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Autor: Rasool Sarwar, Ghulam / Omer, Saood / Quaiser, Mohammad

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Sedum pakistanicum Sarwar, a new species of Crassulaceae from Pakistan and Kashmir

GHULAM RASOOL SARWAR
SAOOD OMER
&
MOHAMMAD QAISER

RÉSUMÉ

SARWAR, G. R., S. OMER & M. QAISER (1995). *Sedum pakistanicum* Sarwar, nouvelle espèce de Crassulacées du Pakistan et du Kashmir. *Candollea* 50: 267-274. En anglais, résumés français et anglais.

Une nouvelle Crassulacée du Pakistan, *Sedum pakistanicum* Sarwar, est décrite. La nouvelle espèce présente d'étroites affinités avec *S. ewersii* Ledeb. Les deux espèces ont un port identique et des morphologies générale et florale similaires. Mais *S. pakistanicum* se caractérise par l'absence de glandes sur le calice et les feuilles.

ABSTRACT

SARWAR, G. R., S. OMER & M. QAISER (1995). *Sedum pakistanicum* Sarwar, a new species of Crassulaceae from Pakistan and Kashmir. *Candollea* 50: 267-274. In English, French and English abstracts.

A new species in the genus *Sedum*, i.e. *Sedum pakistanicum* Sarwar, is recognized from Pakistan. The new species has close affinities with *Sedum ewersii* Ledeb. and is similar in habit and general and floral morphology. *Sedum pakistanicum* Sarwar differs from *Sedum ewersii* Ledeb. by the lack of gland spots from leaf and calyx surface.

KEY-WORDS: *Sedum pakistanicum* — CRASSULACEAE — Pakistan — Kashmir.

Introduction

Sedum ewersii Ledeb. is widely distributed from Central Asia to the Baltistan and Kashmir region of Pakistan. Phytogeographically, it is a Central Asian or Irano-Turanian element, and its wide distribution range results in pronounced variation.

The genus *Sedum* L. (s.l.) is a polymorphic and variable assemblage, which resulted in the segregation of the genus into a number of splits. Probably, due to these facts, *Sedum ewersii* Ledeb. has been overlooked in finer details. Number of studies exist at the generic level (BERGER, 1930; BORISSOVA, 1969 and OHBA, 1975), indicating simplified version of *Sedum* L. (s.l.). While studying the genus *Sedum* L. (s.l.) and *Sedum ewersii* Ledeb. for the Flora of Pakistan, it occurred that two distinct taxa exist in the region studied.

