

THE GENUS *RANUNCULUS* L. (RANUNCULACEAE) IN IRAN

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A revision of the genus *Ranunculus* L. in Iran including: key, literatures, synonymes and locality lists is presented, meanwhile a list of genera of the family *Ranunculaceae* with the total number of the species for each genus recognized in Iran is added. Altogether 58 species are known from the genus in Iran. 3 new species and 2 new varieties are described: *R. sabalanicus* Mobayen & Maleki, *R. syroussii* Mobayen, *R. thala* Mobayen, *R. oxyspermus* Willd. var. *curvirostris* Mobayen & Maleki and *R. sericeus* Banks & Sol. var. *chrysanthus* Mobayen & Maleki. 3 new combinations are presented: *R. constantinopolitanus* Urv. var. *farsicus* (Rech. f.) Mobayen & Maleki, *R. constantinopolitanus* Urv. var. *villosus* (DC.) Mobayen & Maleki and *R. crymophilus* Boiss. & Hohen. var. *merovenssis* (Grossheim) Mobayen & Maleki. *R. dolosus* and *R. lateriflorus* are reported as new records for Iran.

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جنس آلاله *Ranunculus* L. در ایران

از: صادق مبین و زین العابدین ملکی

گونه‌های جنس آلاله *Ranunculus* L. در ایران مطالعه گردیده و نتایج حاصله شامل کلید شناسایی، سوابق، اسامی مترادف و لیست رویشگاهها ارائه میگردد. همچنین اسامی جنس‌های شناخته شده از خانواده آلاله (*Ranunculaceae*) در ایران و تعدادگونه‌های آنها اضافه میشود. جمعاً "تعداد ۵۸ گونه از جنس آلاله در ایران شناخته شده و ۳ گونه و دو واریته جدید بنامهای:

R. sabalanicus Mobayen & Maleki, *R. syroussii* Mobayen, *R. thala* Mobayen, *R. oxyspermus* Willd. var. *curvirostris* Mobayen & Maleki, *R. sericeus* Banks & Sol. var. *chrysanthus* Mobayen & Maleki

نامگذاری و معرفی میگردند. سه ترکیب جدید شامل:

R. constantinopolitanus Urv. var. *farsicus* (Rech. f.) Mobayen & Maleki, *R. constantinopolitanus* Urv. var. *villosus* (DC.) Mobayen & Maleki, *R. crimophilus* Boiss. & Hohen. var. *merovenssis* (Gros-sheim) Mobayen & Maleki.

نیز ارائه و گونه‌های *R. dolosus*, *R. lateriflorus* برای اولین بار از ایران گزارش داده میشوند.

Introduction

While observing and revising plant collections of the herbaria of Plant Pests and Diseases Research Institute (EVIN), Research Institute of Forests and Rangelands (TARI) and Tehran University at Faculty of Sciences and Faculty of Agriculture during the years 1980 — 1981, it was an opportunity to accomplish the identification of non-identified existing specimens in these herbaria and to arrange a new key to the species of *Ranunculaceae* for Flora of Iran.

The results of these investigations are presented here by describing some new taxa to the science of Botany and listing under new key to the species of the genus *Ranunculus*, known from Iran along with their localities. Hoping to continue in future the same for other genera and families.

Altogether 21 genera including *Batrachium* S. F. Gray (6 species), *Ficaria* L. (4 species), *Caltha* L. (2 species), *Trollius* L. (1 species), *Ranunculus* L. (58 species), *Ceratocephalus* Moench. (2 species), *Eranthis* Salisb. (2 species), *Adonis* L. (7 species), *Nigella* L. (9 species), *Anemone* L. (7 species), *Pulsatilla* Mill. (2 species), *Isopyrum* L. (1 species), *Thalictrum* L. (5 species), *Paraquilegia* Drum. & Hutch. (3 species), *Aquilegia* L. (2 species), *Consolida* (DC.) S. F. Gray (21 species), *Delphinium* L. (17

species), *Aconitum* L. (4 species), *Paeonia* L. (2 species), *Actaea* L. (1 species) and *Clematis* L. (6 species) recognized for the Flora of Iran. Between these genera *Actaea* L. for the first time is reported from Iran.

