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Revision of Genus *Ranunculus* L. (Ranunculaceae) in India

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ABSTRACT: The genus *Ranunculus* L. in India is taxonomically revised, based on morphological and phytogeographacial patterns. Forty-five taxa (41 species and 4 varieties) of *Ranunculus* have been recognized, of these, the taxonomic complexicity among the *Ranunculs cantoniensis* DC., *R. diffusus* DC., *R. hyperboreus* Rottb. and *R. pulchellus* C.A.Mey. have been resolved in this treatment, and also several taxa were treated as synonymous to these species by the earlier workers, have been segregated either as infra- specific taxa or were merged under the species proper. Efforts have been made to check and study each and every taxon of *Ranunculus* known from India, represented in all the Indian and European herbaria and from the literature. Sixteen species of *Ranunculus* show a very meager representation in the herbaria and in the field as well. The present work also includes the lectotypification of eight species (article submitted for publication). A key to the species, nomenclatural citation of each species, their synonyms, details of type, taxonomic description, phenology, distribution in India and worldwide, exsiccata, ecological and taxonomical notes if any, have been provided. Line drawings of the habit and details of each species have been drawn wherever possible, based on the availability of the materials.The distribution of all the species in India has been shown on the maps.

KEY WORDS: *Ranunculus*, Ranunculaceae, revision, taxonomic, lectotypification, India.

INTRODUCTION

Genus *Ranunculus* L. (Ranunculaceae) is widespread throughout the world in all the continents, cosmopolitan in distribution except Antarctica, mainly in northern temperate region and cold tropical mountains with approximately 600 species (Mabberley, 2008). Hook. f. and Thomson (1855) in Flora Indica dealt twenty five species of *Ranunculus* under four sections viz., Batrichium, Ceratocephalus, Hecatonia and Echinella from India, Afghanistan, Tibet and Sri Lanka. Subsequently, in Flora of British India vol. I (1872), they included twenty one species and six varieties from India and its sub-continents. Several species mentioned in Flora Indica *viz*., *R. radicans, R. caespitosus, R. subpinnatus*, *R. fibrosus* and *R. chinensis* have been treated either as a variety or synonyms in Flora British India. Hara and Williams (1979) enumerated 17 species and 7 varieties from Nepal, of these 14 species and 5 varieties are known from India. Rau (1993) in Flora of India included thirty three species and one variety from the present Indian boundary. He has suggested several intermediate forms under *R. pulchellus*. Besides, the genus was taxonomically studied by various researchers in Asian continent, such as Reidl (1991) in Flora West Pakistan mentioned 28 species out of which 22 are represented in India. Mao et al. (2001) in Flora of China described 125 species, of which 20 species and four varieties are also known from India.

However, it has been observed that opinions on species and infraspecific delimitation and their taxonomic treatment varies and inconsistent among the various workers. This anomaly may be due to individual's morph- taxonomic parameters and approach, lack of comprehensive, larger geographical scale studies and also mixing of interspecific individuals from different populations. *Ranunculus emuricatus* Majeed Kak and *Ranunculus gaurii* Dangwal & Rawat, the new species were described from north –west Himalaya in eighty's which on critical studies revealed that both these taxa can not attain a specific status. Hence, they were merged and treated synonymous to *Ranunculus muricatus* DC. and *Ranunculus pulchellus* C. A. Mey. respectively. *Ranunculus diffusus* DC. var. *mollis* (Wall. ex D. Don.) S. K. Srivast. *comb. nov*. has been proposed while reducing *R. mollis* Wall. ex D.Don, synonymous to *R. diffusus* DC. Aswal and Mehrotra (1983) proposed new name *R. trivedii* against *R. lobatus* Jacquem. ex Cambess. (1844) as being the later homonym of *R. lobatus* Moench (1802).

The present revisionary work has been carried out at Royal Botanic Gardens, Kew (K) in UK and Central National Herbarium, Howrah (CAL) in India is based on the study of dried herbarium specimens, relevant literature in India and neighboring regions. Thorough scrutiny of all the general herbarium specimens have been done in the herbaria of K, BM, OXF, CGE, G, L, P, E, LIV, CAL, DD, ASSAM, BSD, LWG, CDRI and MH. The type specimens of all the available species represented in these herbaria were also examined. Typification of most of the species were not done except few of Royle's species deposited in LIV herbarium. Lauener (1978, 1980) while carrying out typification of Royle's Ranunculaceae, examined Royle's collections in LIV herbarium and the duplicate specimens of Royle's type in Kew general and Wallich herbarium (K-W) and

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also at other herbaria *viz*., K, E, E-GL. He has summarized few *Ranunculus* species of Royle's collections and their synonyms with their status as possible and probable types. Here, typification of *Ranunculus hydrocotyloides* Wall. ex D. Don (= *Ranunculus diffusus* DC. var. *mollis* (Wall. ex D. Don) S. K. Srivast., *R. hirtellus* Royle, *R. laetus* Wall. ex D. Don, *R. microphyllus* Hand.-Mazz., *R. munroanus* J. R. Drumm. ex Dunn, *R. reniformis* Wall. ex Wight ex Arn., *R. subpinnatus* Wight ex Arn. and *R. wallichianus* Wight ex Arn.[paper submitted for publication]. The article comprises the taxonomic treatment of 41 species and 4 varieties, key to the species, nomenclature citation, their synonyms, type details, taxonomic descriptions, phenology, distribution in India and outside, ecological and nomenclatural notes if any, were also appended. Line drawings of habit and also the detailed flowers part as available have been provided for all the species.The distribution of all the species in India has been shown on the maps.

TAXONOMIC TREATMENTS

***Ranunculus* L.**

Annual or perennial, terrestrial and aquatic herbs; root stock tuberous or horizontal, roots often fibrous; stem erect, decumbent or prostrate or creeping, stoloniferous. Leaves radical and cauline, whorled or alternate on stem, often palmatifid or palmatipartite, ternate on lobed or dissected, sometimes into capillary segments (in aquatic forms), rarely entire often with membranous stipular auricles. Flowers white or yellow, actinomorphic, solitary few or in corymbose panicle. Sepals 3-5, usually 5, green or petaloid, deciduous often flowering. Petals 5, rarely more or less with sub-basal nectar pit often protected by the scales. Stamens 4-many, spirally arranged. Carpels 4-many, superior, arranged in globose to oblong heads, unilocular with one ovule. Fruits a head or spike of achenes, smooth, tubercled or spinous, laterally compressed usually with distinct or curved style.

The genus represents *ca.* 600 species, widely distributed throughout the world, cosmopolitan in distribution, mostly in temperate regions and in cold tropical mountains; 41 species and 4 varieties in India.

Key to the Species

1. Aquatic or semiaquatic herbs 2
1. Terrestrial herbs 6
2. Flowers up to 1 cm in diam 3
2. Flowers more than 1 cm in diam 4
3. Lamina reniform; flowers yellow; receptacles glabrous ..... 20. *R. natans*
3. Lamina bristle like; flowers white; receptacles hairy ..... 27. *R. rionii*
4. Leaves submerged, divided in capillary segments; flowers 1.5-2.5 cm in diam 5
4. Leaves not submerged, ovate-cordate with hollow erect stem; flowers 3 - 5 cm in diam ..... 15. *R. lingua*
5. Nectar pits elongated; achenes *ca* 0.1 cm long ..... 33. *R. sphaerospermus*
5. Nectar pits lunate; achenes *ca* 0.15 cm long ..... 36. *R. trichophyllus*
6. Herbs annual 7
6. Herbs perennial 12
7. Achenes emarginate, smooth, not tubercled or spinous, in cylindrical heads ..... 31. *R. scleratus*
7. Achenes marginate, smooth, tubercled or spinous in globose heads 8
8. Achenes tubercled all over the surface 10
8. Achenes tubercled or hooked along the border only or sometime smooth 9
9. Radical leaves simple, glabrous ..... 2. *R.arvensis*
9. Radical leaves 3-partite, sparsely to densely hairy ..... 30. *R. sardosus*
10. Radical leaves reniform; flowers *ca* 1.5 cm in diam; sepals sparsely setulose ..... 19. *R. muricatus*
10. Radical leaves not reniform; flowers less than 1.6 cm in diam.; Sepals glabrous 11
11. Sepals shorter than the petals, ovate-lanceolate ..... 4. *R. bikramii*
11. Sepals as long as petals, obovate ..... 38. *R. trilobus*
12. Herbs forming clumps; leaves undivided or rarely lobed 13
12. Herbs not forming clumps; leaves divided or prominently lobed 16
13. Decumbent herbs 14
13. Erect herbs 15
14. Lamina suborbicular; margin teeth rounded, obtuse; sepals glabrous ..... 9. *R. trivedii*
14. Lamina subcordate; margin teeth triangular, acute; sepals hairy outside ..... 40. *R. uttaranchalensis*
15. Plants 5-10 cm high; radical leaves ovate-lanceolate, silky tomentose ..... 16. *R. membranaceous*
15. Plants 20-35 cm high; radical leaves oblong, ovate - elliptic, nearly glabrous ..... 24. *R. pulchellus*
16. Achenes tubercled 17
16. Achenes not tubercled 18
17. Leaves 0.4-1.2 cm in diam., crenate; sepals nearly equaling petals ..... 17. *R. microphyllus*
17. Leaves 3-8 cm in diam., serrate; sepals shorter than petals ..... 41. *R. wallichianus*
18. Achenes with intramarginal ribs, flattened 19
18. Achenes not margined, turgid 26
19. Achenes dotted 20
19. Achenes not dotted 21
20. Lobes of the leaves scarcely segmented; flowers 0.8-1.5 cm in diam. ..... 9. *R. diffusus*
20. Lobes of the leaves deeply divided; flowers 1.5-2.5 cm in diam. ..... 5. *R. subpinnatus*
21. Receptacles of fruits pilose 22
21. Receptacles of fruits glabrous 24
22. Stout plants; stem with stiff hairs; radical leaf blade ovate or broadly ovate ..... 6. *R. cantoniensis*
22. Slender plants; stem villous without stiff hairs; radical leaf blade triangular ovate to broadly rounded, cordate or ternate 23
23. Radical leaves broadly ovate to rounded; cauline leaves entire ..... 7. *R. chaerophyllos*
23. Radical leaves triangular ovate, lobes dentate; cauline leaves less divided.....26. *R. repens*
24. Stem densely strigose or with adpressed or spreading hairs; radical leaves tripartite, pentagonal or dissected 25
24. Stem nearly glabrous; radical leaves pinnatified ..... 22. *R. pangiensis*
25. Petioles 1.5-6 cm long; flowers 1-1.6 cm in diam; achenes *ca* 0.4 cm in diam ..... 37. *R. trigonus* var. *strigosus*
25. Petioles 12-15 cm long; flowers 2.5-3 cm in diam.; achenes *ca* 0.25 cm in diam ..... 14. *R. laetus*

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26. Stem absent or creeping, stoloniferous 27
26. Stem erect or decumbent 31
27. Stem absent; leaves oblong, reniform, orbicular; petioles 3-8 cm long ..... 8. *R. cymbalariae*
27. Stem creeping; leaves pentagonal to reniform; petioles 2-4 cm long 28
28. Herbs caespitose or loosely caespitose 29
28. Herbs not caespitose 30
29. Sepals densely covered with brown hairs ..... 29. *R. rufosepalous*
29. sepals glabrous or with white hairs ..... 28. *R. rubrocalyx*
30. Flowers *ca* 0.5 cm in diam., nectar scale forked or circular, surrounding the nectar pits ..... 12. *R. hyperboreus*
30. Flowers *ca* 1 cm in diam.; nectar scale cup shaped, laterally connate to ventral side ..... 23. *R. pegaeus*
31. Root stock slender or small, thin fibrous 32
31. Root stock tuberous or densely fibrous 35
32. Leaves flabellate ..... 10. *R. felixii*
32. Leaves not flabellate 33
33. Sepals shaggy ..... 32. *R. sikkimensis*
33. Sepals silky 34
34. Herbs, 12-20 cm high, flaccid ..... 1. *R. adoxifolius*
34. Herbs, 3-10 cm high, forming small mat ..... 5. *R. brotherusii*
35. Stem filiform, flaccid; carpels glabrous 36
35. Stem usually erect, neither filiform nor flaccid; carpels sparingly hairy to densely pubescent 38
36. Leaves ternate or tripartite, segments obovate; flowers 2.5-3 cm in diam ..... 34. *R. stewartii*
36. Leaves, tripartite, segments ovate or somewhat reniform, flower 0.8-1 cm in diam 37
37. Herbs 2-5 cm high; stem nearly absent or creeping ..... 13. *R. jacquemontii*
37. Herbs 5-15 cm high; stem erect or ascending ..... 18. *R. munroanus*
38. Radical leaves linear, deeply cut, laciniate ..... 3. *R. aucheri*
38. Radical leaves broad, rotund or reniform or palmate partite 39
39. Radical leaves palmately partite ..... 21. *R. palmatifidus*
39. Radical leaves ovate orbicular or reniform 40
40. Stem many flowered, nearly 1-flowered in alpine forms ..... 11. *R. hirtellus*
40. Stem 1-flowered ..... 25. *R. reniformis*

1. ***Ranunculus adoxifolius*** Hand.-Mazz. in Acta Hort. Gotob. 13: 152.1939; Mukerjee in Bull. Bot. Surv. India 2:102. 1960; H. Hara & L.J.H.Williams, Enum. Flow. Pl. Nepal 2: 18. 1979; H.B. Naithani & Aswal in Indian J. Forest.7: 75. 1984; M.A. Rau in B.D. Sharma et al., Fl. India 1:115.1993; Aswal & Mehrotra, Fl. Lahaul-Spiti 63.1994; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 288.2001. Fig. 1

Type: India, Sikkim, Changu, 3350m, 6.7.1910, *W.W. Smith* 3177 [Hb. Breslau, Mus.Vindob.] (W).

R. affinis auct. non R. Br.; Hook.f. & Thomson, Fl. Brit. India 1:18.1872, p.p.
R. caespitosus Wall. [Cat. no.4701] ex Hook.f. & Thomson in Fl. Ind. 1: 33.1855 (non Thuill., 1799). Type: Wall. 4701, Gossain (CAL!).

Perennial, caespitose, sub-erect herbs; roots numerous; stem erect, ascending, 12-20 cm high, flaccid, branched, densely hairy. Radical leaves cordate-ovate to suborbicular, 1-2.7 cm long, sparsely pubescent with ternate lobes; terminal leaflets broadly ovate, slender; lateral leaflets shortly petiolulate, 2-3 mm long; segment 2-4 partite; petioles longer than lamina, slender at base; cauline leaves smaller, less divided than basal. Flowers *ca* 1 cm in diam., yellow; pedicel 1.5-4.2 cm long, sparsely pubescent. Sepals 5, 2.5- 4.5 x 1.5-2.0 mm long, broadly ovate-lanceolate, spreading sparsely hairy. Petals 3-4.5 x 2.5-3.5 mm, ovate to suborbicular. Carpels numerous. Achenes *ca* 1 mm long, subglobose, oblong, on glabrous head, *ca* 5 mm across.

Flower and fruit: June- August

Distribution: India: Himalaya. Jammu & Kashmir (Gulmarg, Jhelum Valley), Himachal Pradesh (Lahaul-Spiti) (Naithani and Aswal, 1984, l.c.), Sikkim; Arunachal Pradesh; Pakistan; Nepal and China (Tibet). (Fig. 44)

Specimens examined: Jammu & Kashmir: Chenab Valley, June 1880, *C.B.Clarke* 46 (CAL); Gilgit expedition, Jan.1887, *J.F.Duthie* s.n. (CAL); Dras, 10-11000ft., 2.7.1892, *J.F.Duthie* 11762 (CGE). Himachal Pradesh: Lahaul- Spiti, Rohtang pass, 300m, 27.7.1979, *B.S.Aswal* 10529 (CDRI); Baralachala Pass, 4500m, 17.08.1982, *B.S.Aswal* 11002 (CDRI). Sikkim: Lachen, 13000ft., 14.07.1849, *J.D.Hooker* s.n. (K); Alpine Garden Society Expedition, Sikkim, 22.06.1983, B.N.Starling *et al*. 27 (K); Herb Supl. Kurz, *S.Kurz* s.n. (CAL); West of Changu, 12000ft., June 1910, *W.W.Smith* 3278 (CAL); Lhasa, 10000 ft. May, 1885, *G.King's* collector s.n. (CAL); Thangu, 14000 ft., Sept.-Oct., 1909, *Lepcha collector* 2924 (CAL).

Ecology: Growing on alpine grassland and moist sandy soil at 3000-3500 m.

Notes: *Ranunculus adoxifolius* Hand.-Mazz. is closely allied to *R. hirtellus* Royle but mainly differs in its much smaller, slender habit, longer pedicel and glabrous achenes whereas the latter is characterized by robust habit and hairy achenes.

2. ***Ranunculus arvensis*** L., Sp. Pl. 780.1753; Hook.f. & Thomson in Fl. Brit. India 1:20 1872; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193:131.1991; M.A. Rau in B.D. Sharma et al., in Fl. India 1:115.1993; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 430.2001. Fig. 2

Type: Described from Europe LINN 715/26 (LINN).

Annual herbs, 10-60 cm high, branched, sometimes sparsely hairy or usually glabrous. Radical leaves simple, 3-5 x 0.5 cm, obovate to oblanceolate, cuneate at apex, 3-5 toothed, glabrous; cauline leaves 2-5 cm long, 3-partite; segments deeply cut into linear, entire or dentate lobes. Flowers 0.8-1.2 cm in diam., greenish yellow; pedicels terete. Sepals 2-3 mm long, oblong spathulate, patent, with long hairs outside. Petals obovate, 5-7 mm long, nearly twice the length of the sepals. Achenes 5-10, in one whorl, 6-8 mm long, inserted in the pubescent receptacles, plano-compressed, obovate, covered by hooked spines along the border; beak 2.5-5.0 mm long, straight or slightly curved.

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Flower and fruit: April- June

Distribution: India: Jammu & Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Arunachal Pradesh; Afghanistan; Pakistan; N. & W. Asia to Europe; Persia. (Fig. 44)

Specimens examined: Jammu & Kashmir: Khudra, 7000ft., 29.5.1962, *Kaul & Party* 73857 (LWG); Andura, Anantnag, 29.5.1962, *Md. Aslam Khan* 73842 (LWG); Kashmir, 5000 ft., *T.Thomsan* s.n. [Herb. Ind. or Hook.f. & Thomson] (CAL, L, G,OXF); Hirpur, 8000 ft., 08.07.1876, *C.B.Clarke* 28714 (CAL, BM.); Kashmir, Dras, 10-11000 ft. 2.7.1892, *J.F.Duthie* 11762 (P); Kashmir, Doabagh on the Jhelum, 5200ft. 03.06.1908, *Keshwanand* 984 (K); Kashmir, May 1913, *Jacquemont* 705(K); Kashmir, near city, 5200ft., May 1920, *Winterbottom* 248(K). Himachal Pradesh: Kullu, Beas valley from Bajaura to foot of Rohtang, 4-6500 ft., 1865, *Dr. Stolirbh* s.n. (CAL); Pagog, North of Simla, 6000ft., 13.5.1877, *J.S.Gamble* 4220, 4220A (CAL, K); Himachal Pradesh, *Edgeworth* 55 (CAL); Rohtang, Kothi, 28.5.1959, *J.G.Srivastava* 60430 (LWG); Kullu, 10.6.1957, *V.Mittre* & Party s.n. (LWG). Uttarakhand: Dehradun, Niranjanpur, 600m, 14.2.1964, *N.P.Singh* 31670 (CAL, BSD); Almora, 5500, *Strachey & Winterbottom* 14 (CAL, BSD); Champawat, 1650m, 7.05.1961, *U.C.Bhattacharya* 14931; Kumaon, [Ind. Or.], 1832, *Dr. Wallich* 4700 (CGE, G); Kumaon, 14700ft., *Strachey & Winterbottom* 4 (P).

Note: This species is also seen growing as weed in Himachal Pradesh along with wheat. Also seen in tea gardens in Uttarakhand.

3. ***Ranunculus aucheri*** Boiss., Ann. Sci. Nat. 351. 1841 & Fl. Orient. 1: 34. 1861; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193: 154. 1991; M.A. Rau in B.D. Sharma et al., in Fl. India 1: 116. 1993. Fig. 3

Type: Iran: Isfaham, *Aucher* 4006 (G!)

Perennial herbs, appressed hirsute, 8-12 cm high; roots cylindrical, fibrous; stem hirsute. Radical leaves ovate, 2-3 sect; segments long stalked deeply cut into linear laciniate lobes; petioles 1.5-2.5 cm long, appressedly hairy, sheathing at base; cauline leaves linear to linear-lanceolate, hairy. Flowers terminal, solitary or in divaricate corymbs, 1-2 cm in diam. Sepals spreading, hairy, persistent. Petals 5, broad ovate to obovate, 0.8-1.2 cm long; nectar-scales conspicuous. Carpels flat, sparsely hairy; style hooked at tip. Achenes globose, compressed.

Flower and fruit: May- June

Distribution: India: Western Himalaya, Jammu & Kashmir; Afghanistan; Pakistan and Iran. (Fig. 44)

Specimens examined: Jammu & Kashmir: N-W Frontier, Gilgit expedition, 1805, *Dr.G.M.Gils* s.n. (CAL); Kashmir, Dras, Ladakh, 10500 ft., 31.5.1941, *F. Ludlow* & *G. Sheriff* 8323 (CAL).

Note: Only two specimens of *R. aucheri* Boiss. are housed in CAL herbarium. Besides, few specimens including type of *R. aucheri* from Iran were studied in Geneva herbarium (G). Stewart (1972) also reported this species from Chitral.

4. ***Ranunculus bikramii*** Aswal & Mehrotra in Indian J. Forest. 7:62.1984; M. A. Rau in B. D. Sharma et al., Fl. India 1:116.1993; Aswal & Mehrotra, Fl. Lahaul - Spiti 64. 1994. Fig. 4

Type: India: Himachal Pradesh, Lahaul valley, Rohtang Pass, 4000m, 9th August, 1980, B.S. Aswal 10582 A-E (Holotype: 10582 A, CDRI!; Isotype:10582 B-E (CDRI!).

Annual herbs, erect or decumbent with fibrous root-stock; stem 12-16 cm high, often tight, purplish, sparsely hairy. Radical leaves arising from fibrous root stock, long petioled, reniform, deeply 3-lobed, glabrous; each lobe further divided into 3-5 smaller lanceolate, acute segments; median cauline leaves shortly petioled, deeply 3-lobed; each lobe again 3-5 lobed; upper most cauline leaves sessile, 3-5 partite, segments linear to linear-lanceolate, acute. Flowers yellow, solitary, terminal, 1-1.8 cm in diam.; pedicels densely hairy. Sepals 5, ovate-lanceolate, acute or obtuse, 5-8 mm long, glabrous, purplish. Petals 5, 8 -10 mm long, streaked with purple. Fruit a globose head of numerous inflated achenes with straight or slightly hooked styles at the tip.

Flower and fruit: July – September

Distribution: India: Western Himalaya, Himachal Pradesh (Lahaul - Spiti). Endemic. (Fig. 44)

Specimens examined: Himachal Pradesh: Lahaul- Spiti, Rohtang Pass, 3800m, 27.07.1979, *B.S.Aswal* 11002 (CDRI); Rohtang Pass, 4000m, 8.9.1992, *H.Hartmann* 4170 (G).

Ecology: Growing on moist alpine meadows.

Notes: Hartmann in 1992 recollected *Ranunculus bikramii* Aswal & Mehrotra
from the type locality Rohtang pass in Lahaul valley. The same specimen is deposited in Geneva herbarium (G).

5. ***Ranunculus brotherusii*** Freyn in Bull. Herb. Boiss 6: 885.1898; Kachroo et al., Fl. Ladakh 46.1974; H. Hara & L. J. H.Williams, Enum. Flow. Pl. Nepal 2:19. 1979; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193:154.1991; M.A. Rau in B.D. Sharma et al., in Fl. India 1:116.1993; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 409.2001. Fig. 5

Type: Turkestan, Terski Alatau, Kokbulak at the spring of river Naryn, 9 Aug., 1896, *V.F. Brotherus* 818 (n.v. LE?)

R. affinis Hook.f. & Thomson in Fl. Brit. India 1:18.1872, p. p. (non R.Br.).
R. pedatifidus Ledeb., Fl. Ross. 1:732. 1842 (non L.).
R. brotherusii Freyn var. *dasycarpus* (Maxim.) Hand.-Mazz. in Acta Hort. Gotob. 13:149.1939; Mukherjee in Bull. Bot. Surv. India 2:102.1960.
R. brotherusii Freyn subsp. *latisectus* Reidl in Kew Bull. 34: 362.1979.
Type: Sonmarg, 2740-3050m, 30 Aug. 1921, Kashmir, R.R. *Stewart* 6838 (Holotype: K!).

Perennial herbs, erect or diffuse, hairy, forming mat with thin fibrous and cylindrical roots; stem 15-30 cm

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high, solitary, simple or branched with appressed white hairs or nearly glabrous. Radical leaves many, reniform 1-3 x 0.8-2.0 cm, deeply 3-lobed or ternate, hairy; middle lobe ovate, partially 3-lobed; lateral lobes deeply 2-lobed, sessile oblong to oblong- ovate, cuneate at base; petiole 1.2- 8.0 cm long, vaginate, pilose; cauline leaves sessile, 2-4 partite, sparsely hairy beneath, glabrous above. Flowers 1-2, *ca* 1 cm in diam., or more, yellow; pedicels pubescent. Sepals spreading, ovate to broadly oblong, membranous, yellowish green, silky with appressed hairs. Petals 5, narrowly to broadly obovate, tapering into tubular claw, 4-6.5 mm in diam., silky; nectaries forked or pocket like. Anthers *ca* 1 mm long, dorsifixed, obovoid; filaments dilated. Carpels glabrous. Achenes *ca* 1.5 mm long, nearly glabrous or hirsute on oblong-ovoid to cylindrical 4-5 mm long head; beak slender, straight or in curved, 0.5-0.7 mm long, glabrous or pubescent.

Key to varieties

1a. Leaves ternate; carpels glabrous …… 5.1 var. *brotherusii*
1b. Leaves 3-lobed; carpels hairy …… 5.2 var. *tanguticus*

5.1 var. ***brotherusii***

Flower and fruit: May-September

Distribution: India: Himalaya. On alpine moist open meadows and scrub forests at 2400–4500 m. (Ladakh) Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, Arunachal Pradesh; Nepal; China (Tibet); Bhutan and Russia. (Fig. 44)

Specimens examined: Jammu & Kashmir: Near Dras, 10-11000ft., 2.7.1892, *J.F.Duthie* 11763 (CAL,G,E); Kangi, Ladakh, 10-11000ft., July,1905, *A.Meebold* 3313 (CAL); Ladakh, Kurgiakh, 4300m, 25.7.1973, *U.C.Bhattacharya* 52232 (CAL, BSD); Ladakh, Sabu, 12000ft., *B.S.Aswal* 4473 (LWG); Ladakh, Leh, 3300 m, 23.08.1986, *B.S.Aswal* 18253 (CDRI); Dras, 10500ft, 31.5.1941, *F.Ludlow & Sheriff* 8327 (E). Himachal Pradesh: Bararkanda, Namal Sobh, 5.2.1885, *J.R.Drummond* 1181 (CAL); Khoksar, 3200, *B.S.Aswal* 1022, (CDRI); Chatru, 3100 m, 25.07.1977, *B.S.Aswal* 6930 (CDRI); Kullu, 12000 ft., 18.06.1952, *E.Schelpe* 3339 (E). Uttarakhand: Kumaon, Palang Gadh, Dyans, 10-11000 ft., 19.7.1886, *J.F.Duthie* 5294 (G); Tehri Garhwal, 10.8.1883, *J.F.Duthie* 749 (CAL). Sikkim: Emantso La, Zemulside, 15000 ft., 12.7.1909, *Smith & Cave* 1290 (CAL); Kaukerteng Nepaltaul, 14000 ft., May, 1888, *Dr. King's* collector s.n. (CAL); Lachung, 9000 ft., May 1885, *Dr. King's* collector s.n. (CAL); Giagong, 23.09.1903, *Dr.Prains* s.n. (CAL); Sikkim, 4000 m, 24.6.1983, *AGSES* 119 (G); Changoo, 12000 ft., 28.6.1913, *R.E.Cooper* 36 (BM, G); Sikkim, 10-14000 ft., *J.D.Hooker* s.n. (G). Arunachal Pradesh: NEFA, KFD, Senge Dzong, 3231m, 21.05.1957,*Unknown collector* 7669 (CAL); Bum Lau, 3139m, 28.05.1957, *R.S.Rao* 7897 (CAL).

5.2 var. ***tanguticus*** (Maxim.) Tamura in Acta Phytotax. & Geobot. Kyoto 23.31 & 106.1969; H. Hara & L.J.H.Williams, Enum. Flow. Pl. Nepal 2: 19. 1979. *R. affinis* var. *tanguticus* Maxim., Fl. Tangut. 14. 1889.

Plants growing in tuft or patches, thin, slender, branched, *ca* 30 cm high. Leaves 3-lobed. Flowers small, *ca* 10 mm in diam. Achenes small in ovoid head, rarely glabrous or hairy with distinct long ascending hairs.

Flower and fruit: June–July

Distribution: India: Eastern Himalaya. Sikkim, Arunachal Pradesh at 3000 - 4000 m; W. China (Tibet); Nepal. (Fig. 44)

6. ***Ranunculus cantoniensis*** DC., Prodr. 1: 43.1824; H. Hara & L.J.H.Williams, Enum. Flow. Pl. Nepal 2: 19. 1979; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193: 133. 1991; M.A. Rau in B.D. Sharma et al., in Fl. India 1: 117. 1993; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 428. 2001. Fig. 6

Type: Described from China (G-DC.)

R. nepalensis DC., Prodr.1:39.1824.Type: Nepal, 1821, Wall. [Cat.No.4706] (Holotype: K!)
R. trilobatus D. Don, Prodr. Fl. Nepal. 194.1825 (non Desf. 1798).
R. fibrosus Wall. [Cat. 4706] ex Hook.f. & Thomson, Fl.India.37.1855.Type: Wall. [Cat. 470. 1832] Nepal 1821 (Syntype: G!, K!); Khasia, up to 1829 m, Hook.f. & Thomson (Syntype: K!).
R. pensylvanicus auct. non L.f.; Hook.f., Fl. Brit. India 1:19.1872, p.p.
R .riparius Edgew. in Trans. L. Soc. 20.18.1846. Type: N.W. India, Hoodkana, M. P. Edgew., 1844 (K!).
R. chinensis Bunge in Enum. Pl. Chin. Bor.3:1831; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 429.2001. Type: "Hab. In Pratensitous propessy = jui = ssy" (P)

Perennial, erect or creeping stem, 0.15 - 2.0 m high, rooting at base, primary roots fibrous, profusely branched, solid, densely covered with long stiff spreading hairs.Radical leaves with long petiole, sheathing at base, 20-30 cm long, 3-foliate or ternatisect; leaflets 4-8 x 5-10 cm, tripartite, deeply incised, ovate or broadly ovate or narrow oblanceolate, coarsely toothed segments, palmately nerved; cauline leaves trifoliolate, progressively shorter from stalked to sessile; petioles 4-5 cm long; leaflets irregularly serrate along margins, 4-7 x 5-7 cm, palmately nerved; petiolules 1-5 cm long. Flowers 6-10, solitary, yellow, 2-2.5 cm across; pedicels terminal. Sepals 5, reflexed, elliptic-oblong to sub-obtuse, membranous, hairy outside. Petals 5, oblong or obovate, 7-8 x 2.5-5.0 mm, yellow to creamy white, many nerved, glabrous. Stamens *ca* 3 mm long; filaments linear, many; anthers yellow. Receptacle subglobose, elongated, hairy. Achenes 2-3 mm long, numerous, compressed with a distinct ribbed at margin, arranged spirally, shortly beaked, glabrous or minutely granular.