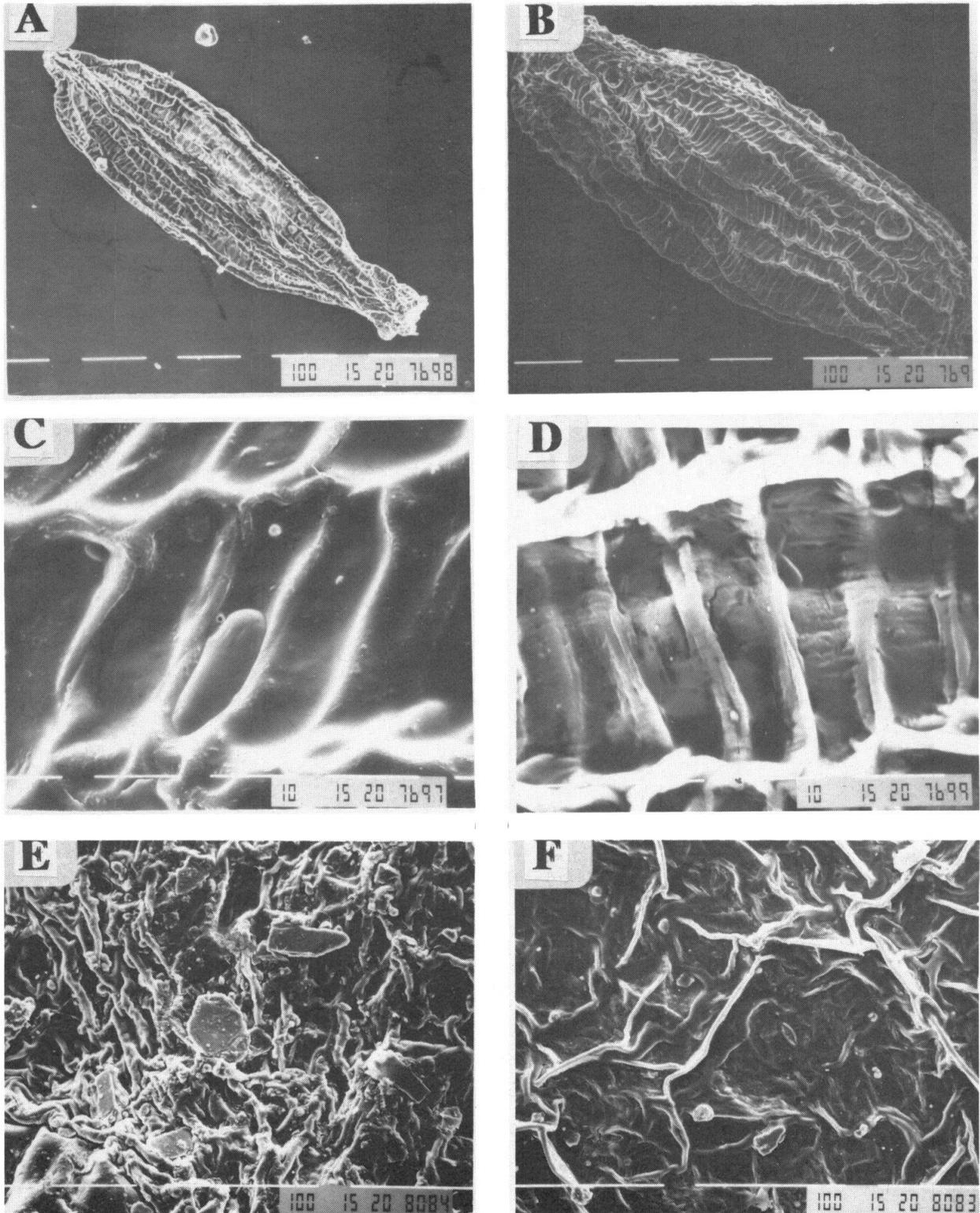


Fig. 1. — **A**, seed of *Sedum pakistanicum*; **B**, seed of *Sedum ewersii*; **C**, seed surface of *Sedum pakistanicum*; **D**, seed surface of *Sedum ewersii*; **E**, leaf surface of *Sedum pakistanicum* without glands; **F**, leaf surface of *Sedum ewersii* with glands.