Ranunculus L.

L., Syst. ed. 1 (1735); L., Sp. Pl. 584 (1753) ex pte. — *Hecatonia* Lour., Fl. Cochinch. 302 (1790). — *Pachyloma* Spach., Hist. Veg. 7: 194 (1839). — *Pfundia* Opiz, Seznam 73 (1852) nomen. — *Xiphocoma* Stev., Bull. Soc. Nat. Mosc. 25: 537 (1852).

Annual or perennial herbaceous plants, with a bundle of slender root fibers, a developed rootstock or numerous tuberosely thickened fasciular roots. Leaves palmately divided or pinnatipartite or rarely undivided entire or dentate. Flowers hermaphrodite, terminal, solitary or in a branched cymose inflorescence, or \pm paniced. Perianth biseriate. Sepals 5, rarely 3 or 4, green sometimes petaloid, usually shorter than petals and deciduous in fruit. Petals usually 5, rarely more (6—9), yellow, rarely white or red, bearing a nectarpit towards the base often protected by a scale or naked (glabrous). Stamens and styles numerous (rarely 4—10 stamens), spirally arranged in several rows. Achenes few to many, forming

a more or less compact head, 1 — seeded, indehiscent, usually with a straight or more or less curved beak (style).

A large genus of about 600 species widely distributed throughout the world specially in temperate zones, 58 species are represented in Iran, some of them are endemic of this area; they grow in different habitat from very cold regions to deserts and alpine zones, in moist boggy places, in forest and steppes, on dry slopes, among stones, riversides, thickets and meadows, However, mesophyllous types predominate. Most species are poisonous. Farsi name: *Alaleh*.

Key to the species

ANNUALS

- 1a. Leaves undivided; leafblades all entire or remotely toothed. 2
 b. Leaves divided; blades [†] deeply parted into palmate or rarely pinnate segments. 4
 2a. Peduncles elongate. Uppermost floral leaves in pair (opposite) or single, finely toothed or lobed. Fruiting heads rounded-globular. Achenes tuberculate, villous.

R. ophioglossifolius Vill.

Vill., Hist. Pl. Dauph. 3: 731, t. 49(1789); Boiss., Fl. Or. 1: 53 (1867); Parsa, Fl. de l'Ir. 1: 398

(1951); DC., Prod. I: 43(1824).

N: Guilan: moist boggy places of Lahijan; riverside and sandy coastal regions of port Anzali. Gorgan: Namtelov.

- b. Flowers sessile, borne in axils at the junction of upper branches. Uppermost floral leaves in pair (opposite), long and without tooth or lobe. 3
 3a. Radical leaves broadly ovate or elliptic, long petiolated. Achenes with subulate, straight and not hamate beak; beak as long as achene.

R. lateriflorus DC.

DC., Syst. 1: 251 (1817); DC. Prod. I: 43 (1824); Boiss., Fl. Or. 1: 53 (1867).

N: Guilan: Amarloo; Damesh; Tchaleh-Angoor Ghaleh. Mazandaran: Ramsar, Tappeh-Sar(new record for Iran).

- b. Radical leaves narrow, band-shaped or lanceolate, tapering gradually to a narrow petiole. Beak curved and shorter than the length of achenes.

R. nodiflorus L.

L., Sp. Pl. 549(1753).

Mediterranean and probably N. Iran.

- 4a. Fruiting heads elongate-elliptic or cylindrical. Achenes numerous. Flowers without nectar-pit. 5

b. Fruiting heads rounded-globular, not cylindrical. Achenes few. Petals bearing nectar-pit towards the base, protected by a scale. 6

5a. Annual, uppermost floral leaves narrowly lanceolate, entire. Achenes rigid, pitted, transversely wrinkled.

