

## ***Ranunculus trilobus* Desfontaines (Ranunculaceae) – a new record for Northwest and Trans-Himalayas**

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### **Abstract**

The occurrence of *Ranunculus trilobus* Desfontaines (Ranunculaceae) is reported for the first time from the Northwest and Trans-Himalayan region. Along with *R. arvensis*, it grows in apple orchards and open fields at lower altitudes (ca. 1850 m) in the Kashmir valley. The high output (>300 per plant) of seeds, their high viability (>90 %), and easy dispersal help the species in quick widening its population size, and in invading the newer areas.

**Key words:** *Ranunculus trilobus*, new record, Northwest Himalaya, Trans-Himalaya.

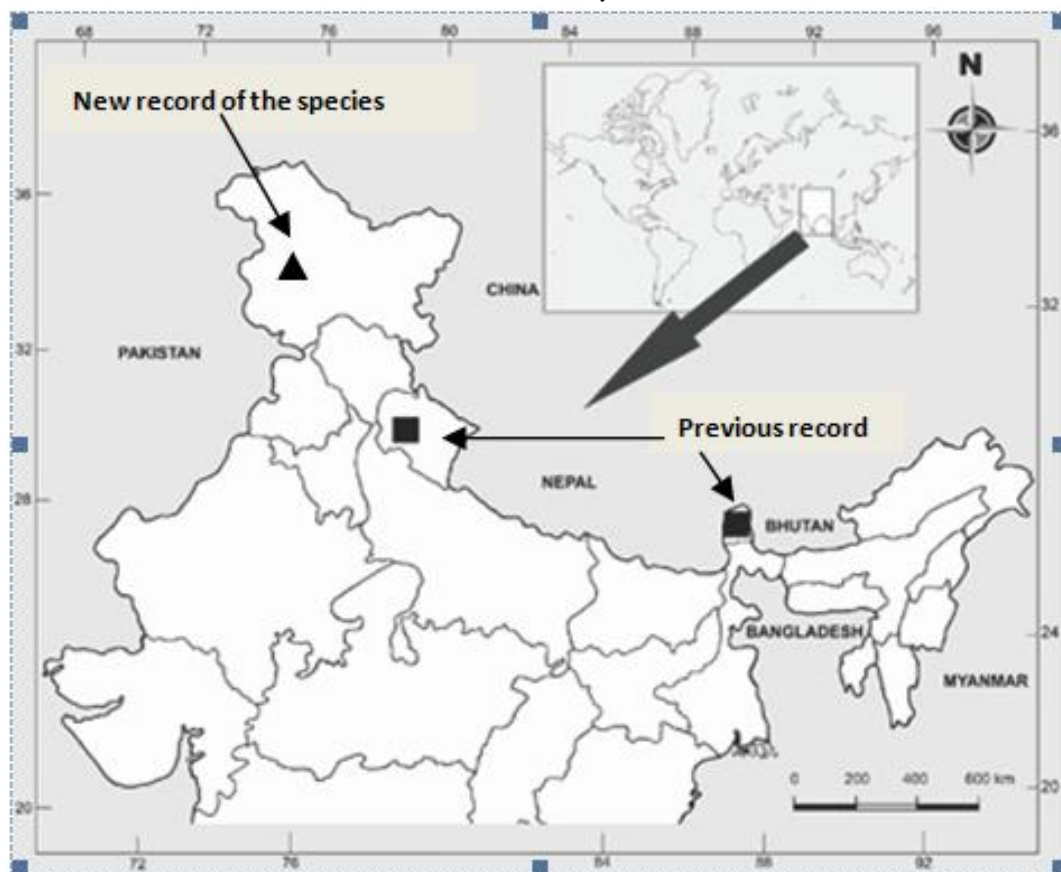
### **INTRODUCTION**

*Ranunculus* Linnaeus is a genus of annual and perennial herbs belonging to Ranunculaceae. The largest genus of the family, it comprises ca. 600 species (Tamura 1995; Mabberley 2008). These occur in a variety of habitats, such as forests, dry and damp meadows, marshes, puddles and streams, shallow and marshy banks of rivers and lakes, and alpine heaths.