Flower and fruit: May- December

Distribution: India: North - Western Himalaya to N.E. India, subtropical to temperate regions. Growing on grassy slopes as weed in irrigated fields at 1000-2500 m. Jammu

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and Kashmir, Punjab, Himachal Pradesh, Uttarakhand, Uttar Pradesh, Bihar, Orissa, Sikkim, Assam, Arunachal Pradesh, Meghalaya, Nagaland and Manipur; Pakistan; Myanmar; Nepal; Bhutan; Malaysia; Indo-China; Korea and Japan. (Fig. 45)

Specimens examined: Jammu & Kashmir: Kashmir, 780 m, 28.07.1886, *J.R.Drummond* 3024 (K).Himachal Pradesh: Una, 3-4000ft, April 1905, *G.L.Searight* 47 (CAL); *G.L. Searight Esq.* 97 (CAL); Kunjam, 16.08.1885, *J.R.Drummond* 1210 (CAL). Uttar Pradesh: Kheri, Dudhwa, 22.04.1898, *Inayat* 21697 (CAL); Bhairaich, Motipur forests, 26.05.1954, *Hira Lal* 1342 (LWG); Bhairaich, Nishangarh forests, 22.04.2003, *S.D.Maliya* 224979 (LWG): Bihar: Netarhat, *S.R.Paul* & party 92272 (LWG); Netarhat, along stream, *H.H.Haines* 3682 (K). Sikkim: Torso, 07.03.1950, *Ribu & Rhomoo* 3825 (CAL). Assam: Golaghat, March 1857, *Jenkins* s.n. (CAL); Nowgong, 23.03.1885, *C.B.Clarke* 37669 (ASSAM, CAL, G). Meghalaya: East of Jowari, 28.10.1956, *G.Panigrahi* 41020 (CAL); Nongpoh, April 1893, *Dr. King's* collector s.n. (CAL); Khasia 4-6000 ft., *J.D.Hooker* s.n. (CAL); Shillong, June 1911, *I.H.Burkill* & *S.C.Banerjee* 34223 (CAL); Khasia 4-6000 ft., *J.D.Hooker* & *T.Thomson* s.n. (K, P, E, CAL); Shillong, 4200, 17.07.1886, *C.B.Clarke* 44314 (G); Barapani, 3000 ft., 18.05.1949, *Thakur Rupchand* 1519 (L); Khasia, 31.10.1871, *C.B.Clarke* 18175 (E); Shillong, 5000 ft, 01.06.1855, *C.B.Clarke* 38215 (K). Manipur: Manipur valley, 2-6000 ft., Jan. 182, *G.Watt* 5998 (K, E, CAL); Ching Sow, 7-8000 ft., Jan.1882, *G.Watt* 5997 (K); Mao, 6000 ft., 4.2.1954, *D.B.Deb* 1872 (CAL); Kohinia, 5-6000 ft. Feb.1906, *A.Meebold* 5163 (CAL); Leuchurapani, 3500-5000 ft., April 1886, *Dr.D. Prain* s.n. (CAL). Arunachal Pradesh: Kameng, Dirang, Dzang, 17.05.1957, *R.S.Rao* 7556 (CAL); Tirap, Pungchaw, 7.7.1961, *D.B.Deb* 26596 (CAL); On way to Hapoli to zero, 2.6.1951, *G.V.Subbarao* 24687 (CAL).

Notes: Reidl in Kew Bull. 34: 364. 1979 described two subspecies under *R. pensylvanicus* L.f. (recently treated under *R. cantoniensis* DC.), *viz*. subsp. *riparius* and subsp. *nepaulensis*. The scrutiny of the herbarium and literature revealed that these taxa cannot be maintained as the separate entity since they show continuous gradations within the broad range of the species, hence merged with the species proper.

7. ***Ranunculus chaerophyllos*** L., Sp. Pl. 555. 1753; Boiss., Fl. Orient. 1:31. 1867; Reidl in Ali & Y.J. Nasir & Ali, Fl. West Pakistan 193:144.1991.

Fig. 7

Type: Probably described from Greece.

Perennial herbs, 15-30 cm high; root- stock cylindrical with thin fibrous roots; stem erect simple or branched in upper part, densely villous. Leaves mostly radical; petioles 4-8 cm long, villous, especially in lower parts with a wide membranous sheath; lamina ovate to rounded, *ca* 3 cm long, narrower, tripartite near the base; primary segments entire, almost trifid or pinnately divided, 0.2-0.4 cm long; cauline leaves sessile, entire, 2-3 partite with narrow linear, obtuse or subacute segments. Flowers 2-3 cm in diam., yellow. Sepals 0.5-1.0 cm long, oblong-ovate, rounded to truncate at apex, margins curved, membranous, yellowish, villous outside. Petals obovate to ovate-oblong, rounded or truncate at apex. Carpels inserted in hairy receptacle. Achenes somewhat compressed, ovate, hairy; style long, hairy.

Flower and fruit: June- August

Distribution: India: Jammu & Kashmir (Ladakh); Europe; Asia and N. Africa. (Fig. 45)

Specimens examined: Jammu & Kashmir: Ladakh, 11000ft., July, 1905, *A.Meebold* 3315 (CAL); Suru Valley, 14500 ft., 27.6.1928, *B.B.Osmaston* 204 (K).

Note: Only one specimen of *R. chaerophyllos* L. from Ladakh could be studied in CAL. The detailed study of this specimen could not be carried out due to lack of complete specimen.

8. ***Ranunculus cymbalariae*** Pursh, Fl. Bor. Arn. 2: 392.1814; Hook.f. & Thomson, Fl. Ind. 1:31.1855 & in Hook.f., Fl. Brit. India 1:17.1872. *R. sarmentosus* Adams in Mem. Soc. Nat. Mosc. IX. 244.1834; R.R. Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. West Pakistan & Kashmir 273.1972. *Oxygraphis cymbalariae* Prantl in Bot. Jahrb. IX. 263. 1888.

Fig. 8

Type: In saline marshes near the salt-works of Onondago, New York (Type not seen)

Small, stoloniferous, creeping herbs, 3-11 cm high, glabrous; root stock with long rooting runners; stem absent. Leaves 0.5-1.0 cm in diam., oblong-reniform, orbicular, rounded or cordate at base, 3-5 lobed, margins coarsely toothed; petioles slender, 3-8 cm long, glabrous; peduncles erect, 1-3 flowered or more; bract linear. Flowers 0.5-1.0 cm in diam., pale yellow. Sepals 5, spreading or reflexed, membranous. Petals 5-8, linear-obovate. Achenes 0.5-0.7 mm in diam., many, small, obovate, compressed, gibbous, longitudinally ribbed.

Flower and fruit: June-August

Distribution: India: Jammu & Kashmir (Ladakh), Himachal Pradesh (Lahaul), Uttarakhand (Kumaon), Sikkim; Afghanistan; Pakistan; Siberia; Persia; Tibet and America. (Fig. 45)

Specimens examined: Jammu & Kashmir: Kashmir, 7000ft., 24.6.1955, *Grady L.Webster* & *Eugene Nasir* 5794 (K); Ladakh, 12-16000ft., *T.Thomson* s.n. (P); Gordon college, 8000 ft., 6.8.1940, *R.R.Stewart* 20408 (CAL); Gilgit, 1885, *Dr.G.M.Gils* s.n. (CAL); Ladakh, 10-11000 ft., July 1905, *A.Meebold* 3304 (CAL). Himachal Pradesh: Lahaul-Spiti, Lahaul, 24.8.1938, *N.L.Bor*198 (DD); Lahaul, 12000ft, 09.07.1888, *J.R.Drummond* 8290 (K). Uttarakhand: Niti Pass, 16800ft., *Strachey* & *Winterbottom* 18 (P); Kumaon, Lebung Pass, 16.9.1900, *J.F.Duthie* 2663 (DD). Sikkim: Below Tankada, 1200 ft., June, 1910, *W.W.Smith* 3304 (CAL): Kangralamo, 17000 ft., 11.8.1909, *Smith* & *Cave* 2446 (CAL); Tham-oo-tra, 14000 ft., June, 1807, *Dr. King's* collector s.n. (CAL); Sikkim, alpine, 11-14000 ft., *J.D.Hooker* s.n. (P).

Note: This species is quite variable and is characterized by the absence of stem and longitudinally ribbed fruits.

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9. ***Ranunculus diffusus*** DC., Prodr. 1: 3. 1824; Hook.f. & Thomson, Fl. Ind. 1:36.1855 & in Hook.f., Fl. Brit. India 1:19.1872; H.Hara & L.J.H.Williams, Enum. Flow. Pl. Nepal 2:19. 1979; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193:140.1991; M.A. Rau in B.D. Sharma et al., 1:119.1993; Aswal & Mehrotra, Fl. Lahaul-Spiti 65.1994; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 428. 2001. Fig. 9

Type: In Nepal, Wall. in hb. Lambert (Holotype: BM!)

Ranunculus vitifolius D. Don in Royle, Illus. Bot. Himal. 53. 1834. Type: Mussooree, (Isotype: LIV!).
Ranunculus obtectus Wall. [Cat. no. 4705.1831] nom. nud. *R. trilobatus* D. Don, Prodr. Fl. Nep. 194.1825, p.p. (non Desf, 1798)

Perennial, diffuse or prostrate herbs, hairy, 6-25 cm high; roots thin, fibrous; stem several, diffusely branched rooting at nodes, densely brownish, hirsute with spreading hairs throughout. Radical leaves on long slender petioles, nearly as broad as long, 1.5-3.5 x 2-3.2 cm, ovate to orbicular, cordate, divided into 3 obovate lobes; lobes scarcely segmented, cuneate, shallowly and sharply deltoid-dentate, shortly stalked, the central one deeply 3-lobed, the lateral one bilobed with appressed hairs on both the surface; petioles up to 10 cm long, densely hirsute; auricles scarious, brown, 0.8 -1.0 cm long; middle and upper cauline leaves similar to other leaves but smaller. Flowers solitary, axillary, white or pale-yellow, 0.8–1.5 cm in diam. Sepals elliptic to ovate-lanceolate, 3-4 x 1-2 mm, membranous, 3-veined with long patent hairs. Petals oblong or obovate- oblong, 3.5-6.0 x 2-3.5 mm, yellow. Achenes in globose head, dotted, suborbicular, acute, compressed, distinctly angled, 1.5-2.0 mm in diam. with a distinct broad margin and intramarginal ribs; style short, flattened slightly curved.

Notes: Hook.f. & Thomson (1872) mentioned several synonyms under *R. diffusus*.

The specimens of *R. vitifolius* Royle and *R. obtectus* Wall. have been studied and they attained their status as synonyms, whereas *R. mollis* has been treated as a variety of *R. diffusus,* as it differs in having smooth, not granular achenes. *R. hydrocotyloides* Wall. [Cat. no. 4703] is treated as synonym of the *R. diffusus* var. *mollis* Wall. ex D. Don

Key to the variety

1. Leaves ovate- orbicular, lobes cuneate, shallowly dentate ….…… ……..…… 9.1 var. *diffusus*
1. Leaves orbicular, rounded, lobes obtuse, cordate at base, not shallowly dentate ….…. 9.2 var. *mollis*

9.1 var. ***diffusus***

Flower and fruit: April – October

Distribution: India: Himalaya in evergreen, subtropical or temperate forests on damp soil and in ditches at an altitude of 1300 - 2700 m. Jammu & Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Sikkim, Assam, Meghalaya, Manipur, Nagaland, Arunachal Pradesh, West Bengal, Tamil Nadu; Myanmar; Nepal; Bhutan; Tibet; Baluchistan. (Fig. 45)

Specimens examined: Jammu & Kashmir: Kashmir, *T.A.Rao* 13 (CAL): Gulmarg, 26.01.1914, *GSC Fuller* 36346 (CAL). Himachal Pradesh: Simla, *Dr. W.Schlich* 14 (OXF); Simla, 6-8000 ft., *T.Thomson* s.n. (OXF); Konain, 6500, Sept. 1890, *Keshwanand* 139 (OXF); Dalhousie, 2000 m, 13.07.1963,*C.L.Malhotra* & *V.J.Nair* 27374 (CAL); Rohtang Pass, 3800 m, 25.09.1960, *M.A.Rau* 12689 (CAL); Simla, Mahasu, 7500 ft., 15.08.1886, *E.R.Johnson* s.n. (CAL); Kullu, 6000ft., 24.06.1930, *Koelz* 39(P); Chanderkani, 11-12000ft., 27.06.1930, *Koelz* 94 (P). Uttarakhand: Chakrata, 2000 m, 27.07.1961, *U.C.Bhattacharya* 16003 (CAL, L); Tehri Garhwal, 26.09.1954, *K.C.Sahni* 214900 (L.); Kalimundhri Pass, 8900 ft., Aug. 1848, *Strachey* & *Winterbottom* 11 (P, CAL); Mussoorie, 2000 m, 02.08.1963; *H.Santapau* 28518 (CAL); Bai Bahli, 15.06.1960, *J.S.Singh* 2146 (CAL); Nainital, Bhimtal, 1400-1600 m, 27.06.1982, *K.H.Rechinger* 60562 (G). West Bengal: Darjeeling, Kalimpong, 27.11.1996, *J.Bhattacharya* 24369 (CAL); Manibhajan to Batasi, 7300 m, 18.06.1948, *K.Biswas* 8017 (CAL); Darjeeling, 10,000ft., 07.10.1870, *C.B.Clarke* 12576 (CAL); Darjeeling, 10,000ft., 07.10.1870, *C.B.Clarke* 12576 A (BM). Sikkim: Gangtok, 4500 m, 06.05.1967, *N.C.Majumdar* & *R.M.Dutta* 21 (CAL); Dumsong, 1877, *J.L.Lister* 5012 (L); Sikkim, 1837, *T.Thomson* s.n. (L.); Tonglo tot, 9000 ft, *S.Kurz* s.n. (K); Below Tangloo, 05.10.1875, *J.S.Gamble* 20 (K); Mangpo, 4000 ft. 13.05.1909, *Kari* 1968 (CAL); Mumsong, 4000 ft., 20.04.1908, *W.W.Smith* s.n. (CAL); Runghee, May, 1878, *J.L.Lister* s.n. (CAL); Latang, 7000 ft., May 1885, *Dr. G.King* s.n. (CAL); Gangtok, Hanuman top, 12.04.1980, *P.K.Hajra* 58 (CAL); Sikkim, May 1877, *J.L.Lister* s.n. (K); Meghalaya: Shillong, 5000, 15.10.1867, *C.B.Clarke* 6070 (K); Barapani, 12.06.1949, *Koelz* 22947 (L); Mawphlong, Khasi Hills, 6000 ft., *Thakur RupChand* 7702 (L); Shillong, May, 1918, *H.G.Carter* 823 (CAL) Khasi Hills, 06.04.1894, *G.A.Gammie* 447 (CAL); Mauflong, 5000 ft., 14.10.1867, *C.B.Clarke* s.n. (CAL, ASSAM); Manipur: Manipur-Naga hills, Chaithar, 4000 ft., 25.03.1948, *S.K.Mukerjee* 2509 (CAL); Delai Valley, 5-6000 ft., 03.05.1928, *F.Kingdom Ward* 8152 (K); Delai Valley, 5000 ft., 03.05.1928, *F.Kingdom Ward* 8149 (K). Nagaland: Nagahills, 7000 ft., 23.07.1935, *N.L.Bor* 6392 (K); Mizoram: Lushai hills, North Kalaipha, 5000 ft., 12.07.1927, *N.E.Parry* 243 (K). Arunachal Pradesh: Kameng, 7900 ft., 19.05.1957, *R.S.Rao* 7500 (ASSAM, CAL, G), Tirap, Rahu to Makka, 02.07.1961, *D.B.Deb* 26399 (CAL).

9.2 var. ***mollis*** (Wall. ex D. Don) S. K. Srivast. *comb. nov*. *Ranunculus mollis* Wall. ex D. Don in Royle, Illus. Bot. Himal. Mount. 53. 1834. Fig. 10

Type: Nepalia, May, 1821, Wall. Cat. 4704; Isotypes: CAL!, E-GL!, LIV!

Ranunculus hydrocotyloides Wall. ex D. Don in Royle, Illus. Bot. Himal. Mount. 53.1834.
Type: Nepalia, July, 1821, Wall. Cat. 4703 'B' 'Lectotype designated here': CAL! Isolectotypes: Wall. 4703 A & C [CAL!], D-M [K!], N-R [LIV!].

Procumbent herbs, hairy. Leaves 1.5-2.5 cm, somewhat rounded, cordate, trifid, lobes obtuse, dentate; petioles hirsute, much longer, up to 12 cm in cauline leaves; peduncle opposite to the leaf. Carpel lanceolate, acute, compressed, smooth.

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Flower and fruit: April-August

Distribution: India: Jammu & Kashmir, Himachal Pradesh, West Bengal, Manipur, Sikkim, Meghalaya, Nagaland, Arunachal Pradesh. (Fig. 45)

Specimens examined: Jammu & Kashmir: Chenab Valley, 23.05.1881, 10,000 ft., *unknown coll*. s.n. (K); Kashmir, 11000ft., 16.07.1876, *C.B.Clarke* 28744 (K). Himachal Pradesh: Lahaul-Spiti, Keylong, 9-10,000ft., 19.06.1885, *J.R.Drummond* 8297 (K); Lahaul-Bhaga Valley, 10, 000 ft., *R.Jaeschke* 202 (K). Sikkim: Tonglo, Tot, 10, 000 ft., May 1848, *Unknown coll*. s.n. (K); Lachung valley, 10,000 ft., 28.08.1892, *G.A.Gammie* 1029 (CAL). West Bengal: Darjeeling, Forpokree, 7000ft., 30.06.1884, *C.B.Clarke* 35611 (CAL). Manipur: Sirohifurar on the margins of foots in damp forests, 7-8000 ft., 12.04.1882, *G.Watt* 6441 (CAL).

Note: Hook.f. & Thomson (1872) treated *Ranunculus mollis* Wall. ex D. Don as a synonym of *Ranunculus diffusus* DC. The study revealed that the specimens of *R. mollis* has orbicular, rounded leaves with obtuse lobes, cordate at base, achenes smooth where as in *R. diffusus* has ovate orbicular leaves, lobes cuneate, shallowly dentate and granular achenes which clearly distinct with *R. diffusus*. Hence, it is reduced as a variety *R.diffusus* var. *mollis* (Wall. ex D.Don) S.K.Srivast. and new combination is proposed.

10. ***Ranunculus felexii*** H. Leveille, Repert. Spec. Nov. Regni Veg. 12: 281. 1931 & Cat. Pl. Yunnan 224. 1917; M.A. Rau in B.D. Sharma et al., Fl. India 1: 12D. 1993; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 414. 2001. Fig. 11

Type: Yun-Nan: Lagunes de Je-Ma-Tehouan, 3200 m, Juill. 1912, *E.E. Maire* s.n. (?)

Perennial herbs; roots fibrous; stem 15-25 cm, spreading, pubescent, 1 or 2 branched above. Radical leaves flabellate or ovate, blade 3-lobed or 3-partite, 1.2-2.6 x 1.5-3.5 cm, chartaceous, glabrous or sparsely pubescent; base truncate-cuneate or cordate; central lobe entire, lateral lobes dentate, teeth ovate; petioles 3-8.5 cm long, nearly glabrous on sparsely pubescent; cauline leaves 3 or 4, nearly sessile, 3-partite, segments linear. Flowers terminal, solitary or 2, 1-1.2 cm in diam.; pedicel 1-4.5 cm long, sparsely puberulent. Receptacle oblong, subglabrous. Sepals 5, elliptic-ovate, 3-3.5 cm long, sparsely pubescent. Petals 5, obovate, 5-7 x 3-4 mm, apex rounded. Fruits ellipsoid *ca* 5 x 3 mm; carpel numerous. Achenes broadly ellipsoid, compressed, 1.8 x 1.2 mm; style persistent.

Flower: May-July

Ecolology: Growing along streams.

Distribution: India: Jammu & Kashmir, Sikkim (Rau, 1993); China. (Fig. 45)

Notes: Rau (1993) mentioned this species from Jammu & Kashmir and Sikkim Himalaya but no specimens of *R. felixii* could be found in any of the Indian and European herbaria. The description and illustration is based on the literature.

11. ***Ranunculus hirtellus*** Royle, Illus. Bot. Himal. 53.1834; Hook.f. & Thomson, Fl. Ind. 34.1855 & in Hook.f., Fl. Brit. India 1:18.1872; Kachroo et al., Fl. Ladakh 46.1977; H. Hara & L.J.H.Williams, Enum. Flow. Pl. Nepal 2:19. 1979; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193:145.1991; M.A. Rau in B.D. Sharma et al., Fl. India 1:121.1993; Aswal & Mehrotra, Fl. Lahaul-Spiti 65.1994; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 404.2001. Fig. 12

Type: Lippa in Kunawar, *Royle* s.n. 'Lectotype designated here: LIV!; Deobun, Royle s.n. 'Lectoparatype designated here: LIV!; Kedarkantha, *Royle* s.n. 'Lectoparatype designated here: LIV!

R. glabellus Royle, Illus.Bot.Himal.53.1834. Type: "Salkur in Kunawar" *Royle* s.n. (LIV!).
R. nervosum D. Don in Royle, Illus. Bot. Himal. 53.1834. Type: Hab. Mussoorie, June, *Royle* 1/42 (LIV!).
R. choorensis D. Don in Royle, Illus. Bot. Himal. 53.1834. Type: Choor, Kedarkantha, *Royle* s.n. (LIV!).

Perennial herbs, 10-40 cm high, erect or decumbent, never caespitose, distinctly pubescent; rootstock fibrous, shortly fusiform; stem ascending, branched, hairy or glabrescent, 5-15 cm long. Radical leaves usually 3-many; lamina reniform to orbicular or broadly ovate, 0.5-1.7 x 0.6-2.0 cm, deeply 3-partite; segments more than 3-toothed, middle lobe large, oblong to obovate, 3-6 x 2-4 cm, sparsely to densely hairy; lateral lobes obliquely ovate, coarsely toothed or entire, base cordate to truncate; petioles 1.5-8.0 cm long; cauline leaves palmately 3-5, partite, sessile or ternate, amplexicaule at base, lobes narrow, linear-lanceolate. Flowers 1-1.8 cm in diam., solitary or many, yellow; pedicels sulcate, 0.5-0.8 cm long, pilose. Sepals oblong, elliptic or ovate - oblong, obtuse or rounded at apex, 0.3-0.5 cm long, hairy. Petals 5, oblong to broadly ovate, asymmetrical obtuse or rounded, cuneate, 0.5-0.7 x 0.2-0.5 cm, 7-12 finely nerved, nectaries cup shaped or forked. Achenes 1-1.2 cm long, basifixed, somewhat inflated, glabrous, arranged in an ovoid, pilose or glabrous receptacle, hairy when young; stylar beak thick, *ca* 1 mm long, straight or curved.

Folwer and fruit: June- September

Distribution: India: North-West to North-East Himalaya, temperate to subalpine slopes at 2000 – 4500 m. Jammu & Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Sikkim, and Arunachal Pradesh; Afghanistan; Pakistan; Nepal and China (Tibet). (Fig. 46)

Specimens examined: Jammu & Kashmir: Ladakh, Singola, 4800m, 22.07.1973, *U.C.Bhattacharya* 52150 (CAL); Gulmarg, 8-9000 ft., 29.05.1892, *J.F.Duthie* 11269 (CAL); Kashmir, Liddarwart, 9000ft.,

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29.05.1954, *L.Deo* 11035 (CAL); Kangan, 6000 ft., 26.05.1954, *Janaki Prasad* 10879 (CAL); Musjid Valley, 12-13000 ft., 25.07.1893, *J.F.Duthie* 13199 (E); Khilanmarg, 10,800ft., 11.08.1956, *O.Polunin* 56/180 (E); Kashmir, 3656m, 28.06.1976, *Janet Maxwell* 22 (E); Kashmir, Kaurivalley, Kalapani, 11500 ft., 28.08.1892, *J.F.Duthie* 12541 (P); Above Gulmarg, 12000ft., 02.06.1892, *J.F.Duthie* 11331 (CAL, G); Deosai plains, Bara Deosai, 13000ft, 19.08.1955, *Grady L.Webster* & *Eugene Nasir* 6532 (G); Sonmarg, 9000-10000ft., 06.08.1920, *R.R.Stewart* 5572 (K); Gilgit, Nittar Valley 05.08.1892, *J.F.Duthie* 6352 (K); Ladakh, Rungdum, 4260 m, 1980, Southampton University 144 (K); Above Gulmarg, 8-9000ft., 31.05.1892, *J.F.Duthie* 11299 (K). Himachal Pradesh: Lahaul, Manali, 10000 ft., 16.05.1941, *N.L.Bor* 14149 (K); Chamba, Sarchu Pass, 02.07.1977, *R.R.Stewart* 2603; Upper Chenab, Tandi 14.06.1881, *R.Ellis* 1264 (K); Pangi, 9-14000 ft., June 1878, *Watt* 4703 (K); Keylong, 10200-12000 ft., 13.07.1930, *Koelz* 407 (P); Sissu, Lahaul, 10-12000 ft., 23.07.1930, *Koelz* 650 (P); Mahasoo, 28.05.1831, *Lady Dalhousie* 2 (G); Bashahar state, 29.05.1890, *J. H. Lace* 202 (E); Parbati Valley, 21.05.1934, *C.E.Parkinson* 3941; Sarchu, 13000 ft., 30.06.1941, *N.L.Bor* 15041 (E); Moralkanda, 1100ft., Oct. 1970, *P.C.Sharma*-ICMR (CAL); Chatru 3375 m, 04.09.1961, *N.C.Nair* 16666 (CAL); Khoksar, 3400, 18.07.1972, *U.C.Bhattacharya*, 48640 (CAL); Lahaul, 15000ft., *Jaeschke* 201 (CAL); Simla, Fagu, 8500ft., 10.06.1877, *J.S.Gamble* 5 (CAL), Dharamshala, 17.10.1874,*C.B.Clarke* 24604 A (CAL); Uttarakhand: Garhwal, 24.05.1972, *B.D.Naithani* 47939 (CAL); Dudatoli, 10000ft., *J.F.Duthie* 2662 (CAL); Bistala alpine, 3000m, 16.06.1959, *M.A.Rau* 10232 (CAL); Jaunsar, Mandali, 8000ft., May 1891, *J.S.Gamble* s.n. (CAL); Kumaon Dhauli Valley, 11-12000 ft., 04.08.1886, *J.F.Duthie* 5290 (G); Garhwal, Bistala, 4000 ft., 17.06.1959, *M.A.Rau* 10232 (G); Tehri Damodar Valley, 11-12000 ft., 26.06.1883, *J.F.Duthie* 750 (G); Almora, 29.05.1972, *K.M. Balapure* 93379 (LWG); West Almora, 23.06.1933, *BisRam* 2134 (E); Tehri Garhwal, Bompas, 14500 ft., *Strachey* & *Winterbottom* 17 (K); Jaunsar, Deoban, 8-9000ft., May 1897, *J.F.Duthie* 1007 (K); Kumaon, near Palam, 11000ft., *Strachey & Winterbottom* 8 (K); Almora 11000 ft., 05.10.1950, D.D.Awasthi 1841 (LWG); Milam Glacier, 12000ft., Garhwal, 24.06.1934, *Strachey* & *Winterbottom* 7 (P); *Parmanand* 304 (E). Sikkim: Lingtes, 12000ft., 11.07.1877, *G.King* 4234 (K); *Yang Poong La*, 13-15000 ft., 30.05.1881, *Watt* 5435 (K); Longhep, 11-12000ft., 05.07.1910, *W.W.Smith* 3070 (CAL); Raigin, 12000ft., 17.07.1906, *J.H.Lace* 136 (CAL); Sandakphu, 11800 ft., 10.06.1892, *G.A.Gammie* 142 (CAL); Patang la, 10000ft., 16.07.1877, *G.King* 4167 (CAL); Karponsong to Gangtok 7500ft., 18.07.1956, *D.Chatterjee* 290 (CAL); Nathula Pass, 02.08.1859, *K.P.Srivastava* & *Ajay Singh* 62861 (LWG); Sikkim, 10-12000 ft., *J.D.Hooker* s.n. (G); Chooa-bama, 12000ft., July 1887, *Dr. King's coll.* s.n. (G,P),; Arunachal Pradesh: NEFA, KFD, Selazong, 3962 m, 04.05.1957, *R.S.Rao* 7792 (CAL).

Notes: This species is extremely variable especially in leaf shape and indumentum.

Caespitose habit is never found in *R. hirtellus*. The specimens from Arunachal Pradesh are smaller as compare to other areas. *R. gracilis* Royle, *R. glabellus* Royle, *R. nervosum* Royle and *R. choorensis* Royle known from Western Himalayas are treated as synonyms to *R.hirtellus* Royle.

12. ***Ranunculus hyperboreus*** Rottb., Skrift. Kjoeb. Selesk. 10: 458.1770; Hook.f. & Thomson in Fl. Ind. 1:32.1855 & in Hook.f., Fl. Brit. India 1:18.1872; Kachroo et al., Fl. Ladakh 46.1977; M.A. Rau in B.D. Sharma et al., Fl. India 1: 128. 1993. Fig. 13

Type: Sikkim, 15-1700ft, 1833, *J.D. Hooker* s.n. (P!, L!, CGE!, CAL!)

R. hyperboreus Rottb. var. *typicus* Hook.f. & Thomson in Hook.f., Fl. Brit. India 1:18.1872.

R. hyperboreus Rottb. var. *multifidus* (Regel) Hook.f. & Thomson, Fl. Brit. India 1:18.1872; R.R. Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. West Pakistan & Kashmir 270.1972.

R. radicans C.A. Mey. var. *multifidus* Regel in Bull. Sci. Nat. MOSC.34: 43.1861.

Perennial herbs, small, terrestrial or floating; roots often tuberous; stem slender, creeping stoloniferous, variable in habit, rarely glabrous or upper part of the stem sometimes covered with soft hairs. Radical leaves reniform or orbicular, ca 2 x 2.5 cm, 3-7 lobed or partite or capillaceo multifid, 3-5 mm long in diam., midlobe ovate, lateral lobes oblong, cuneate; petiole short; cauline leaves 1-2, sessile, trilobed or tripartite. Flowers solitary, axillary, *ca* 5 mm in diam., yellow. Sepals 3, 3-4 mm long, reflexed. Petals obovate, equal to sepals; nectary scales surrounds the nectary pits; receptacle hirsute. Achenes numerous, small, 0.15-0.2 cm long, globose, oval, beaked with small style.