R. scleratus L.

L., Sp. Pl. 551 (1753); DC., Prod. 1: 34 (1824); Boiss., Fl. Or. 1: 53 (1867); Parsa Fl. de l'Ir. 1: 398 (1951).

C: Tehran: Alborz. — N.: moist boggy places of Lahijan; Mianposhteh Isle; Anzali; Rasht.

b. Annual or biennial, uppermost floral leaves broadly elliptic with lobed margin. Achenes not hard. Stems with divergent [†] procumbent branches.

R. dolosus Fisch. & Mey. Fisch. & Mey. in Hohenack., Enum. Talysch. 148: (1837); Boiss., Fl. Or. 1: 53(1867); Komarov, Fl. of the USSR. 7: 409(1937).

N: Lahijan; Nowshahr; Bandare-Gaz; Rasht (new record for Iran).

6a. Achenes spiny bordered, bearing thick spines. Leaves tripartite, cuneate at base; segments dentate. Petals longer than sepals.

R. arvensis L.

L., Sp. Pl. 555(1753); Boiss., Fl. Or.

1: 57(1867); Parsa, Fl. de l'Ir. 1: 405(1951).

N: Mazandaran; Alborz. — W: Khorramabad; Bakhtaran; Sanandaj; Malayer; Tafresh. — NW: Azarbayegan: Oroomieh; Soofian; around Tabriz. — S: Fars: Shiraz; Booshehr — SW: Kotal; Bazoft valley. — SE: Baloochistan; Kerman; jabol-Barez. — C: around Tehran; Karaj; Yazd.

6b. Achenes not spiny bordered, smooth, glabrous or pubescent or minutely tuberculate. 7

7a. Petals as long as sepals. Achenes tuberculate bearing whitish hairs. Radical leaves orbicular, cordate; blades trilobed. Peduncles slender, glabrous, terete.

R. parviflorus L.

L., Sp. Pl. 780(1753); Boiss., Fl. Or. 1: 54(1867); Parsa, Fl. de l'Ir. 1: 399(1951).

W: Mesopotami, Gotwand.

b. Petals longer than sepals, often twice longer. Achenes lacking whitish hairs. 8

8a. Achenes longer than 10 mm (up to 15 mm), adpressed hairy with stout hamate beak. Radical leaves trilobed, orbicular.

R. pinardii (Stev.) Boiss.

Boiss., Diagn. Ser. 2(5): 10 (1856);

Parsa, Fl. de l'Ir. 1: 406 (1951).
Syn.: *Gampsoceras pinardii* Stev.
in Bull. Soc. Nat. Mos. 25: 542, t.
vii, f. 6(1852). — *R. cornutus* Boiss.,
Pl. exs. non DC.

N: Ghazvin.—NW: Azarbayejan: Oroo-
mieh, Sylvana valley.

b. Achenes smaller (up to 6 mm). 9

9a. Peuncles stout, claviform. Torus sw-
ollen. Achenes quite flat with ha-
mate-curved beak. Leaves palma-
tely lobed. Stems and leaves pube-
scent.

R. chius DC.

DC., Syst. 1: 299 (1818); Boiss.,
Fl. Or. 1: 54(1967); Komarov, Fl.
of the USSR 7: 477(1937); Parsa,
Fl. de l'Ir. 1: 400(1951).

W: Bakhtaran. — S: Kotal; Boos-
hehr.

b. Peduncles strongly terete. Torus not
swollen. Leaves palmate or pinnate.

10

10a. Achenes flattened, spiny tubercu-
late or nearly smooth with 2 prom-
inent nerves on the disc parallel to
the adaxial margin. Leaf segments
nearly broad.

11

b. Achenes more or less inflated. tub-
erculate or minutely wrinkled, with-
out 2 prominent nerves.

13

11a. Achenes strongly muricate with pr-
ojections; beak broadly lanceolate.
Plants glabrous or sparsely hairy.