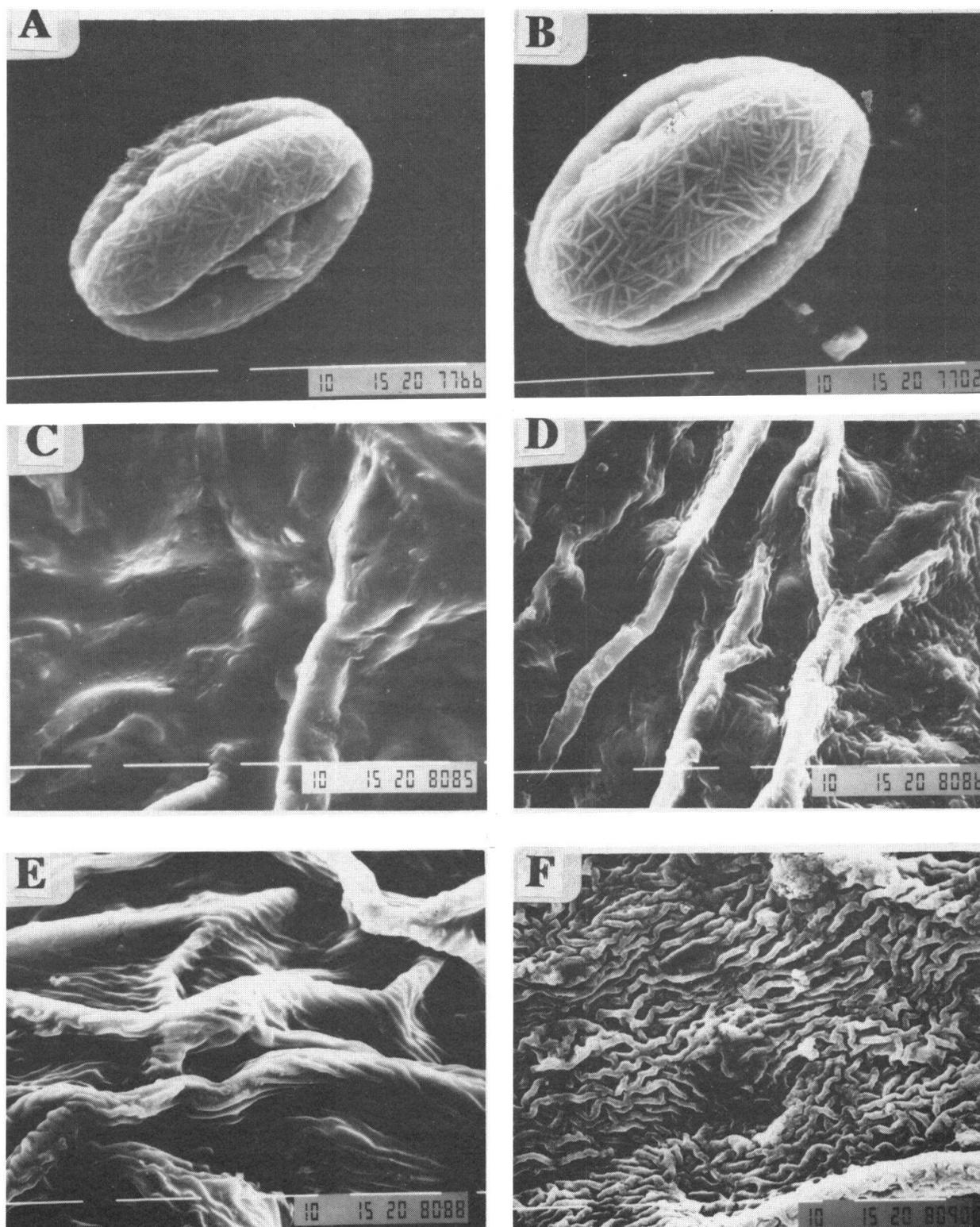


Fig. 2. — **A**, pollen grains of *Sedum pakistanicum*; **B**, pollen grains of *Sedum ewersii*; **C**, sepal surface of *Sedum pakistanicum*; **D**, sepal surface of *Sedum ewersii*; **E**, petal surface of *Sedum pakistanicum*; **F**, petal surface of *Sedum ewersii*.

