flowering shoots. Thus bare stalks are produced, which bear terminally propagules covered by a layer of imbricate dead leaves. In autumn these propagules form roots and also produce new leaves at their apices. During winter and spring *S. tenuifolium* is hard to distinguish from the other species of the series *Rupestria*.

The area of *S. tenuifolium* is by and large circum-mediterranean, extending from North Africa (Algeria, Morocco) and Southern Europe to Asia Minor (PRAEGER 1921, FRÖDERSTRÖM 1931). In Southern Europe *S. tenuifolium* is restricted to Spain, Portugal, S. France, S. Italy, S. Yugoslavia (Montenegro, Macedonia), Albania, Greece, and S. Bulgaria (WEBB 1964).

Polyploidy, which is a common feature in many *Sedum* species, also occurs in *S. tenuifolium*. Until now the chromosome numbers $2n = 24$ in plants originating from Portugal (FERNANDES & QUEIRÓS 1971, 't HART 1972) and $2n = 72$ in plants originating from the Sierra Nevada ('t HART 1972) have been reported. In Greek plants the chromosome number $2n = 72$ has been found ('t Hart, unpubl.).

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This paper deals with the morphological variation in *S. tenuifolium*, found to be the counterpart of the cytological variation in this species.

MATERIAL

Specimens from the following herbaria have been used; Museum of Natural History, Budapest (BP), Botanical Institute of the University of Coimbra (COI), Botanical Museum and Herbarium, Lund (LD), Komarov Botanical Institute, Leningrad (LE), Biološki Institut, Sarajewo (SARA), Botanical Museum and Herbarium, Utrecht (U), Naturhistorisches Museum, Wien (W), Botanisches Institut und Botanischer Garten der Universität Wien (WU).

RESULTS

Within large parts of its area *S. tenuifolium* shows little or no infraspecific morphological variation. However, plants originating from France and the northern and central parts of the Iberian Peninsula differ markedly from those from the other parts of the area. The differences observed are the following:

1. The plants from France and the northern and central parts of the Iberian Peninsula have propagules without or with very short stalks. The length of the stalks varies between 0 and 4 cm (mean 0.5 cm). In no single specimen of this group the mean length of the stalks exceeds 1.5 cm (*fig. 1*).

The plants from the other parts of the area have propagules with long stalks. The length of the stalks varies from 0 to 30 cm (average, depending on the region, 2.5–6 cm). In every specimen from this group the mean length of the stalks is more than 1 cm.

2. The propagules of the plants with short-stalked propagules are usually borne on the plant in a suberect position (*fig. 2A*). The stalks of the propagules of the plants with long-stalked propagules are usually prostrate. The propagules are in an almost horizontal position or slightly ascending (*fig. 2B*).

3. The dead leaves attached to the propagules of the plants with short-stalked propagules are always narrow, straight and appressed (*fig. 2A*), those of the plants with long-stalked propagules bent outward, usually broader, and of a bright white colour (*fig. 2B*).

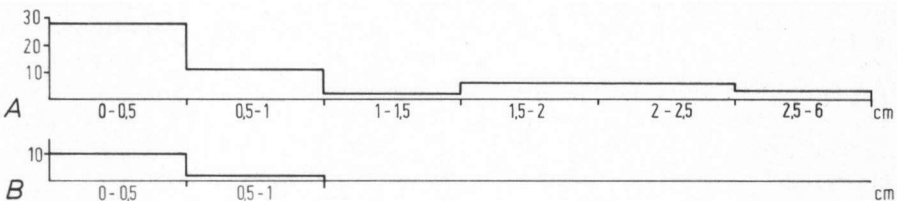


Fig. 1. Histogram of the mean length of the stalks of the propagules of 56 specimens of *S. tenuifolium* ssp. *tenuifolium* and ssp. *ibericum* from Portugal and Spain (A) and of 11 specimens of *S. tenuifolium* ssp. *ibericum* from France (B).