Helophytes *R. muricatus* L.
L., Sp. Pl. 780: (1753); Boiss., Fl. Or. 1:
56(1867); Komarov, Fl. of the US-
SR. 7: 477(1937); Parsa Fl. de l'Ir
1: 404(1951).

N: Lahijan; Rasht; Caspian sea co-
asts. — W: Korramabad. — S :
Baloochistan; Saravan; Kerman. —
C: around Tehran; Karaj.

R. muricatus L. var. *graecus* Heldr.
& Sarth.

Parsa, Fl. de l'Ir. 1: 405(1951).

N: Bandar-Anzali; Bandar-e Gaz.

Stems and leaves shorter.

b. Achenes smooth, glabrous or sli-
ghtly rugose. 12

12a. Achenes bordered with 2 distinct
slits and 2 prominent nerves; beak
curved. 1/2 as long as achenes.

R. marginatus d'Urv.

d'Urv. in Mem Soc. Linn. Paris 1:
318(1822); Boiss., Fl. Or. 1: 56
(1867); Parsa, Fl. de l'Ir. 1: 402
(1951).

Syn.: *R. trachycarpus* Fich. & Mey.
var. *leiodiscus* Boiss., Diagn. Ser.
2(5): 9 (1856).

N: Guilan: moist boggy places of
Rasht.

b. Achenes minutely tuberculate, ven-
tral slit not clearly distinct; beak
1/3 of achenes.

R. trachycarpus Fisch. & Mey.
Fisch. & Mey., Ind. Sem. Hort.
Petrop. 3: 46(1838); Boiss., Fl. Or.
1: 35(1867); Parsa, Fl. de l'Ir. 1:
402(1951).

N: Guilan: sandy shore of Anzali;
Mianposhteh; Sefid-Rood valley; Ka-
rum. Gorgan: Agh-Ghaleh.

- 13a. Stems and leaves more or less pub-
escent. Radical leaves ovate; cauline
leaves pinnate; uppermost stem lea-
ves divided to linear-lanceolate seg-
ments.

R. trilobus Desf.

Desf., Fl. Atl. 1: 437(1798); Boiss.,
Fl. Or. 1: 54(1867); Parsa, Fl. de
l'Ir. 1: 40(1951).

N: Guilan: Lahijan

- b. Stems and leaves nearly glabrous.
Leaves 3 — partite with serrate
segments. Cauline leaves more or
less pinnate; uppermost floral leaves
undivided with entire blades. Ac-
henes minutely tuberculate with sm-
ooth border and a short beak.

R. lomatacarpus Fisch. & Mey.
Fisch. & Mey., Ind. Sem. Horti
Petrop. 36(1835); Parsa, Fl. de l'Iran
I: 403(1951).

Syn: *R. rhynchocarpus* Mey. Enum.
Cauc. 202(1831) non. DC.

NW: Azarbyejan: Sabalan. — S:
Booshehr; Shiraz.

PERENNIALS

- la. Leaves undivided; blades entire with
parallel veins. 2
b. Leaves divided; blades palmate or
pinnate without parallel veins. 3
2a. Rootstock stout with long joints
and verticillate root fibers at the
nodes. Stems 100 cm or more high,
erect, stout, hollow. Leaves sessile;
blades 20 cm (or more) long (di-
tches and lakeshore plants).

R. lingua L.

L., Sp. Pl. 594(1753).

N: standing water of Amir-Kalayeh;
slow flowing river water of Tch-
amkhaleh.

- b. Rootstock short, without adventi-
tious roots. Stems 30 — 40 cm high,
erect, not hollow. Leaves to 10 cm
long; lower leaves long petioled;
blades with acute teeth.

R. strigillosus Boiss. & Huet
Boiss. & Huet in Boiss., Diagn. Ser.
2(5): 7(1856); Boiss., Fl. Or. 1: 52
(1867); Boiss. Fl. Or. suppl. 14
(1888); Parsa, Fl. de l'Ir. 1: 397
(1951).