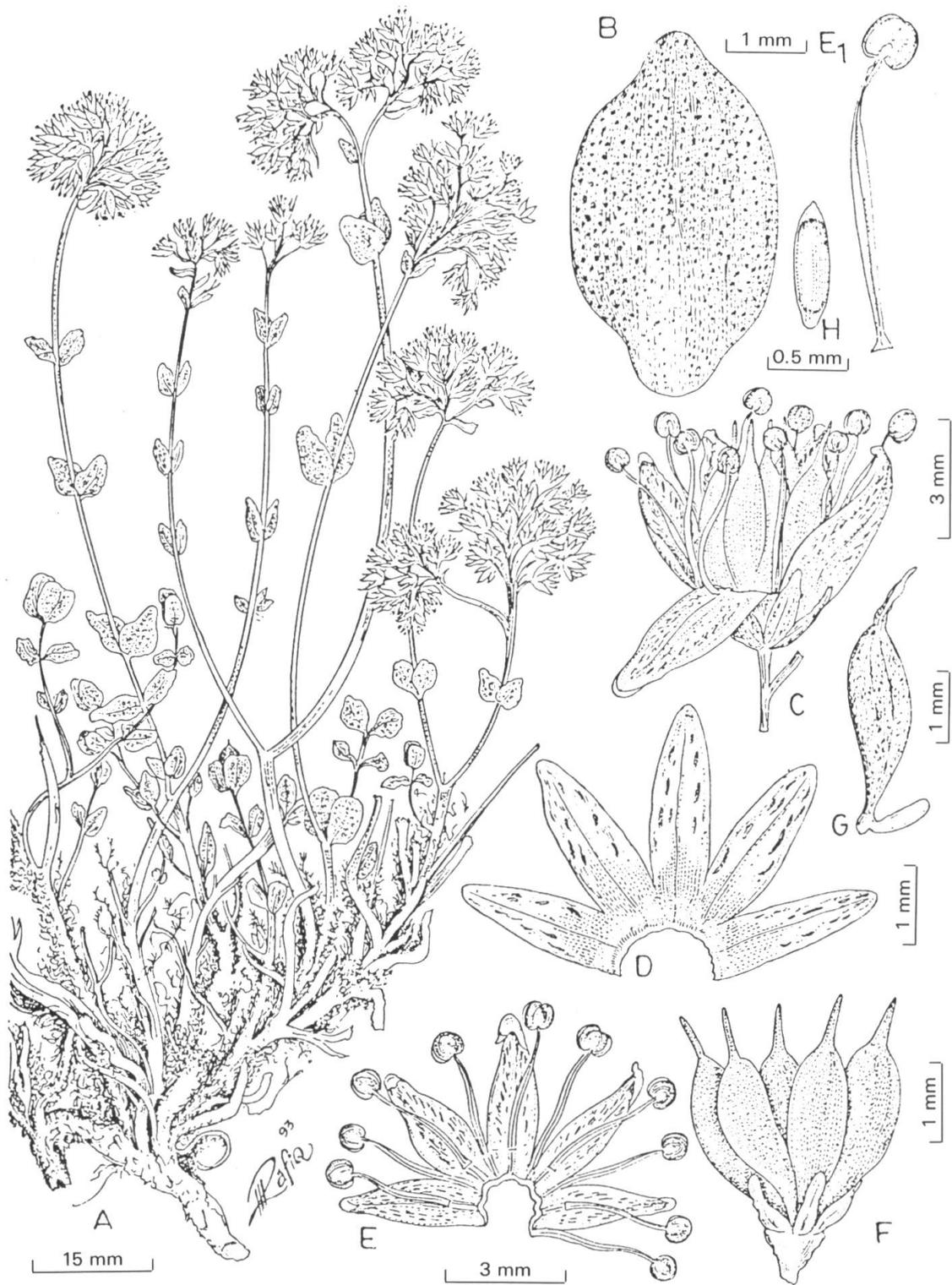


Fig. 3. — *Sedum ewersii* Ledeb.

A, habit; B, leaf; C, flower; D, sepals; E, petals with stamens; E₁, stamen; F, carpels; G, fruit; H, seed.

