



Jungermannia (Solenostoma) confertissima: Endemic Species to Western Himalayas, India

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The present study gives the complete account of *Jungermannia* (*Solenostoma*) *confertissima* Nees. *Jungermannia* subg. *Solenostoma* has been a controversial genus. It has been treated differently by various Bryologist from time to time. Amakawa(1960) treated *Solenostoma* under the genus *Jungermannia* L. and divided it into 4 sections viz., *Protosolenostoma*, *Desmorhiza*, *Solenostoma* and *Nematocaulon*(see Amakawa,1967 also). The present species *Jungermannia* (*Solenostoma*) *confertissima* Nees belongs to the section *Desmorhiza* of Subgenus *Solenostoma*. The important characteristic of the section are rhizoids arising from stem as well as from the rhizoid initial cells of leaf lamina, the most important identification feature along with rhizoidal characteristics is the monoecious condition of the plants.

The plants were studied in detail from Western Himalayas, India (Singh Panzy,1991), also reported by Kashyap (1932).

Description:

Jungermannia (*Solenostoma*) *Confertissima* Nees, *Naturg. Eur. Leberm.* 1: 277-291 (1833); Vana, *Journ. Hatt. Bot. Lab.* 36: 63 (1972).

Jungermmannia duthiana Steph., *Spec. Hepat.* 2: 71 (1901); Amakawa, *Journ. Hatt. Bot. Lab.* 30:196 (1967); Kashyap, *Liverworts of the Western Himalayas and the Panjab plains - II:* 88 (1932).

(Plate -1, Figs. 1-4; Plate -2, Figs. 1-18; Plate -3, Figs. 1-6)

Plants in patches, small, 5-11 mm long, 1.4-1.8 mm wide, pale brown or brown. Stem erect usually simple, 0.25-0.4 mm or 10-11 cells across the diameter, one or rarely two layers of cortical cells thick walled, 6.8-27.2 x 10.2-34.0 μ m, medullary cells thin walled 27.2- 51.0 x 10.0-34.0 μ m. Sub-floral innovations very rare. Rhizoids numerous, pale brown, decurrent forming a fascicle along the stem, some of them occurring on the leaf lamina and perianths. Leaves succubous, imbricate, sinuately inserted, dorsally decurrent, strongly concave, when flattened orbicular (broader than long), (0.6) 0.9-1.3 (1.6) mm long, 0.9-1.4 (1.7) mm wide, cells 13.6-27.8 x 17.0-34.0 μ m along the leaf margin(sometimes epidermal cells slightly thick-walled), 17.0-51.0 x 17.0-34.0 μ m in the middle and 34.0-68.0 x 20.4-30.6 μ m at the base, walls thin, trigones small acute (rarely slightly bulging), cuticle smooth.

Monoecious. Male inflorescence just below the female inflorescence, male bracts in 2-3 pairs, ventricose, 1.1-1.3 mm long, 1.1-1.7mm wide. Perianth clavate-oblong, 1.5-2.0 x 1.0-1.2 mm, 4-plicate, mouth crenulate, beak present, perigynium erect. Apical cells of perianth 23.8-40.8 x 13.6-17.0 μ m, cells in the middle 17.0-47.6 x 17.0-40.8 μ m and basal cells 51-68 x20.4-22.8 μ m Female bracts one pair, similar to leaves, ventricose, 1-1.5 mm long,1.5-1.8 mm wide. Sporophyte with foot, seta and capsule. Seta 7-8 cells or 0.30-0.35mm across diameter, composed of three circles of cells surrounding 4 valved, capsule wall bi-tri-stratose, outer layer cells much broader than long having nodular thickenings on radial and end walls, cells of the inner layer much longer than broad with semiannular thickening bands. Spores 13.6-18.7 μ m in diameter, pale brown. Elaters bispirate, pale brown-brown, 119-142 μ m long and 11.9-13.6 μ m wide with tapering ends.