The genus is distributed almost worldwide; the maximum number of species occurring in the temperate zones of Europe, Asia, North and South America, Australia, New Zealand, and in the alpine regions of New Guinea (Johansson 1998). Some of the species occur in tropical regions, where they are restricted to high mountain areas (Tamura 1995). In India, Rau (1993) has reported the occurrence of 33 species of *Ranunculus*; while Srivastava (2010) reported 41 species, ranging from low altitudes of Peninsula to the high alpine lands of the Himalayas. The Northwest and Trans-Himalaya, constituting a part of the Great Himalayan range, represents a repository of *Ranunculus*. Hooker & Thomson (1872) have listed 21 of its species from the British India, of which 12 species are from the Northwest and Trans-Himalaya; Stewart (1972) has reported 36 species of the genus from this region; Polunin & Stainton (1984) have reported 10 species; while Riedl & Nasir (1991) have reported 23 of its species from the Northwest Himalaya.

*Ranunculus trilobus* Desfontaines, commonly called as three-lobed buttercup, is distributed at the world level in parts of North America, Australia, Mediterranean region in Greece, Albania, Italy, Malta, Portugal and Spain. In India, this species has, so far, been reported only from Uttarakhand (Almora, Aasan Barrage, Baijnath, Dehradun) and Sikkim (Deva & Naithani 1984; Rau 1993; Uniyal 1998; Srivastava 2010).

During the course of our studies on genus *Ranunculus* Linnaeus in Kashmir Himalaya



**Figure 1.** Map of Northwest and Trans Himalaya showing distribution of *Ranunculus trilobus*.

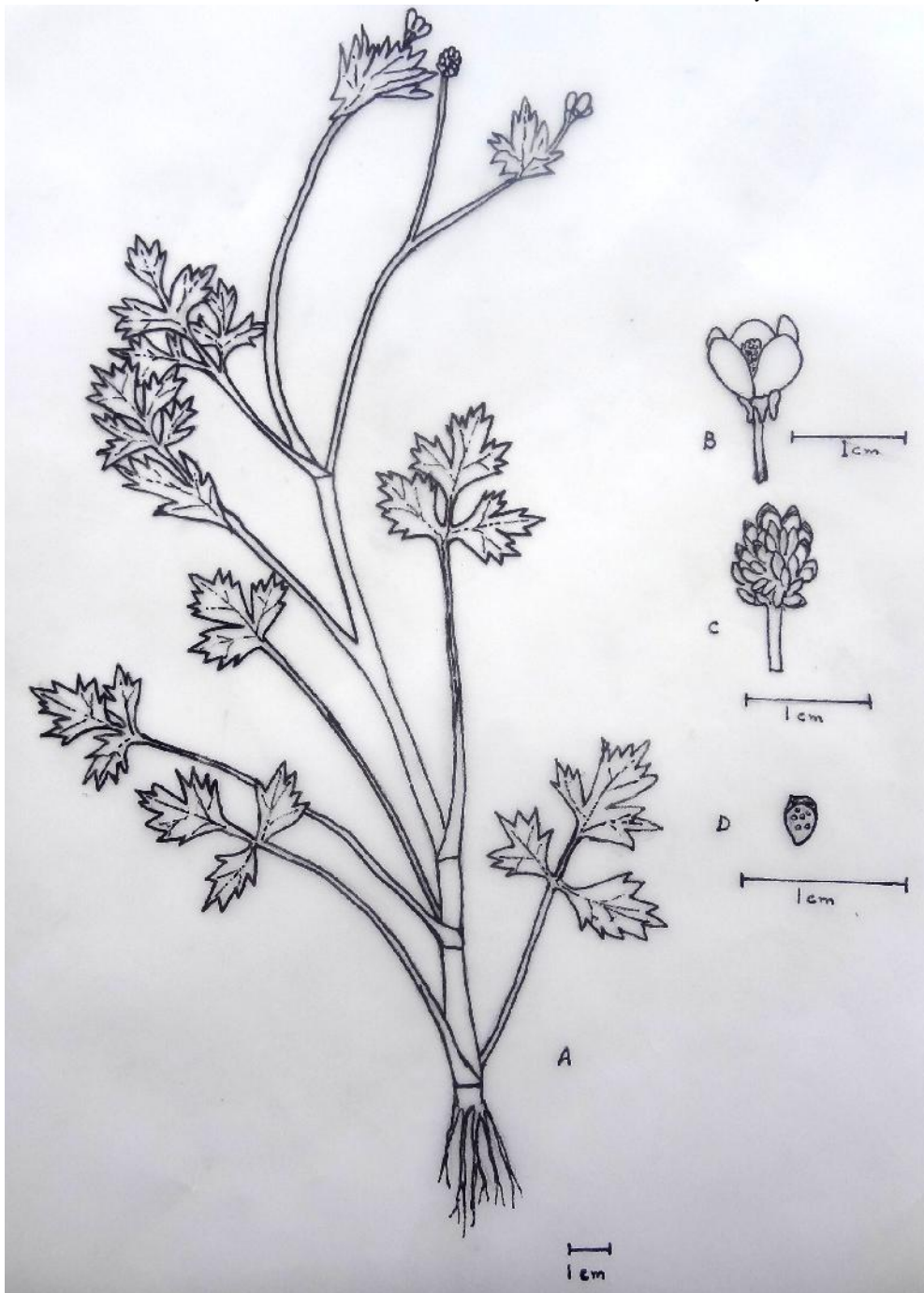
during 2005 – 2012, present authors collected some specimens of this genus from two places (Bemina, Srinagar, 34.06° N, 74.76° E, and Bategam, Kupwara, 34.53° N, 74.22° E) in the Kashmir valley (Fig. 1). After detailed studies, the identity of these specimens turned out to be *R. trilobus*. Our identification of the species was confirmed by matching its specimens with those deposited in CAL and DD; as also by Elvira Hörandl, the Austrian buttercup expert.

