



JUNGERMANNIA (SOLENOSTOMA) PURPURATA MITT.

From Khasia Mountain

By Dr. Panzy Singh

Jungermannia (Solenostoma) purpurata Amak. Belongs to the section *Desmorhiza* of subgenus *Solenostoma*. The species is widely distributed in Khasia mountain, Assam, Darjeeling, Nainital, Himachal Pradesh, Valley of Flowers.

Plants Olive green to purplish, (Singh,1991) rhizoids long decurrent along the stem forming a distinct fascicle, leave cordate sinuately inserted, decurrent or dorsal surface, cells thin walled, Dioecious male inflorescence intercalary.

JUNGERMANNIA (SOLENOSTOMA) PURPURATA MITT.

Jungermannia (Solenostoma) purpurata Mitt., Journ. Proc. Linn. Soc. London 5: 91 (1861); Amakawa, Journ. Hatt. Bot. Lab. 30: 183 (1967);

Vana, Journ. Hatt. Bot. Lab. 36: 67 (1972).

Solenostoma purpuratum Steph., Spec. Hepat. 2: 51 (1901).

Solenostoma purpurata Mitt., in Kashyap, Liverworts of the Western Himalayas and the Panjab Plains - II: 85 (1932).
Aplozia purpurata (Mitt.) Chopra, Proc. Ind. Acad. Sci. Sect. 67: 245 (1938).

(Plate - 1, Figs. 1-6; Plate - 2, Figs. 1-10; Plate - 3, Figs. 1-17; Plate 4, Figs. 1-3)

Plants in turfs or mats, 10-16 mm long, 1.6-2.8 mm wide, olive green-yellowish brown or purplish. Stem erect, simple, 0.3-0.5 mm or 12-14 cells across the diameter, 2-3 layers of cortical cells thick walled, 25-60 x 25-45 µm, medullary cells thin walled, 25-60 x 45-60 µm. Subfloral innovations occasionally present. Rhizoids numerous, long, decurrent along the stem forming a distinct fascicle, colourless or pale brown. Leaves succubous, distant and smaller below, larger and contiguous above, sinuately inserted, slightly dorsally decurrent, concave, cordate (broadest at base), entire, 0.8-1.8 mm long, 0.9-2.1 mm wide, leaf bases are sometimes tinged with purple, cells (10.2) 17.0-27.2 x 13.6-30.6 µm along the leaf margin, (13.6) 23.8-44.2 x 17.0-34.0 µm in the middle and (30.6) 64-119 x 17.0-47.6 µm at the base, walls thin, trigones acute to slightly bulging, cuticle smooth.

Dioecious. Male inflorescence terminal or intercalary, bracts 8-10 pairs or more, ventricose, (0.6) 0.8-1.3 mm long, (0.8) 1.0-1.4 mm wide. Perianth pyriform, 1.5-3.2 mm long, 1.1-1.6 mm wide, 4-plicate, ½ exerted, mouth crenulate, beak short, perigynium undeveloped.

Apical cells of perianth 10.2-34.0 x 10.2-20.4 µm, cells in the middle 17.0-34.0 (40) x 17.0-34.0 µm and basal cells 34.0-128 x 17.0-50.0 µm.

Female bracts one pair, similar to cauline leaves, 1.3-1.6 x 1.4-2.0 μm . Sporophyte with foot, seta and capsule. Seta 7-8 cells or 3.7 mm across diameter, massive type. Capsule on maturity four valved, capsule wall bistratose, outer layer cells much broader than long having nodular thickenings on radial and end walls, cells of the inner layer much longer than broad having complete or incomplete semiannular thickening bands. Spores 17.0-20.4 μm in diameter, pale brown. Elaters bispirate, reddish brown, 136-204 μm long, 10.2 μm wide with tapering ends.

SEM of spores: The sporoderm architecture on distal (Plate- 4, Fig. 2) and proximal faces comprises of small papillae of identical size, densely arranged and uniformly distributed throughout. Sometimes due to the dense arrangement, the papillae tend to fuse with each other. On the proximal (Plate-4, Fig.1) face a distinct, uplifted, tri-radiate mark is present, the rays of this tri-radiate mark terminate near the equator. The granules which are present on the rays are sometimes slightly larger.

Habitat: Terricolous.

Type Locality: Khasia mountains.

Distribution in India: Eastern Himalayas: Assam Khasia mts., Sikkim; W. Bengal - Darjeeling.

Western Himalayas: Himachal Pradesh - Simla; Uttar Pradesh - Naini Tal & valley of flowers,

Range: India and Nepal.