SEM of spores: Sporoderm with numerous small, closely arranged papillae, uniformly distributed throughout. The sporoderm architecture is identical on distal (Plate - 3, Fig. 3) and proximal (Plate - 3, Figs.1, 2) faces.

On the proximal face a prominent, uplifted tri-radiate mark is present, tri-radiate rays touching the equator (Plate - 3, Figs.1, 2, 4, 6).

Habitat Terricolous or corticolous.

Type Locality: Kashmir.

Distribution in India: Endemic to Western Himalayas: Jammu & Kashmir-

Kashmir: Gumbliali nullah. Hem Kund and valley of flowers.

Range India (Endemic to Western Himalayas).

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Characteristics of the species:

1. Plants 5-11 mm long, pale brown-brown.
2. Rhizoids decurrent along the stem forming a distinct fascicle, also occurring on the leaf lamina and perianths.
3. Leaves orbicular, sinuately inserted, walls thin, trigones small, acute or rarely slightly bulging.
4. Monoecious. Male inflorescence just below the female bracts, male bracts in 2-3 pairs.
5. Perianth clavate-oblong, ½ exerted, tetra-plicate, perigynium erect

Following specimens have been examined:

LWU 4123, 4126, 4136, 4201, 4211, 4212, 4214, 4216, 4217, 4218, 4219, 4220, 4226/80, Bryophytes from Western Himalayas, *Jungermannia (Solenostoma) confertissima* Nees., Loc.: Valley of flowers, alt.- 4000 m
Habitat: on soil in association with *Radula* sp., *Gymnocolea* sp., *Conoce-phalum* sp., *Pallavicinia* sp., and *Jungermannia (Solenostoma) purpurata*

Mitt., Leg.: S.C. Srivastava, D. Kumar & D.K. Singh, Date: 22.5.1980,

Det.: S.C. Srivastava & P. Singh.

LWU 4276, 4278, 4287, 4317/80, Bryophytes from Western Himalayas, *Jungermannia (Solenostoma) confertissima* Nees, Loc.: Valley of flowers, alt.4000 m,

Habitat: on soil in association with *Blepharostoma* sp., *Bazzania* sp., *Calypogeia* sp. *Lophozia* sp., *Plagiochila* sp., *Tritomaria* sp., *Metzgeria* sp., *Apometzgeria* sp., *Sauteria* sp., *Gymnocolea* sp., and *Lophocolea minor*,

Leg.: S.C. Srivastava, D. Kumar & D.K. Singh, Date:23.5.1980,

Det.: S.C. Srivastava & P. Singh.

LWU 4321, 4324, 4325/80, Bryophytes from Western Himalayas, *Jungermannia (Solenostoma) confertissima* Nees, Loc.: Hem-Kund, alt. ca. 4000 m,

Habitat: on soil in association with *Lophocolea minor*, *Calypogeia* sp., *Lophozia* sp., *Tritomaria* sp., *Blepharostoma* sp.,

Leg.: S.C. Srivastava, D. Kumar & D. K. Singh, Date: 23.5.1980,

Det.: S.C. Srivastava & P. Singh.