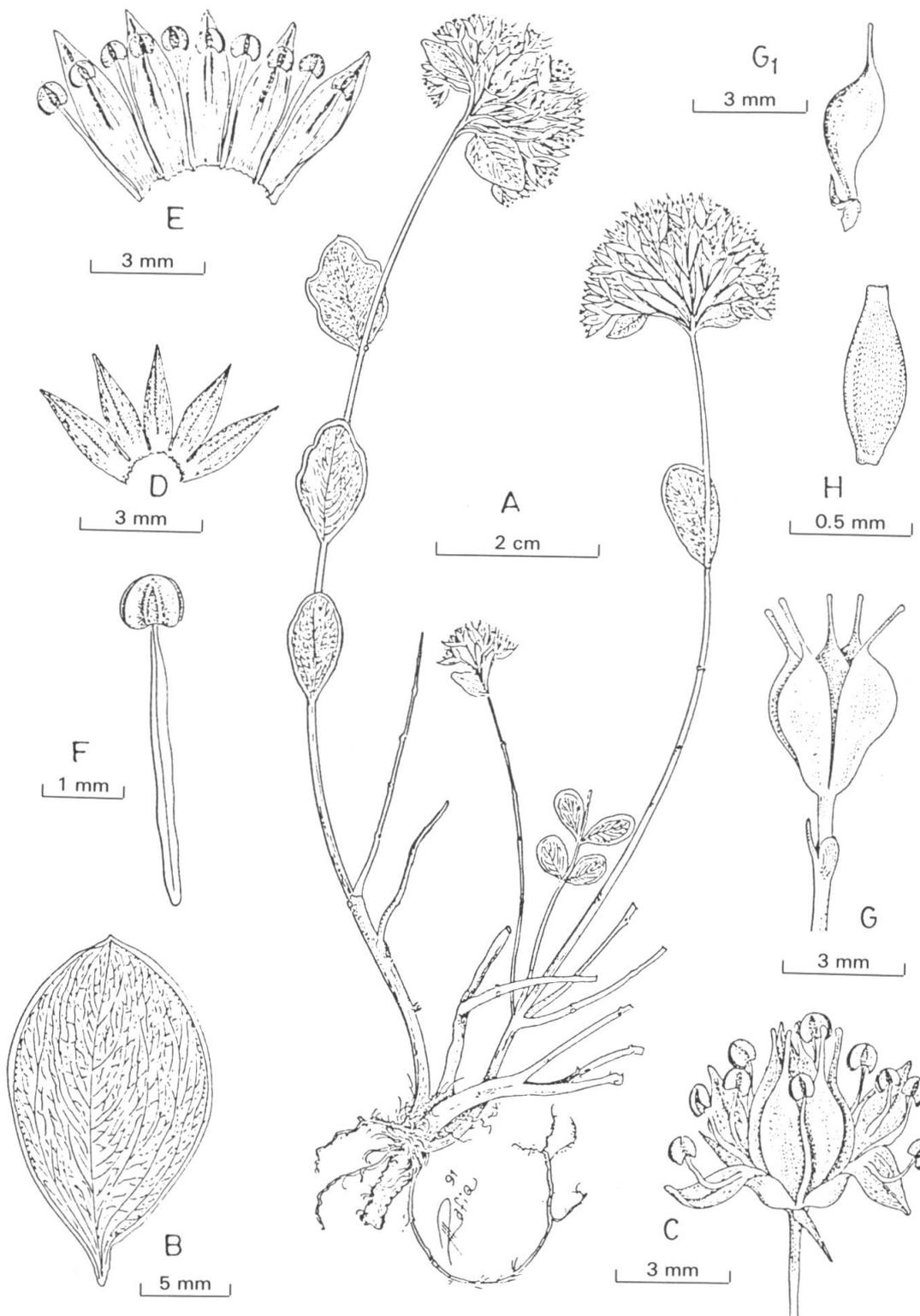


Fig. 4. — *Sedum pakistanicum* Sarwar
 A, habit; B, leaf; C, flower; D, sepals; E, petals with stamens; F, stamen; G, carpels; G₁ fruit; H, seed.

Materials and methods

Palynological studies

Pollen grains of *Sedum ewersii* Ledeb. and *Sedum pakistanicum* Sarwar were obtained from herbarium sheets. Twenty five pollen grains were studied and measured for each collection. More than one specimen was studied in both species.