Flower and fruit: May- September

Distribution: India: Himalaya at higher altitude. Jammu & Kashmir (Ladakh), Himachal Pradesh, Uttarakhand, Sikkim, Manipur; Nepal; Pakistan and Russia. (Fig. 46)

Specimens examined: Jammu & Kashmir: Ladakh, above Tsakchum, 17500 ft., July 1923, *W.Koelz* 2415 d (K); Kashmir, 10000ft., 23.07.1946, *R.R.Stewart* 22875 (K); Gulmarg, under rock, 10-11000ft., 31.05.1892, *J.F. Duthie* s.n. (CAL); Kashmir, July 1956, *T.A.Rao* 402 (CAL); Taltal nullah, Kajnag range, 12-13000 ft., 19.05.1892, *J.F.Duthie* 11101 (CAL); Sheshanag 23.09.1913, *C.B.Clarke* 24628 (BM); Kashmir, 13000 ft, June 1879, *Watt* 4705 (E); Himachal Pradesh: Lahaul, Manali 1860, *Jaeschke* s.n. (CAL); Khoksar, 3500 m, 18.07.1972, *U.C.Bhattacharya* 48619 (CAL); near Lebung glacier, 14-15000ft., 03.08.1886, *J.F.Duthie* 5291 (CAL); Lahaul, Bhoja Valley, 13000ft., *J.R.Drummond* 8291 (K); Kunawar, 12000ft., 21.11.1885, *J.R.Drummond* 4338 (K); Nita Valley, 11-12000ft., 22.06.1883, *J.F.Duthie* 754 (K); Manali, Oct. 1886, *H.Collett* s.n. (K); Kunawar, 12000ft., 21.11.1885, *J.R.Drummond* 4738 (BM); Bashahr, 27-31.07.1830, *V.Jacquemont* 1902 (BM). Uttarakhand: Kumaon, Palang, 21.07.1886, *J.F.Duthie* 5291 (CAL,K); Garhwal, 12-13000ft., 08.09.1885, *J.F.Duthie* 3800 (K); Garhwal, Mandakini valley, 3900 m, 16.08.1976, *B.N.Mehrotra* 5378 (CDRI); Tehri Garhwal, 11-12000 ft., 2.06.1883, *J.F.Duthie* 754 (E,CAL); Sikkim: Tankra La, 15000 ft., *G.A.Gammie* 512 (CAL); Sherathang in Swamp, 13000ft., 12.07.1910, *W.W.Smith* 3399 (CAL); Sundukphoo, 10000ft., 06.06.1884, *C.B.Clarke* 35046 c (CAL); Sikkim, alpine, 15-17000 ft., *J.D.Hooker* s.n. (P, CAL); Manipur: Delei valley, 21.06.1928, 11-12000ft., *F.Kingdom Ward* 8354 (K).

Note: *R. hyperboreus* Rottb., shows quite variation in habit of the plant, leaf shape and size of the receptacle. Hook.f. & Thomson (1872) mentioned four varieties under this species, of these, var. *typicus* Hook.f. & Thomson and var. *multifidus* (Regel) Hook.f. & Thomson have been merged under *R. hyperboreus* Rottb., whereas var. *natans* C.A. Mey. has been treated as distinct species and var. *radicans* (C.A.Mey.) Hook.f. & Thomson is included as synonym of *R. natans*.

13. ***Ranunculus jacquemontii*** Riedl in Ali & Y.J. Nasir, Fl. West Pakistan 143:151.1991. Fig. 14

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Type: Kunawar, Intermuscos in humid supra Kainun, *Jacquemont* 706 (K!)

Perennial herbs, *ca* 2-5 cm high; roots fibrous, elongated; stem absent or creeping and rooting at nodes, glabrous or sub-glabrous, giving rise to axillary peduncles. Leaves 0.5-1.0 cm, somewhat reniform, truncate at base, tripartite beyond middle or sometime nearly to the base, segments ovate, tapering towards base, obtuse or acute; lateral segments bilobed or entire; petioles 2.5-4.0 cm long. Peduncle arising from the base or axillary at the nodes of creeping stem, sometimes sparsely hairy in their uppermost part, 1-3 cm long; flowers solitary, *ca* 0.5 cm in diam., yellow. Sepals obovate to obovate-oblong, *ca* 0.3 cm long, nearly glabrous. Petals narrower than sepals, *ca* 0.3 cm long; receptacle elongated, glabrous. Achenes *ca* 0.7 mm long, numerous, arranged on globose to ellipsoid head; style filiform, erect.

Flower and fruit: July- August

Distribution: India: N.W. Himalaya; Uttarakhand (Kumaon), Sikkim; Pakistan. (Fig. 46)

Specimens examined: Uttarakhand: Kumaon, Pindari, 11000 ft., *J. L. Stewart* s.n. (K); Sikkim: Sikkim, 15-17000 ft., *J.D.Hooker* s.n. (K).

Note: This species apparently resembles with *R. hyperboreus* in general habit of creeping stolon but differs in exclusively terrestrial habit, roots not tuberous and leaves mostly 3-lobed with longer petiole.

14. ***Ranunculus laetus*** Wall. ex D. Don in Royle, Illus. Bot. Himal. 53.1834; Hook.f. & Thomson, Fl. Ind. 36.1855 & in Hook.f., Fl. Brit. India 1:19.1872; H. Hara & L.J.H.Williams, Enum. Flow. Pl. Nepal 2:19. 1979; Reidl in Ali & Y.J. Nasir, Fl.West Pakistan 193:141.1991; M.A. Rau in B.D. Sharma et al., Fl. India 1:122.193; Aswal & Mehrotra, Fl. Lahaul-Spiti 66. 1994. Fig. 15

Type: Specimen '3', Deyra Dhoon, 1825 [Wall. 4702 A] 'Lectotype designated here: CAL! ; Isolectotypes: (No. 1-2) CAL!, (No. 4-6) E-GL!; Kumaon, Robert Blinkworth [Wall. 4702 B] 'Lectoparatype designated here: (No. 1-5) E-GL!, (No. 6-7) CAL!, (No. 8-9) K-W!, (No. 10) K-W! G!; Kumaon, var. minor [Wall. Cat. 4702 D] 'Lectoparatype designated here: (No. 1-3) E-GL!; Shimla, 6-8000 ped, June 1849, T. Thomson s.n. 'Lectoparatype' designated here: K!; Mussoorie, No. 1/41, Royle s.n. 'Lectoparatype' designated here: (No. 1-3) LIV!.

R. distans D. Don in Royle, Ill. 53.1834; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 407.2001. Type: Road to Cashmere, Royle s.n. (LIV!).

R. brevirostris Edgew. in Trans. Linn. Soc. 20. 28.1851. Type: India, Himalaya, Badrinath, 10 000 – 11 000 ft., 1838, Fl. Oct., (K!).

R. riparius Edgew. in Trans. Linn. Soc. 20. 28. 1851. Type: Hab. in ripis arenosis fluminum Indie Septentrionalis Lodhiana, Bhogpur in Gange.

Tall, perennial herbs, 30-80 cm high; rootstock woody, creeping, producing several fibrous roots and stem; stem erect, *ca* 3-5 mm thick, usually branched with appressed hairs or sub glabrous. Radical leaves with long petioles, 7-10 cm across, with soft appressed hairs on both surfaces; lamina rounded, reniform, 3-partite or dissected into narrowly oblong, sharply 2-5 toothed lobes; lobes long, narrow, segments spreading only at maturity; petioles 12-15 cm long, hairy, channelled; cauline leaves sessile, lower one shortly petiolate; upper leaves bract like with narrow, linear, segments. Flowers 2.5-3.0 cm in diam., yellow. Sepals 5-7 x 4 mm, hairy, lanceolate to ovate-lanceolate with membranous margin, acute or sub obtuse, densely whitish hairy. Petals 0.8-1.2 x 0.7-1.0 cm, roundish obovate; receptacle glabrous. Achenes on globose head, 0.2-0.3 cm in diam., numerous, suborbicular, smooth, flattened, dotted when young, cuneate at base, dark at centre, thin along margins; style persistent, straight.

Flower and fruit: July – September

Distribution: India: Temperate to subalpine regions in Himalaya in damp fields and ditches. Jammu & Kashmir (Ladakh), Punjab, Himachal Pradesh, Uttarakhand, Uttar Pradesh, Sikkim, Arunachal Pradesh, Orissa; Afghanistan; Pakistan; China (Tibet); Nepal; Bhutan; Central Asia and Russia. (Fig. 46)

Specimens examined: Jammu & Kashmir : Kashmir, Sedar, 1700 m, 04.06.1959, *T.A.Rao* 225 (CAL); Gandarbal, 5500ft., *G.A.Gamble* s.n. (CAL); Sonmarg, 1700m, 18.09.1970, *U.C.Bhattacharya* 41256 (CAL); Dangbol, 8000ft., 19.07.1876, *C.B. Clarke* 29209 (CAL); Astor valley, near Dakshin, 8-9000ft., 26.07.1892, *J.F.Duthie* 12250 (CAL); Indus valley near Katzura, 8-9000ft., 17.07.1892, *J.F.Duthie* 12090 (CAL); Liddar (CAL); Astor valley , near Dakshin, 8-9000ft., 26.07.1892, *J.F.Duthie* 12250 (CAL); Indus valley near Katzura, 8-9000ft., 17.07.1892, *J.F.Duthie* 12090 (CAL); Liddar Valley, 6500ft., 22.08.1958, *Polunin* 56/441 (E); Kashmir, 5500 ft., 09.06.1983, *J.D.A.Stainton* 8858 (E); Srinagar, 5600 ft., 12.07.1876, *C.B.Clarke* 29040 (K) Kashmir, 5400ft., May 1848, *T.Thomson* s.n. (K); Kishtwar, 8000 ft., *T.Thomson* s.n. (K); Himachal Pradesh: Lahaul, Darcha, 3500 m, 16.07.1973, *U.C.Bhattacharya* 52033 (CAL); Chamba state, 6500 ft., 26.04.1898, *J.H. Lace* 1692 (CAL); Dalhousie, 4000 ft., 20.09.1874, *C.B.Clarke* 22833 (CAL); Simla, 4500 ft., May 1886, *E.R. Johnson* s.n. (CAL); Urni, 2300 m, 30.05.1962, *N.C.Nair,* 22144 (CAL); Sissu, 3400 m, 03.07.1958, *M.A.Rau* 6070 (CAL); Bashahr, 8000 ft., 29.05.1890, *J.H.Lace* 202 (CAL); Himalaya, 8-9000 ft., 1844, *M.P. Edgeworth* 31 (K); Simla, 6-8000 ft., *T.Thomson* s.n. (E); Lahaul, 4600 m, 27.06.1938, *N.L.Bor* 11803 (E); Near Matiyan, 8500 ft., 16.06.1939, *F.Ludlow* & *G.Sheriff* 7314 (E); Simla, 2000 m, 15.04.1960, *M.A.Rau* 11416 (E); Lahaul, Sissu, 3200m, 18.07.1977, *B.S.Aswal* 6791 (CDRI); Dharamshala, 4000 ft., 04.06.1971, *K.K.Singh* 3431 (CDRI); Tandi, 3000ft., 06.09.1981, *B.S.Aswal* 10859 (CDRI). Uttarakhand: Kumaon, 7500 m, May 1857, *Anderson* s.n. (E,D); Jaunsar, 6000ft., April 1892, *J.S.Gamble* 23479 (CAL); Kumaon, 5000 ft., 15.12.1848, *Strachey & Winterbottom* 12 (CAL); Mussoorie, 10.05.1900, *P.W.Machinon* s.n. (CAL); Nainital, 6000, Oct. 1905, *A.Meebold* 3297 (CAL); Nainital, 6500 ft., *Strachey & Winterbottom* 12 (CAL), Garhwal, Guptakashi, 1355 m, 24. 04. 1963, *C. L. Malhotra* 26870 (CAL, BSD);

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Uttarkashi, 2700m, 27.05.1981, *B.S.Aswal* 11961 (CDRI); Mandakini, 1300 m, 22.04.1973, *B.N.Mehrotra* 3949 (CDRI). Sikkim: On the barrack of Jullapahar, 7000 ft., *S.Kurz* s.n. (CAL).

15. ***Ranunculus lingua*** L., Sp. Pl. 775.1753; Hook.f. & Thomson in Fl. Brit. India 1:16.1872; M.A. Rau in B.D. Sharma et al., Fl. India 1: 122. 1993; Aswal & Mehrotra, Fl. Lahaul -Spiti 67.1994; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 420.2001. Fig. 16

Type: Herb. Clifford 228, *Ranunculus* (Lectotype: BM!). Original element: 715.3 LINN; Herb. Clifford 228, *Ranunculus* 3; *Tabernaemontanus* (1590: 48); Herb. Burser 1 X: 120.

Perennial herbs, 30-90 cm high, erect or stoloniferous in semiaquatic habitat, glabrous or sparsely appressed pubescent; root-stock thick, articulate, stout, creeping; stem erect, hollow, glabrous. Radical leaves ovate, cordate, long petioled, soon withering; cauline leaves 10-30 x 2.5-5.0 cm, oblong-lanceolate, nearly entire or subserrate, amplexicaule at base, attenuate at apex, ribbed, parallel veined, entire or subserrate at margins. Flowers few, subpanicled, large, 3-5 cm in diam., bright yellow. Sepals pubescent. Petals 5, orbicular, finely dichotomously veined. Carpels numerous, 80-100 or more on elongate receptacle. Achenes obovate, *ca* 3 mm long, compressed, submarginate, pitted, shortly beaked.

Flower and fruit: June – October

Distribution: India: Western Himalaya up to 2500 m, Jammu & Kashmir (Srinagar, Ladakh), Himachal Pradesh (Lahaul-Spiti, Kullu); Pakistan; Asia; Europe; America. (Fig. 46)

Specimens examined: Jammu & Kashmir: Kashmir, June –July, 1831, *Jacquemont* 643 (P); Kashmir, *Dr.J.L.Stewart*, s.n. (E); Jhelum valley, Shadipur, 5200ft., 17.07.1940, *F.Ludlow & Sheriff* 7810 (M,E); Urni, 6800ft., 03.10.1903, *J.R.Drummond* 14771 (E); Sind, 5000ft., 20.07.1902, *J.R.Drummond* 14358 (K); Naginbagh, 5200 ft., 05.07.1947, *R.R.Stewart* 23020 (K); Nilnag, 6800m, 03.10.1903, *J.R.Drummond* 14771 (CAL,K); Gulmarg, 10000 ft., unknown coll. s.n. (CAL); Sind river below Ganderbal, 5-6000 ft., 22.06.1892, *J.F.Duthie* 11450 (BM, CAL); Srinagar, 1700 m, 20.06.1959, *T.A.Rao* 9579 (CAL); City lake, 5300 ft., 07.07.1891, *G.A.Gammie* s.n. (CAL); Himachal Pradesh: Lahaul Spiti, Khoksar, 04.07.1938, *N.L.Bor* s.n. (CAL); Kullu, 6000ft., 30.09.1916, *R.E.Cooper & A.K.Bulley* 5715 (E); Kullu, Raisen, 24.07.1888, *J.R.Drummond* 8289 (E,K).

Note: Growing in marshy areas and in semi-aquatic habitat in Himalaya. This species is characterized by hollow stem, entire leaves, obscure lateral nerves and large yellow flowers.

16. ***Ranunculus membranaceous*** Royle, Illus. Bot. Himal. Mount. 53.1853; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193: 136. 1991; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 412.2001. *R. pulchellus* C.A.Mey. var. *sericeus* Hook.f., & Thomson in Hook.f., Fl. Brit. India 1: 17. 1872; Maxim., Fl. Tangut. 13. 1889; H. Hara & L.J.H.Williams, Enum. Flow. Pl. Nepal 2: 20. 1979. Fig. 17

Type: Specimen 1 on the left side, Lippa in Kunawar, 1831, *Royle* 42 'Lectotype' designated by Pusalkar (DD!).

Perennial herbs, 5-10 cm high, whitish tomentose; roots numerous, fibrous; stem 1-3 branches. Radical leaves ovate lanceolate, dentate, 0.8-1.0 x 0.3 cm, mostly reduced to wide membranous sheath with sheathing petiole, 1-1.8 cm long, silky tomentose; cauline leaves sessile, 2-3-fid, primary segments further bifid, lobes linear to oblong-linear, *ca* 0.3 cm wide, obtuse, upper surface nearly glabrous, otherwise tomentose. Flowers 0.8-1.4 cm in diam., yellow. Sepals 0.4-0.6 cm long, ovate, obtuse to subacute, hairy. Petals longer than sepals, obovate or obovate-oblong, finely veined. Achenes many, small, lanceolate, glabrous or pubescent, arranged in globose head; style often recurved, subulate from broad, triangular base.

Flower and fruit: July - September

Distribution: India: Himalaya; Jammu & Kashmir (Ladakh), Himachal Pradesh (Kunawar, Lahaul-Spiti), Uttarakhand (Tehri), Sikkim; China (Tibet) and Pakistan. Found in dry cold desert areas in Himalaya. (Fig. 46)

Specimens examined: Himachal Pradesh: Kunawar, Lippa, 1831 (DD); Bashahar state, Kanawar, 14300 ft., 03.09.1891, *J.H.Lace* 1026 (E). Uttarakhand: Tehri, RudraPrayag, 15-16000ft., 20.07.1953, *J.F.Duthie* 758 (DD). Sikkim: Sikkim, 15-18000ft., *J.D.Hooker* s.n. (K); Lhonakh, 14500 ft., 01.08.1909, *Smith & Cave* 1826 (K,E,P); Lhonakh, 15000 ft., 28.08.1947, *G.H.Cave* 38/47 (E); Kangralamo, 16000 ft., 14.08.1909, *Smith & Cave* 2451 (P).

Note: Hook.f. & Thomson (1872) treated *R. membranaceous* Royle, as a synonym of *R. pulchellus* var. *sericeus* Hook.f. & Thomson. Rau (1993) placed var. *sericeus* under *R. pulchellus* C.A. Mey. *R. membranaceous* Royle is characteristically distinct in having reduced, sheathing radical leaves, deeply divided cauline leaves, silky tomentose throughout, except upper leaf surface, small flowers and globose heads of achenes. Hence, it is treated here as distinct species. Two specimens from Kunawar in Himachal Pradesh and Tehri, Uttarakhand are housed in DD, besides few are deposited in K, E, P from Himachal Pradesh and Sikkim.

17. ***Ranunculus microphyllus*** Hand.-Mazz., Symb. Sin Pl. VII: 299.1931 & in Acta Hort. Gotob. 13:141.1939. *R. flaccidus* Hook.f. & Thomson, Fl. India 1:38.1855 & in Hook.f., Fl. Brit. India 1: 20.1872 (non Pers., 1795). Fig. 18

Type: India: Specimen No. 3, Kumaon, Lahoor, 10,000 ped, *Strachey & Winterbottom* 2 'Lectotype designated here: BM!, Isolectotype: (No. 1, 2 & 4) BM!, (No. 5-8) K!, (No. 9-11[P00186410] P!; Specimen No. 1-5, Kumaon, Madari Pass, 9500 ft., 11, 05. 1884, *Strachey &*

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Winterbottom 2 'Lectoparatype designated here: CAL!; Sikkim, 9-10000 ft, *J.D. Hooker* s.n. 'Lectoparatype designated here': (No. 1-2) CAL!, (No. 3-8) K!; (No. 1-2) BM!, (No. 9-10) G!, (No. 11 [P00186407] & 12-15 [P00186408] P!, E!, OXF!, CGE!; Bhutan, *Griffith* 1716 'Lectoparatype designated here': (No. 1-9) K!.

R. ficariifolius A. Leveille & Vanoit in Bull. Soc. Bot. Fr. 51: 289.1904; M.A. Rau in B.D. Sharma et al., Fl. India 1:120.1993; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 422.2001.
Type: Kouy-Tcheou: Pin-fa, grande grotte, 14.10.1902, no. 629 [Jul. Cavalerie leg.] n. v. P?

Perennial, tufted or decumbent herbs, 1-7 cm high, green, occurring in large dense patches, appressed to the ground; stem filiform, nodes often rooting. Leaves small ovate, reniform or suborbicular 0.4-1.2 cm in diam., or less, acute or sub-acute, truncate or cordate at base, 3-5 crenate, membranous or flaccid, glabrous, 3-5 lobed along margins; petioles 0.3-4.5 cm long, tapering, sheathing at base. Flowers solitary, minute, yellow *ca* 0.8 mm in diam. on long scape, *ca* 1.5-2.0 cm long, opposite to leaf, densely hairy. Sepals elliptic, reflexed, 2- 4.5 mm long. Petals obovate, 2.5-4 x 1-3 mm, yellow. Achenes 6-12 in capitulum, pubescent with small tubercles, ellipsoid compressed surrounded by narrow rim, glabrous *ca* 1-2 mm in diam.; style hooked, short reflexed.

Flower and fruit: June-August

Distribution: India: Himalaya. In marshy places along the stream at 1200-3500m. Himachal Pradesh, Uttarakhand, West Bengal, Sikkim, Arunachal Pradesh; Nepal; Bhutan and China. (Fig. 47)

Specimens examined: Himachal Pradesh: Chumbi, 03.06.1884, *Dr. King's* coll. 432 (CAL). Uttarakhand: Niti Pass, 10000ft., *Strachey & Winterbottom* 2 (P); Kumaon, above Ralam glacier, 14000ft., 25.08.1884, *J.F.Duthie* 2666 (CAL); Madari Pass, 9500 ft., 11.05.1848, *Strachey* & *Winterbottom*, 2 (CAL, K). Sikkim: Tassia, 10000 ft., June 1888, *King's* collector s.n. (K, G); Phalut, 11000 ft., 05.11.1857, *T.Thomson* s.n. (K); Sikkim, 10000 ft., May 1881, *G.Watt* s.n. (K); Sikkim, 10000 ft., 01.07.1913, *R.E.Cooper* 121 (E); Phalut, 11000 ft., 15.06.1912, *Cave* s.n. (E); Sikkim, 9-10000 ft., *J.D.Hooker* s.n. (G,L,K,E,P,OXF); Sikkim, 13000ft., *Dr. King'* s collector s.n. (P); Nayathang, Phalut, 02.06.1966, *H.A.Khan* 9703 (DD); Changu Lake, 12100ft., 20.07.1910, *W.W.Smith* 3594 (CAL); Jongri, 13500ft., 20.06.1892, *G.A.Gamble* 154 (CAL); On way to Sandakpur, 10000 ft., 17.05.1881, *G.Watt* 5309 (CAL).West Bengal: Darjeeling, 25.04.1945, *James Sinclair* 4226 (E); Darjeeling, Tonyly, 3048 m, 16.06.1961, Unknown collector s.n. (CAL).

Note: *Ranunculus ficariifolius* Leveille & Vanoit (1904) is the synonym of *R. yunnanensis* Finet & Gagnep in Bull. Soc. Bot. Fr.LI., p.p min (non Franch), a Chinese species). Hand.-Mazz. (1931) proposed *nov.nom*. *R. microphyllus,* against *R. flaccidus* Hook.f. & Thomson which was preoccupied by Persoon, hence, rejected as being the later homonym.

18. ***Ranunculus munroanus*** J. R. Drumm. ex Dunn in Bull. Misc. Inf. Kew 1925: 279. 1925; H. Hara & L.J.H. Williams, Enum. Flow. Pl. Nepal 2: 20. 1979; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193: 150.1991; M.A. Rau in Sharma et al., Fl. India 1: 123.1993; Aswal & Mehrotra, Fl. Lahaul-Spiti 68. 1994; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 402. 2001. Fig. 19

Type: Pass to Gurais, N. side, 21. 06. 1847, *Munro* 514 'Lectotype designated here': K! [Fig. -5]; Kashmir West Tibet, 27.06.1838, *Falconer* 41 'Lectoparatype designated here': (K000357835, specimens no. 1-3) & (K000357836, specimens no. 4-9) K!; Near Sheshnag, at the base of rocks, 3750m, 10. 07. 1902, *J.R. Drummond* 14173 'Lectoparatype designated here: (K000357833, specimens no. 1-3) K!; Kashmir, Astanmarg, 3600-3900m, 12. 07. 1902, *J.R. Drummond* 14304 'Lectoparatype designated here: (K000357839, specimens no. 1-5) K!; Kashmir, above Gulmarg, 3000-3300m, 31.05.1892, *J.F. Duthie* 11309 'Lectoparatype designated here: (K000357838, specimens no. 1-3) K! DD!; Kashmir, Liddarwat, 3000m, forming dense extensive patches of plants, 20. 07. 1924, *B.O. Coventry* 889 'Lectoparatype designated here: (K000357834, specimens no. 1-7) K!; Kashmir, Deorsai, 4000m, 31.07.1876, *C.B. Clarke* 29834 'Lectoparatype designated here: (K000357838, specimens no. 1-3) K!; Kashmir, *B. Sahni* 287 'Lectoparatype designated here': (K000357833, specimen no. 1-3) and (K000357839, specimens no. 4) K!

Perennial, small, herbs, 5-15 cm high; root-stock tuberous with fibrous and fleshy roots; stem erect or ascending, flaccid, sparsely villous towards upper part. Radical leaves with flaccid, long petioles up to 10 cm long; lamina reniform *ca* 2.5 cm in diam., rotund, broadly obovate, 3-lobed, crenate, sometime with one deeper incision; cauline leaves similar, shortly petioled, the upper most smaller. Peduncle axillary, 1-5 cm long, hairy; flowers 0.8-1.0 cm in diam., axillary, yellow. Sepals 5, 0.3-0.4 cm long, ovate to oblong-ovate, obtuse, glabrous. Petals obovate, obtuse 0.4-0.5 cm long, broadly rounded to cuneate. Achenes *ca* 1 mm broad, glabrous, slightly compressed; style short, triangular.

Flower and fruit: June- July

Distribution: India: Western Himalaya; Jammu & Kashmir (Ladakh), Himachal Pradesh; Pakistan; Nepal; China (W. Tibet). (Fig. 47)

Specimens examined: Jammu & Kashmir: Kashmir, Sonmarg, *ca* 3100m, 04.07.1979, Unknown collector 2678 (G); Kashmir, Gulmarg, under rocks, 10-11000ft., 31.05.1892, *J.F.Duthie* 11309 (DD); Kashmir, 7000ft., 19.04.1848, *T.Thomson* s.n. (K); Kashmir, 13000ft., July, 1823, *J.E.Winterbottom* 778 (K); Upper Chenab, 12000 ft., *B.H.Baden-Powell* 46 (K); Sonmarg, Upper Nichanai valley, 3330m, 04.08.1989, *C.C. Townsend* 89 / 254 (K); Pahalgam, 05.09.1928, *ca* 9000 ft., *R.R. Stewart* 5951 (K); Pahalgam, 05.08.1922, *ca* 11000ft., *R.R.Stewart* 7248 (K); Kashmir, Nichanai, 12000 ft., 2.07.1977, J.D.A. Stainton 7931 (E). Himachal Pradesh: Kullu, Chanderkani, 11-12000 ft., 27.06.1930, *Koelz* 144 (P); Kullu, Chanderkani, 11-12000ft., *Koelz* 566 (P); Sissu, 13000 ft., 05.07.1938, *N.L. Bor* 12348 (K).

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Ecology: Growing in damp crevices at an altitude of 1500-4000 m.

19. ***Ranunculus muricatus*** L., Sp. Pl. 780. 1753; Hook.f. & Thomson, Fl. Ind. 1: 39. 1855 & in Hook.f., Fl. Brit. India 1:20. 1872; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193:129.1991; M.A. Rau in B.D. Sharma et al., Fl. India 1:124.1993; Aswal & Mehrotra, Fl. Lahaul-Spiti 68.1994; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 430. 2001. *R. emuricatus* Majeed Kak in Biol. Bull. India 3(3):155.1981, *syn. nov*. Fig. 20

Type: Described from Mediterranean

Annual herbs, glabrous, erect or diffusely branched; stem solitary, fistulose or many short stems, branched from near the base, 10-30 cm high. Radical leaves long-petioled, rounded, reniform to sub-orbicular, 3-5 cm in diam., trifid; lobes irregularly cut, coarsely crenate-lobate, rounded or cordate at base; petioles of the lowermost leaf up to 15 cm long, decreasing in length towards apex; cauline leaves 3-partite, cuneate at base, similar to radical ones. Peduncles axillary, usually 1-3 cm long; flowers *ca* 1.5 cm in diam., solitary, leaf opposed, yellow. Sepals reflexed, ovate membranous, *ca* 0.4 cm long, shorter than petals, sparsely setulose. Petals oblong-obovate, tapering at apex, *ca* 0.5-0.6 cm long. Achenes many, in globose head, ovate, flattened, 7-8 mm long, with numerous scattered tubercles on the surface; beak broadly triangular, 2-3 mm long, nearly straight, shorter than the achene.

Flower and fruit: May – October

Distribution: India: Temperate region of Himalaya and Peninsular India. Jammu & Kashmir, Punjab, Haryana, Himachal Pradesh, Uttarakhand, Uttar Pradesh, Tamil Nadu; Pakistan; Afghanistan; Iran; Greece; Russia to Europe. (Fig. 51)

Specimens examined: Jammu & Kashmir: Kashmir, Mundee hills, May 1848, *Leint Parish* s.n. (K); Banihal Valley, 5000ft., *T.Thomson* s.n. (CAL,P,G,E,K); Kohat, 1878, *J. R. Drummond* s.n. (K); Kashmir , *Falconer* 48 (CAL, K); Jammu, *Dr. Mitre* 21308 (CAL); Uri Cashmere, 4000ft., June 1905, *A.Meebold* 3305 (CAL); Srinagar, 1735 m, 20.06.1959, *T.A.Rao* 9584 (CAL); Baramula, 5200 ft., 04.06.1954, *S.N.Singh* 11359 (CAL); Anantnag, Andura forests, 27.05.1962, *Abdul Rasheed* 96630 (CAL); Near Khirbhawani, 5000ft., 20.05.1954, Ram Lakhan 10836 (CAL).Punjab: Hoshiarpur, March 1868, *Dr. Aitchinson* s.n. (CAL, K); Punjab, *J.R.Drummond* 2021 (K); Pathankot, 1000ft., 28.01.1917, *R.R.Stewart* 899 (K); Beas, 24.03.1960, *J.N.Vohra* 11318 (CAL); Batala, 05.03.1902, *G.Watt* 14478 (CAL); Amritsar 09.03.1896, *D.Prain* s.n. (CAL); Punjab, 1860 *C.B.Clarke* 40 (CAL). Himachal Pradesh: Una, 04.04.1972, *O. P. Mishra* 45838 (CAL). Uttarakhand: Dehradun, Harbanswala Tea Estate, 600 m, 07.03.1964, *N.P.Singh* 31689 (CAL); Rispana, 21.02.1965, *C.R.Babu* 33890 (CAL); Niranjanpur, 07.03.1964, *N.P.Singh* 31670 (CAL). West Bengal: Howrah, Shibpur, 07.02.1976, *A.K.Mukherjee* 10558 (CAL); Burdwan, 15.09.1962, *A.K.Dutta* 183 (CAL). TamilNadu: Madras, Ootacamund, 7000ft., Sept.1886, *J.S.Gamble* 18143 (CAL,K); Nilgiri, Nadvattam, 24.09.1934, *Edwards Barnes* 1127 (K); Nilgiris, Kurumund road, 16.09.1909, *Bourne* 5354 (K); Nilgiri, 1901, *Barber* s.n. [det. *S.T.Dunn*, 1917] (K, CAL); Ootacamund, 8000 ft., Oct. 1910, *A.Meebold* 11913 (CAL).

