

## ANGELICA KAGHANICA (APIACEAE), A NEW SPECIES FROM KAGHAN VALLEY, PAKISTAN

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### Abstract

*Angelica kaghanica* M.Ishtiaq & R.A.Qureshi sp.nov. from Kaghan valley is described, photographed and fruit vittae distribution pattern illustrated. It is closely related to *Angelica roylei* (Lindley) P.K. Mukharjee & Constance from which it differs in leaf division pattern, bracts and bracteoles and mericarp features.

### Introduction

The classification of *Angelica* L., and related genera is complex and controversial, and many species are known only from a few specimens (Zehui & Watson, 2005). The Himalayas are the southern delimitation of the distribution area of *Angelica* and numerous other temperate genera of the northern hemisphere. *Angelica* has its highest species diversity in E. Asia, particularly in the Chinese provinces of Sichuan and Yunnan. Another center of species diversity is in Middle Asia, but there the genus is represented by only five species belonging to subgenera. *Archangelica* and *Mesangelica*. Five species of *Angelica* are known from Himalayas namely *A.oreadum* Diels closely related to *A. sect. Archangelica*, *A. glauca* Edgew., *A. cyclocarpa* (C. Norman) M. Hiroe, *A. nubigena* (C.B Clarke) P.K. Mukharjee with the new addition of *A. indica* Pimenov & Kljuykov, (Pimenov & Kljuykove, 2003). Zehui & Watson (considering *Angelica* and *Archangelica* as separate genera) mentioned 45 species from China belonging to *Angelica* with a total number of reported species over 90 and 2 species of *Archangelica* Hoffm. with a total number of about 10 species (Flora of China, 2005). Mabberly (2008) mentioned that the genus *Angelica* comprised c. 110 species and it is distributed in north temperate region. Stewart (1972) listed two species belonging to *Angelica* namely *A. glauca* and *A. ternata* Regel & Schm. ex Regel., and two species belonging to *Archangelica* namely *Archangelica officinalis* Hoffm. var. *himalaica* C.B. Clarke and *Archangelica oreadum* Diels from West Pakistan and Kashmir. Nasir (1972) reported *A. glauca* and *A. archangelica* L. var. *himalaica* E.Nasir in Flora of Pakistan. Recently, Mukharjee & Constance recognized only *Angelica roylei* merging *Archangelica roylei* Lindley, *Archangelica officinalis* var. *himalaica* C.B. Clarke, *Angelica archangelica* var. *himalaica* (C.B. Clarke) Krishna & Badhwar, *Archangelica oreadum* Diels and *Angelica oreada* (Diels) Hiroe. (Umbelliferae of India, 1993). Keeping in view all these treatments, a distinct new species is being described from Kaghan valley, district Mansehra, Khyber Pakhtunkhwa, Pakistan. As the number, shape and size of vittae differ from one species to the other (Kapoor & Kaul, 1966), so the size, number and distribution pattern of vittae has been focused in the present study in addition to general morphology.

### Description

*Angelica kaghanica* M. Ishtiaq & R.A. Qureshi sp.nov. (Figs. 1-3)

**Type:** Pakistan, Khyber Pakhtunkhwa, District Mansehra, Kaghan valley, on the way from Naran to Battakundi, along Kunhar river, 34°35'N, 73°29'E, 2680 m 02-7-2008, M.Ishtiaq s.n. (holo. ISL)

**Diagnosis:** Affinis *A. roylei* (Lindley) P.K. Mukharjee & Constance sed foliis 1- pinnatis (non 2-3- pinnatis); bracteolis nullis (non linearis 1cm longis); juga dorsalia alata (non acuminata); vittis dorsalibus 2-3 per valleculem (non numeralis); vittis commissuralibus 6-9 (non numeralis).

Caulis solitarius, erectus, glabris, aromatis; folia peiolata, laminis late-triangularis-ovatis 80 –100 x 5-15 cm, 1-pinnatis; segmentis basalibus petiolulatis, ovatis; involucrum nullum, umbellae 50 radiatae, subaequalibus; Pedicellis 7mm longis, subaequalibus; bracteolis nullis; fructus glabri, stylopodia breve conica; styli erecti; juga marginalia late alata, dorsalia alata; vittis dorsalibus 2-3 per valleculem, commissuralibus 6-9.

Plants 200-300cm tall, erect, branching, aromatic, essentially glabrous throughout; stem stout, with fine ridges; leaves triangular –ovate, 80-100 cm long, 5-15 cm broad, petiolate, compound, 1-pinnate; petiole stout, c 80 cm long, broadly sheathing, sheaths succate; leaflets ovate, 3-5, crenate-dentate, lower surface paler, c 15 cm long, 3-5 cm broad, upper leaflets decurrent, lateral leaflets shortly petiolulate; cauline leaves a few, reduced upward; peduncles stout, c 20 cm long, umbels compound, terminal and lateral; bracts and bracteoles absent; rays stout, c 50, subequal, 10-16 cm long, spreading; fruit pedicels c 7mm long, spreading, subequal; calyx teeth obsolete; styles long, erect; stylopodium low conical, shorter than styles; immature fruit oblong, glabrous, 5mm long, 2mm broad; dorsal and intermediate ridges thick, corky, ± equally winged; lateral ridges narrowly winged, lateral wing narrower than the body; vittae large, of unequal diameter, neither adhering nor encircling the seed; dorsal vittae 2-3 per valleculae; commissural vittae 6-9; vittae occasionally present under ribs; commissural face convex. Fruiting July.