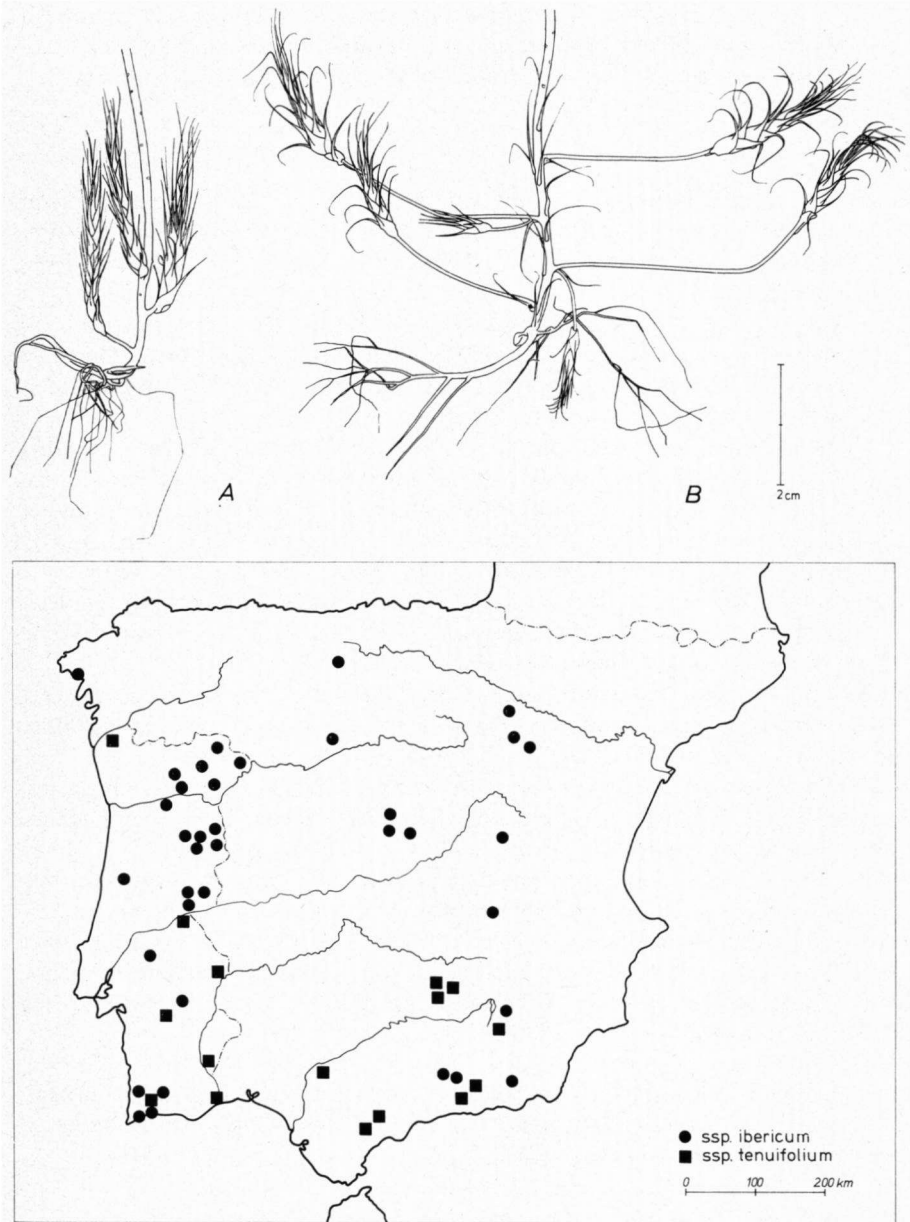


Fig. 2. Basal parts with propagules of two Portuguese specimens of *S. tenuifolium* demonstrating the differences between the two subspecies, and a map showing the distribution of both subspecies in the Iberian Peninsula.

A. *S. tenuifolium* ssp. *ibericum* (Tras-os-Montes, vic. of Alfândega da Fé, Ochôa)

B. *S. tenuifolium* ssp. *tenuifolium* (Algarve, Vila Real de St. Antonio Graia de Monte Gordo, Fontes c.s. 1773)

Both diploid plants of *S. tenuifolium* originating from Portugal belong to the form with short-stalked propagules. The hexaploid plants of *S. tenuifolium* from Spain and from Greece were found to belong to the form with long-stalked propagules.

DISCUSSION

The original description of *S. tenuifolium* was based on plants originating from the vicinity of Athens (SIBTHORP & SMITH 1806). A figure (SIBTHORP & SMITH 1825) confirms that the type of *S. tenuifolium* belongs to the form with long-stalked propagules.