Uses: The herbs are used in curing intermittent fever and Asthma in Kashmir (Kumar & Naqshi in *J. Econ. Taxon. Bot*. 14:72.1990).

Notes: *Ranunculus muricatus* L. shows a good range of variation in morphological characters like branching in stem, attachment of lamina, size of the petals, smooth and tubercled achenes. Majeed Kak (1981) described *R. emuricata* from Kashmir allied to *R. muricatus*, stated the differentiation is mainly in having erect habit, glabrescent stem, leaf base, receptacle and smooth achenes.The critical study of the specimens of *R.muricatus* revealed that most of the individuals have these overlapping characters. Since, *R. muricatus* is quiet variable in its morphological features so, *R. emuricata* Majeed has been merged and treated as a synonym of *R. muricatus* L.

20. ***Ranunculus natans*** C.A. Mey. in Ledeb., Fl. Alt. 2: 315. 1830 & Ic. Pl. Fl. Ross. II.8. t.114.1830; H. Hara & L.J.H.Williams, Enum. Flow. Pl. Nepal 2:20. 1979; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193:135.1991; M.A. Rau in B.D. Sharma et al., Fl. India 1:124.1993; Aswal & Mehrotra, Fl. Lahaul-Spiti 68.1994; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 420. 2001. Fig. 21

R. hyperboreus Rottb. var. *natans* (C.A. Mey.) Regel in Bull. Sci. Nat. Mosc. 34:43.1861; & Plantae Raddeanae 1:43.1862; Hook.f. & Thomson in Hook.f, Fl. Brit. India 1:18.1872; R.R. Stewart in Nasir & Ali, Ann. Cat. Vasc. Pl. West. Pakistan & Kashmir. 270.1972. *R. radicans* C.A. Mey. in Ledeb., Fl. Alt. 2:316.1830; Hook.f. & Thomson in Fl. Ind. 1:32.1855; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 419.2001.

R. hyperboreus Rottb. var. *radicans* (C.A.Mey.) Hook.f. & Thomson in Hook.f., Fl. Brit. India 1:18.1872.

Type: In aquistoquantibus and Fl. Tscharysch, Bunge; in fluv. Mon et Tegagom in Fl. Tschiya inflatibus, *Bunge n.v.* LE? (Syntype)

Aquatic herbs, floating or creeping on moist with fibrous roots, rooting at nodes, glabrous, except sometimes in the upper part of the stem and peduncles; stem sulcate, prostrate, branched, *ca* 3 mm thick. Leaves petiolate; petioles 1-4 cm long, with membranous scales present near the base; lamina reniform, broadly 3-5 lobate, 0.8-2.0 x 1.5-3.0 cm, glabrous; lobes rounded at apex, shallowly crenate or entire or with broad rounded lobules, 3-8 mm wide at base. Peduncles 1-2.5 cm long, axillary; flowers *ca* 1 cm in diam., yellow. Sepals 5, *ca* 0.4 cm long, ovate or rounded ovate, glabrous, deciduous. Petals 5, slightly longer than sepals. Achenes 0.15-0.2 cm, numerous, glabrous, smooth, forming a large globose head, inserted in a rounded, glabrous, sparsely hairy receptacle; style short, slightly hooked at the tip.

Flower and fruit: May-July

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Distribution: India: Jammu & Kashmir (Ladakh), Himachal Pradesh (Lahaul-Spiti), Uttarakhand; Afghanistan; Turkestan; Central Asia; China; Nepal; Mangolia and Russia. (Fig. 47)

Specimens examined: Jammu & Kashmir: Kashmir, Liddarwart, Sangam Valley, 12-13000 ft., 12.08.1893, *J.F.Duthie* 13333 (DD); Khillanmarg, 10-11000 ft., 03. 07. 1893, *J.F.Duthie* 13056 (DD); Dras 9-10000ft., 29.08.1940; *R.R.Stewart* 21178 (CAL,DD); Moralle, 11000 ft., 11.06.1886, *E.R.Johanson* s.n. (CAL); Upper Chenab, Drati Pass, 13000 ft., 1897, *B.H.BadenPowell* 43(CAL); Shagarthang valley, 8-9000ft., 18.07.1892, *J.F.Duthie* s.n. (CAL); Kamari valley, 11-12000 ft., 25.08.1892, *J.F.Duthie* 12567 (CAL); Kashmir, 1871, *J.L.Stewart* s.n. (E); Kashmir, Karapachu Valley, 09.07.1892, *J.F.Duthie* s.n. (E); Ladakh, *Stewart* s.n. (K); Kashmir, above astor, 10000ft., 23.07.1946, *R.R.Stewart* 22875 (K); Ladakh, Dras, 10000ft., 12.08.1946, *R.R.Stewart* 2349 (K). Himachal Pradesh: Lahaul- Spiti, Lossar, 13500ft., 29.06.1958, *R.C.Kaushik* 972 (DD); Sarchu, 13000ft., 30.06.1891, *N.L.Bor* 15114 (DD); Keylong, Jispa, 10200 ft., 16.07.1941, *N.L.Bor* 16417 (DD); Spiti, 4200m, 31.07.1972, *U.C.Bhattacharya* 49178 (CAL); Upper Bhaga Valley on metamorpher rocks, 9500-13000 ft., *Dr. Stoliczks* s.n. (CAL); Jispa, 3300 m, 09.07. 1973, *U.Bhattacharya* 51947 (CAL); Darcha, 3500 m, 10.07.1973, *U.C.Bhattacharya* 51967 (CAL); Darcha, 3430m, 12.07. 1986, *Kirkpatrick & Mc Beath* 1892 (E); Bhaga Valley, 13000ft., *J.R. Drummond* 8291 (K); Lahaul valley, Rohtang slopes, 3500m, 27.07.1979, *B.S. Aswal* 10525 (CDRI); Darcha, 3400m, 16.09.1978, *B.S.Aswal* 9332 (CDRI).

Note: The specimens of var. *natans* and var. *radicans* differs only in the degree of division of the leaves and habit like floating and creeping on moist soil. Hence, they have been merged under the *Ranunculus natans* C.A. Mey.

21. ***Ranunculus palmatifidus*** Riedl. in Kew Bull. 34. 362.1979 & in Ali & Y.J. Nasir, Fl. West Pakistan 193:153.1991; M.A. Rau in B.D. Sharma et al., Fl. India 1: 125.1993. Fig. 22

Type: India: Kashmir, Sonmarg, 9000ft, 03. 07. 191, H. Rich. 1115 (Holotype: K!).

Perennial herbs, 30-60 cm tall high; rootstock fibrous; stem single or branched in the upper part, loosely villous, striated when dry. Radical leaves subreniform, palmate-partite, 5-10 cm wide, loosely hairy on both the surfaces, densely ciliate along margins; lateral segments deeply bifid and deeply bi-dentate again, middle segments lanceolate, broader below the middle, 4-6 x 0.8-1.2 cm; petioles 10-20 cm long, striate, pilose, vaginate at base; cauline leaves subsessile or sessile, 3-5 lobed; lobes narrowly linear-lanceolate, 2.5-7 x 0.2-0.6 cm, shortly sheathing at a base. Flowers yellow, 2-2.2 cm in diam.; peduncle 4-6 cm long, densely strigulose in its upper part. Sepals ovate or elliptic, sub-acute to obtuse, 5-6 x 2-4 mm, spreading, densely villous. Petals obovate, cuneate, triangular, undulate along margins, 0.9-1.2 cm in diam., receptacle glabrous. Achenes 4-6, ovate-oblong, 0.7-1.0 x 0.6 cm, arranged in ovoid to oblong head, inflated, glabrous; style 0.7-0.8 mm long, slightly curved or hooked.

Flower & Fruit: July – September

Distribution: India: Western Himalaya; Jammu & Kashmir, Himachal Pradesh (Pin Valley National Park in Spiti valley), Uttarakhand (Uttarkashi). (Fig. 47)

Specimens examined: Jammu & Kashmir: Sonmarg, 9000 ft., 03.07.1919, *H.Rich* 1115 (K). Himachal Pradesh: Lahaul-Spiti, Pin Valley National Park, Larang-La-Tariya, 3950 m, 06.08.2003, *K.Chandra Sekar* 103762 (BSD); Uttarakhand: Uttarkashi, Bhojbase, 3700 m, 04.09.1983, *U.C.Bhattacharya* 74861 (BSD).

Notes: *Ranunculus palmatifidus* Riedl has been recently collected from Pin Valley National Park, Lahaul-Spiti in Himachal Pradesh (Chandra Sekar & Srivastava, 2008 (in press), after the type collection from Kashmir lodged at Kew herbarium. Two specimens are known from BSD. Prior to this, no specimen of the species are known from any of the Indian herbaria.

22. ***Ranunculus pangiensis*** Watt in J. Linn. Soc. Bot. 18: 377. 1881; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193: 143.1991. Fig. 23

Type: India: N.W. Himalaya, Himachal Pradesh, Pangi, Bhudra Baja, Kilar, 9,500 ft., May 1878, *G.Watt* 908 (Isotype: K!, E!); In the cut through Chenab passes from Sidika, 9,500 ft., 1880, *G.Watt* 2234 (Paratype: K!)

Perennial herbs with short cylindrical and long fibrous roots; stem 50-90 cm high, with few long hairs or glabrous, somewhat flaccid, branched, arising from the creeping rootstock. Radical leaves ternate, segments pinnatifid or bi-pinnatifid; petioles up to 3 cm long, nearly glabrous; lobes oblong, obtuse, *ca* 4 x 2 mm, papery when dry, some time with small petioles; cauline leaves almost sessile, tri-partite, simple, segments entire or pinnate; peduncle, up to 5 cm long, densely strigulose. Flowers 1.5-2.0 cm in diam., yellow. Sepals *ca* 1 cm long, oblong-ovate, densely hairy. Petals obovate-rotundate, 1.4-1.8 cm long. Achenes 1.5-2.0 mm in diam., ovate, glabrous, forming a broad-ovoid head; style flat, recurved.

Flower and fruit: May – July

Distribution: India: Himachal Pradesh; Central Pakistan. (Fig. 47)

Specimens examined: Himachal Pradesh: Pangi, Sanch village, 8500 ft., *Watt* 2234 (E); Pangi, Bhudra Baja, Kilar, 9500 ft., May, 1978, *G.Watt* 98 (E, K).

Notes: This species is not represented in any of the Indian herbaria.

23. ***Ranunculus pegaeus*** Hand.-Mazz. in Acta Hort. Gotob. 13: 141. 1939; H. Hara, Fl. East. Himalaya 3: 37. 1975; H. Hara & L.J.H.Williams, Enum. Flow. Pl. Nepal 2:20. 1979; M.A. Rau in B.D. Sharma et al., Fl. India 1: 125. 1993; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 403.2001. *R. hyperboreus* Hand.-Mazz., Symb. Sin. VII. 308.1931 *p.p.* non Rottb.; Hook.f. & Thomson in Hook.f, Fl. Brit. India 1: 18. 1872. Fig. 24

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Type: Yunnan boreo-occid: Inter vicos Bodo (Peti) et al., Alo ad austro-orientalis pagi chungtien in regionis frigid temperatae fontibus adjugum, *ca* 4,100m, 7. VIII. 1914, *Handel-Mazzetti* 4526 (Image -Holotype: WU!)

Perennial, dwarf, glabrous herbs; roots somewhat thickened proximally; fibrous roots few; stem creeping, stoloniferous, up to 20 cm long, rooting at nodes with rosulate leaves. Radical leaves trisect, pentagonal to reniform, 0.2-0.9 x 0.2-1.0 cm, medially to deeply 3-lobed; middle lobes ovate to oblong lanceolate, entire or rarely 3-dentate; lateral lobes simple or 3-partite; petiole slender, 2-4 cm long. Scape slender, 1-3.5 cm long, single flowered. Flowers yellow, small, less than 1.3 cm in diam. Sepals 5, broadly obovate, concave, 1.5-2 mm long, glabrous. Petals 5, narrowly elliptic, clawed at base, rounded at apex, 1.5-2.0 mm long, nectary scale cup shaped. Anther small, 0.2-0.6 cm long, basified, filaments flattened. Receptacle broadly ovoid or globose, 0.2-0.3 cm long. Achenes obovate, glabrous

Flower and fruit: June- August

Distribution: India: Sikkim, West Bengal (Darjeeling); Nepal; Bhutan and China (W. Tibet). (Fig. 47)

Specimens examined: Sikkim: West Distt., Chhurong Chu Valley between Jam linghang and Bikbari in west flush, 3925 m, 11. 07. 1992, *D.G.Long, R.J.D.McBeath, H.J.Noltie, L.M.F.Watson* 221 (E).

Notes: Rau (1993) mentioned *R. pegaeus* is known from Himalaya in Himachal Pradesh and Uttar Pradesh (present Uttarakhand). During the course of revisionary study, no specimen of *R. pegaeus* could be found from the Indian herbaria. Only one specimen from Sikkim in Edinburgh (E) and one from Nepal in Kew (K) have been studied.

24. ***Ranunculus pulchellus*** C.A. Mey. in Ledeb., Fl. Alt. 2: 333.1830 & in Ic. Fl. Pl. Ross. II: t. 1830; Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 17. 1872; Kachroo et al., Fl. Ladakh 47. 1973; H. Hara & L.J.H. Williams, Enum. Flow. Pl. Nepal 2: 20. 1979; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193: 138. 1991; M.A. Rau in B.D. Sharma et al., Fl. India 1: 125. 1993; Aswal & Mehrotra, Fl. Lahaul-Spiti 69. 1994; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 411. 2001. *R. gaurii* L.R. Dangwal & D.S. Rawat in J. Econ. Taxon. Bot. 20(3): 703. 1996, *syn. nov*. Fig. 25

Type: In locis humids subsalis ad. Fl. Tschyia, *Bunge* s.n.

R. flammula D. Don in Royle. Ill. 53.1835 (non L.) Type: Himachal Pradesh, Soongnum in Kunawar (LIV!)
R. nephelogenes Edgew. in Trans. L. Soc. 20.28.1851. Type: Himachal, in elatis, alt. 17000 - 18,000 ft. (K!)

Perennial herbs, erect, densely branched, 20-35 cm high; roots fusiform, fibrous; stem erect or decumbent, 3-25 cm long, simple or branched, nearly glabrous to sericeous. Radical leaves 1-5 or more, 1.5-3.5 x 0.4-1.0 cm, oblong, reniform or ovate–elliptic, entire or 3-lobed or deeply incised, crenate, rounded or sub-truncate at base, nearly glabrous; petioles 1.5-12 cm long, longer than the leaf blade, sheathing at base; cauline leaves narrowly elliptic or deeply 3-lobed, sheathing at base, up to 10 cm long. Peduncles in their upper part with few long reddish-brown hairs; flowers solitary or 2-3, 0.5-1.5 cm in diam., yellow; pedicel sulcate, sericeous. Sepals ovate–elliptic or ovate-lanceolate, obtuse, 4-6 x 3-5 mm, purplish, hairy along margins. Petals 5 (or sometimes 8), obovate to broadly obovate, 0.5-1.0 cm in diam., yellow, nectaries cup shaped with forked borders. Receptacles nearly glabrous. Achenes obovoid *ca* 1.5 mm long, glabrous, inflated on subglobose to ovoid head; stylar beak *ca* 1 mm long, straight or recurved.

Key to the varieties

1a. Basal leaves margin ciliate, petioles hairy .... 24.3 var. *stracheyanum*
b. Basal leaves margin glabrous, petioles glabrous ……..…… 2
2a. Cauline leaves long, linear; stylar beak straight with broad apex …..…
……..24.1 var. *longicaulis*
b. Cauline leaves narrowly elliptic; stylar beak recurved with narrow apex ……..… 24.2 var. *pulchellus*

24.1 ***Ranunculus pulchellus*** C.A. Mey. var. ***longicaulis*** (C.A. Mey.) Hook.f. & Thomson, Fl. Ind. 1: 31. 1855 & in Hook.f., Fl. Brit. India 1:17.1872. *R. longicaulis* C.A. Mey. in Ledeb. Fl. Alt. 2: 233. 1830. Fig. 26

Type: In locis humids ad fl. Tscharysch

Erect, branched herbs; stem with straight hairs; cauline leaves very long, lower petiolate, elliptic-oblong, minutely toothed; upper one sessile, nearly lanceolate, absolutely entire. Sepals broad, hirsute. Petals trumpet shaped. Achenes glabrous; style straight with broad apex.

Flower and fruit: June - September

Distribution: India: Kashmir (Ladakh), Himachal Pradesh (Pangi, Spiti Valley), Sikkim; Pakistan. (Fig. 48)

Specimens examined: Jammu & Kashmir: Ladakh, Tsomorari, *Dr. Stolivizka* s.n. (CAL); Gomboramzang, 4500 m, 24.07.1973, *U.C.Bhattacharya* 52198 (CAL); Pang, Rupshu, 4600 m, 03.09.1970, *U.C.Bhattacharya* 40994 (CAL); Dras, 10-11000ft., 21.08.1893, *J.F.Duthie* 13684 (K,E,DD); Singhu valley, 10-11000ft., 07.07.1892, *J.F.Duthie* s.n. (DD); Himachal Pradesh: Spiti, Takcha, 25.07.1972, *U.C.Bhattacharya* 48810 (CAL); Pangi, 11-16500 ft., 1879, *A. W. Hegde* s.n. (DD, CAL); Spiti, 4200 m, 01.08.1972, *U.C.Bhattacharya* 49224 (CAL); Sikkim: Slousk, 14500 ft., 31.07.1909, *Smith & Cave* 2086 (CAL); (DD); Lachung Valley, 10-12000 ft., 28.08.1942, *G.A.Gammie* 1028 (CAL); Sikkim Himalaya, 13000 ft., 19.09.1926, Unknown Collector 13 (CAL).

24.2 var. ***pulchellus***

Flower and fruit: July - November

Distribution: India: Himalayas; growing in meadows and cliff edges at 3500-4500 m in alpine and sub-alpine

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regions. Jammu & Kashmir (Ladakh), Himachal Pradesh (Lahaul-Spiti), Uttarakhand (Kumaon), Sikkim, Manipur; Afghanistan; Iran; Nepal; Bhutan; China and Russia. (Fig. 48)

Specimens examined: Jammu & Kashmir: Kashmir, Dras Valley, 11000 ft., 30.06.1892 *J.F.Duthie* 11975 (CAL,P); Rupshu, 13. 07. 1931, 14300ft., *Walter Koelz* 2306 (L); Kashmir, *Floconer* 28 (L); Kashmir, Nubra, 10500, *T.Thomson* s.n. (L); Ladakh, 4860 m, 05.08. 1897, *H.Hartman* 3121 (G); Stoke 3700 m, 18.07.1979, *H.Hartman* 2675 (G); Ladakh, Nubra temp, 10500 ft., *T.Thomson* s.n. (G); Ladakh, Dras, 10500 ft., 31.05.1941, *Ludlow & Sherriff* 8325 (BM); Kashmir, July 1956, *T.A.Rao* 644 (CAL); Chandarani to Seshnag, 3500 m, 26. 09. 1961, *B.M.Wadhwa & J.N.Vohra* 237 (CAL); Kangi, Ladakh, 10-11000ft., July,1905, *A.Meebold* 3308 (CAL); Krupuchu valley, 12-13000ft., 07. 07. 1892, *J.F. Duthie* s.n. (CAL); near Randum Gompha in Zankur, 12-14000ft., 08.1865, *Dr. Stolivzki* s.n. (Herb. Supl. Kurz) (CAL). Himachal Pradesh: Spiti, 1857, *W.H. Hay* s.n. (OXF); Bashahar, Kanun, 27.07.1830, Unknown collector s.n. (P); Soongum, Kunawar, Unknown collector *s.n.* (LIV); Spiti, 4200m, 01.08.1972, *U.C.Bhattacharya* 49224 (L); Keylong, 12000ft., 02.07.1888, *Ram Babu* 8292 (BM); Baspa, 12500ft., 22.07.1939, *G. Sherriff* 74 (BM); Pangi, 11-16500ft., 1879, *Rev. A.W. Heyde* s.n. (CAL); Sagnum in Spiti Valley, 11500-12000ft., *Dr. Stolivzki* s.n. (CAL). Uttarakhand: Kumaon, *Strachey* 3082 (OXF); Kumaon, 15000 ft., water course, *Strachey & Winterbottom* 15 (P); Tehri Garhwal, Phulaldaru in Nila Valley, 14-15000 ft., 21.06.1883, *J.F. Duthie* 757 (G). Sikkim: Tonglo, 4500 ft., Herb. W.Hans (P); Sikkim alpine, 11-13000 ft., *J.D.Hooker* s.n. (G, P); Sikkim, 11-13000 ft., *J.D. Hooker* s.n. (L); South of Changu, 12000ft., 07.07.1910, *W.W. Smith* 3144 (CAL); Darkila, Aug, 1879, *G. King* s.n. (CAL); Sikkim, *R.S. Rao* 565 (CAL); Slousk, 12000ft., 20.07.1909, 1761, *Smith & Cave* s.n. (CAL). Manipur: Luguthang, 12000ft., 06. 06. 1935, *F. Kingdom* Ward 11633 (BM).

24.3 ***Ranunculus pulchellus*** C.A. Mey. var. *stracheyanus* (Maxim.) Hand.-Mazz. in Acta Hort. Gotob. 13: 147. 1939; H. Hara & L.J.H. Williams, Enum. Flow. Pl. Nepal 2: 20. 1979. *R. affinis* R. Br. var. *stracheyanus* Maxim., Fl. Tangut. 14. 1889.

Fig. 27

Type: India, Kumaon, Niti, 16, 800 ft., *Strachey & Winterbottom* 18 (K!).

Plant small. Radical leaves, ovate, reniform, 1-2 cm in diam., truncate or cordate at base, 3-lobed; segments ovate-lanceolate, margins densely ciliate. Pedicel tomentose.

Flower and fruit: June - September

Distribution: India: Jammu & Kashmir (Ladakh), Himachal Pradesh, Uttarakhand, Sikkim; Nepal; China (Tibet). (Fig. 48)

Specimens examined: Jammu & Kashmir: E.Ladakh, Misaling, 4860 m, 05.08.1987, *H.Hartmann* 3118 (G); Himachal Pradesh: Lahaul, Kylong, 12000ft., 02.07.1888, *Ram Bansh* 8292, (K); Parabati valley, Kullu, 2 miles from onch village, 6000 ft., 03.06.1958, *P.C. Nanda* 1396 (CAL); Bashahar state, Kiari Pass, 14500 ft., 03.09. 1891, *J.H. Lace* 1176 (E). Uttarakhand: Himalayan Herbarium, Niti, 16800 ft., *Strachey & Winterbottom* no. 18 (K); Kumaon, *J.F.Duthie* 2664 (CAL); Tehri Garhwal, Ridge above Jhala, 12-13000 ft., 29.06. 1883, *J.F.Duthie* 756 (E). Sikkim: Syangalur, 15000 ft., July 1888, *Dr. King's collector* s.n. (CAL, K); Dankia, 16-18000ft., 16.08.1892, *G.A. Gammie* 820 (CAL); Nachegoh, 16000 ft., 12.07.1909, *Smith & Cave* 1727 (CAL); Linglon, 12000 ft., 11.07.1877, *Dr. King's collector* 4233 (CAL); Churong, Chhu Valley, 3110m, 11.07.1992, *D.G.Long, R.J.D.McBeath, H.J.Noltie & M.F.Watson* 224 (E); Beside Prek, Chhu near bridge, North of Dzongri, River Shingle, 18.07.1992, 3700 m, *D.G.Long ,R.J.D.McBeath, H.J.Noltie & M.F.Watson* 473 (E).

25. ***Ranunculus reniformis*** Wall. ex Wight & Arn., Prodr. Fl. Ind. Orient. 3. 1834; Hook.f. & Thomson Fl. Ind. 1: 30. 1855 & in Hook.f., Fl. Brit. India 1: 16. 1872; M.A. Rau in B.D. Sharma et al., Fl. India 1: 126. 1993.

Fig. 28

Type: Specimen no. 1 on left side, Peninsula Indae Orient, *Wight* Cat. 14 'Herb Wight Propr.' 'Holotype designated here: P! [cf. Art. 9.1; note -1 McNeill et al.]; Isotypes: Specimen no. 2 P! ; Specimens 3-5 on sheet K000357826 K!; Specimens 6-10 on sheet of MH!; Two sheets bearing specimens 11-12 and specimen 13 housed at G!; specimens 14-15 on sheet housed at E!.

Perennial herbs, 1-2 ft. high; rootstock stout, horizontal, densely fibrous; stem branched faintly ribbed, softly hairy, generally 1-2-flowered. Radical leaves long petioled; lamina 2.5-7 x 2-5.5 cm, thick, broadly ovate or orbicular, rounded, truncate or cordate at base, coarsely crenated, sparsely to densely setose; petioles densely setose; cauline leaves narrow, linear-lanceolate, bracteiform. Flowers *ca* 2.5 cm in diam., yellow. Petals 10-13 (15), ovate-oblong, twice as long as patulous calyx. Achenes in globose head, oblong, turgid, minutely dotted, beak straight.

Flower and fruit: March - November

Distribution: India: Western Ghats of Peninsular India. Tamil Nadu, Kerala and Rajasthan. Growing on grassy slopes at 1600 – 2400 m. Rare and endemic. (Fig. 51)

Specimens examined: Rajasthan: Kota, Bharva Rly. Station, 15. 1. 1968, *V.Singh* 90501 (LWG). Tamilnadu: Nilgherries, Dodabetta, Feb. 1845, *G.Gardner* s.n. (OXF); Nilgherries, Dodabetta 1840, *Perottet* 418 (P); Madura Distt., *A.Sauliere* 191 (K,P); S.India, Pulney hills, abundant in moist places near stream, Unknown collector s.n. (BM); Annamalais, Ootacamund, 1885, Col., *R.H.Beddome* s.n. (BM); Nilgiri, Ooty, 8000ft., June 1886, *Gamble* 17402 (BM); Nilgherries, *Perottet* no. 13 (G); Pulney hills, Madura 7000ft., *L.Anglade* s.n. 378 (G); Pulney hills, Madura, 6800 ft., May, 1914, *A.Sauliere* 118 (G); S.India, *Wight* 7 (CAL); Nilgherries, Ooty, 8000 ft., 22. 03. 1870, Unknown collector 11173 B (CAL); Coimbatore, Konalar, 1925 m, 18.11.1980, *M.Chandrabose & V. Chandrasekran* 69022 (CAL); Madras, Nilgiris, Coonoor 6000 ft., June 1883, *J.S.Gamble* 11761 (K); Kodaikanal, 20.05.1897, *Bourne* 19 (K); Kodaikanal, 26.06.1913, 7000 ft., *A.Sauliere* 24 (K); Nadooputtah, June, 1846, Herb. *Wight* 7 (K); Ooty, Riyle range, 23.05.1886, unknown coll. s.n. (E); Pulney mountains, Sept. 1836, *Wight* s.n. (E); Nilgiri, Laddaki, 2225 m, 02. 06. 1970, *B.V.Shetty* 34078 (L). Kerala: Travancore, Chuduvurai, May 1937, Unknown collector s.n. (K); Travancore high range, Sept. 1933, *Prof. Edward Barnes* 732 B (K); Devicolum, Munnar forests, 30.05.1886, unknown coll. s.n. (L).

Note: *R. reniformis* is listed in Wallich Catalogue no. 4709, but Wallich has not collected this species. Wight & Arnott have described this species based on the collection made by Wight no. 14 from Nilgherries. Five specimens

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having the same Wight nos.14 are housed in the herbaria of K, P, MH and E. Of these, the specimen of P has been choosen as holotype and remaining will be the Isotype as they are from the same gatherings.

26. ***Ranunculus repens*** L., Sp. Pl. ed. 1: 554. 1753; Boiss., Fl. Orient. 1:39. 1867; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193:139. 1991; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 429. 2001. Fig. 29

Type: Europe, Herb. Linn. 715/52 (LINN).

Perennial herbs with creeping stolons, rooting at nodes, densely pubescent; stem 15-40 cm high, branched. Radical leaves triangular-ovate; leaflets three, middle segments distinctly stalked, other shortly, segments ovate, lobes dentate; cauline leaves few, linear-lanceolate, smaller, sessile, less divided; petioles sulcate, densely hairy. Flowers 2-3 cm in diam., yellow. Sepals linear to ovate lanceolate, 4-5 mm long with spreading hairs. Petals obovate or obovate-oblong, 0.8-1.0 cm long, finely veined. Receptacle *ca* 5 mm in diam., rounded, ovate, compressed, hairy. Achenes *ca* 3 mm in diam., arranged on globose head; style *ca* 1.5 mm, curved.

Flower and fruit: June – August

Distribution: India: Sikkim; Pakistan; Europe; USSR; West & South -West Asia. (Fig. 48)

Specimens examined: Sikkim: On the barracks of Jullapahar, 7000 ft., *S.Kurz* s.n. (CAL); Darjeeling, adbarracks, 6000 ft., 22.05.1862, *T.Anderson* s.n. (CAL).

Notes: Hook.f. & Thomson (1872) have not included *Ranunculus repens* L., in Fl. Brit. India. Only two specimens are known from Sikkim at the barracks of Jullapahar at an altitude of 6000-7000 ft., collected by S. Kurz and T. Anderson in 1862, housed in CAL have been studied.

27. ***Ranunculus rionii*** Lagger in Flora (Regensb.) 31: 49. 1848; Reidl in Ali and Y.J. Nasir, Fl. West Pakistan 193: 123.1991; M.A. Rau in B.D. Sharma et al., Fl. India 1: 127.1993. *Batrichium rionii* (Lagger) Nymanin Bot. Notiser 98.1852. *Ranunculus trichophyllus* Chaix subsp. *rionii* (Lagger) Soo in A. Magyer. Nur. Kerikonyre 22. 1951.

Type: Described from Switzerland, *Lagger* s.n. (Isotype: K!)

Aquatic herbs, short lived annuals; stem obtuse - angled. Leaves all submerged, bristle like, branched capillary, laciniate, widely spreading, petiolate, 3-4 cm long, laminate leaves absent. Flowers bud globose, flattened above; flowers small, white *ca* 1 cm in diam.; pedicels much longer than leaves. Petals 5, obovate, less than 0.5 cm long, white, yellow at base; nectar-pits, small, lunate at margins, thick slightly raised. Receptacle hairy, elongated in fruits. Achenes 60 - 90, subglobose, up to 1 mm long, nearly glabrous.