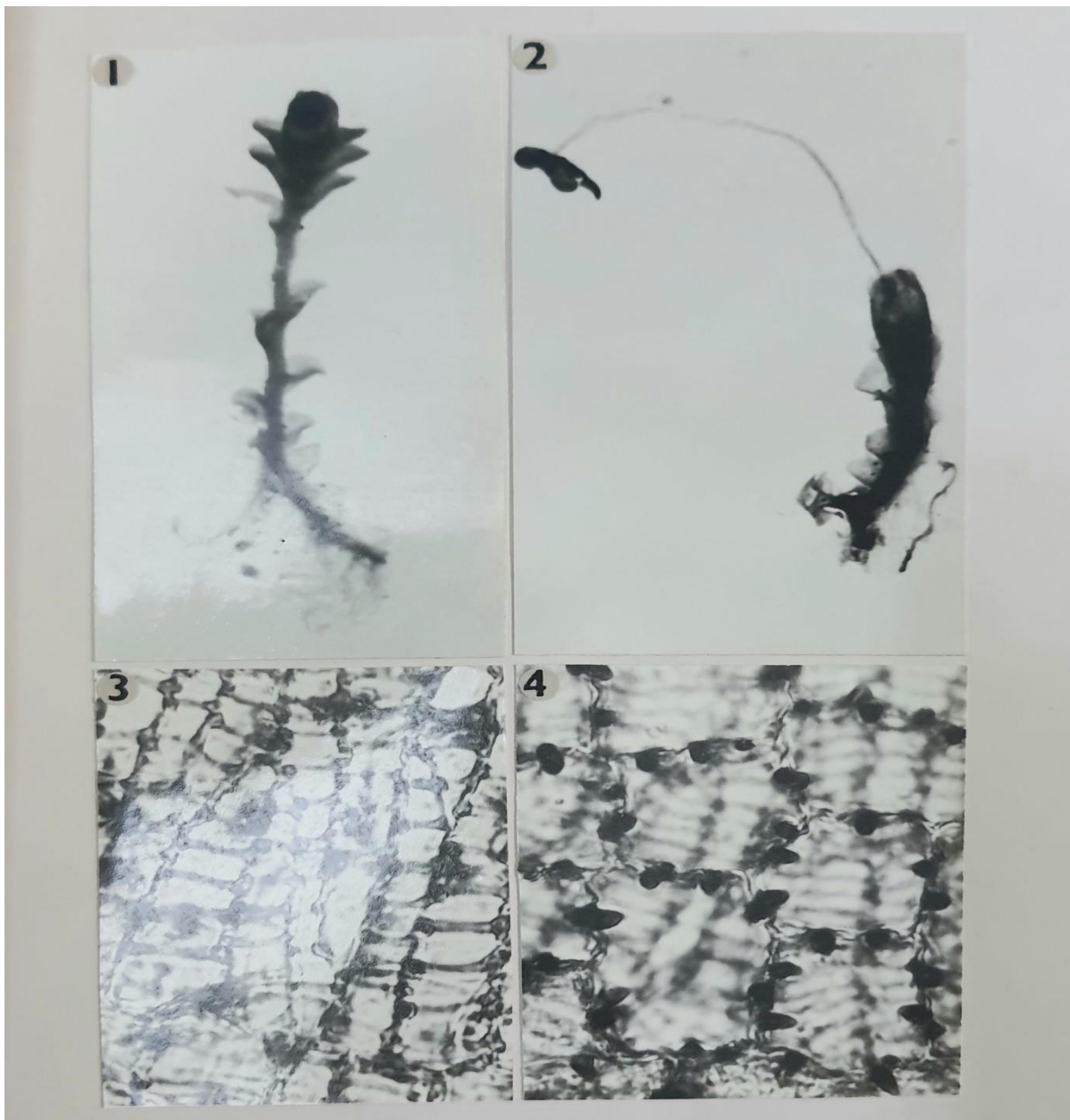
Following specimen from foreign herbarium has been examined:

G Typus *Jungermannia confertissima* Nees (*Jungermannia duthiana* Steph.), Loc.: Kashmir, Gumbliali nullah, 10-11000 ft., Date: 22.5.1892, Leg.: J.F. Duthie, No. 12915.

Jungermannia (Solenostoma) confertissima, a species endemic to the Western Himalayas (India) was introduced by Nees (1833) from Kashmir. An allied species, *J. duthiana* Steph., earlier instituted by Stephani (1901) from Kashmir and later described by Kashyap (1932) and Amakawa (1967) from the same area was reduced as a synonym of the former (Vana, 1972b). *Jungermannia (Solenostoma) confertissima* is closely related to *J. (Solenostoma) ariadne* Tayl. and *J. (Solenostoma) lanigera* Mitt., in having rhizoids on leaf surface. However, the latter two are dioecious and possess more decurrent leaves on the stem. The antheridium in *J. confertissima* is described as thick-stalked, globose and single per bract (Stephani, 1901; Kashyap, 1932) which has not been observed in the specimens studied. However, presence of saccate bracts just below the female perianth can be considered as male bracts.

