

A CYTOTAXONOMIC NOTE ON *SEDUM AETNENSE* (CRASSULACEAE)

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SUMMARY

The chromosome number $2n = 26$ is reported for *Sedum aetnense*. This species is probably affiliated to a small group of archaic, W. European and Atlantic *Sedum* species.

1. INTRODUCTION

The rare and inconspicuous, annual *Sedum aetnense* Tin. is one of the last three or four European *Sedum* species which has not yet been studied cytologically. *S. aetnense* was described from the slopes of Mt. Etna on Sicily (TINEO 1845) but it also occurs in Spain, in the Balkans and in southern Russia and central Anatolia (WEBB 1964, CHAMBERLAIN 1972). A somewhat more robust form with less distinctly ciliate leaves and sepals, *S. aetnense* var. *tetramerum* (Trautv.) Hamet, occurs in eastern Anatolia, the Caucasus, Syria, Iran, Afganistan and Tien-Shan (BORISSOVA 1939, MOUTERDE 1969, JANSSON & RECHINGER 1970). Although *S. aetnense* has a very wide distribution it seems to be extremely local and its area is remarkably discontinuous. Because *S. aetnense* is very small, greyish-green, short-living and has minute, whitish flowers it is most probably under-collected. Although it is apparently very rare it seems to be somewhat more abundant in the eastern parts of its area, for it has been found in some seven localities in Bulgaria (ČESHMEDZIEV 1967) and in a relatively large number of localities in Asia Minor (CHAMBERLAIN 1972), but it is known from only two localities in Spain (LLAMAS 1983). *S. aetnense* is traditionally classified in the highly artificial *S. sect. Epeteium* Boiss., but its natural affinities are still completely obscure. Whether *S. aetnense* is of Mediterranean or Asiatic origin is also unknown, the latter is usually implied.

2. MATERIALS AND METHODS

Fruiting specimens of *S. aetnense* with ripe seeds were collected on the Hill of the Liberators (Bunardžik) in the city of Plovdiv (Bulgaria). The plants raised from these seeds were grown in the temperate greenhouse of the experimental garden of the Univeristy at Utrecht and a voucher specimen has been deposited

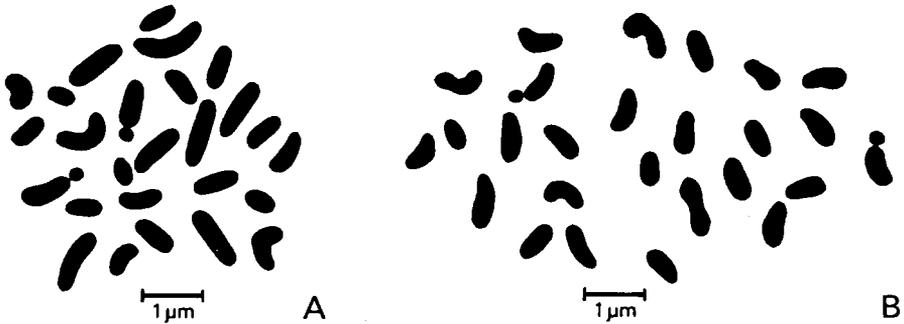


Fig. 1. Chromosome complements of *Sedum aetnense* Tin. (A) and *S. melanantherum* DC. (B).

at the Herbarium (U). The chromosomes were studied in root-tip mitoses ('T HART 1978).

3. RESULTS AND DISCUSSION

S. aetnense has the chromosome number $2n = 26$. The chromosomes are very small, up to 1 micron long only, but differ considerably in length (*fig. 1A*).

The chromosome number $2n = 26$ has also been reported for some other European *Sedum* species, i.e. the yellow flowered *S. borissovae* Balk. of *S. series Alpestris* Berger and *S. pruinaum* Brot. of *S. series Rupestris* Berger as well as for the white-flowered *S. alsinefolium* All. of *S. series Alsinefolia* Berger which is closely related to *S. series Cepaea* (Koch) Fröd. ('T HART 1978, 1983). Although these three species occur in widely different regions they also happen to be rare and very local endemics (WEBB 1964). The chromosome number $2n = 26$ also occurs in the perennial, white-flowered *S. melanantherum* DC. ('T Hart unpubl.) which occurs only on the Sierra Nevada and the Sierra Mijas in south-east Spain and the Atlas Mts. in Morocco (WILLKOMM 1893, MAIRE 1977). The chromosomes of *S. melanantherum* are also less than 1 micron long, but they are rather uniform (*fig. 1B*). Since within the genus *Sedum* identical chromosome numbers occur in widely different taxa they usually do not indicate a genetic relationship ('T HART 1978). However, *S. aetnense* and *S. melanantherum* also resemble each other in a large number of morphological characters. Both species are small and have elliptical, semiterete (distinctly flattened adaxially), obtuse leaves up to c. 5 mm long with a short, truncate, whitish spur at the base, (4-)5-merous flowers, sepals the bases of which are not fused with the receptacle, white, acuminate petals, carpels with 3-5 ovules each, orthocarpic follicles and seeds with a reticulate testa. *S. aetnense* differs from *S. melanantherum* primarily in that it is annual and has haplostemous flowers with very small petals (2-3 mm long), small, globose anthers and short styles. However,

in several Mediterranean *Sedum* species similar reductions of the flower occur within a polyploid series and could be shown to be relatively recent adaptations to an autogamous or pseudocleistogamous mode of reproduction ('t Hart in prep.).