Light microscopic studies:

Pollen slides were prepared by the usual acetolysis method of ERDTMAN (1952). Measurements of polar axis, length and diameter of the grain, mesocolpium, apocolpium, intercolpus distance of the pollen grain, along with the thickness of the exine. PAI (polar area index) was also calculated.

Scanning electron microscopy:

Mostly acetolysed pollen grains were mounted on metallic (brass) stubs, with the help of double adhesive tape. The specimens were coated with gold by the conventional method and were observed under a JSM-T-200 at the Biological Research Center, University of Karachi.

Seeds

Seed samples were collected from the herbarium specimens. Only healthy and mature looking seeds were studied. Seed size, seed shape and seed surface were studied. Seed size was measured by using a Nikon SE model microscope. Seed surface patterns were studied with the help of scanning electron microscopy. The seeds were mounted on metallic stub with the help of double adhesive tape and gold-coated for 6 minutes in a sputtering unit of Jeol and observed in a SEM Jeol JSM-T-200.

Observations and results

Palynology

The palynological studies have revealed that almost no differences exist between the two taxa. The pollen grains are slightly bigger in length, diameter, colpus length, intercolpus distance (Table 1). On the other hand, the surface structure is identical in the two species.

Seed morphology

The morphological studies have revealed the existence of two groups from Pakistan and Kashmir. One group has smooth and thin surface of striae while the other group has rough and thick surface of striae. The depression between two longitudinal striae is deeper and has smooth surface in *Sedum pakistanicum* Sarwar where as in *Sedum ewersii* Ledeb. depression is lesser and has horizontal striae between two longitudinal striae. The detailed measurement of the two species are indicated in Table 2; Fig. 1A, B, C and D.

Taxonomy

The critical study of specimens previously identified as *Sedum ewersii* Ledeb. (s.l.) have indicated that two taxa can be recognized.

Following key is prepared between the two taxa to identify the *Sedum ewersii* Ledeb. and *Sedum pakistanicum* Sarwar.

Key to the species

1. Leaves and calyx with distinct reddish brown glands on the surface; epipetalous filaments for lower 1/3 adnate to petals **Sedum ewersii**
2. Leaves and calyx without any glands on the surface; epipetalous filaments for lower 1/2 adnate to petals **Sedum pakistanicum**

1. **Sedum ewersii** Ledeb., Fl. Alt. 2: 191. 1830 (Fig. 3).

Type: Russia, Altaï: "ad fl. Bolschaja Uba, Buchtorma et Kokoryo et ad lacum aureum (Teletzko Osero)" (LE, n.v.).

Specimens examined. — **Baltistan:** Kuru valley, Kote, 15.9.1941, *Mohinder Nath 4419* (RAW); **Abbotabad:** Abbotabad, 11.4.1952, *Coll. ignot.*, s.n. (KUH); Thandiani, 5.9.1985, *Y. Nasir, R. Akhtar & M. Hanif 12035* (RAW); **Gilgit:** ca. 8 Km from Babusar village on the way to Babusar top, 5.9.1988, *S. Omer & M. Qaiser 2652* (KUH); ca. 28 Km from Gram Chasma on the way to Shah Saleem, 12.8.1992, *Tahir Ali, S. Z. Husain & Gohar Khan 2287* (KUH); **Muzaffarabad:** between Reshian and Leepa, 28.8.1986, *M. Qaiser & Rizwan Yusuf 7855* (KUH); Sharda, *Jan Mohd. 136*, 23.8.1958 (RAW); Leepa Valley, 4.9.1969, *Jan Mohd* s.n. (RAW); **Hazara:** Kalabagh, Nathiagali, 15.10.1955, *Coll. ignot 620* (KUH); Changla Gali, 16.6.1959, *Jafri & Ali 3134* (KUH); Naran, Saif-ul-Maluk, 22.8.1987, *Y. Nasir, R. Akhtar & M. Hanif 13093* (RAW); **Swat:** Gabral, 2.9.1962, *Stewart, Nasir & Siddiq 1549* (RAW); Jaha Nullah, 3.9.1962, *Dr. Zaman* s.n. (RAW); Kalam, 21.8.1952, *R. R. Stewart s.n.* (RAW); Utroth, 30.10.1985, *Atiq-ur-Rehman* s.n. (KUH); **Kashmir:** Pahlgam, 2.9.1920, *R. R. Stewart 5882* (RAW); Kum Pather, Masjid Gali, 13.9.1939, *R. R. Stewart & I. D. Stewart 18459* (RAW); Sapi La, Surn, 8.1912, *R. R. Stewart* s.n. (RAW); Baghicha to Olding, Indus Valley, 23.8.1940, *R. R. Stewart 21022A* (RAW); between Shadra and Kail, 23.9.1987, *Tahir Ali, M. Qaiser & M. Ajmal Khan 525* (KUH).