A thorough scrutiny of all the available literature on *Ranunculus* in the Indian subcontinent revealed that *R. trilobus* is not so far reported from anywhere in the study area. The present paper, therefore, reports the occurrence of *R. trilobus* in Northwest and Trans-Himalayan region for the first time. A detailed description of the species, together with a distribution map, an illustration and some photographs are provided to help its future recognition.

#### TAXONOMIC TREATMENT

*Ranunculus trilobus* Desfontaines, Fl. Atlant. 1: 437. 1798; Deva & H.B. Naithani in Indian J. Forest. 7: 337. 1984; Srivastava, S. K. in Taiwania 55: 293. 2010; FNA vol. 3 @ www.efloras.org. *R. sardous* subsp. *trilobus* (Desfontaines) Rouy & Foucaud, Fl. France 1: 109. 1893.

[Figures 2 & 3]



**Figure 2.** *Ranunculus trilobus* Desfontaines: A, Habit; B, Flower; C, Aggregate of achenes; D, An achene.

Terrestrial herb, annual. Stem solitary or 2 – 3, erect, terete, branched, 10 – 49 cm high, 2.0 – 3.5 mm in diameter, hollow, continuously pubescent with 200 – 320  $\mu\text{m}$  long appressed or spreading trichomes. Basal leaves with petiole 3.5 – 14 cm long, sulcate along upper side, continuously hairy with appressed trichomes; lamina cordate-ovate with cordate base,



**Figure 3.** *Ranunculus trilobus*. **a.** habit; **b.** leaf; **c.** flower; **d.** reflexed sepals; **e.** petal with nectary scale; **f.** achene head; **g.** achene; **h.** torus. Note the presence of a petiolule in the leaf and the papillate outgrowths on the achene.