NW: Azarbayejan: mount Sahand
near Nazaghek; Sarab, Bozgoosh 27
km to Khajoo.

- 3a. Roots tuberously thickend, without rhizome. 4
- b. Roots slender, fibrous or cordlike, not tuberous, more often rhizomatous. 18
- 4a. Leaf blades pinnate with more than one pair of lateral segments; veins feathery. 5
- b. Leaf blades palmate with only one pair of lateral segments; veins radiate. 9
- 5a. Radical leaves with narrow pinnate segments. Cauline leaves palmate. Achenes with a curved slender beak. *R. leptorrhynchus* Aitch. & Hemsl. Aitch. & Hemsl. in Transactions of the Linnean Society of London 3: 29 (1888 — 1894). — Ic., Parsa Fl. de l'Ir. 1: 376(1951).
N: Pole-Sefid, Sangdeh, 1400 m. — NE: Harirud valley, border of Afghanistan.
- b. Radical and cauline leaves all pinnate. 6
- 6a. Achenes with a distinct basal appendage (Sec. *Xiphocoma*). 7
- b. Achenes lacking a basal appendage. 8
- 7a. Stems, leaves and sepals hairy. Achenes glabrous, irregularly triangular-rounded, laterally flattened with a subulate somewhat straight beak. *R. orientalis* L. L., Sp. Pl. 781(1753); Boiss., Fl. Or. 1: 27(1867); Parsa, Fl. de l'Ir. 1: 377(1951).
Syn.: *Xiphocoma orientalis* Stev., Bull. Soc. Nat. Mosc. 25: 538(1852). — *X. atropatana* Stev., l. c.
NW: Azarbaijan. — C: Shahrood, Kuh-e Abr, 2060 m.
- b. Stems, leaves and sepals densely hairy. Achenes covered with dense setose hairs; beak short, hamately curved.
R. dasycarpus (Stev.) Boiss. Boiss., Fl. Or. 1: 38(1867); Parsa, Fl. de l'Ir. 1: 378(1951).
Syn.: *Xiphocoma dasycarpa* Stev. in Bull. Soc. Nat. Mosc. 21: 270 (1848).
N: Ghazvin, Zereschg. — NW: Azerbaijan: Oroomieh; Khoi; Marand; west Silavana, 1600 m. — W: mount Razvand; mount Tafresh.
- 8a. Roots tuberously thickened, elongated fusiform. Stems and leaves cottony, covered with long white hairs. Achenes triangular, glabrous, smooth.
R. millefolius Banks & Sol. Banks & Sol. in Russel, Aleppo, ed. 2. 2: 254(1794); Parsa Fl. de l'Ir. 1: 383(1951).
Syn.: *R. myriophyllus* DC., Syst. 257(1817).
W: Khorramabad, 6 mile to the

South.

- b. Roots in the form of a bundle of tuberous elliptic-ovoid short thickenings. Stems and leaves covered with dense greyish short hairs (not cottony). Segments fan-shaped. Achenes obtriangular; beak short.

R. cicutarius Schlechtd. Schlechtd., Animadv 25(1819); Parsa, Fl. de l'Ir. 1: 384(1951).

Syn.: *R. daucifolius* Stev., Bull. Soc. Nat. Mosc. 21: 270(1848).

N: Bandar-Gaz; Gorgan; Rasht; Sands of port Anzali.

(*R. zaghei* Parsa, a perennial Plant which in Fl. de l'Ir. 8: 213(1960), is compared with *R. arvensis*, an annual plant, seems to have very close affinity with *R. millefolius*).

- 9a. Flowers large, usually solitary, terminal, reddish or reddish-brown. Fruiting head elongated-cylindric. Achenes inflated, scarious with a curved beak. *R. asiaticus* L.

L., Sp. Pl. 777(1753); Boiss. Fl. Or. 1: 31(1867); Parsa, Fl. de l'Ir. 1: 380(1951).