Distribution. — Alpine Siberia and Soongaria; temperate and alpine Himalaya from Kumaon to Kashmir, alt. 3000-6000 m.

Flowers and fruits. — April-October.

2. **Sedum pakistanicum** Sarwar, spec. nov. (Fig. 4).

Holotype: Pakistan, Gilgit: Chaprot, 3080 m, West of Chalt, *Y. Nasir* (RAW!).

A. S. ewersii differt absentia glandularum in foliis calicibusque, filamentis staminum fere 1/2 longitudine adnatis ad petalis.

Perennial: rhizome branched, woody, giving rise to numerous sterile and fruiting shoots; roots slender-cordlike; stem glabrous, basally woody and branched, spreading-ascending and rooting at nodes, 9.5-17.5 cm high; leaves opposite, sessile, broadly ovate or suborbicular, 12-20 mm × 5-13 mm; inflorescence corymbiform compound; flowers small, bisexual; pedicel 1.2-5.0 mm long; sepals 5, lanceolate, acute, 1.6-3.0 mm long; petals 5, elliptic, acute, pink or light purple, 4.0-5.0 mm long; stamens 10, in two whorls, filaments nearly for the lower 1/2 adnate to petals, with blackish anthers; carpels bulging in the middle and tapering upward and downward; nectary scales 0.4-0.7 mm long, oblong; follicles erect, 3.5-5.0 mm long; seeds ellipsoid, 0.8-1.0 mm long, 0.2 mm wide.

Specimens examined. — **Gilgit:** W. of Chalt, above Chaprot, 30.8.1988, *Y. Nasir & Ali Gohar 13544* (RAW); Rama, 13.8.1955, *E. Nasir & G. L. Webster 6470* (RAW); Hunza, 12.8.1954, *R. R. Stewart* s.n. (RAW); **Baltistan:** Thalle la, 14.8.1940, *R. R. Stewart 20695* (RAW); Thalle la, 28.8.1930, *J. R. Graham* s.n. (RAW).

Distribution. — Pakistan (Gilgit, Hunza, Baltistan).

Flowers and fruits. — April-October.

	<i>Sedum ewersii</i>	<i>Sedum pakistanicum</i>
Length μm	21.0	20.7
Breadth μm	15.2	14.4
P/E μm	138.0	143.9
Shape	Prolate	Prolate
Colpi length μm	18.0	17.6
Colpi breadth μm	2.40	2.40
Exine μm	2.40	2.40
Mesocolpium μm	10.4	10.1
Apocolpium μm	7.44	7.39
Intercolpate distance μm	6.24	5.47
Table 1. – Measurement of pollen grains of two taxa.		

	Length μm	Breadth μm
<i>Sedum ewersii</i>	700.0	210.8
<i>Sedum pakistanicum</i>	735.6	227.6
Table 2. – Measurement of seeds of two taxa.		

ACKNOWLEDGEMENTS

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