A new species of *Panax* L. (Araliaceae) from Arunachal Pradesh, India

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**Abstract**

*Panax arunachalensis*, a new species in Araliaceae from Ziro valley in Lower Subansiri District of Arunachal Pradesh in Northeastern India is recognized and named. Its nomenclature along with detailed description, distribution, suitable photographs and illustration are provided. A comparison of the species with known species of *Panax* L. from the Indian Himalayan region is also provided.

**Key words**: *Panax arunachalensis*, New species, Araliaceae, Ziro Valley, Arunachal Pradesh, India

**INTRODUCTION**

Araliaceae (the ginseng family) includes about 50 genera and approximately 1500 species. The family is distributed mostly in tropics and subtropics with some genera occurring in temperate regions (e.g. *Aralia, Hedera, Oplopanax* and *Panax*) (Pandey *et al*. 2007). The Himalayas and central and western China are the current centre of diversity of the genus (Wen & Zimmer 1996). The plants of the family include perennial herbs, trees, vines, epiphytes and succulents.

The systematics of Araliaceae is currently under study and taxonomic changes and novelties are to be expected (https://en.wikipedia.org/wiki/Araliaceae). Species of Araliaceae are of crucial significance in traditional Chinese medicine in which *Panax* L. is medicinally most important genus (Jiang *et al*. 2018).

The genus *Panax* was established by Linnaeus (1753) and was described under *Pentandria digyna* (Pandey *et al*. 2007) and is consist of 19 species world wide of which two species grow in eastern North America and other species in Eastern-Central Asia (Venugopal & Ahuja 2014). Seven species of *Panax* are described in China (e-flora of china) and 11 of its accepted species are listed in the plant list (www.theplantlist.org). But, Kew Science has listed 13 accepted species for the genus, which includes *Panax assamicus* R.N Banerjee and *Panax sokpayensis* Shiva K. Sharma & Pandit (www.plantsoftheworldonline.org). All the *Panax* species are commonly known as ginseng and commercially its name go with their country of origin (Gurung *et al*. 2016). Maximum species diversity in *Panax* is reported from eastern, southwestern and central provinces of China, Central to Eastern Himalaya (Nepal, Bhutan and India) and some parts of South-East Asia. The lack of congruence in morphological characters among *Panax* species has made the taxonomic delimitation in the genus rather controversial (Sharma & Pandit 2009). In India, *Panax* occurs mostly in the north and northeastern regions.
Figure 1. Illustration of *Panax arunachalensis* M.Taram, A.P. Das & H.Tag: a. Plant habit; b. Single flower; c. Flower parts corolla removed; d. Dorsal and ventral surface of corolla; e. Stamen; f. Gynoecium with 2 styles; g. Gynoecium with 1 style; h. Bract; i. Stipels at the base of leaflets.
TAXONOMIC TREATMENT

Panax arunachalensis M.Taram, A.P Das & H.Tag, sp. nov.

Panax arunachalensis differs from Panax sokpayensis Shiva K. Sharma & Pandit in having trichomes on both surfaces of leaf, lanceolate leaflets, inflorescence with single terminal umbel, triangular calyx-lobes and much smaller bracts. The new species differs from Panax assamicus R.N. Banerjee in having horizontal rhizome, stem color, lanceolate leaflets with oblique base, triangular calyx, lanceolate petals, fruit having lower portion red and apical part black and flattish seed. It also differs from Panax bipinnatifidus Seem. in having horizontal rhizome, pinnatified lobed leaflets, trichomes on both surfaces of leaf, linear bracts and flattish seeds; and differs from Panax pseudoginseng Wall. in having horizontal rhizome, stem color, lanceolate leaflets with attenuate or oblique base, presence of trichomes on both surfaces of leaf, single umbel inflorescence, linear bract, lanceolate corolla and fruits with lower portion red and only apical part black.

TYPE: INDIA, Arunachal Pradesh: Lower Subansiri District. Ziro Valley. 2300 m, 27°63′ N latitude 93°38′ E longitude, dated 23.12.2017, Momang Taram, A.P Das & Hui Tag - HAU/MT-790/23.12.2017/Hake Tari (Holotype: ASSAM; Paratype: HAU, ARUN)