W: Bakhtaran; mount Paroo; Guilan-Gharb; Ghasr-e Shirin; Andimeshk; Ahoodasht. — S: Khoozestan: Guenaveh; Ahvaz, Khoramshahr, Ab-

adan.

- b. Stems many-flowered, rarely solitary. Flowers yellow or whitish. Fruiting head not cylindrical. 10
 10a. Beak of Achenes subulate, straight or somewhat curved in upper part and at the tip. 11
 b. Beak of Achenes curved-hamate. 13
 11a. Roots tuberous, thickened-inflated, elliptic. Stems 2 or rarely more flowered. Leaves usually tripartite; segments elongate, dactyliform, entire, densely covered with adpressed silky white hairs. Sepals recurved, hairy beneath. Achenes glabrous, elongate.

R. syroussii Moboyen sp. nov.

NW: Azerbayejan, between Khoi and Makoo, W. of Diseji.

- b. Roots tuberously thickened, oblong-cylindric. Leaves more or less deeply palmatipartite; segments dentate. 12
 12a. Achenes triangular-ovoid with few long ciliate hairs; beak straight, proximally broadened.

R. damascenus Boiss. & Gaill. Boiss. & Gaill. in Boiss., Diagn. Ser. 2(6): 5(1859). — Ic. Zohary, Fl. Palest. 1: 291(1966).

Iraq, Lebanon and it is highly probable that it occurs in the west of Iran.

- b. Achenes elliptic, glabrous with small tubercles at the sides; beak with a slender more or less curved tip. 15
R. oxyspermus Willd.
 Willd., Sp. Pl. 2: 1328(1800); Boiss., Fl. Or. 1: 29(1867); Parsa, Fl. de l'Ir. 1: 379(1951). Ic.: Betrol., Miscell. 2, tab. 1, f. 2 (sub *R. mucronatus*).
 N: Lahijan. — NW: Azerbayejan: Khoi. — W: between Arak and Kerend; Arak. — C: Tehran; Karaj; Lashgarak.
- 13a. Roots tuberous, oblong-elongate, tapering gradually then cord-like, slender. Stems and leaves densely covered with adpressed hairs. 14
- b. Roots tuberously thickened, elliptic. Stems and leaves glabrous or somewhat sparsely hairy 16
- 14a. Stems hairy. Leaf blades orbicular, mostly glabrous, undivided or slightly divided, dentate or lobulate. Peduncles hairy. Achenes short, glabrous; beak hamately curved.
R. afghanicus Aitch. & Hemsley
 Aitch. & Hemsley in Journ. Linn. Soc., 19: 148(1882).
 Syn., *R. olgae* Rgl. in Izv. Ovshch., lyubit. estestv. 34(2): 1(1882).
 NE: Alam-Kooh, Koqet-Dagh, Shirvan, Khorasan.
- b. Leaf blades more or less deeply divided, covered with lanate hairs.
- 15a. Radical leaves ovate-orbicular, deeply divided, tripartite, mostly short-petioled. Achenes flat, with a hamate-curved tip beak.
R. aucheri Boiss.
 Boiss. in Ann. Sci. Nat. 16: 351(1841); Boiss., Fl. Or. 1: 34(1867); Parsa, Fl. de l'Ir: 382(1951).
 N: Kandavan; Emamzadeh Dawood, 2600 m; Gholhak; Azadbar; Ploor.— NW: Azerbyejan: Band-Oroomieh. — W: Alwand; Tooiserkan; mount Forghan at Arak; Sefid-Khaneh; mount Guero; Kerend; Esfahan.
- b. Radical leaves uniformly trilobed, dissected to the middle, broad, usually with small spots. Sepals horizontally distant, with long hairs. Achenes laterally compressed, with a slender beak.
R. pichleri Freyn.
 Freyn in Denkschr. Akad. Wien 2: 23(1886); Parsa, Fl. de l'Ir. 1: 382(1951)
 W: Manian; between Shoorab and Kharaghan.
- 16a. Plant densely covered with adpressed short hairs. Stems short, somewhat thickened. Radical leaves orbicular, sessile; blades deeply divided. Achenes more or less hairy

with a curved beak.