Flower and fruit: April- August

Distribution: India: Jammu & Kashmir (Pahalgam, Dal Lake, Ladakh); Pakistan; Central & Southern Europe and S.E. Russia. (Fig. 48)

Specimens examined: Jammu & Kashmir: Kashmir, Pahalgam, 7250ft., 06.09.1876, *C.B.Clarke* 31117 (K); Kashmir, Shapion, 7000 ft., 09.07. 1876, *C.B.Clarke* 28602 (K); Srinagar, Kashmir University, *V.N. Kaul* s.n. (H 3983/66) (K).

28. ***Ranunculus rubrocalyx*** Regel ex Komarov, Trav. Soc. Nat. Peterb. 26: 62.1896; Tamura in Kitamura, Fl. Plants West Pakistan & Afghanistan 65.1964; Reidl in Ali & Y.J. Nasir, West Pakistan 193: 150. 1991; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 404.2001. Fig. 30

Type: Described from Zeravshan River basin (LE?).

Perennial herbs, sometime loosely caespitose; roots fibrous; stem 8-20 cm long, 1-many, ascending, sparsely with appressed hairs throughout. Radical leaves petiolate; lamina ternate, suborbicular, segments obovate, free to the base or united, dentate, hairy at margins; lobules ovate-oblong entire or dentate; petioles 4-6 cm long, sparsely appressed with white hairs; cauline leaves few, sessile, palmatipartite; lobes linear, entire or incised dentate. Peduncle densely hairy towards the uppermost part; flowers solitary, 1.5-1.8 cm in diam., yellow. Sepals 0.5-0.7 cm long, ovate, brown, with short appressed white hairs. Petals 0.7-0.9 cm long, obovate. Achenes on globose to rounded head, *ca* 0.2 cm long, ellipsoid-obovoid, glabrous; style short, slightly recurved, hooked at apex.

Flower and fruit: June- August

Distribution: India: N.W. Himalaya; Kashmir, Himachal Pradesh (Pangi, Lahaul-Spiti); Afghanistan; Pakistan and Russia. (Fig. 48)

Specimen examined: Himachal Pradesh: Lahaul-Spiti, Lahaul, July-Aug., 1864, 14000 ft., *D.Brandis* s.n. (DD).

Notes: This species often confused with *R. rufosepalus* as it apparently looks alike but differs in habit (not mat forming), white hairs on the sepals, longer petiole and larger leaves.

29. ***Ranunculus rufosepalus*** Franch. in Ann. Sci. Nat. Ser. 6, 15:217.1883; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193:146.1991; M.A. Rau in B.D. Sharma et al., Fl. India 1:127.1993; G.S. Mao, Wencai Wang and M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 407. 2001 Fig. 31

Type: Tolfam (Kohistan) *Franchet* 28; Tourpoly- Bell. n. 29, Valter de l'Ona Oulgoe n. 30 (n.v. Syntype ST?).

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Perennial herbs , subcaespitose, often forming mats; rootstock short with fibrous roots; stem 10 - 20 cm high, ascending glabrous or with scattered reddish brown hairs. Radical leaves petioled, 4-5- palmately lobed, glabrous; lobes rounded - cordate, ternate; terminal lobes orbicular; petioles 2-3 cm long, sheathed, nearly glabrous or with reddish brown hairs; cauline leaves sessile with a sheath, dissected, segments 3-5-palmatilobate. Flowers 1.5-2.0 cm diam., yellow. Sepals 5-6 mm long, ovate, densely covered with reddish brown hairs on outer surface. Petals 5, 6-8 x 5-7 mm, broadly obovate, cuneate, wavy at margins. Achenes 2-2.5 mm, rounded ovoid, slightly inflated, glabrous, forming an ovoid head, inserted in ellipsoid-oblong, glabrous or sparsely hairy receptacle; style *ca* 1 mm long, hooked at apex.

Flower and fruit: June – August

Distribution: India: North-Western Himalaya. Jammu and Kashmir, Himachal Pradesh; Afghanistan; Pakistan and Russia. (Fig. 49)

Specimens examined: Jammu & Kashmir: Darah Pass, 14-15000ft., 27.08.1896, *Col. J.Davidson* s.n. (DD); Pamir Boundary, Commission, 1895, 15000 ft., In moist or drying ground, Surg. Capt. Aluck 17675 (DD). Himachal Pradesh: Chamba, Between Satrundi and the Sainch Pass, 11-13000 ft., 14.07.1899, *Harsukh* s.n. (CAL).

Notes: Only one specimen of *R. rufosepalus* Franch. has been studied at CAL and two specimens from Kashmir in DD.

30. ***Ranunculus sardosus*** Crantz, Strip. Austr. 2: 84. 1763; Mukherjee & Sinha in Bull. Bot. Surv. India 20: 150, f.l.1978; M.A. Rau in B.D. Sharma et al., Fl. India 1: 127. 1993; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 430. 2001. *R. pseudo-bulbosus* Schur in Vern. D. sieb. ver. p. 29. 1853 et p. 84. 1859. Fig. 32

Type: Europe (not seen).

Annual herbs, 15-45 cm high, pubescent; root-stock corm like, roots in clusters, not fleshy; stem branched, ribbed. Radical leaves long petioled, 3-partite; middle lobe abruptly contracted into a stalk, all variously dentate and lobed, sparsely to densely hairy on both the surfaces; petioles 3-6 cm long; lower cauline leaves smaller, resembling with radical leaves; upper cauline leaves sessile with linear lanceolate lobes, midrib deeply veined, nearly glabrous or faintly long hairs. Flowers 1.2-2.5 cm in diam. Sepals *ca* 4 mm long, broad ovate to ovate - lanceolate, margins membranous with appressed white hairs. Petals pale yellow, 0.3-0.5 x 0.2-0.3 cm. Achenes 0.2-0.3 cm long, minutely puncate with small obtuse tubercles near the margins or some time smooth; beak *ca* 0.5 mm long, curved upwards.

Flower and fruit: April – August

Distribution: India: West Bengal (Howrah); Europe (France, Switzerland, Spain, France, Italy, Greece and Central Europe). (Fig. 49)

Specimens examined: West Bengal: Howrah, Shibpur, 14.03.1975, *A.Sinha & A.K.Mukerjee,* s.n. (CAL); Howrah, Shibpur, Feb. 1898, *D.Prains* s.n. (L, G).

Note: *Ranunculus sardosus* Crantz is allied to *R. scleretus* L. but differ in having longer petioles of basal leaves, middle segments of the leaves abruptly contracted into a stalk and whole plants is more or less pubescent. Three specimens labelled *Flora Exsiccata Austro -Hunganica* housed in DD, which exactly matches with *R. sardosus* Crantz, a new report from West Bengal by Mukherjee and Sinha in 1978.

31. ***Ranunculus scleratus*** L., Sp. Pl. 776. 1753; Hook. f. & Thomson, Fl. Brit. India 1:19.1872; H. Hara & L. J. H. Williams, Enum. Flow. Pl. Nepal 2:20. 1979; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193: 132. 1991; M.A. Rau in B.D. Sharma et al., Fl. India 1: 128. 1993; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 421 .2001. Fig. 33

Type: Described from Europe.

Ranunculus indicus Roxb., Fl. Ind. 2:671.1820. Type: Herb. Rottler, J. P., s. n., Nerbudda (LIV!).
Ranumculus carnosus Wall. Cat. no. 4699. Type: Nepalia, Wall. 4699 (LIV!, CAL!).
Hindi: Jaldhaniya

Annual herbs, erect, fleshy, glabrous or sparsely pubescent, up to 90 cm high; stem stout, branched, hollow, deeply furrowed outside. Radical leaves petiolate, reniform, 2.5-5.0 cm in diam., 3-lobed or 3-partite; segments obovate, bluntly 3-5 toothed; lateral lobes sometime deeply bilobed again, lobes irregularly shallow crenate; petioles 2.5-15 cm long, progressively shortened and ultimately sessile in cauline leaves, auricles scarious, 5-7 mm long; cauline leaves sessile, 3-lobed or 3-5 partite, lobes linear-oblong, entire or deeply crenate or lobulate. Flowers numerous, *ca* 1 cm in diam., bright yellow, diffusely racemose. Sepals ca 3 mm long, elliptic, ovate, pubescent outside, reflexed, caduceus. Petals shorter or as long as sepals, obovate. Achenes small, obovoid, up to 1.3 mm in diam., glabrous, compressed, smooth to rugose, arranged in an oblong to shortly cylindrical, 7-8 mm long head; style short, minutely beaked.

Flower and fruit: February- April

Distribution: India: Plains of North India, Himalaya and in warm valleys. Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Uttarakhand, Uttar Pradesh, Madhya Pradesh, Rajasthan, Bihar, West Bengal, Assam, Arunachal Pradesh and Manipur; Japan; China; Myanmar; Nepal; Pakistan; Afghanistan; Iran; Syria; Egypt; Europe and Russia. (Fig. 49)

Specimens examined: Jammu & Kashmir: Kashmir, 5000ft., *T.Thomson* s.n. (P); Kashmir, 5000 ft., 01. 06. 1958, *H. D. Thapaliyal &*

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Raizada 26381 (L); J & K University, *Dr. V.N. Kaul* s.n. (K). Himachal Pradesh: On the bank of Beas, Mandi, 15.05.1959, *J.G.Srivastava* 55870 (LWG); Kullu Valley, Katrain to Naggar, 23.05.1959, *J.G. Srivastava* 60035 (LWG); Sutlej valley 2000ft., 06.04.1917, *H.J.Rich* 495 (K); Manali-Kothi, 8000ft., 09.05.1941, *N.L.Bor* 14097 (K); April 1886, 3000 ft., *H.Collett* 494 (K). Uttarakhand: Kumaon, 1000ft., *Strachey & Winterbottom* 13 (P); Garhwal, 03.03.1830, *V. Jacquemont* 562 (P); Almora, 14.11.1958, *J.G.Srivastava* & Party 53672 (LWG); Dehradun, 27.04.1993, *Anand Prakash* 212546 (LWG); Pithoragarh, Tanakpur, 01.03.1953, *Kaul & Party* 19703 (LWG); Kumaon, *Blinkworth* s.n. (L); Dehradun, Feb. 1900, *U.N.Kanjilal* 3 (K); Pitthoragarh, 22.04.1962, *U.C.Bhattacharya* 2425 (CAL); Dehradun, *Mackinnon* s.n. (CAL); Tehri Garhwal, 3500 ft., May 1896, *J.S. Gamble* 25730 (CAL); Raspana, 28.02.1965, *C.R.Babu* 35004 (CAL); Dhikala, 26.04.1971, *P.C.Pant* 43703 (CAL). Punjab: Subtrop. *T. Thomson* s.n. (L, OXF, G); Punjab, *V. Jacquemont* 676 (K); Karnal, 11.11. 1887, *J.R.Drummond* 4334 (K); Sirsa, Jan. 1886, *J.R.Drummond* 3020 (K, CAL). Uttar Pradesh: Gorakhpur, Banki, 23.02.1966, *G.Panigrahi* 10525 (P); Moradabad, Feb. 1845, *Dr. Thomson* 49 (K, OXF); Saharanpur, 19.03.1897, *J.F.Duthie* 21698 (K). Madhya Pradesh: Guna, 27.01.1959, *A.Singh & Party* 55907 (LWG). Rajasthan: Bharatpur, 1903-1982, *P.J. Parmar* 8562 (CAL). Delhi: Azadpur, Feb. 1959, *M.Wadhi* s.n. (G); Delhi Canal, N.W.India 1844, *M.P.Edgeworth* 26 (K). Bihar: Purnia, 23.03.1958, *J.G.Srivastava* 49541 (LWG); Netarhat, *S.R.Paul &* Party 94506 (LWG); Gobardhan village, 11.03.1958, *J.G.Srivastava* 48722 (LWG); Champaran, Manguraha forest, 11.04.1963, *K.Thothathri,* 10014 (CAL). West Bengal: Purulia station, Lower Bengal, 04.02.1869, *C.B.Clarke* 8350 (K). Assam: N.Lakhimpur, 24.03.1894, *G.A. Gammie* 174 (G); Simons s.n. (K, L); River bank 3000 ft., 21.03.1944, *N.L.Bor* 18355 (L); N.Lakhimpur, Badati 12.12.1946, *D.C.Mukherjee* 21 (K). Manipur: Unknown locality, 2-5500 ft., Feb. 1882, *George Watt* 6168 (P, K); Thonbal, 4200 ft., 27.02.1943, *N.L.Bor* 16998 (L). Meghalaya: Khasia, *Griffith* 465 (K). Arunachal Pradesh: NEFA, 28.02.1957, *G.Panigrahi* 5795 (L).

Notes: According to Fl. USSR of 7:408.1937, one of the most poisonous species of *Ranunculus*.

32. ***Ranunculus sikkimensis*** Hand.-Mazz. in Acta Hort. Gotob. 13: 155. 1939; M.A. Rau in B.D. Sharma et al., Fl. India 1:128.1993. *R. nivalis* Hook.f. & Thomson, Fl. Ind. 1: 35. 1855 in Hook.f., Fl. Brit. India 1: 19. 1872, non. L. Fig. 34

Type: India: Sikkim, Tankra La, in reg. alpine, 4575 m [Hooker: Herb. Kew, Mus. Vindob] (K!).

Perennial herbs, up to 8 cm high. Rhizome short, vertical with several roots growing in clusters, covered with sheath; stem erect or ascending. Radical leaves long petioled, 3-5 lobed or partite, 1-2 cm in diam., semi-orbicular or sub-reniformis, 1-1.8 cm in diam., glabrous; medium segments spathulate, trilobed; lateral segment, bi-partite which further divided in to 2-3 lobed or sect, lobes ovate, oblong; petioles up to 2 cm long, broadly membranous at base; cauline leaves same as radical, shortly petioled in lower ones and becoming sessile upwards. Flowers solitary, yellow; pedicels yellow, up to 1 cm long, pubescent. Sepals shaggy, spreading, ovate, 5-7 mm, truncate, densely yellow pubescent. Petals obovate, almost equal to sepals. Receptacles hairy. Carpel glabrous.

Flower and fruit: June – September

Distribution: India: Eastern Himalaya, *ca* 4800 m. Sikkim, Arunachal Pradesh. Endemic. (Fig. 49)

Specimen examined: Sikkim: Sikkim, 15000 ft., *J.D.Hooker* s.n. (L); Tankra Pass, alpine, 15000 ft., *J.D.Hooker* s.n. (K).

33. ***Ranunculus sphaerospermus*** Boiss. & Blanche in Boiss., Diagn. Ser.:6.1856; H. Hara & L.J.H.Williams, Enum. Flow. Pl. Nepal 2:20. 1979; M.A. Rau in B.D. Sharma et al., Fl. India 1:129.1993. *R. peltatus* Schrank subsp. *sphaerospermus* (Boiss. & Blanche) Miekle in Notes R. Bot. Gard. Edinb. 23: 13.1959. *R. aquatilis* L. var. *sphaerospermus* (Boiss. & Blanche) Boiss., Fl. Orient. 1: 23. 1867. Fig. 35

Type: Hab. In aquis ad Tripoli et Alexandrette syriae (*n.v*. BI)

Aquatic herbs. Leaves all submerged, floating leaves absent; submerged leaves 0.5-1.6 cm or more long, thread like spreading with numerous rather rigid, diverging segments, farming dense spherical tufts; petioles very short. Peduncle 2.5-6 (up to 8 cm) long, often greatly exceeding the leaves; flowers large 1.5-2.5 (up to 3 cm) in diam., cream-white. Petals broad, obovate, 0.5-0.7 x 0.3-0.4 cm, 9-11 nerved. Nectar-pit elongated, pyriform. Stamens numerous. Fruiting peduncles much longer than leaves. Achenes up to 1 cm in diam., somewhat rounded or subglobose, glabrous; style short.

Flower and fruit: July- September

Distribution: India: Jammu and Kashmir (Ladakh); Nepal; Pakistan; China (Tibet) ; Egypt; Syria; Labanon; Turkey; and SE Europe. (Fig. 49)

Specimen examined: Jammu & Kashmir: Ladakh, Tsokar lake, Rupshu, 4600 m, 05.09.1970, *U.C.Bhattacharya* 41020 (BSD).

Notes: Specimens of *R. peltatus* subsp. *sphaerospermus* from British Isles and Ladakh differs from the Middle East specimens in having larger achenes. Since the type of *R. sphaerospermum* is from the Orient, the British and Ladakh specimens should be differentiated perhaps as a variety of subsp. *sphaerospermus*. The present study reveals that the Indian specimen is treated as species *R. sphaerospermus* Boiss. & Blench. This species should be further studied critically with more specimens.

34. ***Ranunculus stewartii*** Reidl in Kew Bull. 34. 364. 1979 & in Ali & Y. J. Nasir, Fl. West Pakistan 193: 148. 1991; M.A. Rau in Sharma et al., Fl. India 1: 129. 1993. Fig. 36

Type: India: Kashmir, Dras (Ladakh road), Top Marpo la north side, 15000 ft., 09.08.1946 (in grasses and stone) quite common in small area, *R.R. Stewart* 22271 (Holotype: K!).

Perennial herbs, 10-20 cm high; rootstock *ca* 5 mm thick, tuberous, elongated, erect, base covered with dark brown fibrous remains of old leaves, roots fibrous; stem

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usually single or paired, simple, erect or ascending, often flaccid, glabrous below, sparsely hairy above. Radicle leaves with long petiole, obliquely truncate at the base, lamina 1.2-2.8 x 2-4 cm, wider than long, ternate or tripartite to near the base, segments obovate or broadly obovate, palmate-lobate with oblong rounded lobes, glabrous; cauline leaves smaller, 1-2 shortly petioled or sessile, tripartite; lobes narrow, oblong-lanceolate to oblong- obovate, dissected, 2-3 palmatilobate or 3-5 palmatipartite with entire segments. Peduncle loosely pilose with brown hairs; flowers solitary, 2.5-3.0 cm in diam., yellow. Sepals broadly elliptic to elliptic-lanceolate, acute 0.7-0.8 x 0.3-0.5 cm, hairy along the margins. Petals broadly obovate undulate along margins, 1-1.3 x 1.2-1.5 cm. Receptacles ellipsoid, glabrous. Achenes broadly elliptic, sub-compressed, 1-1.2 mm long, indistinctly marginate on globose or subglobose head; styles short, sometimes shortly hooked at apex.

Flower and fruit: July- September

Distribution: India: Western Himalaya. Jammu & Kashmir; Pakistan. (Fig. 49)

Specimens examined: Jammu & Kashmir: Kashmir, Dras, 15000 ft., 09.08.1946, *R.R.Stewart* 22272 (K); Burjila, 14500 ft., 01.08.1876, *C.B.Clarke* 29841 A (K).

Note: This species is known by the type collection and two more specimens lodged in Kew herbarium. No specimens are available in Indian herbaria.

35. ***Ranunculus subpinnatus*** Wight & Arn., Prodr.Fl. Ind. Orient. 4: 1834 & Wight Ic. t.49.18; Hook. f. & Thomson, Fl. Ind. 36. 1855; Hook.f. & Thomson, Fl. Brit. India 1:19.1872 & in Hook., f. Fl. Brit. India 1: 19. 1872; M.A. Rau in B.D. Sharma et al., Fl. India 1: 129.1993; Dunn in Gamble Fl. Pres. Madras 1: 4. 1915. Fig. 37

Type: Peninsula Indae Orient, Wight Cat. no. 15 [Herb Wight Propr] 'Holotype designated here': G!; Isotype: (specimen 2) MH!, (specimen no. 3-5) K!, (specimens no. 6-11) E-GL!, (specimens no. 12-14) E!

Perennial herbs, branched, erect, hairy, leafless when flower. Radical and cauline leaves tripartite, deeply 3- lobed, 3-6 x 2-5 cm, densely hairy; lobes cuneate, deeply incised, lateral division sessile, middle one stalked, all deeply 3-cleft, segments cut and serrated; middle leaves resembling the middle division of the radical leaf; petioles 1-4 cm long densely hairy, deep violet. Flowers solitary, 1.5-2.5 cm in diam., pale yellow; peduncles terminal or leaf opposed, hairy. Sepals 0.4-0.5 cm long, villous. Petals *ca* 1 cm long, twice long as sepals. Achenes ovate, rounded, minutely dotted, glabrous, acute, compressed with intramarginal rib from margin on globose head; style short, straight.

Flower and fruit: August – October

Distribution: India; Western Ghats of Peninsular India; Tamil Nadu, Kerala, West Bengal (Darjeeling), Assam. (Fig. 51)

Specimens examined: Uttarakhand: Jaunsar, 6500 ft., April 1892, *J.F. Duthie* 23479.West Bengal: Darjeeling, Senchal lake, 7000 ft., 18. 06. 1960, *J.K. Maheshwari* 4016 (CAL). TamilNadu: Nilgiri, Temp., *J. D. Hooker* & *Thomson* s.n. (P); Pondichery, Herb. Richard (P); Nilgiri, *R. F. Hohenacker* 1123 (P); Dodabetta, *Hohenacker* 1123 (P); Nilgherries, *Perrottet* s.n. (P); Ootacamund, *M.Perrottet* 69 (M); Nilgiri, Pykara, Aug. 1878, *G.King* s.n. (CAL); Neelgherry, sept. 1852, *Wight* 8 (K, CAL); Nilgiri, Temp., (Herb. Ind. or Hook.f.& Thomson) (CAL); Ootacamund, 7000 ft., June 1884, *J.S.Gamble* 14546 (CAL); Kukal, Upper Palni, 6300ft., 08.09.1911, *C.E.C.*Fischer 2938 (CAL); Madurai, Kodaikanal, 6-8000 ft., 26.06.1913, *A. Sauliere* 32 (K); Pulney hills, *C.E.C. Fischer* s.n. (K); Above Kodaikanal, Pulneys, 7500 ft., Sept. 1912, *Fyson* 2126 (K); Ooty, 7000 ft., Sept. 1886, *Gamble* 18086 (K); Coonoor, 15.06. 1896, *Bourne* s.n. (K); Ootacamund, 08.07.1904, *Bourne* 4601 (K); Ooty, 7000 ft., June 1886, *J.S.Gamble* 17462 (K); Nilgherries, *Wighti* s.n. (OXF).

Specimen examined: Growing usually on grassy slopes at 1800-2500 m.

Notes: Hook.f. and Thomson (1872) treated *Ranunculus subpinnatus* Wight & Arn. treated as a synonym of *R. diffusus*. Wight and Arnott (1834) treated *Ranunculus subpinnatus* as a distinct species, which is confined to Western Ghats in Peninsular India and well distinct with *R. diffusus* in having erect habit of the plant, more densely hairy, much more divided leaves and comparatively larger flowers.

36. ***Ranunculus trichophyllus*** Chaix in Villars, Hist. Pl. Dauph. 1: 335. 1786; Cooke in Mitt. Bot. Staatssamaal. Muenchen 6: 26. 1966; H. Hara & L.J.H. Williams, Enum. Flow. Pl. Nepal 2: 20. 1979; M.A. Rau in B.D. Sharma et al., Fl. India 1: 130. 1993; Aswal & Mehrotra, Fl. Lahaul-Spiti 69. 1994. Fig. 38

Type: Herb. Moller fil. Examined and designated as Neotype by Cooke. (G).

R. aquatilis L. var. *trichophyllus* (Chaix) Hook.f. & Thomson in Hook.f., Fl. Brit. India 1:16.1872. *R. flaccidus* Pers. in Usteri, Ann. Bot.14. 39.1795 (non Hook.f. & Thomson, 1872).

Perennial, aquatic herbs, spreading, somewhat erect under water. Leaves all submerged, divided into many capillary segments, 2-3 cm long, dark green; laminate leaves absent; stipules adnate to the petiole for at least 2/3 of their length; petioles *ca* 5 mm long, sheathed at base. Flowers white or yellow, 1.2-1.5 cm in diam.; pedicels solitary in leaf axils, 2-3.5 cm long, spreading, caducous. Petals obovate, 4-6 x 2-3 mm, white, yellow near the base; nectar-pits lunate. Fruiting peduncle 1-5 cm long. Achenes 25-30, obovoid, *ca* 1.5 mm long, strongly ribbed, hispid.

Flower and fruit: May-August

Distribution: India: Himalaya; temperate and sub-alpine regions, in ponds and slow flowing stream at an altitude of 3500 – 4500 m. Jammu & Kashmir (Ladakh), Himachal Pradesh, Uttarakhand, Punjab, Sikkim; Pakistan; China (Tibet); Nepal; Eurasia; Africa and N. America. (Fig. 50)

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Specimens examined: Jammu & Kashmir: Gilgit, 1885, *G.M. Giles* A47 (CAL); Kulgam, 1700 m, 04.06.1959, *T.A. Rao* 9213 (G, CAL); Kashmir, 5-6000ft., 03.09.1940, *R.R. Stewart* 21361 (CAL); Ladakh, 4600m, Tsokar lake, 05.09.1970, *U.C. Bhattacharya* 41020 (CAL); Kashmir, Gulmarg, 11.06.1892, *J.F. Duthie* 11418 (BM, CAL); Jhelum valley, 5-6000 ft., *J.F.Duthie* 10881 (CAL); Srinagar, Dal lake, 03.06.1954, *G.S.Srivastava* 11247 (LWG); Pahalgam, Oct. 1953, *Kaul* & Party s.n. (LWG); Kashmir, near Ganderbal, 5000 ft., 26.05. 1954, *Ram* Lakhan 10805 (LWG); Ladakh, Tsokar, Rupshu, 14000 ft., *Walter Koelz* 6603 (G); Ladakh, Pitu, 04.08.1933, *Walter Koelz* 2678 a (L); Wular lake, 16.07.1876, 5150 ft., *C.B.Clarke* 29138 A (K); Dal lake, Unknown collector, 9252 (K); Wular lake, 5000 ft., May 1830, *Winterbottom* 293 (K); Wular lake, 5150 ft., 16.07.1876, *C.B. Clarke* 29140 A (K). Himachal Pradesh: Baspa valley, Rakcham, *ca* 3200 m, 21.05.1972, *K.P.Janardhanan* 47355 (CAL); Simla, 9000 ft., 12.03.1889, *Ram Baksh* 6277 (CAL, BM); Baspa, *G.Sherriff* 7482 (BM). Uttarakhand: Kumaon, Barphu, 11500 ft., 27.08.1848, *Strachey* & *Winterbottom* 1 (P, K, CAL).Punjab: Subhanpur, 24.03.1960, *J.N. Vohra* 11332 (CAL); Pathankot, Gurdaspur Road, 09.02.1917, *R.R .Stewart* 1089 (K). Sikkim: Lhonok, 15150 m, 02.08.1909, *Smith & Cave* 1887 (CAL); Sikkim, 16000 ft., 23.09.1903, *Dr.Prains* s.n. (P, CAL); Sikkim, 17000 ft., alp. *J.D.Hooker* s.n. (P); Sikkim, 16000 ft., Sept. 1903, *Dr. Prains* s.n. (G); Sikkim, 17000 ft., alp., *J.D.Hooker* s.n. (G).

37. ***Ranunculus trigonus*** var. ***strigosus*** W.T.Wang in Bull. Bot. Res. Harbin 6: 164. 1996; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y.Wu, Raven & D. Hong, Fl. China 6: 427.2001; R.K. Choudhary et al., in Rheedea 18(1): 37. 2008. Fig. 39

Type: Yunnan: Gengma, alt. 1670 m in bushes, fl. Yellow, Apr. 1936, Wang Chi-Wu 72869 (Holoype: KUN).

Erect perennial herbs; roots fibrous; stem 40-50 cm high, densely strigose, branched. Radical leaves 3; lamina 3-partite, pentagonal, 5.5 x 3.5 cm, papery, base subtruncate, central segments rhombi-obovate, 3-lobed, incised-dentate; lateral rhombic-cuneate or rhombic, 3-lobed; central leaflet broadly rhombic, 3-partite, petiolulate; petioles 1.5-6.0 cm long, strigose; cauline leaves 3-sect. Flowers 1-1.6 cm in diam., yellow; pedicels 0.5-0.8 cm long, strigose. Receptacle strigose. Sepals 5, ovate, 4-5 mm long, abaxially pubescent. Petals 5, obovate-oblong, 6-8 x 3-4 mm, nectar pit-covered by a scale, apices rounded. Stamens numerous, anthers oblong. Fruits aggregate, subglobose, oblong, *ca* 8 mm in diam. Achenes many, flat, obliquely broadly-obovate, *ca* 4 x 2.5 mm, shortly beaked, glabrous.

Flower and fruit: March-September

Distribution: India: (Upper Siang) Arunachal Pradesh; China (SW Sichuan, SE Xizang, Yunnan). (Fig. 50)

Specimen examined: Arunachal Pradesh: Upper Siang dist., Yingkyomg, 500m, *R.K.Choudhary* 16276 (ARUN).

Ecol: Growing at 500 m, on moist shady humus rich soil, not common.

Notes: Choudhary et al., (2008) recorded this variety from Upper Siang district in Arunachal Pradesh, earlier known to occur in China. This variety can be easily distinguished from the typical variety in having densely strigose stem, petiole and large, petals.

38. ***Ranunculus trilobus*** Desf., Fl. Atlant. 1: 437, t.113. 1798; Deva & H.B. Naithani in Indian J. Forest. 7: 337. 1984. Fig. 40

Type: Not seen.

Annual herbs, 5-25 cm high; roots fibrous to thick, not tuberous; stem erect, not creeping, rooting at nodes, slightly hairy to almost glabrous. Leaves mostly crowded at base; the lowest simple, next 3-partite; segments simple, cuneate- obovate, dentate; upper ones with more numerous linear-oblong lobes. Flowers yellow, 1-1.5 cm in diam. Sepals obovate, 0.5-0.7 cm long, glabrous. Petals yellow, as long as sepals, nectar at base, covered by a flap which is more or less free laterally. Receptacle pubescent. Achenes *ca* 2 mm long, strongly compressed with numerous small tubercles; beak short, triangular.

Flower and fruit: June – August

Distribution: India: Western Himalaya; Uttarakhand (Almora, Aasan Barrage, Baijnath), Sikkim. Mediterranean region in Greece, Albania, Italy, Malta, Portugal and Spain. (Fig. 50)

Specimens examined: Uttarakhand: Kumaon, Baijnath, 07.06. 1983, *Soma Deva* 10582 (DD). Sikkim: Sikkim, 15000 ft., *J.D. Hooker* s.n. (Herb. Ind. or Hook.f. & Thomson) (L); Sikkim, 27.06.1983, AGSES 171 (K); Dupin, 16000 ft., *J.D.Hooker* s.n. (K); Dzongri in damp seepage areas, 4000m, 23.06.1983, *B.N. Straling et al.,* AGSES 78 (CAL); Sikkim, 15000 ft., *J.D.Hooker* s.n. (CAL); Donkia, 16-18000 ft., 16.08. 1892, *G.A.Gammie* 820 (CAL).

Notes: *R. trilobus* was recorded as new to India from Almora in Uttarakhand by Som Deva & Naithani in Year 1984. Later, this species has been recollected from Aasan Barrage in Dehradun by Uniyal in 1998. Two specimen are housed in BSD. This species apparently resembles with *Ranunculus sardosus* Crantz, but differs in having fleshy roots, smaller plants and leaves, middle lobes of the 3-partite leaf abruptly contracted into a stalk.