Characteristics of the species:

1. Plants 10-16 mm long, olive green-brown or purplish.
2. Rhizoids long decurrent along the stem forming a distinct fascicle.
3. Leaves cordate (broadest at base), sinuately inserted, Decurrent on dorsal surface, cells thin walled, trigones acute-slightly bulging.
4. Dioecious. Male inflorescence intercalary or terminal and bracts 8-10 pairs.
5. Perianth pyriform, 4-plicate, mouth crenulate and perigynium undeveloped.

Following specimens have been examined:

LWU 2725/72, Bryophytes from Eastern Himalayas, *Jungermannia (solenostoma) purpurata* Mitt., Loc.: Darjeeling, alt. ca 2134 m, Habitat: on soil, Leg.: D. Kumar & V. Nath, Date: 31.12.1972, Det.: S.C. Srivastava & P. Singh.

LWU 2769/72, Bryophytes from Eastern Himalayas, *Jungermannia (Solenostoma) purpurata* Mitt., Loc: Darjeeling: Senchal, alt. ca 2956 m, Habitat: on soil in association with *Jungermannia (Solenostoma) macrocarpa* Steph., Leg.: D. Kumar & V. Nath, Date: 31.12.1972, Det.: S.C. Srivastava & P. Singh.

LWU 4216/80, Bryophytes from Western Himalayas, *Jungermannia (Solenostoma) purpurata* Mitt., Loc.: Valley of flowers, alt. ca 4000 m, Habitat: on soil in association with *Jungermannia (Solenostoma) confertissima* Nees, Leg.: S.C. Srivastava, D. Kumar & D.K. Singh, Date: 22.5.1980, Det.: S.C. Srivastava & P. Singh.

LWU 6556/82, Bryophytes from Western Himalayas, *Jungermannia (Solenostoma) Mitt.*, Loc.:Naini Tal, alt. ca 2000 m, Habitat: on soil in association with *Jungermannia gollanii* Steph., Leg.: R. Udar & U.S. Awasthi, Date: 7.11.1982, Det.: S.C. Srivastava & P. Singh.

Following specimens from foreign herbarium have been examined:

NY Holotype *Jungermannia purpurata* Mitt., Lectotype of *Jungermannia purpurata* Mitt., Loc.: Khasia mountains, alt. 2000-4000 ped, Griffith. J.H. et T.T, No. 1327.

NY Isolectotype *Jungermannia purpurata* Mitt., Loc.: Simla near Waterfall, Herb. Griffith. No. 937.

J. (Solenostoma) purpurata Mitt. belongs to the section *Desmorhiza*. The species is characterized by the plants which are tinged with purple and leaves which are cordate. It is important that cordate leaves are found only in this taxon of subgenus *Solenostoma*. This species is dioecious although erroneously stated to be monoecious by Stephani (1901).

Mitten (1861) discovered this species from Khasia mountains and described the leaves as orbicular while Stephani (1901) stated the leaves of this species as cordiform.

Kashyap (1932) also described *Solenostoma purpurata* Mitt. which is similar to *Jungermannia purpurata*. According to him the plants are dark purple in mats, leaves suborbicular and base cordate, obliquely inserted, however, specimens studied by him are not available and the present discussion is based on the description given by him.

Amakawa (1967) in his study of *Jungermannia purpurata* described dark olive plants and used this character in the key. However, the colour of syntype (J.D. Hooker and T. Thomson No. 1327) is fitted for the specific epithet *purpurata*. In our specimens also the plants are tinged with purple rather characteristic of this species.

Vana (1972b) also examined some purplish or reddish plants of this taxon but according to him the main feature of the species seems to be its cordate leaves.



PLATE-1**Jungermannia (Solenostoma) purpurata Mitt.**

(Figs. 1-6)



Fig. 1. A female plant, lateral view (x 5.8).

Fig. 2. A female plant, dorsal view (x 6.3.)

Fig. 3. A male plant with terminal inflorescence (x 8.3.)

Fig. 4. A male plant with intercalary inflorescence (8.1).

Fig. 5. Leaf cells (x 839).

Fig. 6. Spores and elaters (x 150).

(Microphotographs 1-6 from LWU 4216/80).

PLATE-2***Jungermannia (Solenostoma) purpurata* Mitt.**

(Figs. 1-10)