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Fig. 1. Habit and habitat of *Angelica kaghanica* M.Ishtiaq & R.A.Qureshi with pollinator.

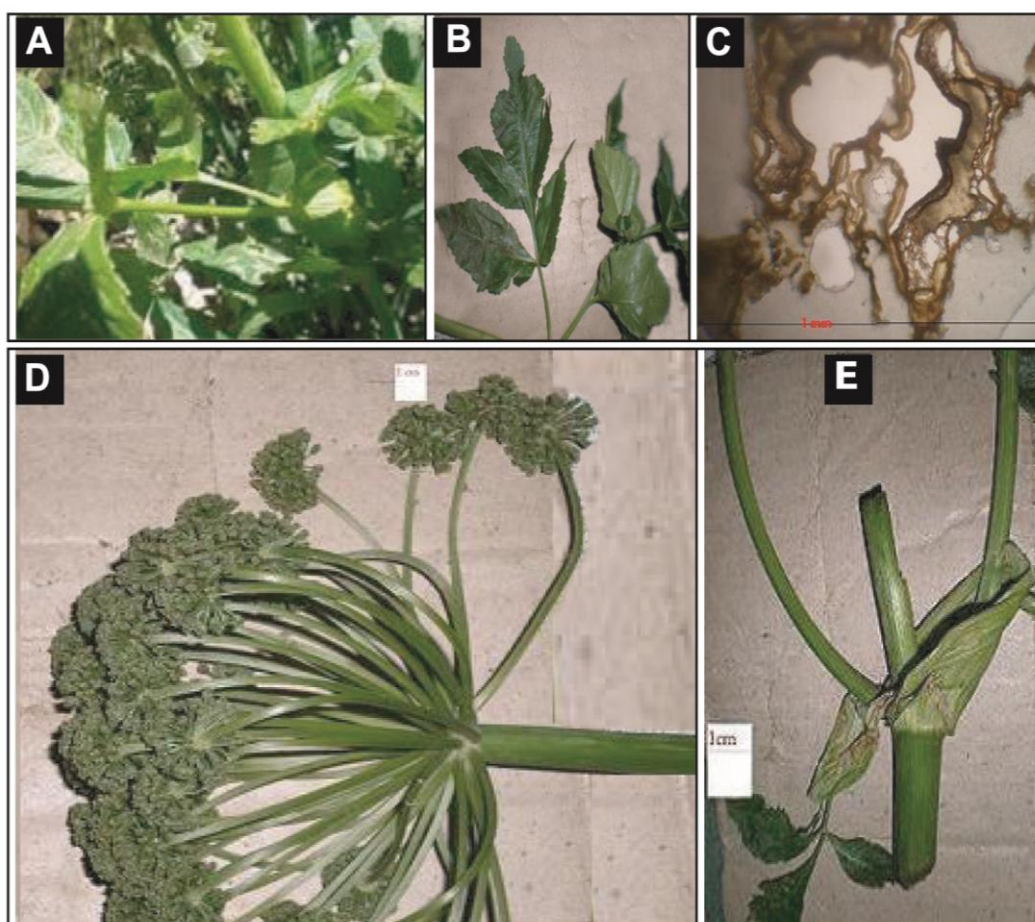


Fig. 2. A. Leaf bases showing petioles, B. Compound leaves, C. Light micro graph showing cross-sectional fruit anatomical features, D. Compound umbel without bracts and bracteoles, E. part of stem showing sheathing leaf bases.



