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## Aconitum heterophyllum pdf

### Aconitum heterophyllum morphology. Aconitum genus.

Aconitum heterophyllum Wall (Ranunculaceae), also called "Atis," is a high-value biennial herb native to northwest and east Himalayan regions of Indian subcontinent. From: Himalayan Medicinal Plants, 2021 Achmatowicz O Jr, Marion L (1965) The structure of homochasmanine. Can J Chem 43(5):1093-1095 Article CAS Google Scholar Adams SJ, Kuruvilla GR, Krishnamurthy K, Nagarajan M, Venkatasubramanian P (2013) Pharmacognostic and phytochemical studies on Ayurvedic drugs Ativisha and Musta. Rev Bras Farmacogn 23(3):398-409. [◆ CAS](#) [Google Scholar](#) Ahmad H (2017) Isolation and characterization of bioactive diterpenoid alkaloids from Aconitum heterophyllum wall and related species. Dissertation, University of Malakand, Malakand Ahmad M, Ahmad W, Ahmad M, Zeeshan M, Obaidullah SF (2008) Norditerpenoid alkaloids from the roots of Aconitum heterophyllum Wall with antibacterial activity. J Enzyme Inhib Med Chem 23(6):1019-1022. [◆ CAS](#) [PubMed](#) [Google Scholar](#) Ahmad H, Ahmad S, Shah SAA, Latif A, Ali M, Khan FA, Tahir MN, Shaheen F, Wadood A, Ahmad M (2017) Antioxidant and anticholinesterase potential of diterpenoid alkaloids from Aconitum heterophyllum. Bioorg Med Chem 25(13):3368-3376. [◆ CAS](#) [PubMed](#) [Google Scholar](#) Ahmad H, Ahmad S, Shah SAA, Khan HU, Khan FA, Ali M, Latif A, Shaheen F, Ahmad M (2018) Selective dual cholinesterase inhibitors from Aconitum laeve. J Asian Nat Prod Res 20(2):172-181. [◆ CAS](#) [PubMed](#) [Google Scholar](#) Ameri A (1998a) The effects of Aconitum alkaloids on the central nervous system. Prog Neurobiol 56(2):211-235. 98)00037-9 Article CAS PubMed Google Scholar Ameri A (1998b) Structure-dependent inhibitory action of the Aconitum alkaloids 14-benzoyltalitsamine and talitsamine in rat hippocampal slices. Naunyn Schmiedeberg Arch Pharmacol 357(6):585-592. [◆ CAS](#) [PubMed](#) [Google Scholar](#) Anwar S, Ahmad B, Sultan M, Gul W, Islam N (2003) Biological and pharmacological properties of Aconitum chasmanthum. J Biol Sci 3:989-993 Article Google Scholar Atal C, Sharma M, Kaul A, Khajuria A (1986) Immunomodulating agents of plant origin. I: Preliminary screening. J Ethnopharmacol 18(2):133-141.



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### A Note on the Floral Morphology of Aconitum heterophyllum Wall. (Ranunculaceae) - An Important Temperate Medicinal Plant

R. Raina\*, Rajesh Chauhan and Rekha Naitani

Department of Forest Pathology, University of Horticulture & Forestry, Nainital, Uttarakhand, India (Email: raina@uohf.ac.in)  
\*Corresponding author: raina@uohf.ac.in  
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*Aconitum heterophyllum* Wall. (Ranunculaceae), commonly known as *Atis*, is an important endangered (IUCN, 1993) indigenous medicinal plant (Fig.1) distributed between 2000 and 4500 m and in temperate and alpine regions of the Himalaya. Distribution and morphology of this species has been extensively documented by various workers from time to time (Hooker and Thomson, 1872; Collett, 1902; Kiriluk Biju 1975; Blatter, 1984; Pokhain & Srinivas, 1984; Pragasini et al., 2007 and Naitani et al., 2009). However, its floral description especially perianth is described by these workers appears to be incomplete. Its perianth has been described as (i) "Rarely many flowered, helmet shortly beaked... flowers more than 1 inch long bright blue, greenish blue with purple veins. Helmet half as high as long" (Hooker & Thomson, 1872), (ii) "Flowers 1 or 2 in long dull green-blue with purple veins; helmet pointed in front, top rounded; lateral sepals as long as the helmet" (Collett, 1902), (iii) "sepals more or less blue or violet, rarely whitish with dark conspicuous veins, deeply pubescent or glabrous; upper sepal almost vertical obliquely erect, shortly or obscurely beaked, 18-20 mm. high and as long from tip to base; widest 6-8 mm above the middle, lateral margins sinuate, lateral sepal very oblique and broadly obovate with dark tips, 14-20 mm. long, 12-20 mm broad, not clawed; inner sepals elliptic-obovate or subovate, 8-10 mm long, nectaries glabrous, obovate-triangular-shaped, claw erect, 16-18 mm. long, hood short tip to 4 mm.) and very wide, more or less gibbous above, tip very short and broad, obscurely beaked or none" (Kiriluk & Biju, 1975), (iv) "More than 1 inch long, flowers dull green purple or dull green-blue with dark purple veins. Sepals 5, petal like, erect, the upper one (helmet) pointed in front, top rounded; lateral sepals as long as the helmet" (Blatter, 1984), (v) "Flowers 2-5 mm. usually in an upright cluster with very variable bracts which are either small linear small ovate, or large ovate and enclosing the lower part of the flower and first head rounded, broader than long" (Pokhain & Srinivas, 1984), (vi) "Flowers are 2.5 cm long, helmet shaped, bright blue or greenish-blue with pale veins" (Pragasini et al., 2007), (vii) "Sepals more or less greenish blue with purplish veins, rarely whitish glabrous, upper sepals almost sessile, obliquely erect and lateral sepals are very oblique and broadly ovate with dark tips" (Naitani et al., 2009).

Critical appraisal of these reports reveals that very little has been mentioned about its petals or their modification. This creates confusion especially when comparing it with other species of *Aconitum* L. Hence a need was felt to study its floral morphology discreetly. Flowers of this species were sourced from Rohang area of district Kullu (2000 to 3000 m amsl), Himachal Pradesh, India.

#### Floral Description

##### Flower

Flowers complex, bisexual, zygomorphic, bluish purple; sepals petaloid; petals rectiflexous; pedicellate; pedicels 1.5-2 cm long; bracteate; bracts petiole-like, ovate, 1.4 x 0.6 cm, apex acute, sessile at base, sheathing around the pedicel base; bracteoles; bracteoles two, opposite, elliptic-obovate, ca 0.7 x 0.3 cm (Fig. 2).

##### Perianth

###### Sepals

5, free, petal-like, blue or purple green-colored, laminae flattened forming the main body of the flower, arranged in three whorls: (i) outermost whorl consisting of single largest posterior sepal, helmet-shaped, ca 2.2 x 1.1 cm, apex beak-like, enclosing two smaller lateral sepals and nectariaceous peak, purple with greenish base, interspersed with prominent network of veins; (ii) inner whorl of two unequal anterior feathery ovate sepals, 0.8-0.9 x 0.3-0.5 cm and (iii) innermost whorl of two equal lateral sepals which are narrow or low triangular shaped with rounded edges and much larger than the two anterior sepals (2.1 x 1.9 cm), most part enclosed by helmet and marginally by two anterior sepals.

###### Petals

2, free, posterior, purple, modified into nectar secreting glands and marking stamens, distal into a shallow shape with smaller apex (ca 2.4 cm long); stalk linear, hollow, cylindrical, ca 2.2 cm long and swollen apex ca 2 mm long. Swollen apex possessing two nectar secreting openings.

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