R. elbursensis Boiss.

Boiss., Fl. Or. 1: 34(1867); Parsa, Fl. de l'Ir. 1: 383(1951).

N: Alborz: Pass-Ghaleh; Ghoochak, 1700 m. — W: Alvand.

b. Stems glabrous or sparsely hairy, slender, more or less dichotomous.

17

17a. Plant with spreading hairs. Leaf sheaths bearing laterally dark tubercous thickening; blades tripartite, the two lateral segments divided. Achenes with a proximally broad and somewhat twisted beak.

R. bulbiferous Boiss. & Hohen. Boiss. & Hohen. in Boiss., Diagn. Ser. 1(8): 3(1846); Boiss., Fl. Or. 1: 26(1867); Parsa, Fl. de l'Ir. 1: 377(1951).

N: Alborz: Touchal; Emamzadeh-Hashem, 2800 — 3200 m. — NW: mount Gilsh, 2600 m.

b. Glabrous or glabrate. Leaf sheaths without lateral thickening; blades tripartite, lateral segments emarginate. Achenes orbicular, with a narrow thin borders, inflated. beak slender.

R. papyrocarpus Rech. f., Allen & Esfand.

Rech. f., Aellen & Esfand. in Anz. Osterr. Akad. Wiss., Math. — Nat:

89: 221(1951).

Syn.: *R. macropus* Boiss. & Buhse in Nouv. Mem. Sos. Nat. Mosc. 12: 5(1860) nom. Illeg., non. Hook. f. Icon Pl. 1: 634(1844).

C: Yazd, mount Mehriz. — SE: mount Jebal-Barez, between Bam and Jiroft, N. of Dehbakri, 2400 m.

18a. Blades often pinnately divided with more than 2 pairs of distant lateral segments. 19

b. Blades palmately divided or with only one pair of distant lateral segments. 20

19a. Alpine or subalpine small plants. Stems ascending, decumbent from base 2- or sometimes 1 — flowered. Peduncles without floral leaves above the branching point. Cauline leaves divided to base into entire or sparsely dentate linear or lanceolate segments.

R. crymophyllus Boiss. & Hohen. Boiss. & Hohen. in Boiss., Diagn. Ser. 1(8): 6(1849); Boiss., Fl. Or. 1: 51(1867); Parsa, Fl. de l'Ir. 1: 396(1951).

N: Alborz: Hezarchal; Takhte-Soleiman, 3800 — 4100 m; Piazhchal; Towchal; Kandavan. — W: Kordestan.

R. crymophyllus Boiss. & Hohen.

var. *merovens* (Grossh.) Mobayen & Meleki comb. nov.

Syn.: *R. merovens* Grossh. in Beih. Bot. Cent. 44(2): 212(1927).

NW: Azarbayejan: Meshoodagh.

Note: Regarding to existing descriptions of 2 species: *R. crymophyllus* and *R. merovens*, there is but little difference between them which is: leaves with rather longer petiole and smaller blades, this is presumably not sufficient to separate them into 2 distinct species.

- b. Plants relatively thick, stout, alpine or subalpine. Radical leaves palmate; cauline leaves pinnate, broad; floral leaves tripartite.

R. persicus DC.
DC., Syst. 1: 288(1817); Boiss. Fl. Or. 1: 45(1867); Parsa Fl. de l'Ir. 1: 392 (1951).

NW: Azarbaijan: Ahar, Tazeh-Kand, 2600 — 2750 m.