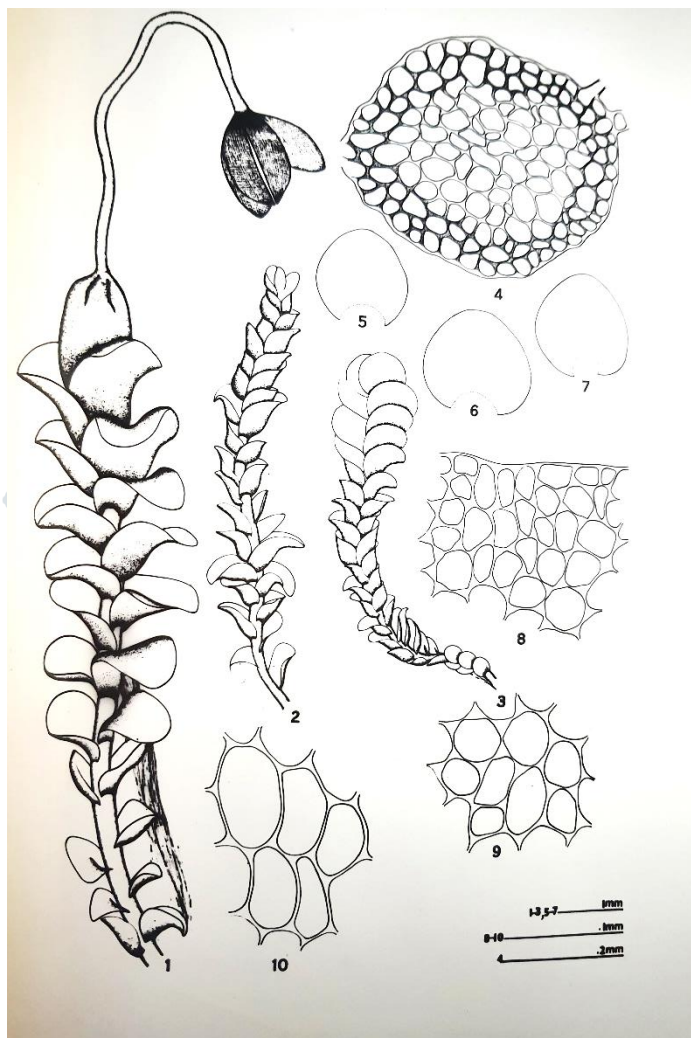


Fig. 1. Female plant (dorsal view).

Figs. 2, 3. Male plants.

Fig. 4. Cross Section of stem.

Figs. 5-7. Leaves.

Fig. 8. Marginal cells of leaf.

Fig. 9. Median cells of the leaf.

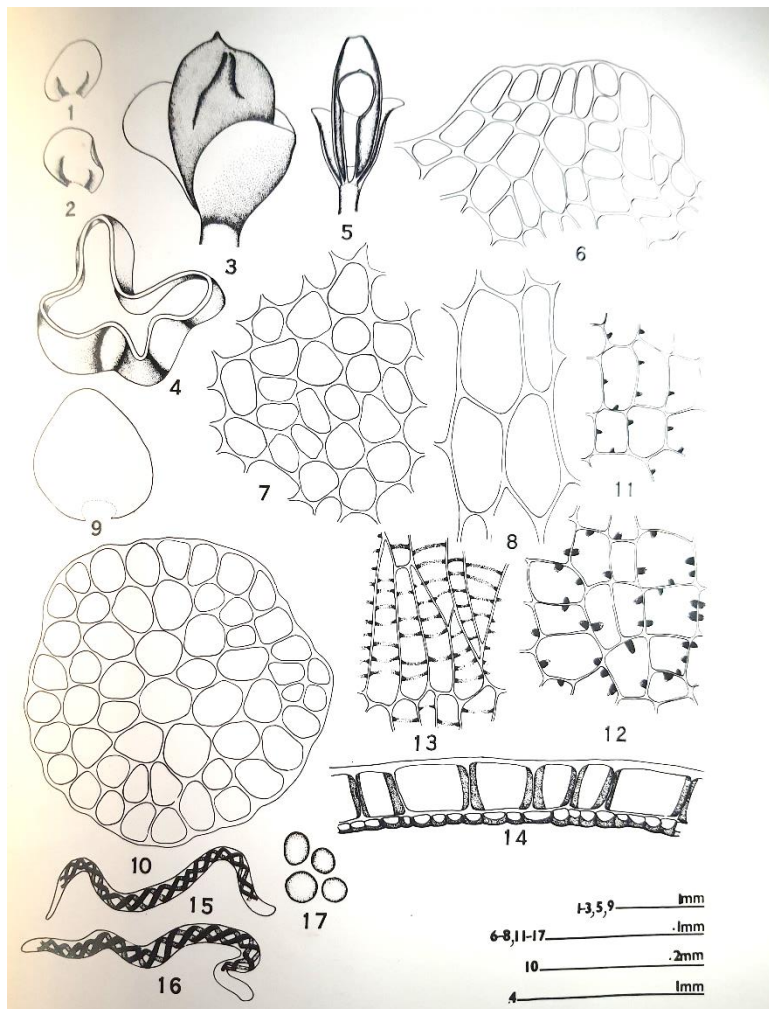
Fig. 10. Basal cells of the leaf.

Figures 1-5, 9, 10 drawn from specimen LWU 4216/80.

Figures 6-8 are drawn from Holotype.