According to FRÖDERSTRÖM (1932) *S. amplexicaule* DC., *S. rostratum* Ten., and *Sempervivum anomalum* Lag. are identical with *S. tenuifolium*. This view is accepted by the present author, although the type specimens were not seen. For that reason these taxa will only be discussed briefly here.

– *S. amplexicaule* was based on plants from the Cévennes (see DE CANDOLLE 1828a). According to a figure (DE CANDOLLE 1828b) *S. amplexicaule* has short-stalked propagules, just like the specimens from southern France studied by the present author. However, these French specimens are far from typical for the form with short-stalked propagules. Most probable they represent a separate northern race of this form which is few-flowered and usually less than 12 cm in height. This race also occurs in N.E. Spain, in the Sierra de Vicor, Sierra de Moncayo, and Sierra de Cuenca.

– *S. rostratum* was based on plants from Southern Italy (see TENORE 1831).

All Italian specimens of *S. tenuifolium* belong to the form with long-stalked propagules.

– *Sempervivum anomalum* was based on plants from Chamartin and Guadarrama (Prov. of Madrid). All specimens of *S. tenuifolium* from this region turned out to belong to the form with short-stalked propagules (fig. 2).

In none of the descriptions of the taxa discussed the characters of the propagules and their stalks are mentioned. However, both forms of *S. tenuifolium* are easily distinguishable, and certainly deserve taxonomic recognition. Since both forms occupy distinct areas, and also have different chromosome numbers, the rank of subspecies seems to be most appropriate. Therefore the following delimitation is proposed:

Sedum tenuifolium (Sibth. & Sm.) Strobl, Oest. Bot. Zeitschr. 34: 255. 1884.

Basionym: *Sempervivum tenuifolium* Sibth. & Sm. Flor. Graec. I: 335. 1806.

Synonyms: *Sempervivum anomalum* Lag. Gen. et Spec. Plant.: 17. 1816.

Sedum amplexicaule DC. Mém. Soc. Agric.: 80. 1808.

Sedum rostratum Ten. Prodr. Flor. Neap. p. 26. 1811–13.

Sedum carinatum Link ex Sprengel Syst. Veg. II ed. 16: 435. 1825.
nom. illegit.

subsp. *tenuifolium*

Propagules on stalks of 0–30 (2.5–6) cm, clothed with white dead leaves bent outward. Stalks prostrate. Propagules prostrate or slightly ascending. Chromo-

some number $2n = 72$. North Africa, Southern Portugal, Southern Spain, Italy, Yugoslavia, Albania, Greece, Bulgaria, and Asia Minor.

subsp. *ibericum* nov. ssp.

Propagula ascendunt, sine caulibus sive caulibus brevibus. Caules propagulorum ad 0–4 (0.5) cm longi. Folia mortua propagulorum recta et adpressa. Chromosomatum numerus $2n = 24$. Lusitania, Hispania borealis et centralis et Gallia meridionalis.

Type: Portugal, Tras-os-Montes Alto Douro, Fonte da Assoreira, on the road from Mirandela to Bragança, *Fernandes, Matos & Matos 5459*, 24.VI.1955 (COI; isotypes LD and U).

ACKNOWLEDGEMENT

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SPECIMENS EXAMINED (France, Portugal, and Spain)

Sedum tenuifolium (Sibth. & Sm.) Strobl ssp. *ibericum* FRANCE: Cévennes, Anonymus (LE); Dep. Gard; Espèrou, Anonymus (LD, W); On rocks and sandy places near Camprieux, Anthouard (BP, LD, W); Le Vigan, Anthouard (LD); Le Vigan, Grenier (W); Dep. Lozère; Mende, Anonymus (LD); La Lozère, Brosi (LE); Mende, Leithner (W); Lozère, Prosl (W); Dep. Vaucluse; Mont Ventoux, Magnier (LD);