In most *Sedum* species the bases of the sepals are completely fused with the receptacle and the seeds have a testa consisting of longitudinal rows of transversely oblong cells which bear two or more papillae each (bipapillate, costate and multipapillate seeds, see 'T HART & BERENDSEN 1980). On the other hand, *S. aetnense* and *S. melanantherum* show the more primitive (plesiomorphic) conditions of this set of phylogenetically significant characters, i.e. their sepals are free at the base (spurred) and they have a testa consisting of isodiametric cells which have only a single papilla in the centre (reticulo-papillose). This combination of primitive characters also occurs in the white flowered *S. anglicum* Huds. and *S. arenarium* Brot. from western Europe and the closely related *S. farinosum* Lowe from Madeira, all three of which have the basic chromosome number $x = 12$, in four other Macaronesian species with yellow flowers, i.e. *S. brissemoreti* Hamet ($x = 11$), *S. fusiforme* Lowe ($x = 12$) and *S. nudum* Ait. ($x = 13$) from Madeira and *S. lancerottense* Murr. from the Canaries, and finally in *S. acre* L. ($x = 20$) which also has yellow flowers and occurs in Morocco, throughout Europe and in Anatolia and the Caucasus ('T HART 1978, 1984). However, in contrast to *S. aetnense* and *S. melanantherum* these eight species all have much larger flowers and many-seeded, kyphocarpic (stellate-patent) follicles with distinct lips along the ventral suture. Nevertheless it seems more likely that *S. aetnense* is related to this small, probably relict group of Atlantic and W. European (including N. Africa) species than to any other taxon of the genus *Sedum*, although a few small groups of equally archaic species also occur in North America, central East Africa and eastern Asia (FRÖDERSTRÖM 1931, 1935).

REFERENCES

- BORISSOVA, A. G. (1939): Crassulaceae. In: V. L. KOMAROV (ed.), *Flora of the USSR*. 9. (Moskva, Leningrad).
- ČEŠMEDZIEV, I. V. (1967): Materiali vŕrchu florata na Bŭlgarija. *Naučn. Trudy na V.S.I.* "V. Kolarov" (Plovdiv, Agrolom. fak.) 16: 211–226.
- CHAMBERLAIN, D. F. (1972): *Sedum*. In: P. H. DAVIS (ed.), *Flora of Turkey*. 4. (Edinburgh)
- FRÖDERSTRÖM, H. (1931): The genus *Sedum* L. 2. *Acta Horti Gothob.* 6 App.: 1–11.
- (1935): The genus *Sedum* L. 4. *Acta Horti Gothob.* 10 App.: 1–181.
- HART, H. 't (1976): *Biosystematic studies in the acre-group and the series Rupestris Berger of the genus Sedum L. (Crassulaceae)*. Thesis (Utrecht)
- (1983): Micro-endemism in *Sedum* (Crassulaceae): the sibling species *S. alsinefolium* All. and *S. fragrans* spec. nov. from the French-Italian Alps. *Bot. Helv.* 93: 269–280.
- (1984): In: A. LÖVE (ed.), IOPB chromosome number reports. 85. *Taxon* 33: 756–760.
- & W. BERENDSEN (1980): Ornamentation of the testa in *Sedum* (Crassulaceae). *Pl. Syst. Evol.* 135: 107–117.
- JANSSON, C. A. & K. H. RECHINGER (1970): *Flora Iranica*. Lfg. 72. (Graz)
- LLAMAS, F. (1983): Sobre la presencia de *Sedum aetnense* Tineo en el norte de la Península Ibérica. *An. Jard. Bot. Madrid* 39: 545–546.

- MAIRE, R. (1977): *Flore de l'Afrique du Nord*. 14. (Paris)
- MOUSTERDE, P. (1969): *Nouvelle Flore du Liban et de la Syrie*. 2. (Dar El-Machreq, Beyrouth)
- TINEO, V. (1985): In: G. Gussone, *Florae siculae synopsis*. 2. (Napoli)
- WEBB, D. A. (1964): Crassulaceae. In: T. G. TUTIN et al. (eds.), *Flora Europaea*. 1. (Cambridge)
- WILLKOMM, M. (1893): *Supplementum Prodromi Florae Hispanicae*. (Stuttgart)