The plants from the valley of flowers and Hem-Kund show acute to slightly bulging trigones however, in the type specimen the trigones are small and acute only. The sporoderm architecture of this species corresponds with those of *J. (Solenostoma) purpurata* Mitt.

Plate 1



Jungermannia (Solenostoma) confertissima Nees

(Figs. 1-4)

Fig.1. A plant, lateral view (x 5.3).

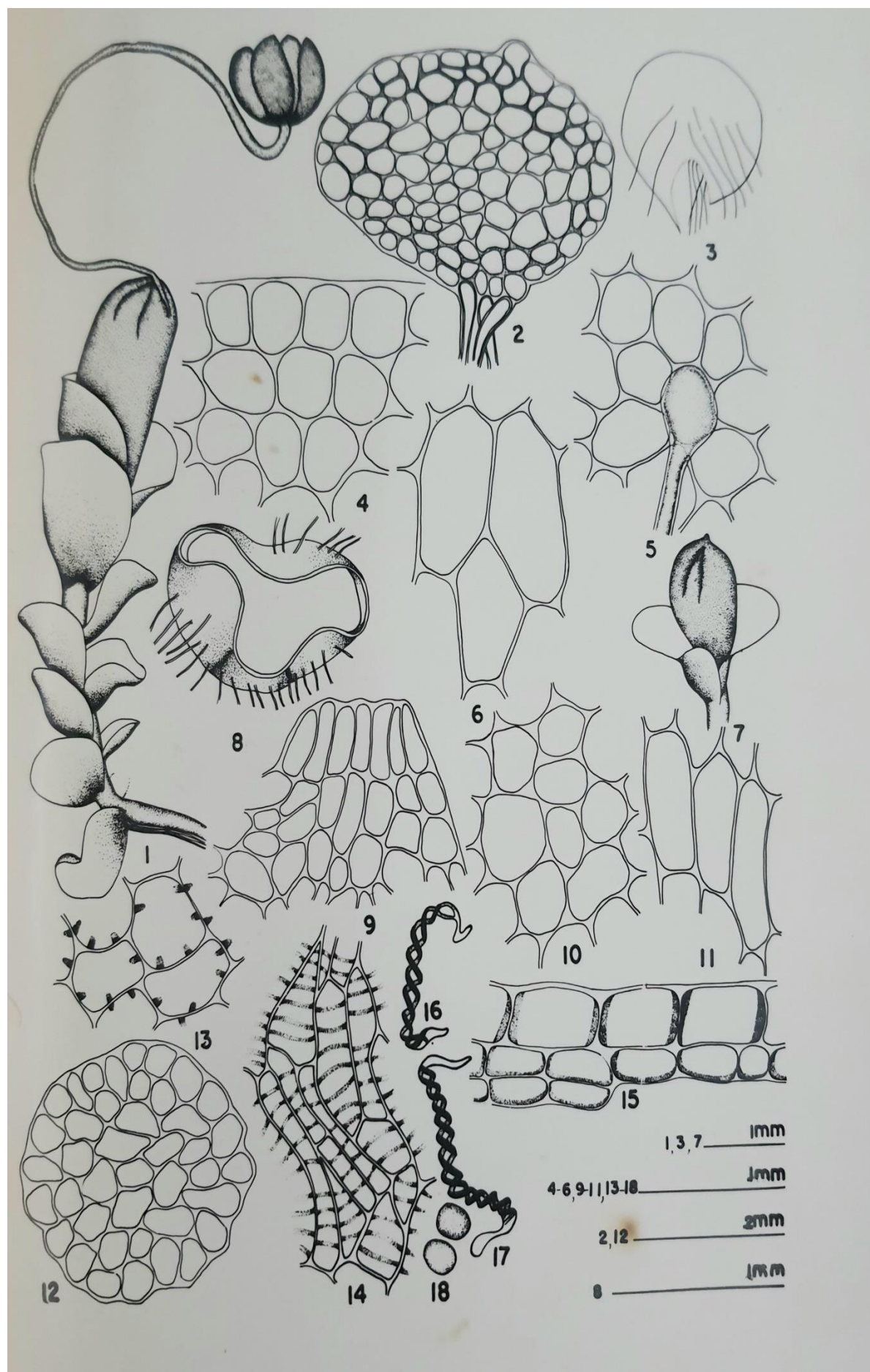
Fig. 2. A plant, dorsal view (x 6.8).