PORTUGAL: Prov. Alentejo Alto; Evora, Moller (COI); Prov. Algarve; Coastal sands at Lagos, Bourgeau 1873 (BP, LD); Caldas de Monchique, Matos c.s. 1795 (COI); Monchique, Moller (COI); Portimão, Welwitsch 331 (LE); Prov. Beira Alta; Between Vilar Formoso and Castelo Boru, Fernandes c.s. 3940 (COI, LD, U); Vic. of Guarda, Fernandes c.s. 4384 (COI, LD); Celorico da Beira, Fernandes & Sousa 3438 (COI); Vic. of Guarda, Fernandes & Sousa 3456 (COI); Vic. of Almeida, Ferreira (COI); Prov. Beira Baixa; Banks of Rio Ponsul, on the road from Castelo Branco to Malpica, Fernandes c.s. 5879 (COI, LD, U); Between Oledo and Idanha-a-Nova, Fernandes c.s. 6004 (COI, LD, U); Vic. of Castelo Branco, Fernandes

c.s. 8558 (COI); Prov. Beira Litoral; Vic. of Coimbra, Ferreira (COI); Prov. Ribatejo; Montargil, Cortezão (COI); Prov. Tras-os-Montes Alto Douro; Road from Lamego to Régua, ca. 5 km from Lamego, Fernandes c.s. 6240 (COI); Favaios, Ferreira (COI); Vic. of Miranda do Douro, Mariz (COI); Vic. of Alfândega da Fé, Ochôa (COI); Fontainhas, between Sabrosa and Pinhão, Paiva c.s. 8177 (COI); Andados, 12 km from Bragança to Valpaços, Paiva c.s. 10075 (COI);

SPAIN: Prov. Almeria; Rio Grande da Nacimiento, Nilsson 883 (LD); Prov. La Coruña; Between Tal and Muros, along the coast, de Smidt 39 (U); Prov. Cuenca; Serrania de Cuenca, Gandoger (W); About 7 km W. of Cañete, ca. 1000 m, Stud. Rheno-Traj. 64-484 (U); Between Villarrobledo and San Clemente, Stud. Rheno-Traj. 64-647 (U); Prov. Granada; On old walls at Granada, Funk (W); Granada, on rocks at the Alhambra, Funk (W); Sierra Alfacar, Winkler (LE); Prov. Jaén; Sierra de Aliaraz et Jaén, Sierra Segura in a dry meadow, 1000-1500 m, Porta & Rigo 403 (SARA); Prov. Madrid; Sierra de Guadarrama, Bourgeau? (LE); Sierra de Guadarrama, Bourgeau 2217 (LD, W); Casa del Campo near Madrid, Leresche (LE); Prov. Palencia; Penna Redonda, W. of Cervera, Leresche (BP); Prov. Valladolid; Valladolid, Pinus forest, Sennen 62 (W); Prov. Zaragoza; Sierra de Vicor, montaneous, on rocks, Vicioso (LD); Calatayud, montaneous, on rocks, Vicioso (LD, U); In Quercus forest on the E. side of the Sierra de Moncayo, ca. 2500 f, Willkomm 407 (LE, W).

Sedum tenuifolium (Sibth. & Sm.) Strobl ssp. *tenuifolium*

PORTUGAL: Prov. Alentejo Alto; Alcacovas, Assumpção (COI); Vic. of Elvas, da Silva Senna (COI); Prov. Alentejo Baixo; Mertola, Moller 524 (COI, LD); Prov. Algarve; Vila Real de St. Antonio Graia de Monte Gordo, Fontes c.s. 1773 (W); Serra do Picota, Welwitsch 4622 (COI); Prov. Beira Baixa; Vila Velha de Rodão, bank of Rio Tejo, Fernandes c.s. 6926 (COI); Prov. Minho; Banks of Rio Minho, Valladares, da Cunha (COI);

SPAIN: Prov. Granada; Mountains near Granada, 8000-10000 f, Boissier (LE, W); Sierra Nevada, 1200-1300 m, Stud. Rheno-Traj. 62-778 (U); Prov. Jaén; Sierra de Segura at Los Choros, Bourgeau 664 (LD, LE); Near Puente del Rey S. of Desfiladero de Despeñaperros, 600 m, Greuter S7155 (LD, W); Desfiladero de Despeñaperros, Stud. Rheno-Traj. 62-1327 (U); Sierra Morena, Collado de los Jardines, N.E. of Santa Elena, Stud. Rheno-Traj. 64-854 (U); Prov. Málaga; Ronda, Willkomm 565 (W); Ronda, Winkler (BP); Prov. Sevilla; Between Carmona and Lora del Rio, Stud. Rheno-Traj. 59-122 (U).