39. ***Ranunculus trivedii*** Aswal & B.N.Mehrotra in J. Econ. Taxon. Bot. 4 (3): 1027. 1983 & in Fl. Lahaul-Spiti 70. 1994. *R. lobatus* Jacquem. ex Cambess. in Jacquem., Voy. Bot. 5 t. 1. B. 1844 (non Moench, 1802); Hook.f. & Thomson in Hook.f., Fl. Brit. India 1: 17. 1872; Reidl in Ali & Y.J. Nasir, Fl. West Pakistan 193: 136. 1991; M.A. Rau in High Alt. Fl. Pl. 59. 1975 & in B.D. Sharma et al., Fl. India 1: 123. 1993; G.S. Mao, Wencai Wang & M.G. Gilbert in C.Y. Wu, Raven & D. Hong, Fl. China 6: 418. 2001. Fig. 41

Type: Kunawar, *Jacquemont* 677 (K!)

R. salsuginosus D. Don in Royle, Illus. Bot. Himal.53.1834 (non Pallas ex Georgi, 1775).

Perennial herbs forming clumps with fine fibrous roots; stem several decumbent, 5-7 cm high, bearing leaf

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rosettes. Radical leaves 1-2.5 cm in diam., long petioled; lamina, rounded, sub orbicular, cordate at base, margins teeth rounded, sometimes deep forming lobes, coriaceous, nearly glabrous, dark green above, pale green beneath; cauline leaves, 3-lobed, shorter petioled; peduncle 3.5-7.0 cm long, appressed hairy. Flowers solitary, 1.5-2.5 cm in diam., yellow. Sepals ovate to ovate-oblong, 4-5 mm long, glabrous, rounded at apex. Petals obovate to ovate-oblong, 4-7 cm in diam. Achenes *ca* 1.5 mm in oval head, slightly compressed, terminated by the long straight style as beak.

Flower and fruit: June - August

Distribution: India: Himalaya; Jammu & Kashmir (Ladakh), Himachal Pradesh, Uttarakhand, Sikkim; Pakistan; Nepal; Bhutan; China (W. Tibet). (Fig. 50)

Specimens examined: Jammu & Kashmir: Ladhakh, Tsakchum Tso, 17500 ft., 23.07.1931, *Walter Koelz* 2415 (K); Mt. Kolahoi, 16000 ft., Aug. 1927, *R.R.Stewart* 9397 (K); Ladakh, Rupshu, 24.09. 1847, Unknown Collector s.n. (K); Near Pangong lake, *Capt. H.Strachey* s.n. (K); Janskar mountain, 4740, *H.Hartman* 2676 (K); Leh, 11500 ft., Aug. 1905, *A.Meebold* 3311 (CAL); Rungdum, 11500 ft., July, 1905, *A.Meebold* 3312 (CAL). Himachal Pradesh: Lahaul-Spiti, Baralacha la Pass, 16000 ft., 16.07.1938, *N.L.Bor* 8691 (DD); Baralacha, 16000 ft., 02.07.1941, *N.L.Bor* 15136 (K); Pangi, 11-16500 ft., 1879, *A.W.Heyde* s.n. (CAL); Bashahar, Kiari Pass, 14300 ft., 03.04.1891, *J.H.Lace* 1176 (CAL).Uttarakhand: Tehri Garhwal, on rock of Nila Valley, 14-15000 ft., 21.06.1883, *J.F. Duthie* 757 (DD); Kumaon, Burphu, 11500 ft., *Strachey & Winterbottom* 3 (K); Topi, Lhoonga, 15200, *Strachey* & *Winterbottom* 20 (K); Ridges above Jhala, (Tehri Garhwal), 12-13000 ft., 29.06.1883, *J.F.Duthie* 756 (K); Tehri Garhwal, Nila Valley, 14-15000 ft., *Duthie* 757 (CAL).

Notes: *Ranunculus lobatus* Jacquem. ex Cambess. (1844) is illegitimate being a later homonym of *R. lobatus* (1802). The next available name *R. salsuginosus* D. Don is also illegitimate being the later homonym of *R. salsuginosus* Pallas ex Georgi (1775). Hence, a new name *Ranunculus trivedii* was proposed by Aswal & B.N. Mehrotra in 1983.

40. ***Ranunculus uttaranchalensis*** Pusalkar & D.K. Singh in Nord. J. Bot. 24 (4): 403. 2005. Fig. 42

Type: Uttarakhand, Uttarkashi, Gangotri National Park, Upper Nandanvan, Near Bhagirathi base camp, 15 July, 2003, *Pusalkar* 102334 (Holotype: CAL!; Isotype: BSD!)

Perennial herbs, up to 7 cm high; roots fibrous; stem solitary or 2-3, ascending, nearly glabrous, base covered with fibrous remains of leaf base. Radical leaves 2-3 cm long, petioled; lamina subcordate, 0.4 -1.0 cm long, apex acute, base truncate, margins teeth rounded, acute, hairy at base, otherwise nearly glabrous; petiole 1-2.4 cm long, glabrous below, hairy above, base membranous; cauline leaves sessile, palmately 3-7 lobed to the base, lobes linear to narrowly lanceolate, 0.2-1.0 x 0.15 cm, glabrous except at margins. Flowers solitary or 1-3 on peduncle, terminal or axillary, 1-1.8 cm in diam., deep yellow; peduncle 0.7-4 cm long, appressedly hairy above. Receptacles oblong, glabrous. Sepals 5, ovate or ovate oblong, 0.4-0.5 x 0.2-0.35 cm, hairy outside, apex rounded or obtuse, margins hairy. Petals 5, rounded- obovate, 0.5-0.75 cm long. Stamens many 0.3-0.32 cm long, yellow; carpel many; style pubescent. Achenes ovate, 0.15-0.17 cm long, beak slightly curved, glabrous, margins winged.

Flower and fruit: July- August

Distribution: India: Uttarakhand (Gangotri in Uttarkashi). (Fig. 50)

Specimens examined: Uttarakhand: Uttarkashi, Gangotri national park, upper Nandanvan, near Bhagirathi II base camp, 15.07. 2003, *Prashant Pushalkar* 102334 (BSD).

Ecology: Growing in shallow, moist places along stream banks.

Notes: This species is closely allied to *R. trivedii* (= *R. lobatus* Jacquem. ex Cambess.) but differs in having sub-cordate lamina, laminar teeth triangular, acute; cauline leaves sessile and hairy along margins, sepals hairy outside and petals rounded - obovate.

41. ***Ranunculus wallichianus*** Wight & Arn., Prodr. 4. 1834; Hook.f. & Thomson, Fl. Ind. 1: 38. 1855 & Fl. Brit. India 1: 20. 1872; M.A. Rau in B.D. Sharma et al., Fl. India 1: 131. 1993. Fig. 43

Type: India: Specimen no.2, Tamil Nadu, Nilgherries, Wight 16 'Holotype designated here': MH!; Isotype: specimens nos. 1, 3 & 4 MH!

R. pinnatus Wight, Illus. 1.6. 1841 (non Poir.).

Perennial herbs; rootstock rarely glabrous; stem glabrous, diffuse, prostrate, decumbent or trailing, spreading, often rooting at nodes. Radical leaves 3-partite, 3-8 cm in diam., petiolate; segments 3-lobed, stalked, somewhat ovate lobed, margins serrated; petioles 2.5-5 cm long, hairy; cauline leaves stalked, 3-lobed. Flowering scape one flowered, 4-8 cm long, opposite to cauline leaves, longer than the petiole, hairy; flowers 5-7 mm in diam., pale yellow. Sepals ovate, 2-3 mm long, reflexed, rather shorter than petals. Petals narrowly obovate, 3-4 mm long. Achenes 10-15, rounded, flat, minutely dotted, tubercled; style broad, hooked at apex.

Flower and fruit: June – October

Distribution: India: Western Ghats; Karnataka, Tamil Nadu, Kerala; Sri Lanka. (Fig. 50)

Specimens examined: TamilNadu: Nilgiris, Avalanche, *M. Perrottet* 11 (G, P); Nilgiheries, *Perrottet* 12 (G, P); Nilgiris temp., *T. Thomson* (P); Peninsular India, *Wight* 9 (K, G, P, L); Pondicherry, *Perrottet* s.n. (P); Shembaganur,Madurai, Unknown Collector 632 (CAL); Nilgiris, 7000 ft., Oct. 1910, *A. Meebold* 11577; Madurai, Pillar rocks Kodaikanal, 14.09.1968, 2150 m, *D.B.Deb* 30842 (CAL); Nilgiri, Gudatur, Nadurattam Rd., 1800 m, 25.07.1960, *K. Subramanyam* 10569 (CAL); Nilgiri, 7000 ft., Aug. 1886, *J.S.Gamble* 17829 (DD, CAL); Nilgiri, Snowdon RF, 24.06. 1981, *K. Abraham* 12729 (CDRI); Nilgiris, 6000 ft., Neduvattam, 29.03. 1870, *C.B.Clarke* 11365C (BM); Nilgherries, 1857-58, *Perottet* 134 (G); Nilgiri, Naduvattam, 1750m,

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29.08. 1970, *B.D.Sharma* 36107 (L); Pulney hills, May 1897, *Bourne* 233 (K); Tinnevelly, Kodaikanal, 22.05.1898, *Bourne* 2333 (K); Ootacamund, Wood Cock hall wood, 21.06.1904, *Bourne* 4600 (K); Nilghiri mountain, *T.Thomson* s.n. (K); Ootacamund, 7000 ft., May 1883, *J.S.Gamble* 11664 (K); Nilgherries, 6000 ft., 24.08.1887, *M.A.Lawson* s.n. (OXF); Nilgherries, *Wight* s.n. (OXF). Kerala: Kottayam dt., Kandloor forest, 24.01.1964, 2000m, *K.M. Sebastine* 18447 (P, L).

ACKNOWLEDGEMENTS

I would like to thank Dr. M. Sanjappa, Director, Botanical Survey of India for facilities; to Dr. D.K. Singh, Additional Director, BSI for constant encouragement and advice from time to time. Grateful thanks are due to Keepers of herbaria *viz*., Royal Botanic Garden, Kew (K), Edinburgh (E); Oxford (OXF), Cambridge (CGE), Paris (P), Leiden (L), Geneva (G) and in-charge of the herbaria of Forest Research Institute, Dehradun (DD), National Botanical Research Institute (LWG) and Central Drug Research Institute (CDRI), Lucknow in India; Central National Herbarium (CAL), Botanical Survey of India, Howrah, Dehradun (BSD) and Shillong (ASSAM) for the study of the general and type materials in their respective herbaria during the course of revisionary study. Thanks are also due to Sri Gautam Kumar Upadhyay, ex SRF, BSI, Howrah for preparing distributional maps and type setting the manuscript. I also thank to Sri Dineshwar Saha, Artist, BSI for inking the line drawings.

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印度毛茛屬植物之訂正

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摘要：本文是一篇基於形態特徵及植物地理學觀點對於印度毛茛屬植物的分類訂正文章，文中共報導了 45 分類群 (包括 41 種及 4 變種)，包括 8 個分類群的指定選模式標本。筆者檢視過印度及歐洲蒐藏有採自印度的毛茛屬植物標本的重要標本館及相關文獻，除了發現有 16 種本屬植物不僅在標本館的標本數量不多，在野外的族群也稀少；本文更處理毛茛屬複雜性較高的物種：禺毛茛 (*Ranunculs cantoniensis* DC.)、鋪散毛茛 (*R. diffusus* DC.)、*R. hyperboreus* Rottb.及美麗毛茛(*R. pulchellus* C.A. Mey.)等與曾被前人處理為同物異名的分類群，在文中都已經被分開為種下分類群或合併到一些物種當中。本文同時包括分種檢索表，每物種詳細的命名資訊 (同物異名、模式標本)、分類學描述、親緣關係、物種在印度及世界上的分佈及乾燥標本，並儘可能包含每物種生態學及分類上的意義，且附每一物種的線描圖及細部說明與其在印度的分佈圖。

關鍵詞：毛茛屬、毛茛科、訂正、分類學、選模式標本、印度。

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Fig. 1. ***Ranunculus adoxifolius*** **Hand.-Mazz. (Habit).**

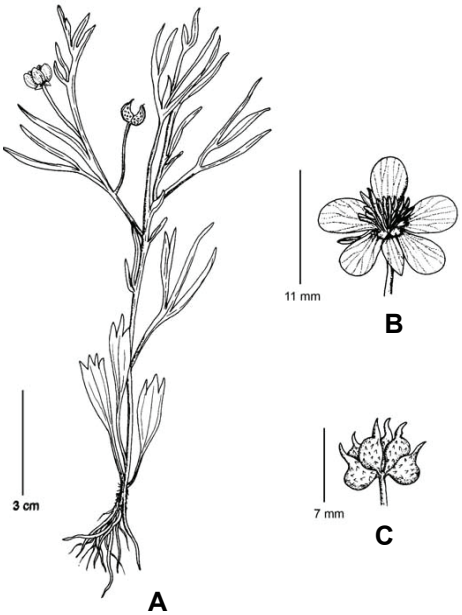


Fig. 2. ***Ranunculus arvensis*** **L. A: Habit. B: Flower. C: Achene.**

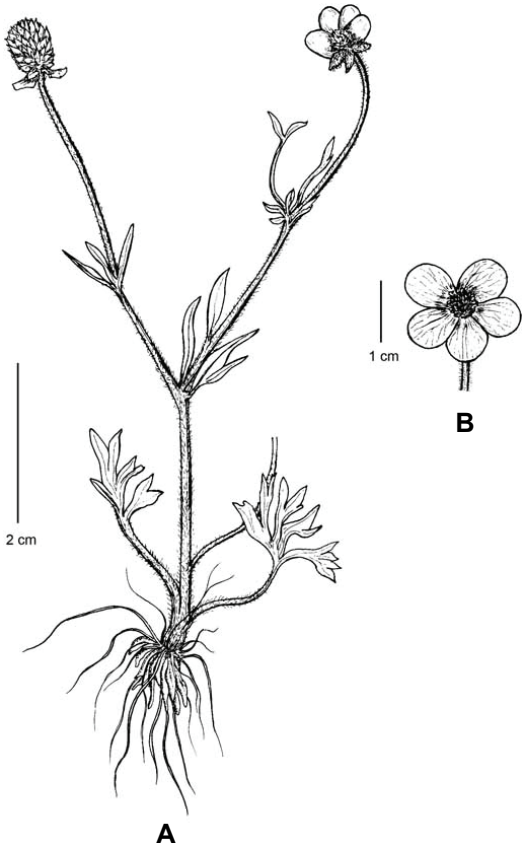


Fig. 3. ***Ranunculus aucheri*** **Boiss. A: Habit. B: Flower.**

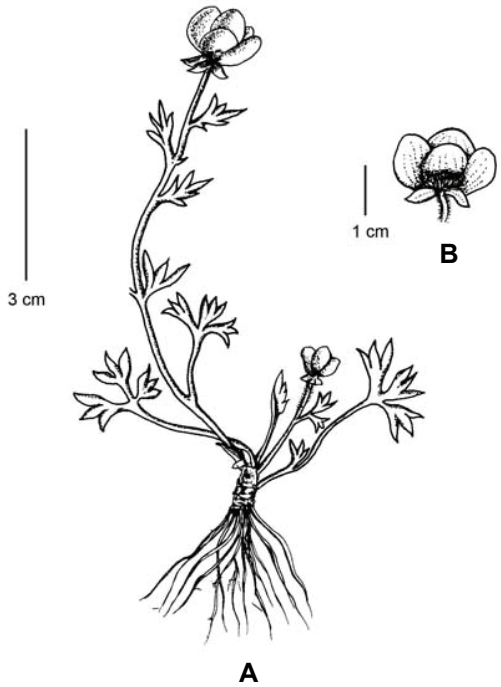


Fig. 4. ***Ranunculus bikramii*** **Aswal & Mehrotra, A: Habit. B: Flower.**

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Fig. 5. *Ranunculus brotherusii* Freyn (Habit).

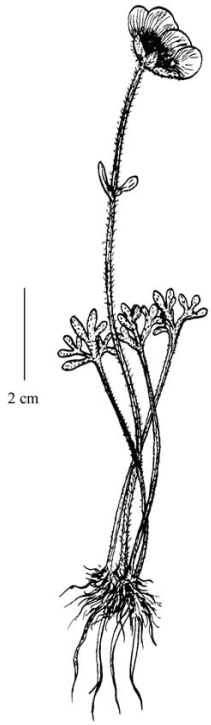


Fig. 7. *Ranunculus chaerophyllos* L. (Habit).

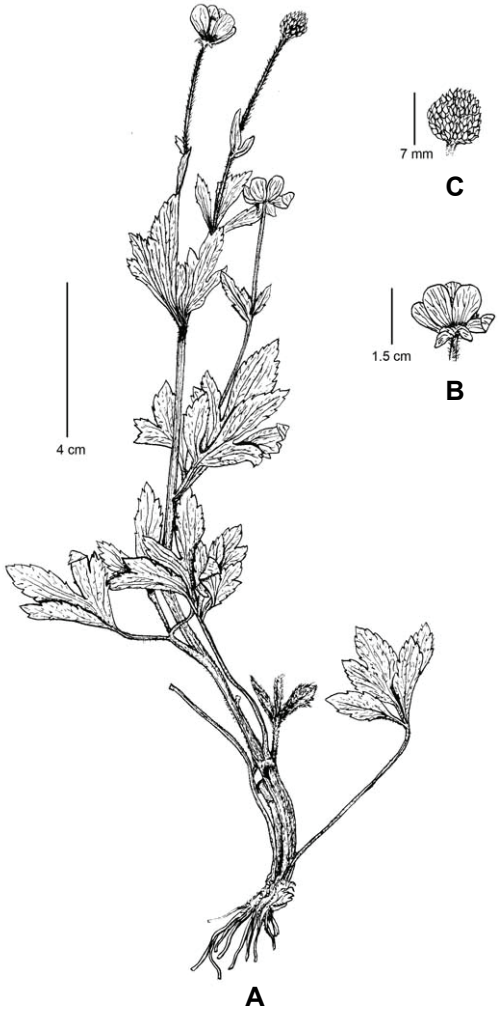


Fig. 6. *Ranunculus cantoniensis* DC. A: Habit. B: Flower. C: Achene.

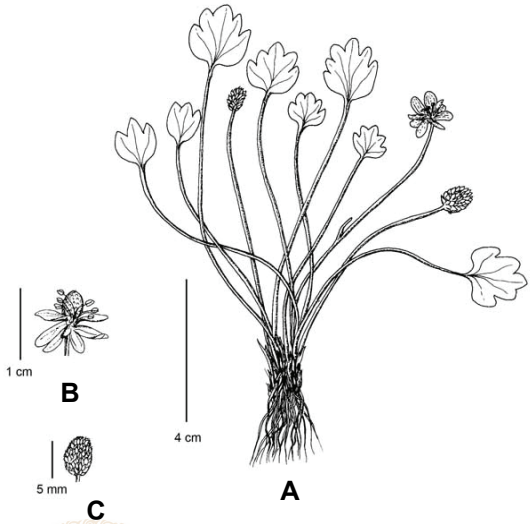


Fig. 8. *Ranunculus cymbalariae* Pursh, A: Habit. B : Flower. C: Achene.

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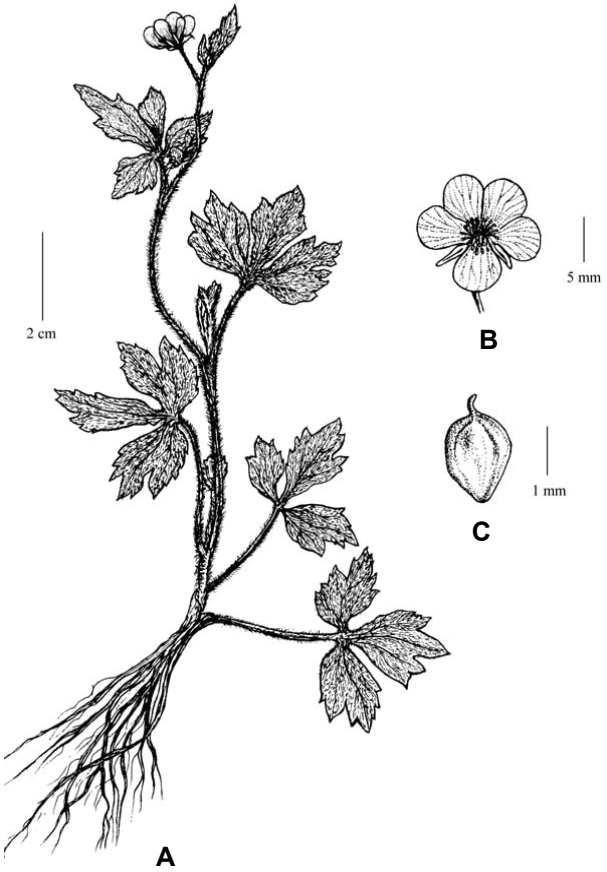


Fig. 9. ***Ranunculus diffusus*** **DC. A: Habit. B: Flower. C: Achene.**

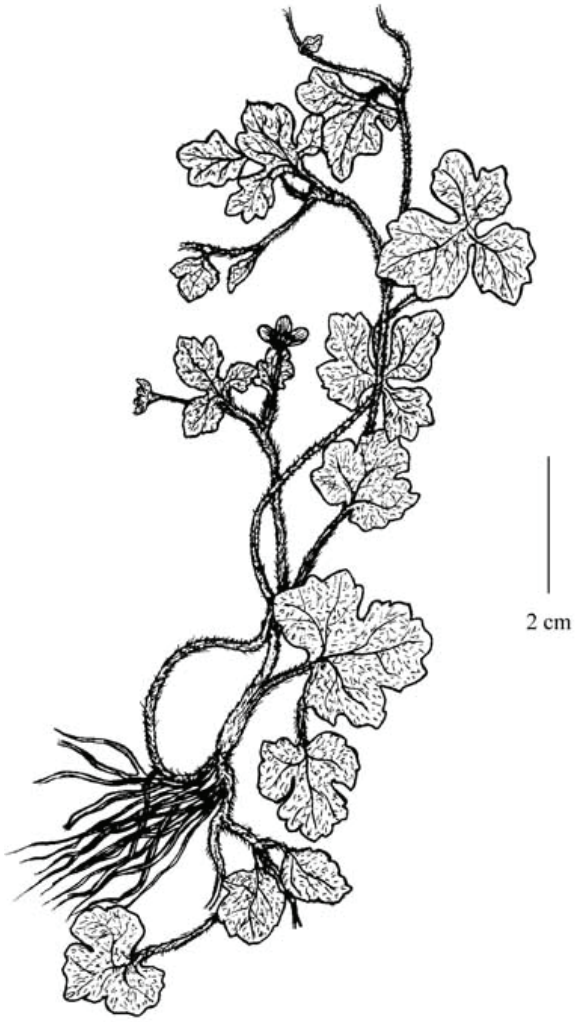


Fig. 10. ***Ranunculus diffusus*** **DC. var.** ***mollis*** **(Wall. ex D. Don) S. K. Srivast. (Habit).**

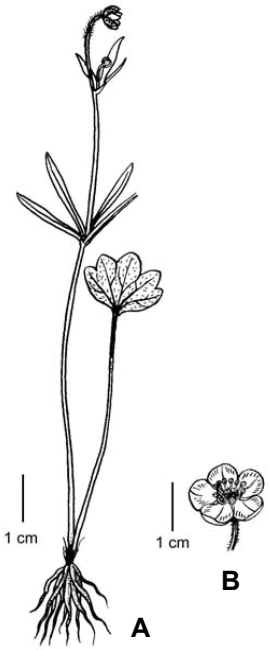


Fig. 11. ***Ranunculus felexii*** **H. Leveille, A: Habit. B: Flower.**

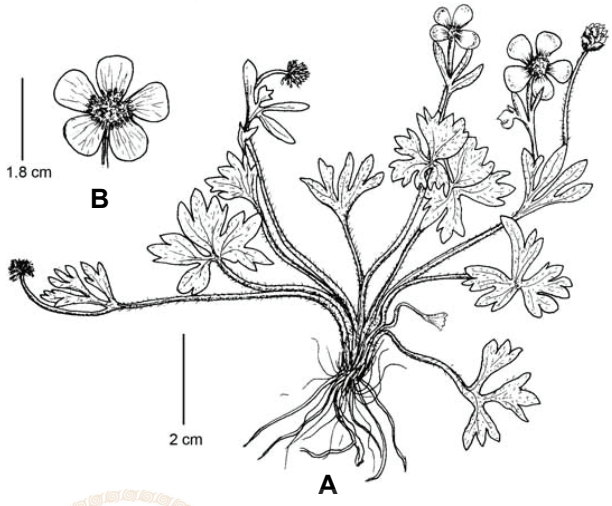


Fig. 12. ***Ranunculus hirtellus*** **Royle, A: Habit. B: Flower.**

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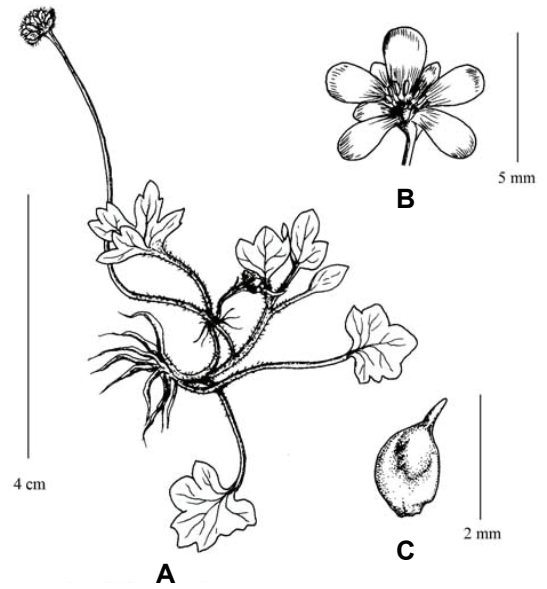


Fig. 13. *Ranunculus hyperboreus* Rottb. A: Habit. B: Flower. C: Achene.

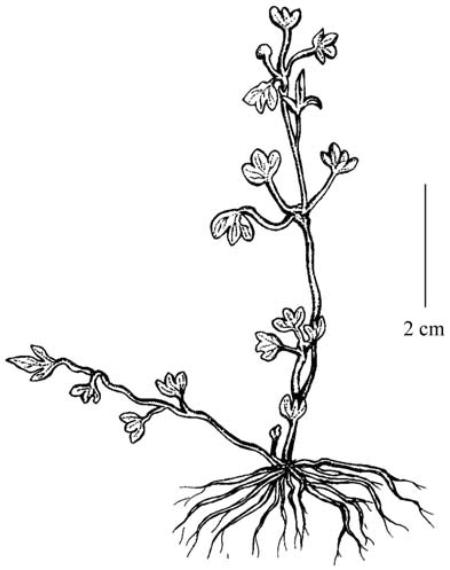


Fig. 14. *Ranunculus jacquemontii* Riedl (Habit).

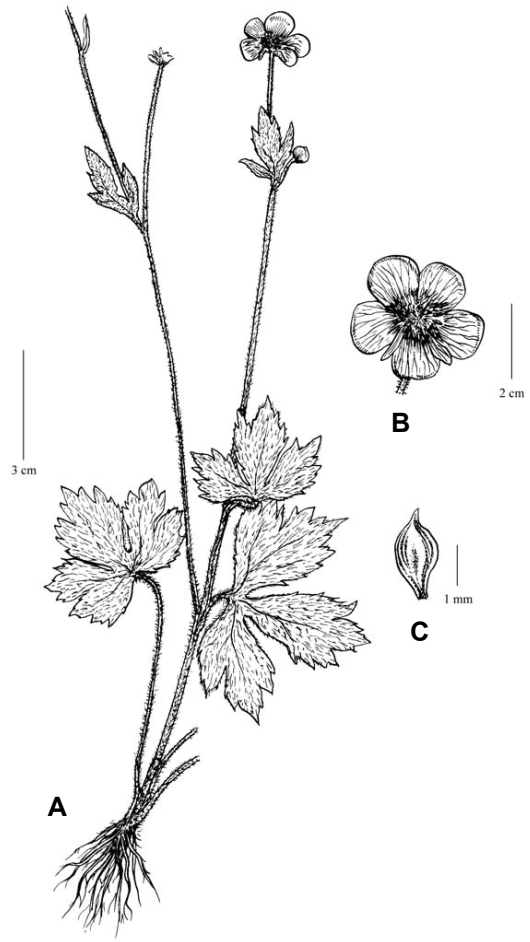


Fig. 15. *Ranunculus laetus* Wall. ex D. Don, A: Habit. B: Flower. C: Achene.

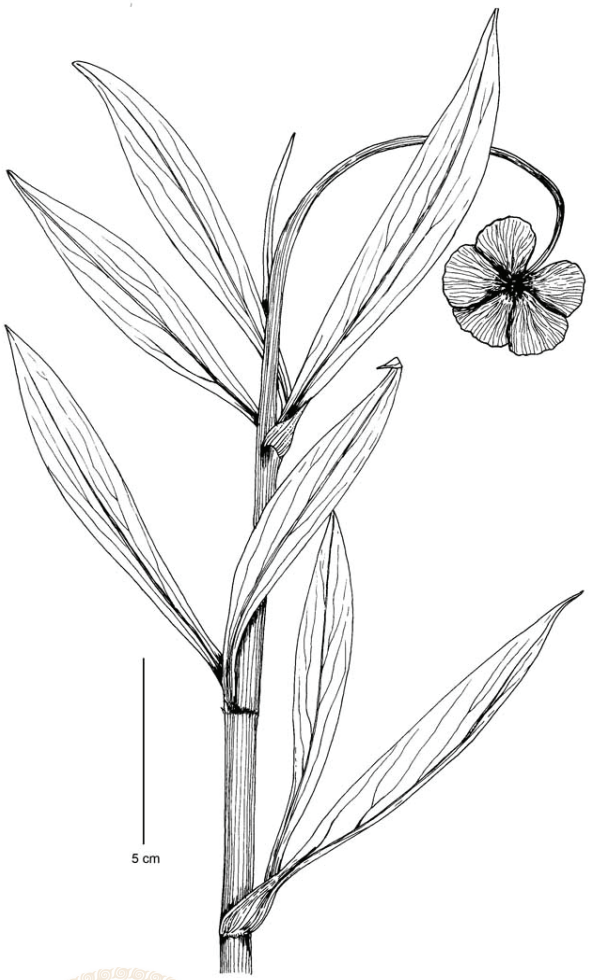


Fig. 16. *Ranunculus lingua* L. (Habit).