Fig. 3. Cells of outer layer of capsule wall (x 610).

Fig. 4. Cells of inner layer of capsule wall (x 730).

(Microphotographs 1, 2 from LWU 4216/80 and 3,4 from LWU 4218/80).

Plate 2



Jungermannia (Solenostoma) confertissima Nees

(Figs. 1-18)

Fig. 1. Female plant.

Fig. 2. T.S. stem.

Fig. 3. Leaf.

Fig. 4. Marginal cells of leaf.

Fig. 5. Median cells of leaf.

Fig. 6. Basal cells of leaf.

Fig. 7. Perianth.

Fig. 8. T.S. perianth.

Fig. 9. Apical cells of perianth.

Fig. 10. Median cells of perianth.

Fig. 11. Basal cells of perianth.

Fig. 12. T.S. seta.

Fig. 13. Cells of outer layer of capsule wall.

Fig. 14. Cells of inner layer of capsule wall.

Fig. 15. T.S. capsule wall.

Fig. 16,17. Elaters.

Fig. 18. Spores.

All the figures drawn from LWU 4220/80.

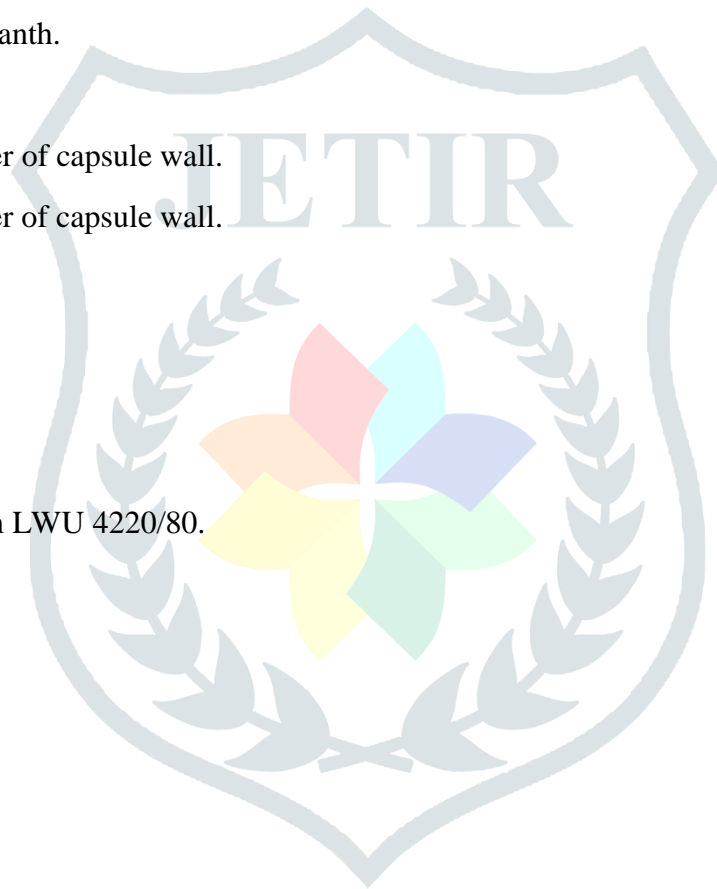
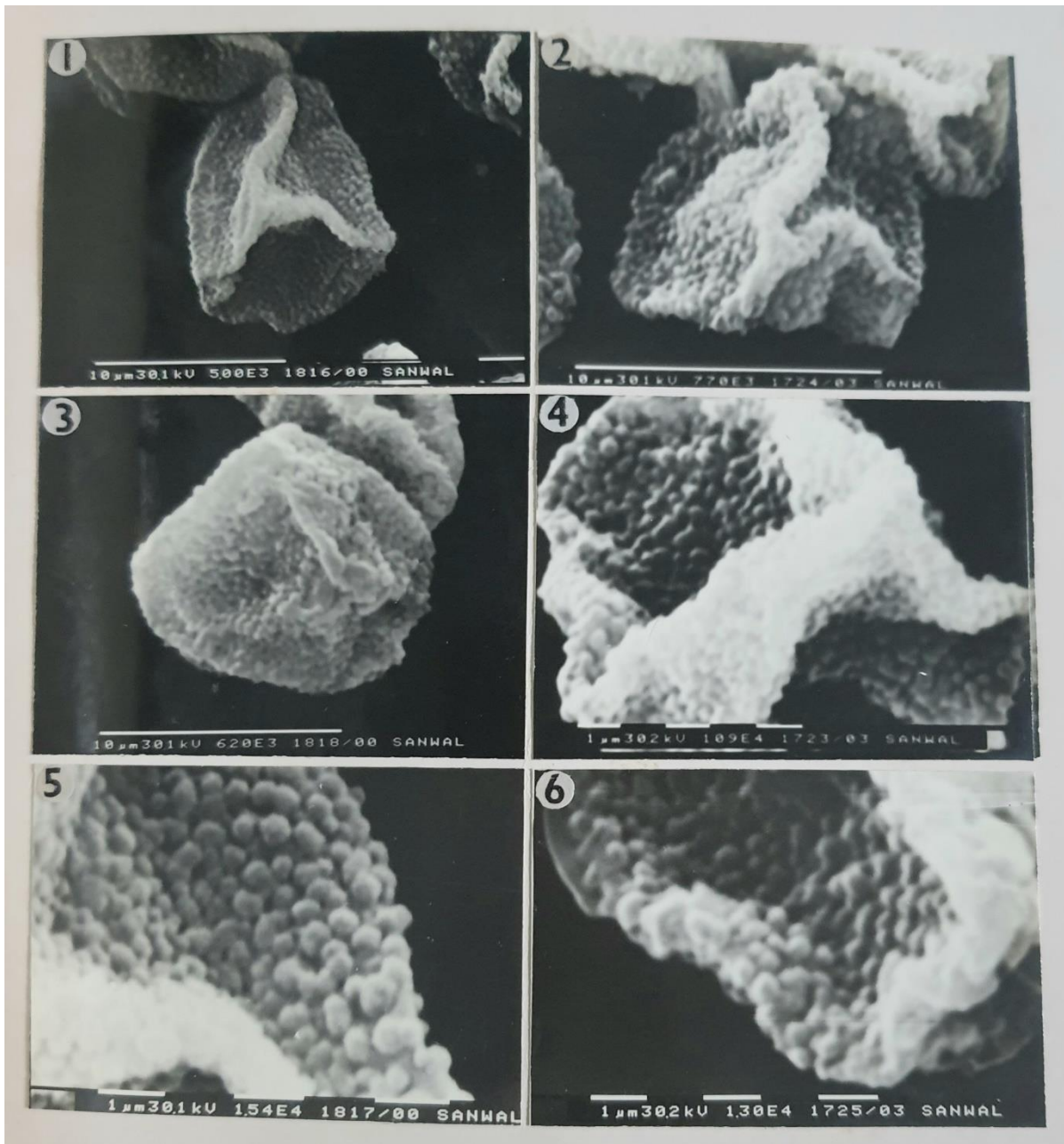


Plate 3



Jungermannia (Solenostoma) confertissima Nees
(Figs. 1-6)

Figs. 1, 2. Spores, proximal view.

Figs. 3. Spore, distal view.

Figs. 4. Spore, proximal view.

Figs. 5, 6. Spores, proximal view (enlarged).

(SEM from LWU 4220/80).

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