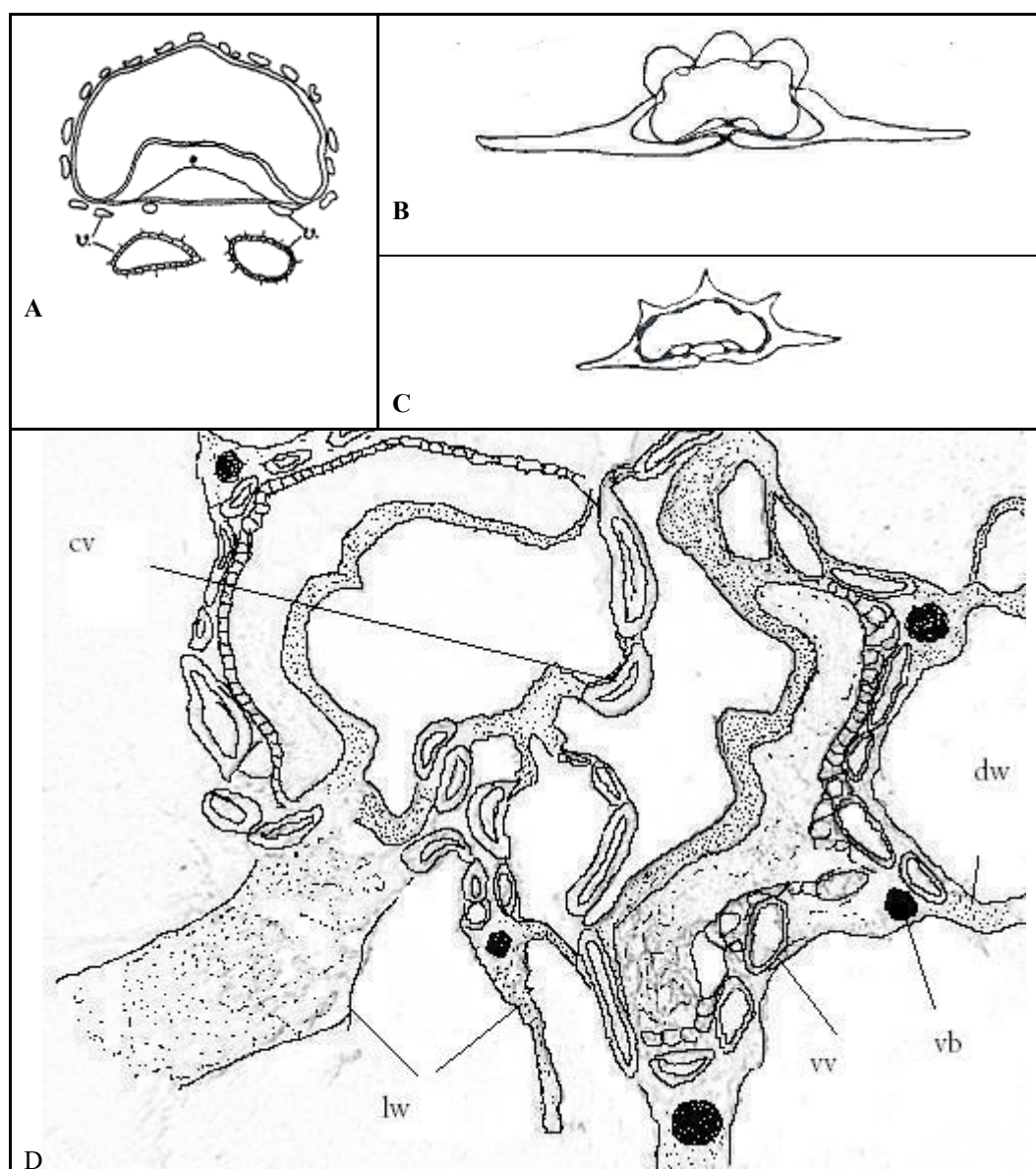


Fig. 3. Cross-sections of mericarps (v = vittae, cv = commissural vittae, vv = vallecular vittae, vb = vascular bundle, lw = lateral wing, dw = dorsal wing).

A. *Angelica archangelica* - re-drawn from *studies on the vittae of some important umbellifers* Kapoor *et al.*, (1963), B. *Angelica glauca*, C. *Angelica archangelica* - re-drawn from *Flora of Pakistan*, E. Nasir (1972), D. *Angelica kaghanica* M. Ishtiaq & R.A. Qureshi.

**Table 1. Comparison of the diagnostic characters of *Angelica kaghanica* M. Ishtiaq & R.A. Qureshi and *Angelica roylei* (Lindley) P.K. Mukherjee & Constance.**

Characters	<i>A. kaghanica</i>	<i>A. roylei</i>
Vesture	essentially glabrous	scaberulous, puberulent
Leaf division pattern	1-pinnate	2-3 -pinnate
Involucral bracts	lacking	small, linear
Rays	spreading	spreading-ascending
Bracteoles of involucre	lacking	numerous, linear, ciliate
Styles	erect	recurved
Dorsal ribs	winged	prominent, acute
Size of vittae	large and small	small
Dorsal vittae	2-3	numerous
Commissural vittae	6-9	4-6

## Discussion

This species being described as a new taxon with no obvious allies reported from China, India and Iran in the relevant literature (Nasir, 1972; Rechinger, 1987;

Mukherjee & Constance, 1993; Pimenov *et al.*, 2000; Pimenov & Kljuykov, 2003; Zehui & Watson, 2005; Vashishtha *et al.*, 2006), due to its 1-pinnate leaves, absence of bracts and bracteoles, spreading rays, winged dorsal ribs, un- equal sized vittae and the

distinct number of dorsal and commissural vittae. The fruit corss-sectional features are also compared critically with that of *Heracleum* L. and related taxa (Fading, 2005 and Lieu *et al.*, 2006) to rule out any match. The plant was collected during a collection trip of Kaghan valley in July, 2008. Fragmentary parts were carefully collected keeping in view the threat to its conservation as there were a few plants growing in that locality in rocks along the bank of Kunhar river. A specific pollinator species was also seen (Fig. 1) which might be an obligate pollinator. Further research in reproductive biology of this plant is strongly recommended.

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(Received for publication 27 April 2010)