Perennial herbs, 40 – 110 cm tall; rhizomes 25 – 30 cm, horizontal, variable in shape with prominent stem scars and rings at node; internodes short and thick, ca.0.4 – 0.6 cm. Stem stout, brownish-green, terete, erect, 24 – 95 × 0.3 – 0.7 cm with scales at base. Leaves 2 – 7, verticillate at stem-tip, 18 – 30 cm long, extipulate, palmately compound; petioles glabrous, stout, 8 – 20 cm long; stipels 0.013 cm – 0.014 cm, linear to lanceolate; petiolules 1 – 4 cm with different sizes on a leaf; leaflets 5 – 7, lateral leaflets shorter, lanceolate, 10 – 25.5 × 2.5 – 4.5 cm, lateral one unequal-sided, serrulate, narrowly caudate-acuminate, cauda up to 4 cm long, base attenuate, oblique in lateral ones, both surfaces setose, trichomes 0.08 cm –
PLATE - I. *Panax arunachalensis* sp. nov.: A. Whole plant; B. Matured plant with fruits; C. Young leaves; D. Umbel with flowers; E. Umbel with developing fruits; F. One flower; G. Rhizome in upright position; H. Rhizome inverted; I. Ripe fruits; J. Pistil with calyx; K. Petals; L. Stamens; M. Ovary with 1-style; N. Ovary with 2-styles.
0.09 cm long, cylindrical on veins and veinlets; venation reticulate. Umbel solitary, simple, terminal; peduncle stout, 13 – 20 cm long; bracts linear 0.1 – 0.3 × 0.1 cm, green; pedicels 0.5 – 1 cm long, glaucous. Flowers 80 – 90 per umbel, actinomorphic, bisexual, epigynous; calyx persistent, sepals 5, deltoid, glabrous, alternate to petals, green; petals 5, free, lanceolate, 0.2 × 0.1 cm, glabrous, yellowish-green; stamens 5, free, 0.3 – 0.4 cm, filaments free 0.3 cm, anthers oblong, bilobed, white, ca. 0.2 × 0.1 cm, dorsifixed; carpels 2 – 3, syncarpous, ovary inferior, glabrous, green; style 1 or 2, stigma continuous, green; placentation apical. Berry more or less reniform, lower portion red and only apical part black, ca. 0.9 cm broad and 1.2 cm long; seed large and flattish ca. 0.6 – 0.9 cm long.

**Flowering:** June - August; **Fruiting:** September – December

**Distribution and Ecology:** Geographical location of the type locality is 27.63 ° N Latitude and 93.83° E Longitude. So far, Panax arunachalensis is known only from the type locality and is growing in temperate environment of 2200 m amsl at Ziro valley in Lower Subansiri district of Arunachal Pradesh, India. The species is shade loving, grows on moist humus-rich soil of forest floor along with Strobalanthes sp., Mycetia sp., Anoectochilus sp., etc. According to IUCN Red List categories and criteria (IUCN 2014), this species should be assessed as Critically Endangered (CR) based on the present situation, i.e. restricted geographic range of less than 2 km² with only single location (CR: B2a) and restricted population (CR: D).

**Conservation status:** The known population of this new species is narrowly distributed in the Medicinal Plant Conservation Area Hake Tari, Ziro Lower Subansiri District in Arunachal Pradesh and due to its high medicinal values and demand in the market, there is continuous uncontrolled harvest of its rhizome that will surely cause decline its population structure.

**Etymology:** The new species epithet ‘arunachalensis’ is based after the name of Arunachal Pradesh, the North-East Indian and extreme east Eastern Himalayan Indian state where from the species was collected and growing with its entire known population.

**Table 1.** Comparative morphology of Panax arunachalensis sp.nov. with the other known species of Panax L. in Eastern Himalaya

| Character        | P. arunachalensis | P. sokpayensis | P. assamicus | P. bipinnatifidus | P. pseudoginseng |
|------------------|-------------------|----------------|--------------|------------------|-----------------|
| **Plant height** | 40 – 100 cm       | 80 – 130 cm    | 70 – 150 cm  | 50 – 100 cm      | 30 – 60 cm      |
| **Rhizome**      | Horizontal, short and thick internodes | Horizontal, short and thick internodes | Small zinger like, horizontal, short and thick internodes | Creeping, elongated, internodes slender; nodes sub-globose | Short, vertical; carrot like or fascicled |
| **Stem color**   | Greenish brown    | Dark brown     | Typically straw | Dark brown       | Light straw     |
| **Leaf**         | 3 - 7 foliate     | 4 - 5 foliate  | 5 - 7 foliate | 3 - 6 foliate    | 3 - 5 foliate   |
| **Leaflets**     | Lanceolate, long caudate | Oblanceolate to narrowly elliptic | Broadly linear | Oblong-lanceolate to lanceolate or ovate | Ovobate to obovate-oblong |
| **Base**         | Attenuate or oblique | Round, attenuate or oblique | Rounded, rarely attenuate | Rounded or attenuate, oblique | base angustate and obtuse |
| **Margin**       | Serrulate         | Entire, serrate, some biserrate | Entire, minutely uniform serrate | Pinnatifid, lobes single or doubly serrate | Entire, doubly incise –serrate |
| **Trichome**     | Setose both surfaces | Setose on adaxial surface | Setose on both surfaces | Setose on adaxial surface | Setose on adaxial surface |
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