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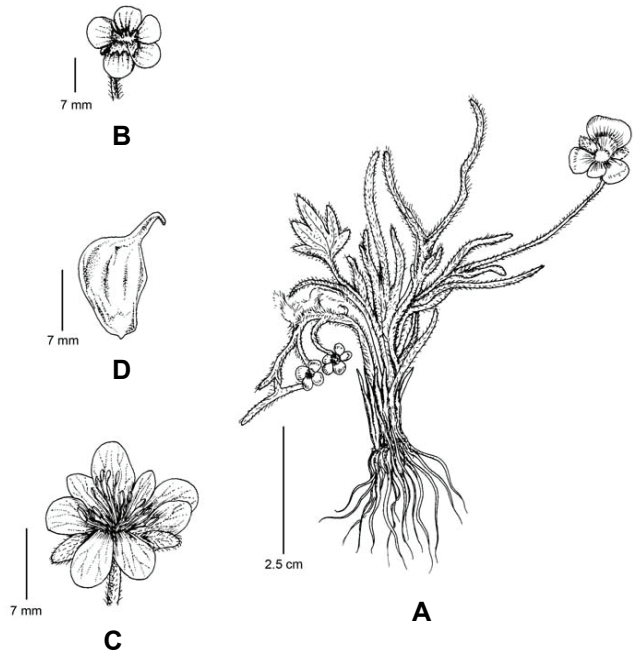


Fig. 17. *Ranunculus membranaceous* Royle, A: Habit. B: Flower. C: Flower (dissected). D: Achene.

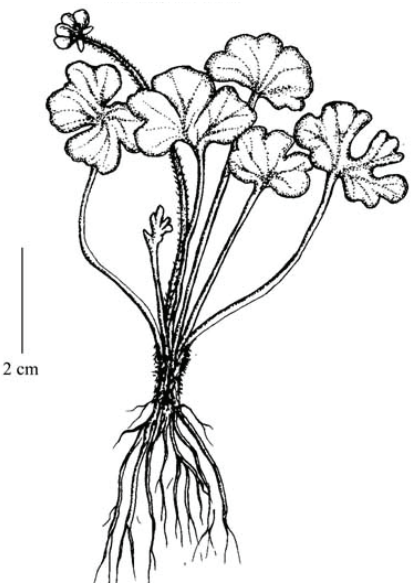


Fig. 19. *Ranunculus munroanus* J. R. Drumm. ex Dunn (Habit).

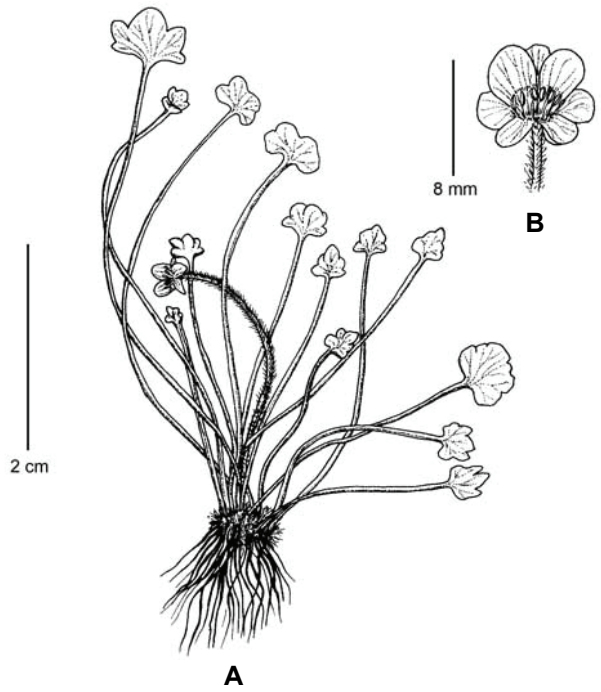


Fig. 18. *Ranunculus microphyllus* Hand.-Mazz. A: Habit. B: Flower.

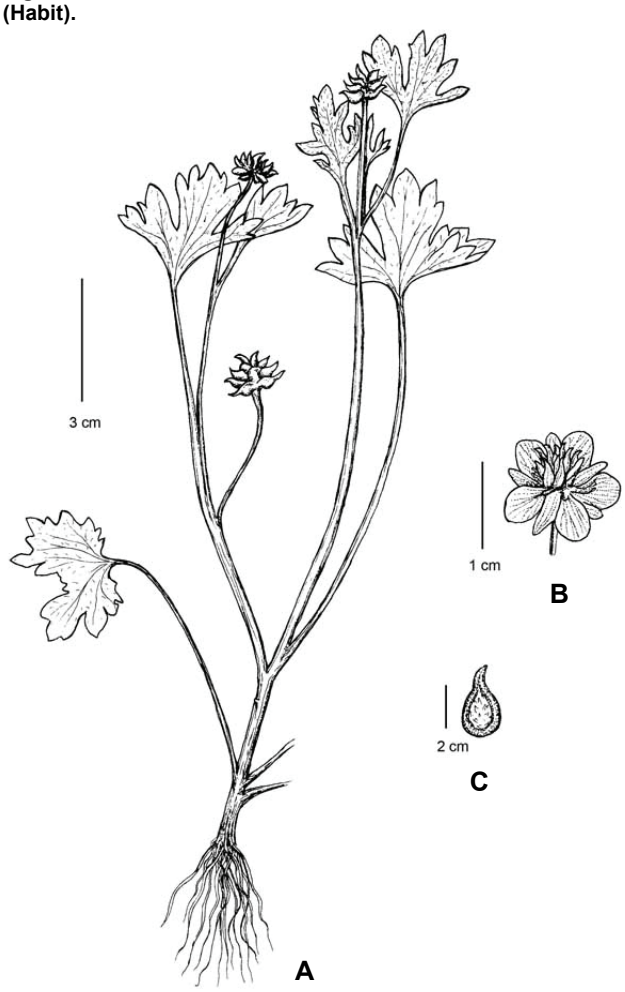


Fig. 20. *Ranunculus muricatus* L. A: Habit. B: Flower. C: Achene.

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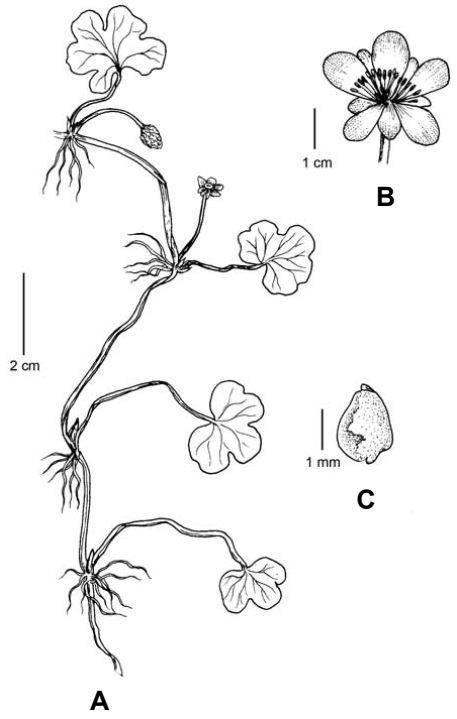


Fig. 21. *Ranunculus natans* C. A. Mey. A: Habit. B: Flower. C: Achene.

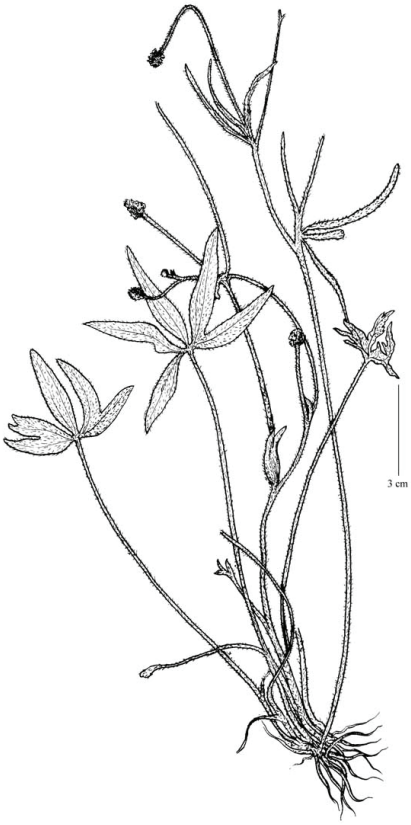


Fig. 22. *Ranunculus palmatifidus* Riedl (Habit).

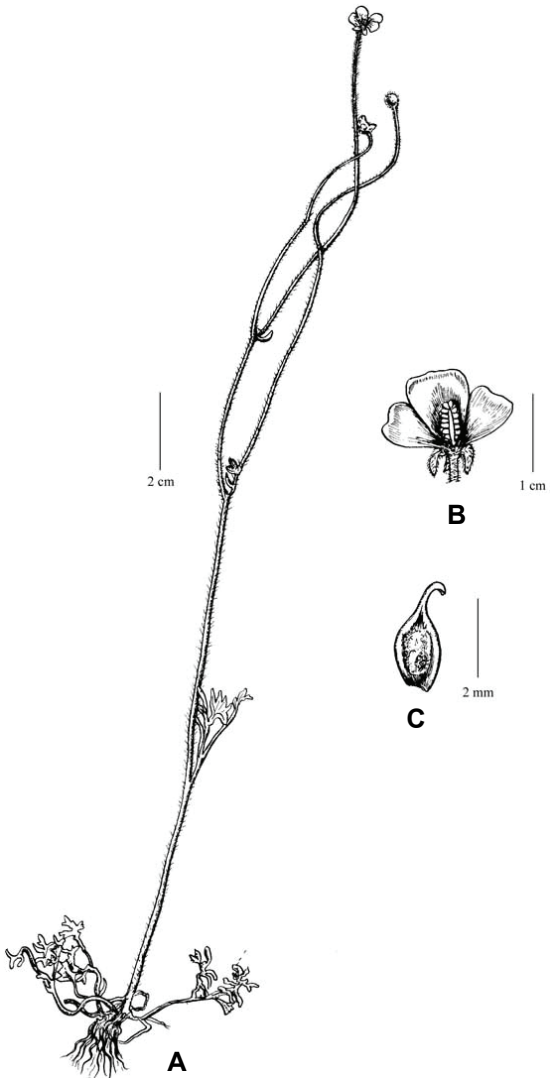


Fig. 23. *Ranunculus pangiensis* Watt, A: Habit. B: Flower. C: Achene.



Fig. 24. *Ranunculus pegaeus* Hand.-Mazz. (Habit).

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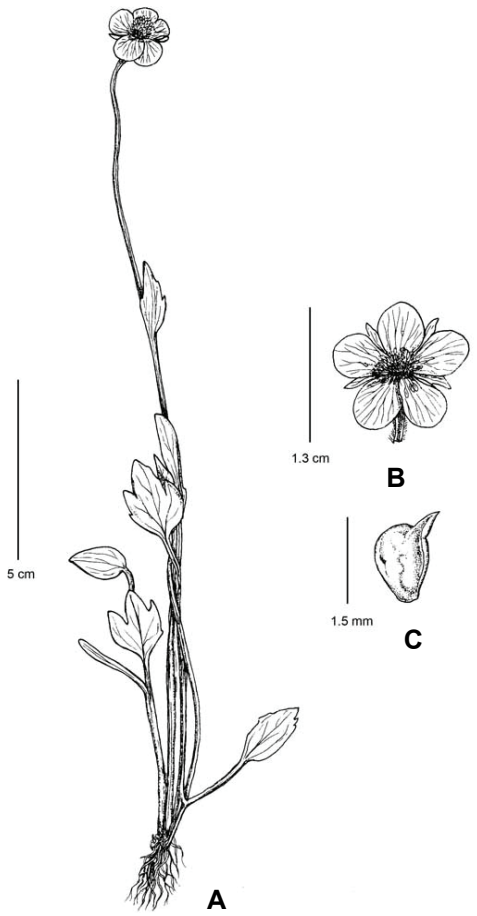


Fig. 25. ***Ranunculus pulchellus*** **C.A. Mey. A: Habit. B: Flower. C: Achene.**



Fig. 26. ***Ranunculus pulchellus*** **C.A. Mey. var.** ***longicaulis*** **(C.A. Mey.) Hook. f. & Thomson (Habit).**

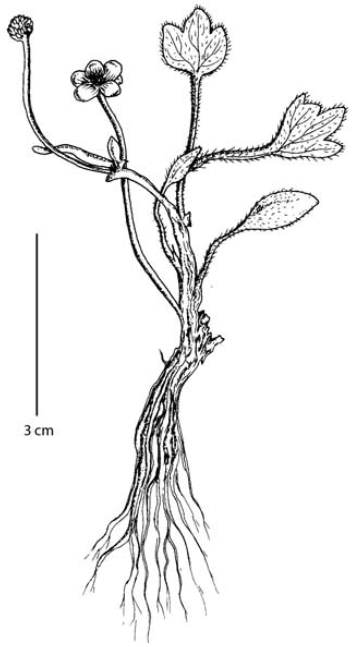


Fig. 27. ***Ranunculus pulchellus*** **C. A. Mey. var.** ***stracheyanus*** **(Maxim.) Hand.-Mazz. (Habit).**

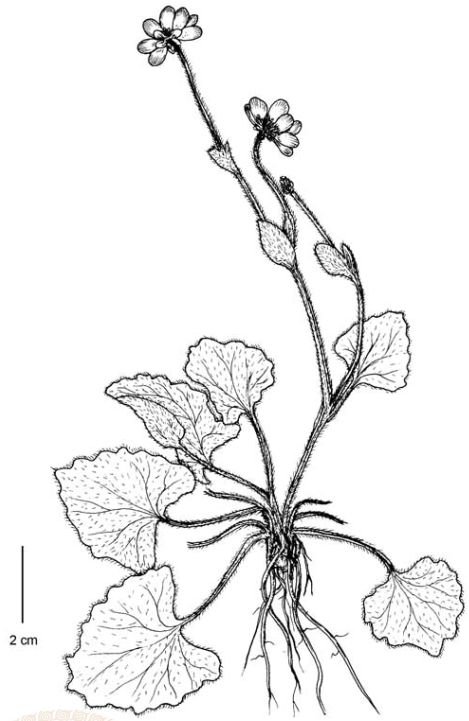


Fig. 28. ***Ranunculus reniformis*** **Wall. ex Wight & Arn. (Habit).**

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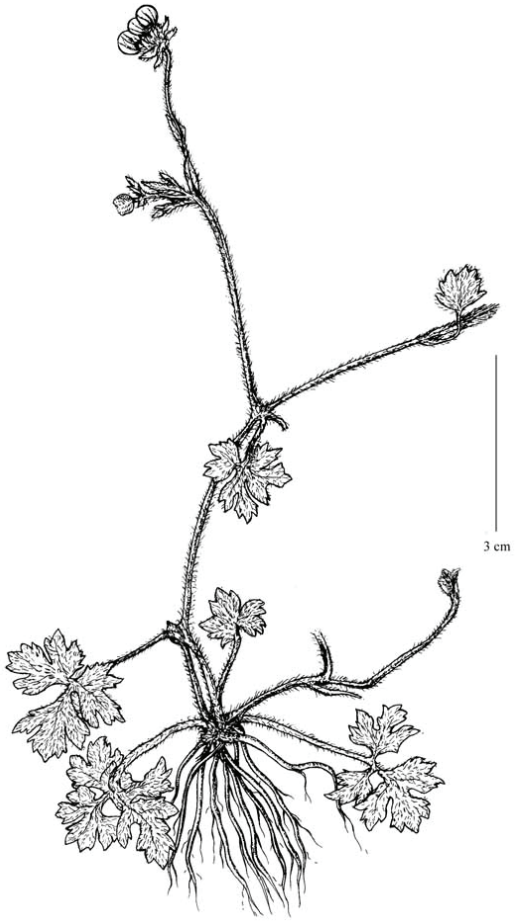


Fig. 29. *Ranunculus repens* L. (Habit).

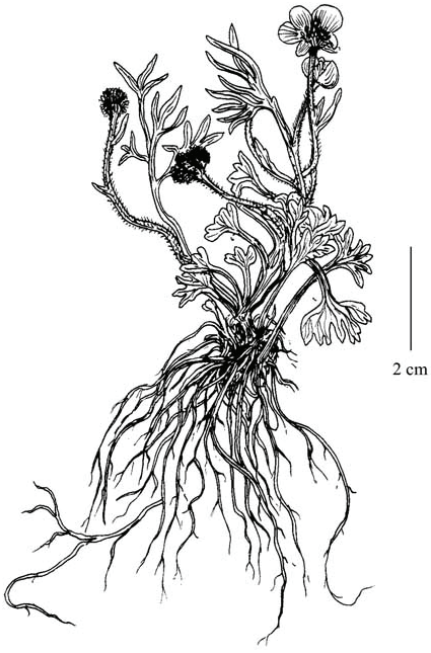


Fig. 31. *Ranunculus rufosepalus* Franch. (Habit).

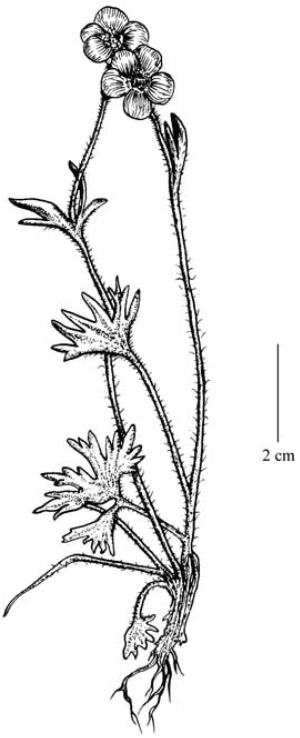


Fig. 30. *Ranunculus rubrocalyx* Regel ex Komarov (Habit).



Fig. 32. *Ranunculus sardosus* Crantz (Habit).

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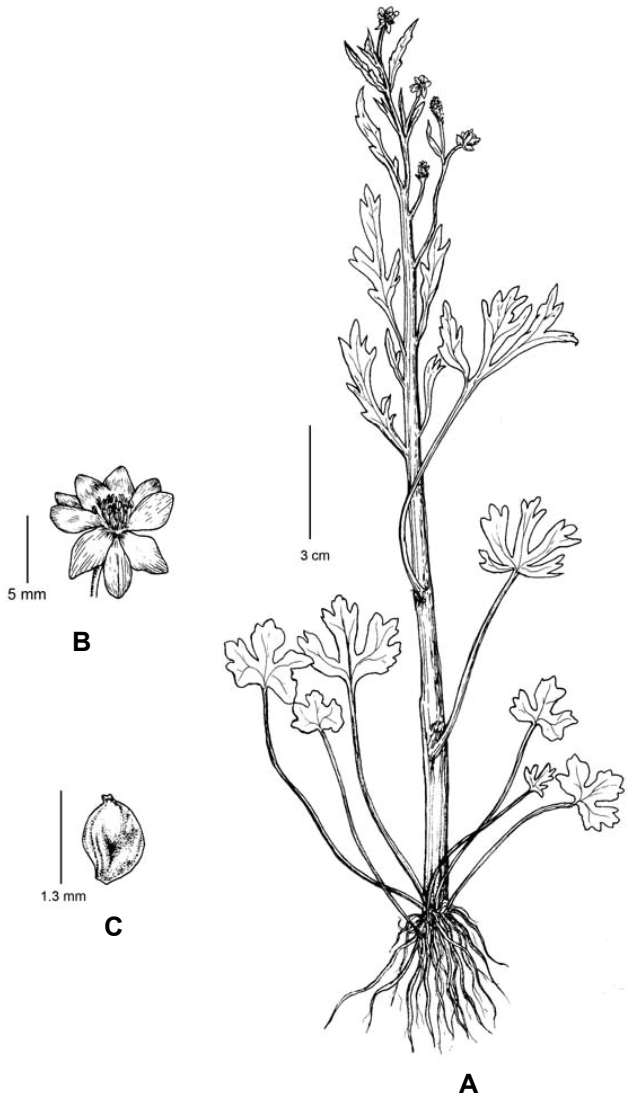


Fig. 33. ***Ranunculus scleratus*** **L. A: Habit. B: Flower. C: Achene.**

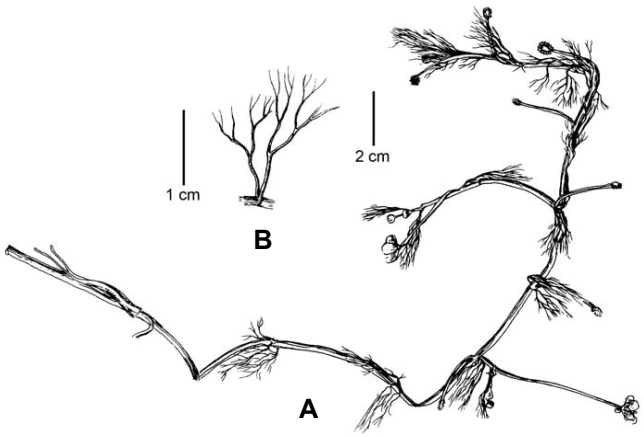


Fig. 35. ***Ranunculus sphaerospermus*** **Boiss. & Blanche, A: Habit. B: Branched leaves.**

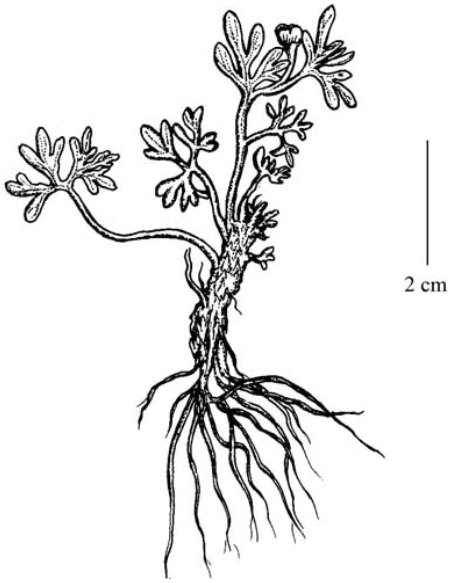


Fig. 34. ***Ranunculus sikkimensis*** **Hand.-Mazz. (Habit).**

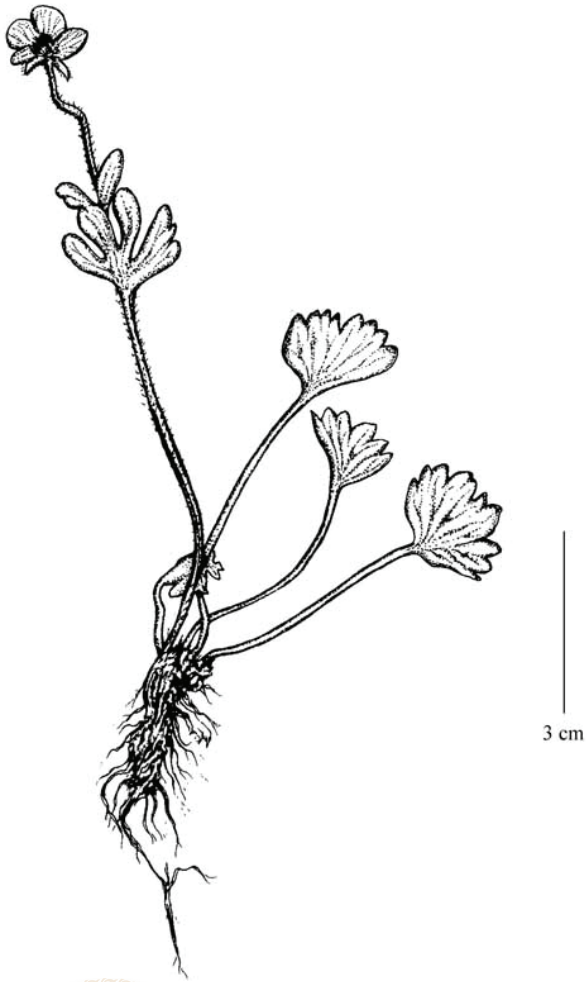


Fig. 36. ***Ranunculus stewartii*** **Reidl (Habit).**

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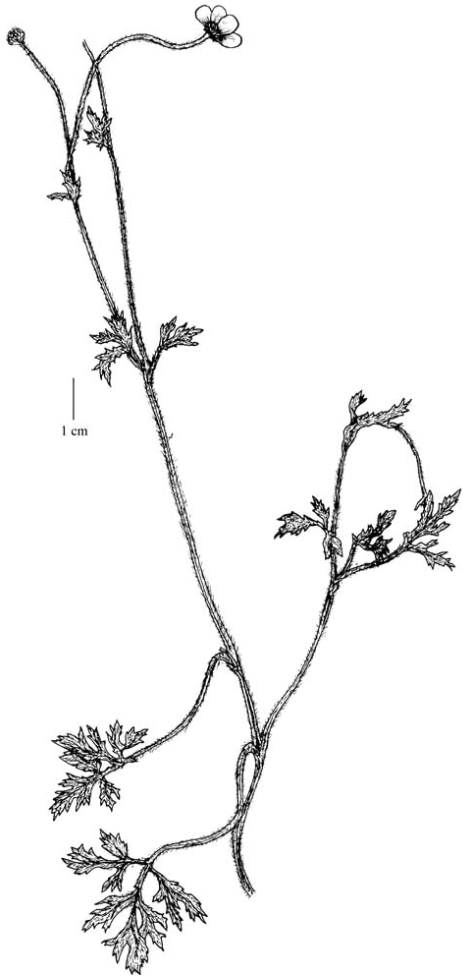


Fig. 37. *Ranunculus subpinnatus* Wight & Arn. (Habit).

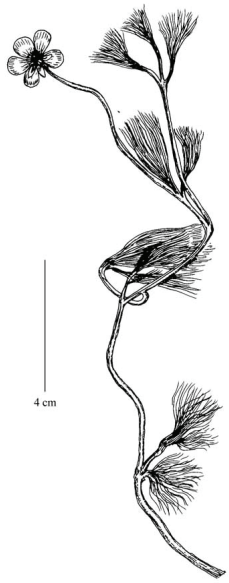


Fig. 38. *Ranunculus trichophyllus* Chaix (Habit).



Fig. 39. *Ranunculus trigonus* var. *strigosus* W.T. Wang, A: Habit. B: Flower. C: Stamen. D: Fruit. E: Achene.

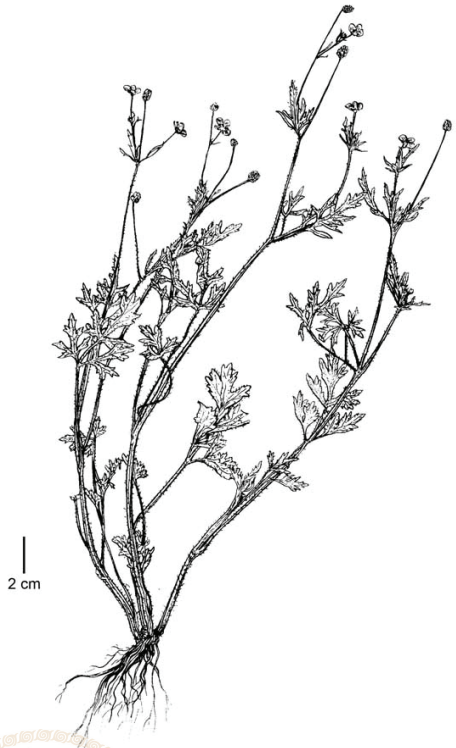


Fig. 40. *Ranunculus trilobus* Desf. (Habit).

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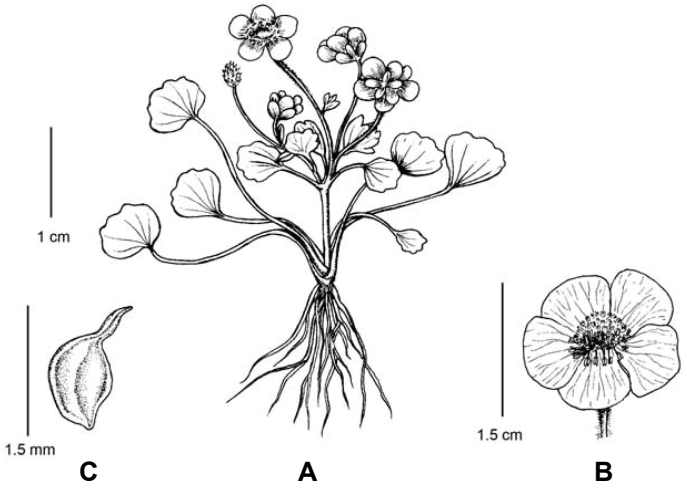


Fig. 41. ***Ranunculus trivedii*** **Aswal & Mehrotra, A: Habit. B: Flower. C: Achene.**

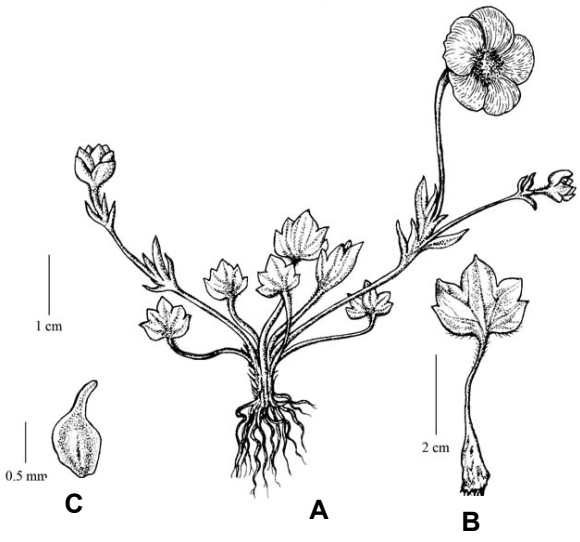


Fig. 42. ***Ranunculus uttaranchalensis*** **Pusalkar & D.K. Singh, A: Habit. B: Flower. C: Achene.**



Fig. 43. ***Ranunculus wallichianus*** **Wight & Arn. (Habit).**

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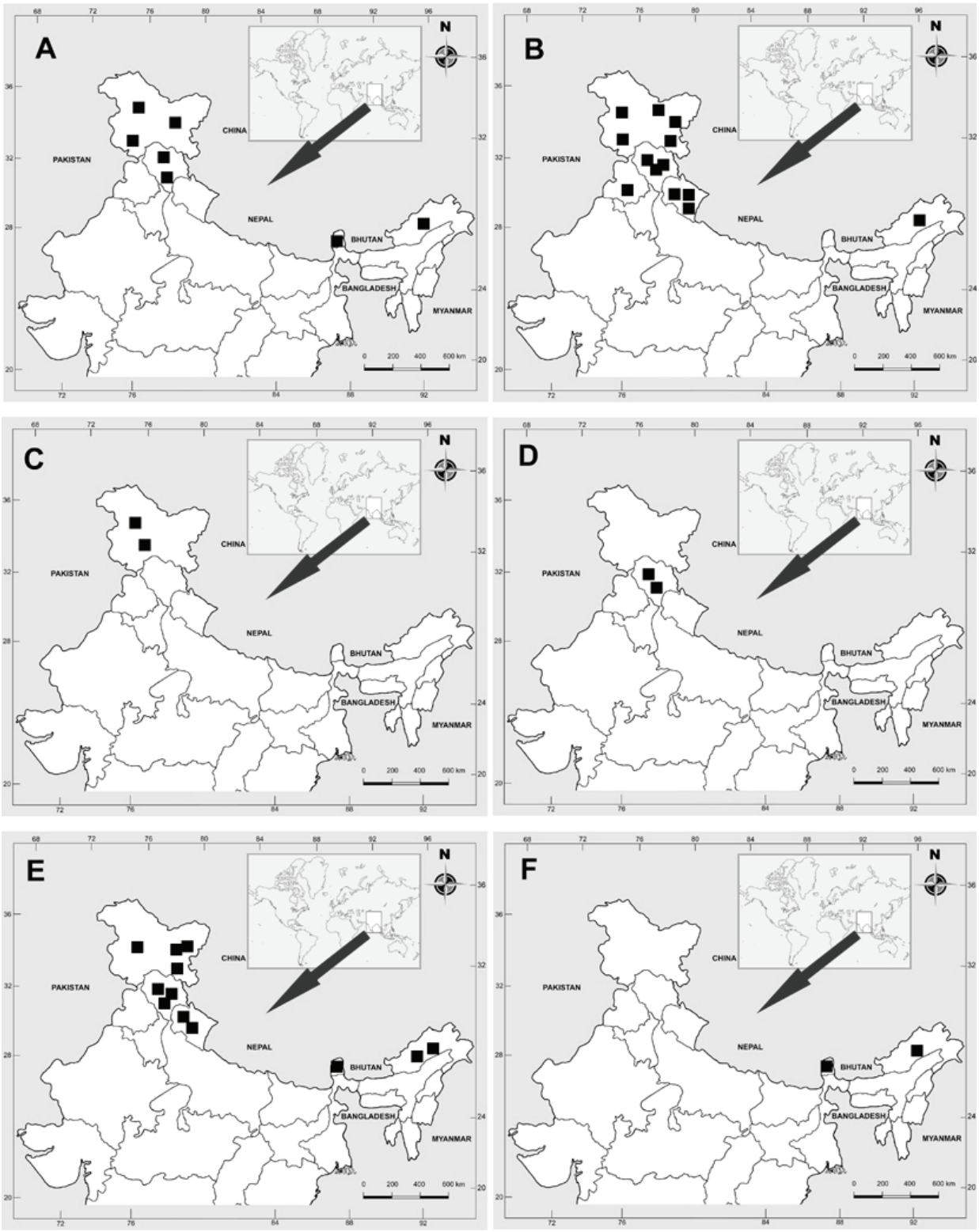


Fig. 44. Distribution maps for India. A: *Ranunculus adoxifolius* Hand.-Mazz.; B: *Ranunculus arvensis* L.; C: *Ranunculus aucheri* Boiss.; D: *Ranunculus bikramii* Aswal & Mehrotra; E: *Ranunculus brotherusii* Freyn var. *brotherusii*; F: *Ranunculus brotherusii* Freyn var. *tanguticus* (Maxim.) Tamura.