PLATE-3**Jungermannia (Solenostoma) purpurata Mitt.**

(Figs. 1-17)



Figs. 1, 2. Male bracts.

Fig. 3. Perianth.

Fig. 4. T.S. perianth.

Fig. 5. L.S. perianth.

Fig. 6. Apical cells of perianth.

Fig. 7. Median cells of perianth.

Fig. 8. Basal cells of perianth.

Fig. 9. Female bract.

Fig. 10. T.S. seta.

Fig. 11, 12. Cells of outer layer of capsule wall.

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

Fig. 14. T.S. capsule wall.

Fig. 15, 16. Elaters.

Fig. 17. Spores.

Figs. 1-10 and 12-17 are drawn from specimen LWU 4216/80.

Fig. 11 is drawn from Holotype of *Jungermannia (Solenostoma) purpurata* Mitt.



PLATE-4

Jungermannia (Solenostoma) purpurata Mitt.

(Figs. 1-3)

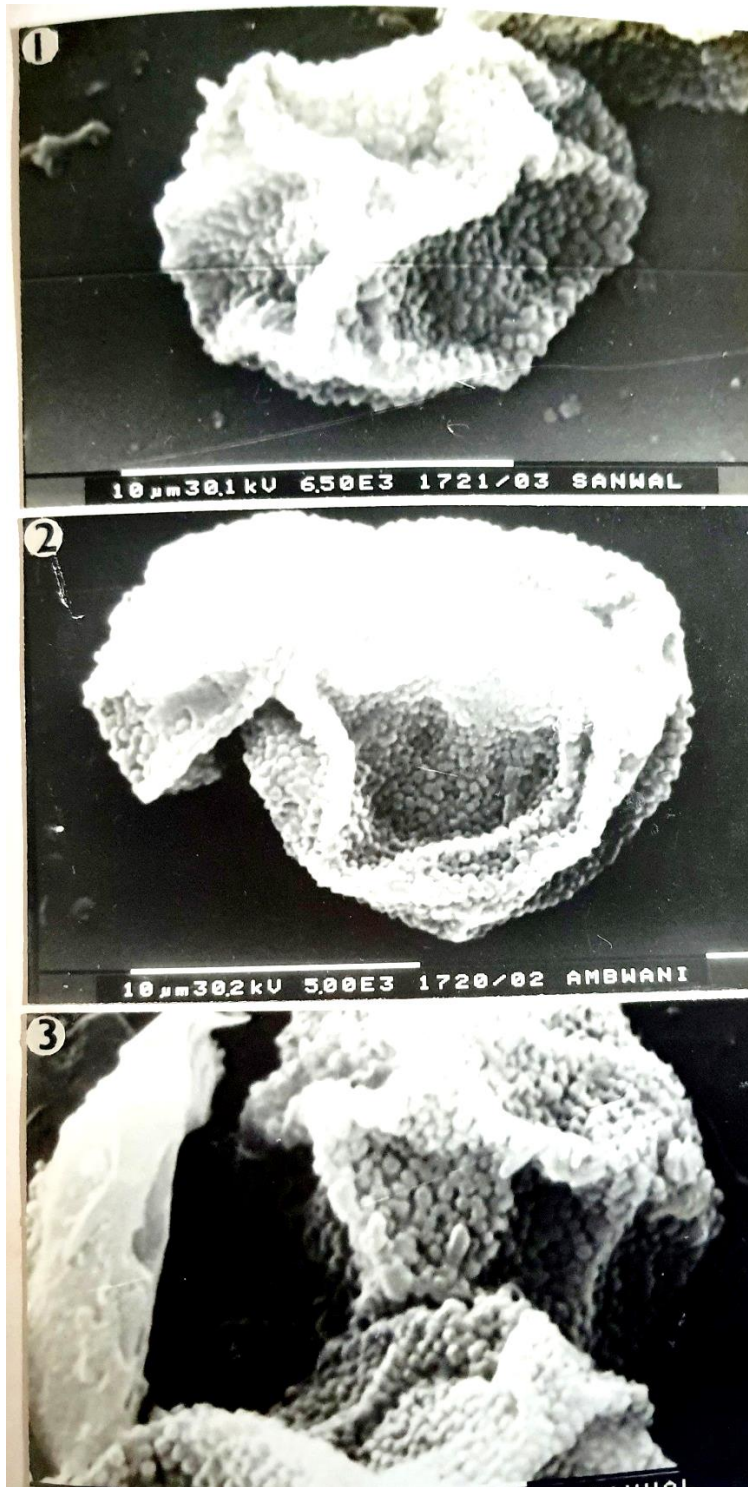


Fig. 1. Spore, proximal view.

Fig. 2. Spores.

Fig. 3. Spore, distal view.

(SEM from LWU 4216/80).

References:

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