4.5 – 9.5 x 4.0 – 9.0 cm, 3-sect, middle segment 3-partite or occasionally unequally 2-partite with 0.5 – 1.0 cm long petiolule, lateral segments 3-partite or irregularly lobed, lobule margins incised dentate, both surfaces pubescent, upper surface with scattered and lower with continuous trichomes, trichomes transparent, appressed, 150 – 200 µm long; cauline leaves similar to basal ones, petioles shorter, 2 – 3 cm long. Flowers yellow, 0.9 – 1.4 cm across; pedicel 1-2 cm long, pubescent with appressed hairs. Sepals 5, ovate to obovate, reflexed, 0.3 – 0.375 x 0.1 – 0.15 cm, sparsely hairy on lower side. Petals 5, imbricate, ovate with rounded apex, 0.5 – 0.6 x 0.3 – 0.4 cm; nectary pit covered with 0.05 – 0.1 x 0.05 – 0.1 cm scale; claw 0.05 – 0.1 cm. Stamens 25 – 30, 0.3 – 0.4 cm long; filaments 0.175 – 0.25 cm; anthers adnate, 0.125 – 0.15 cm, laterorse. Carpels 25 – 35, 0.1 – 0.15 cm long, glabrous, minutely papillate in the ovary region. Achenes complanate, 25 – 40 per head, orbicular-obovate, 0.25 – 0.3 x 0.175 – 0.225 cm; faces papillate or verrucose, distinctly marginate, margin smooth; beak small, 0.05 – 0.1 cm. Torus club-shaped, 0.4 – 0.55 x 0.15 – 0.2 cm, sparsely hairy, trichomes 0.05 – 0.1 cm; gynoclinium 0.3 – 0.35 cm, intervallum 0.05 – 0.075 cm; androclinium narrow, about 0.05 cm.

**Distribution:** Europe (native), Australia, North America, Shangai, India [Uttarakhand (Almora, Dehradun), Sikkim, and in the Kashmir valley - present report].

**Habitat:** Apple orchards, open fields.

**Flowering & fruiting:** April – June.

**Specimens examined:** Uttarakhand: Kumaon, Baijnath, 07.06.1983, *Soma Deva* 10582 (DD); Sikkim, *J.D. Hooker* s.n. (CAL); Donkia, 16.08.1892, *G.A. Gammie* 820 (CAL); Bemina, Srinagar 20.05.2006, *Fayaz, Dar & Wafai* 1007 (KASH); Bategam, Kupwara 26.05.2006 *Fayaz, Dar & Wafai* 2023 (KASH).

**Notes:** In the Mediterranean, the species looks similar to, and is often hardly distinguished from, the other annual species, such as *R. angulatus* C. Presl, *R. cordiger* Viviani, *R. marginatus* d'Urville and *R. sardous* Crantz (Baltisberger & Widmer 2009). *R. marginatus* and *R. sardous* are morphologically and ecologically similar to *R. trilobus* and show similar karyotypes too (Geopfert 1974; Lentini *et al.* 1988; Jalas & Suominen 1989; Baltisberger & Baltisberger 1995; Diosdado & Pastor 1993). The two species are found in the same clade as *R. trilobus* based on ITS sequences of of nrDNA, and sequences of plastid matK and the adjacent trnK regions (Paun *et al.* 2005); however, they remain clearly separated in ITS based sequences of nrDNA (Hörandl *et al.* 2005).

The diagnostic characters of *R. trilobus* are: stem erect; basal leaves ovate-cordate, 3-sect, middle segment 3- or 2-partite, petiolulate, petiolule 5-10 mm, lateral segments 3-partite or irregularly lobed, lobe margins incised dentate; flowers 0.9-1.5 cm across, sepals 5, reflexed, petals 5, ovate, apex rounded, claw prominent; achenes complanate, orbicular-obovate, surface papillate or verrucose in the centre, margins smooth, beak inconspicuous, 0.5 mm.

*R. trilobus* has a high reproductive potential. A plant, on an average, produces 475 ±112.45 seeds on 8 – 15 fruit heads throughout its life cycle. The seeds have a high degree of germination (85 to 94.5%). Since the achenes have a papillate or verrucose surface and are lighter in weight, they easily get attached to the skin-hairs of cattle and sheep browsing on the weed and, as such, are easily dispersed. Even winds play a significant role in the dispersal of seeds. The high seed output together with their easy dispersal and high degree of germination are responsible for increasing size of already existing populations and invading newer areas.

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