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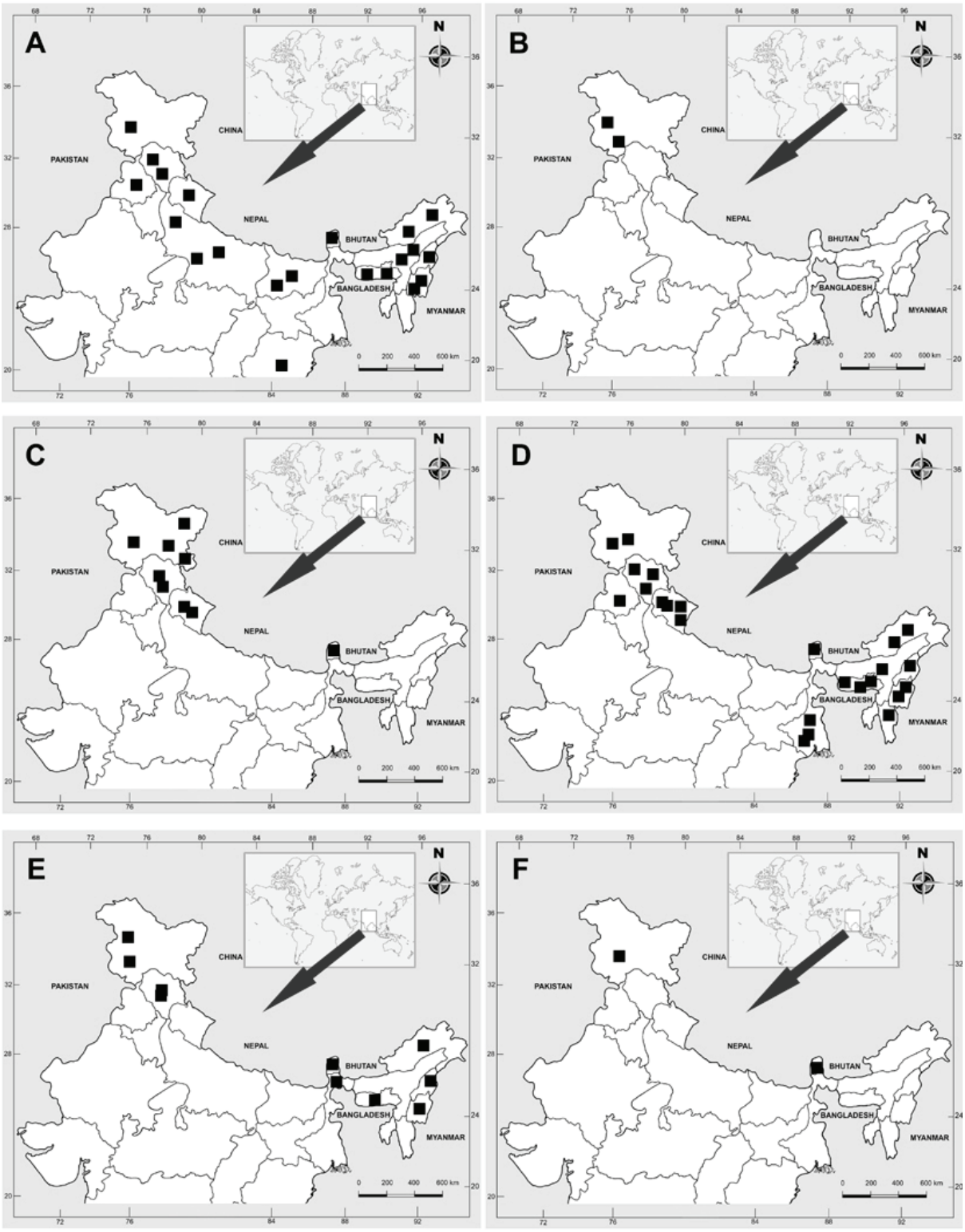


Fig. 45. Distribution map in India. A. *Ranunculus cantoniensis* DC.; B. *Ranunculus chaerophyllos* L.; C. *Ranunculus cymbalariae* Pursh; D. R*anunculus diffusus* DC. var. *diffusus*; E. *Ranunculus diffusus* DC. var. *mollis* (Wall. ex D. Don) S. K. Srivast.; F. *Ranunculus felexii* H. Leveille

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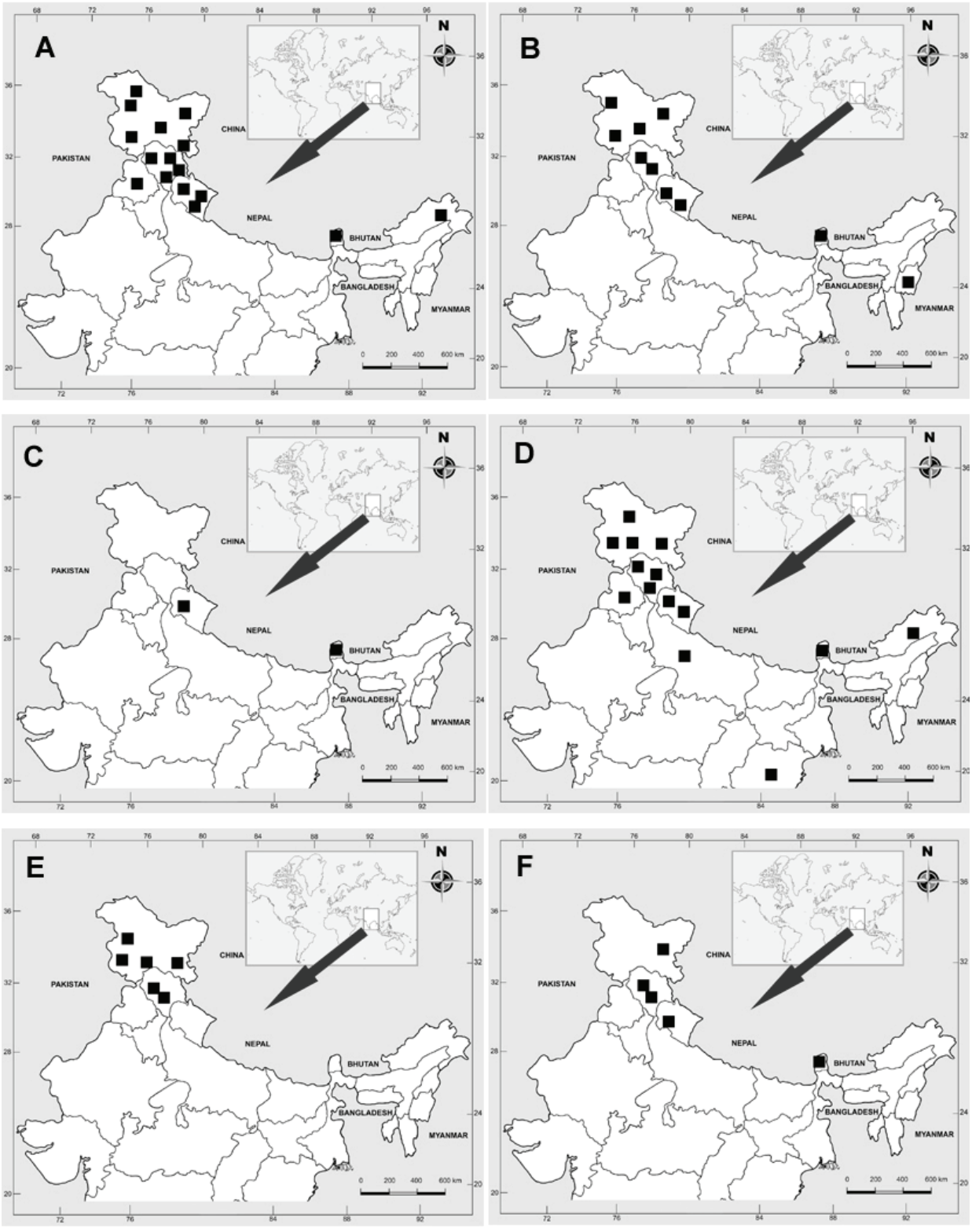


Fig. 46. Distribution map in India. A. *Ranunculus hirtellus* Royle; B. *Ranunculus hyperboreus* Rottb.; C. *Ranunculus jacquemontii* Riedl; D. *Ranunculus laetus* Wall. ex D.Don; E. *Ranunculus lingua* L.; F. *Ranunculus membranaceous* Royle

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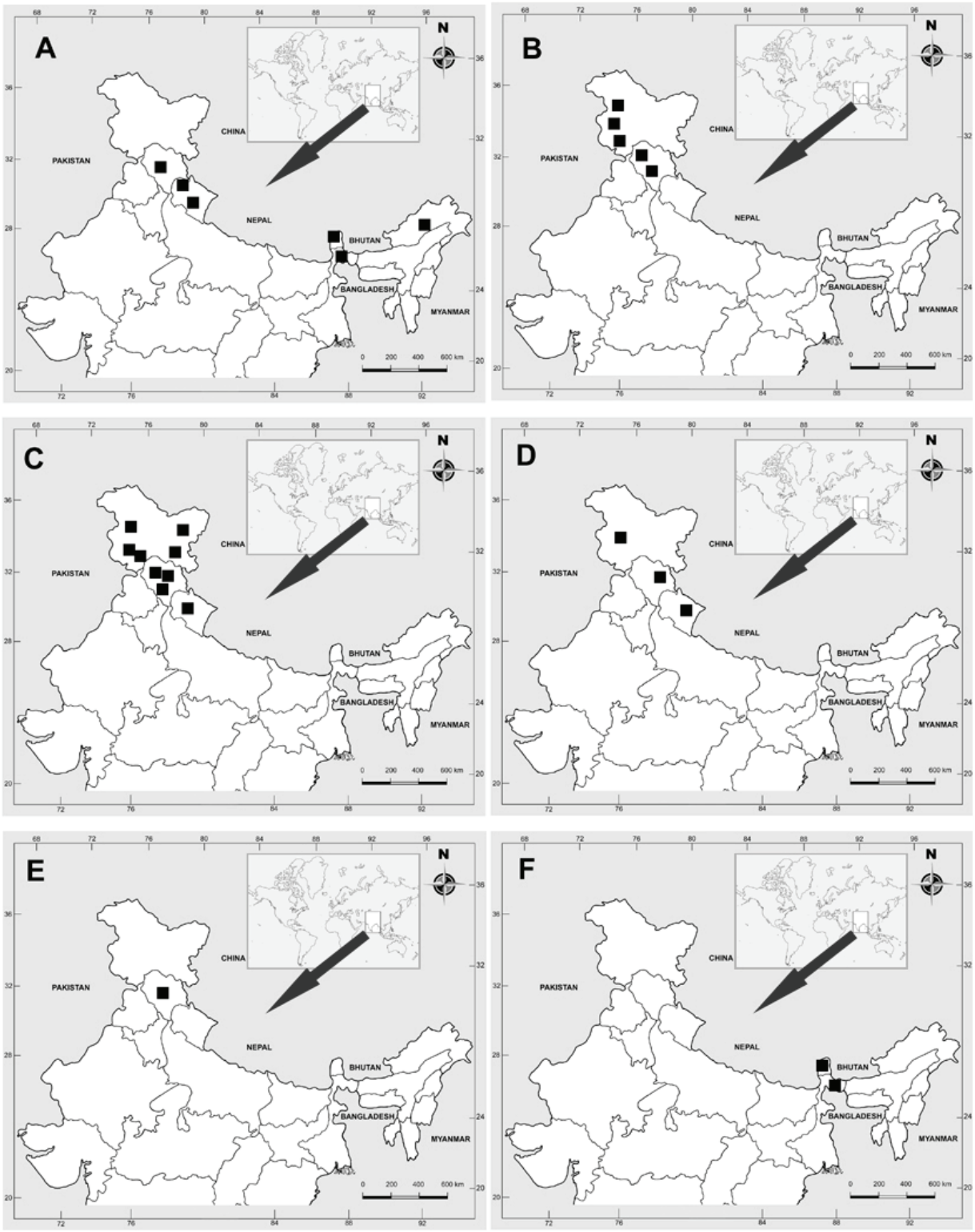


Fig. 47. Distribution Map in India. A. *Ranunculus microphyllus* Hand.-Mazz.; B. *Ranunculus munroanus* J.R. Drumm. ex Dunn; C. *Ranunculus natans* C.A.Mey; D. *Ranunculus palmatifidus* Riedl; E. *Ranunculus pangiensis* Watt; F. *Ranunculus pegaeus* Hand.-Mazz.

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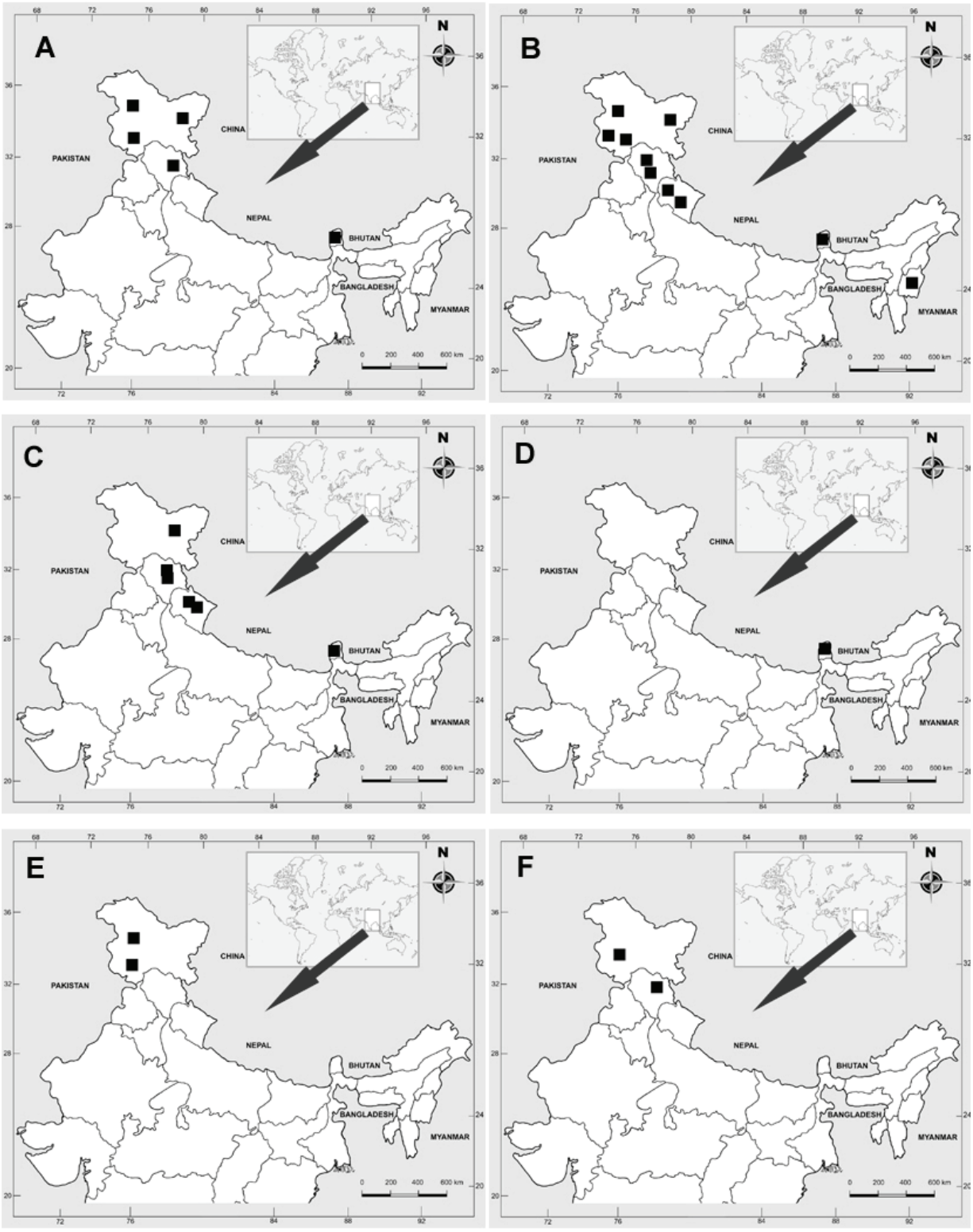


Fig. 48. Distribution map in India. A. *Ranunculus pulchellus* C.A. Mey. var. l*ongicaulis* (C.A. Mey.) Hook.f. & Thomson; B. *Ranunculus pulchellus* C.A. Mey. var. *pulchellus*; C. *Ranunculus pulchellus* C.A. Mey. var. *stracheyanus* (Maxim.) Hand.-Mazz.; D. *Ranunculus repens* L.; E. *Ranunculus rionii* Lagger; F. *Ranunculus rubrocalyx* Regel ex Komarov

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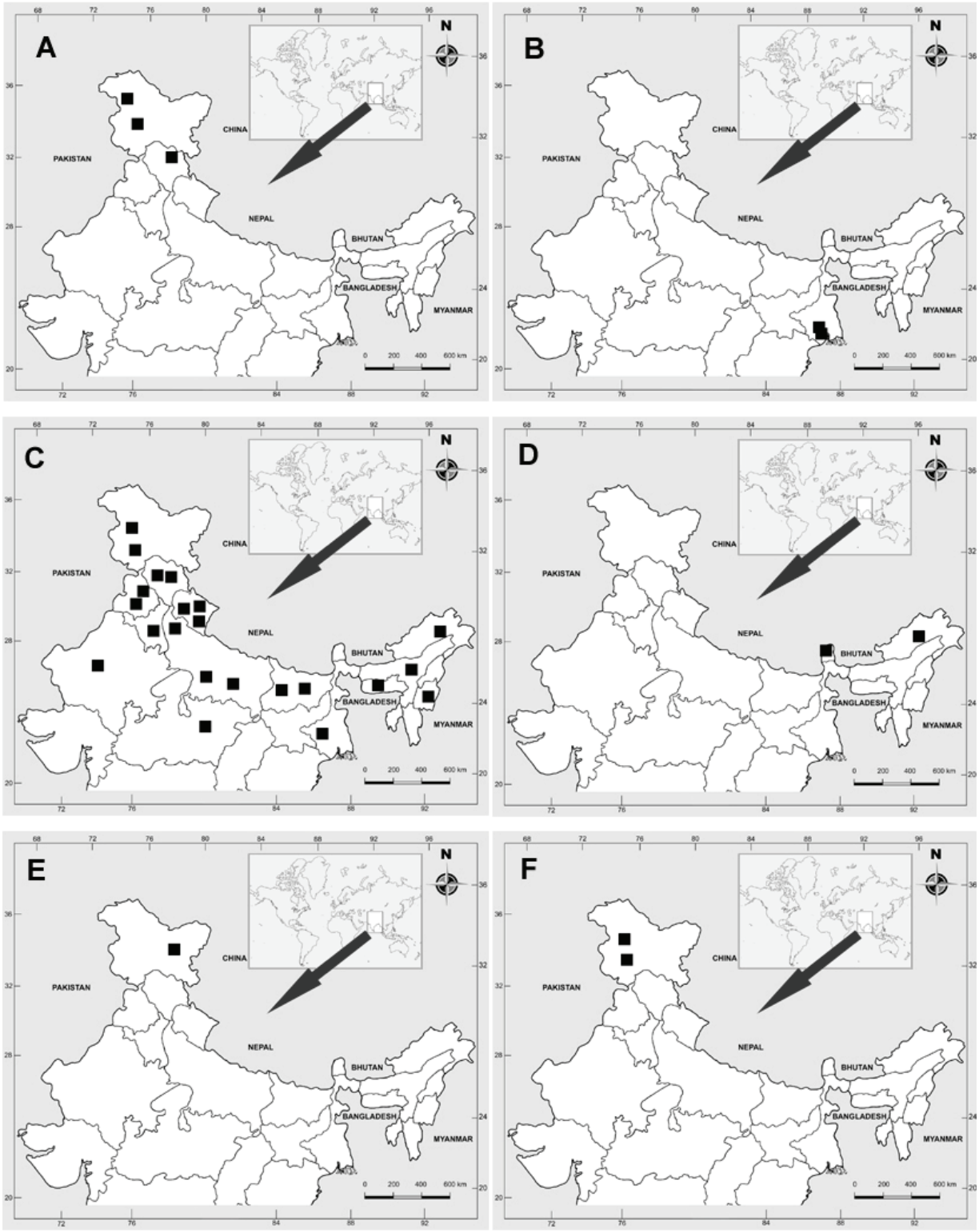


Fig. 49. Distribution map in India. A. *Ranunculus rufosepalus* Franch; B. *Ranunculus sardosus* Crantz; C. *Ranunculus scleratus* L.; D. *Ranunculus sikkimensis* Hand.–Mazz.; E. *Ranunculus sphaerospermus* Boiss. & Blanche; F. *Ranunculus stewartii* Reidl

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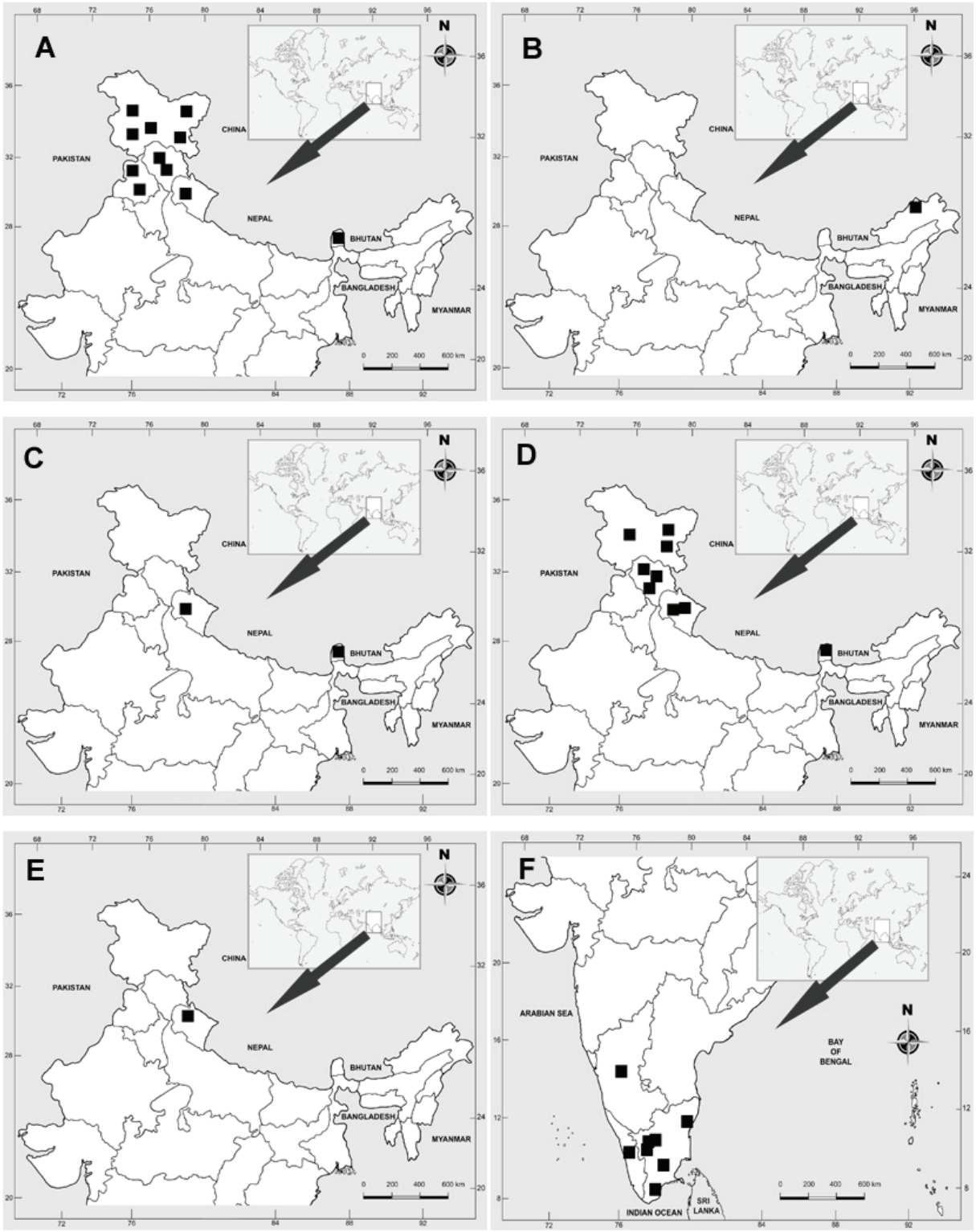


Fig. 50. Distribution Map in India. A. *Ranunculus trichophyllus* Chaix; B. *Ranunculus trigonus* var. *strigosus* W.T.Wang; C. *Ranunculus trilobus* Desf.; D. *Ranunculus trivedii* Aswal & Mehrotra; E. *Ranunculus uttaranchalensis* Pusalkar & D.K. Singh; F. *Ranunculus wallichianus* Wight & Arn.

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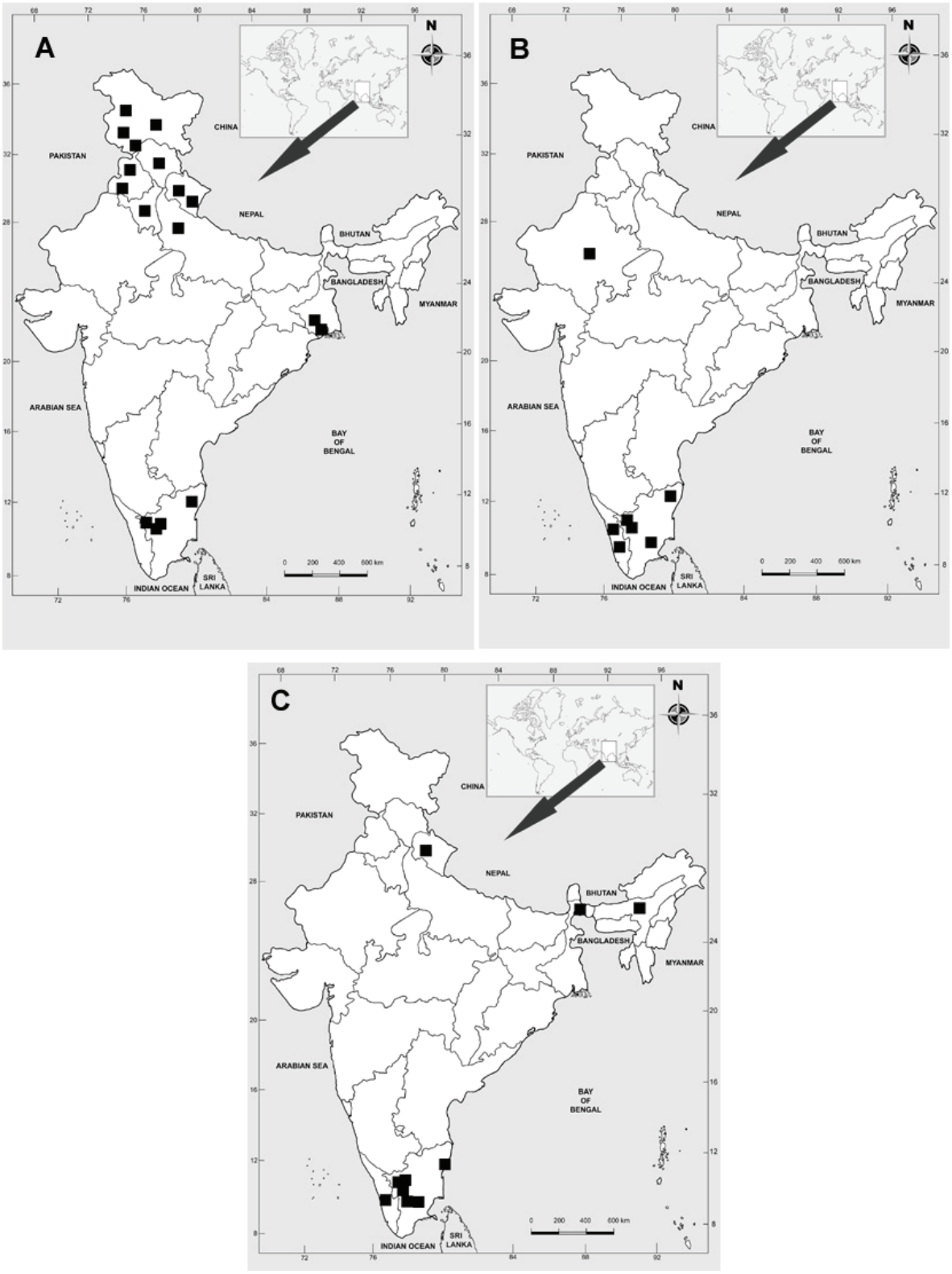


Fig. 51. Distribution map in India. A. *Ranunculus muricatus* L.; B. *Ranunculus reniformis* Wall. ex Wight & Arn.; C. *Ranunculus subpinnatus* Wight & Arn.

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