- 20a. Small alpine plants with short stems, up to 15 cm high, usually glabrous or with scattered hairs confined to the very tip. 21
- b. Large low land plants with long, stout, thickened stems, up to 30 cm high densely covered with adpressed hairs. 27
- 21a. Stems 1 — flowered. 22

- b. Stems distally branched, 2 or more flowered. 23

- 22a. Sepals glabrous. Leaves 3—5 -parted, glabrous. Stems glabrous at base. Achenes with a slender, straight, curved to the side beak.

R. elymaiticus Boiss. & Hausskn.
Boiss. & Hausskn. in Boiss., Fl. Or. suppl. p. 6(1888); Parsa, Fl. de l'Ir. 1: 377(1951).

S: Koohe-Noor; Koohe - Abassali. 3860 m.

- b. Sepals hairy. Leaves tripartite; segments divided to 3—7 linear lobes. Stems covered with white hairs at the base.

R. eriorrhizus Boiss. & Buhse
Boiss. & Buhse in Nouv. Mem. Soc. Nat. Mosc. 12: 5(1860); Boiss., Fl. Or. 1: 42(1867); Parsa, Fl. de l'Ir. 1: 391(1951).

SE: Kerman: Koohe-Lalezar; Koohe-Nasr, 3000 m., Koohe-Siraj, 3500 — 3900 m. — C: Yazd: mount Shirkooh.

- 23a. Sepals reddish or covered with reddish hairs. 24
- b. Sepals and hairs not reddish. 25
- 24a. Sepals green or pale greenish, densely covered with dark reddish-brown or rufous hairs. Achenes

hairy; beak laterally displaced, often curved to the side with a somewhat hamate tip. *R. rufosepalus* Franch. Franch. in Mis. Capus, Plante d. Turk. 6(1883); Fedtsch., Consp. Fl. Turk. 1: 12(1906).

Centr. Asia: Tadjhikistan, Zaravshan river and Probably NE. of Iran, Khorasan.

- b. Sepals dark red, covered with white hairs. Achenes glabrous; beak declinate with hamate tip.

R. rubrocalyx Rgl. ex Kom. Rgl. ex Kom. in Trav. Soc. Nat. Petersb. 26: 62(1896).

Syn.: *R. rufosepalus* Franch. var. *parviflorus* Kom. in l. c., P. 62.

Centr. Asia: Zeravshan and probably NE. of Iran.

- 25a. Stems and leaves hairy pilose. Radical leaves palmate with one pair of lateral segments distally from the middle segment and almost pinnate. Achenes elliptic with short curved beak. *R. szowitsianus* Boiss Boiss, Fl. Or. 1: 42(1867); Parsa, Fl. de l'Ir. 1: 39(1951).

NW: Azarbajejan, Arkely-Gadook.

- b. Stems and leaves glabrous. Radical leaves palmate; all segments alike, not pinnate. 26

- 26a. Stems white hairy at base. Petals

5, yellow. Achenes hairy, triangular with a short beak.

R. straussii Bornm.

Bornm., in Beih. Bot. Cent. 27(2): 290(1910); Parsa, Fl. de l'Ir. 1: 383(1951).

W: Lorestan, Oshtorankuh.

- b. Rootstock with a bundle of slender root fibers. Stems thickened at base, covered with long white hairs. Petals 5 — 6, reddish-yellow. Achenes glabrous, elliptic, inflated, with a slender small beak.

R. thala Mobayen sp. nov.

S: Fars: Peak of mount Dena.

- 27a. Stems prostrate, terrestrial creeping, rooting at the nodes. Achenes with a curved beak *R. repens* L L., Sp. Pl., 554(1753); Boiss. Fl. Or. 1: 39(1867); Parsa, Fl. de l'Ir. 1: 387(1951).

N: Guilan: Ispili; Asalem. Tehran. Taleghan, mount Hassanjan. — NW: Azarbajejan: Deilaman. — W: Arak; Alvand.

- b. Stems and branches erect, stout, not prostrate. 28

- 28a. Stems with a rounded tuberous thickening at base. Radical leaves with long petioles, tripartite to base, the lateral segments distant, sessile,

with dentate subacute lobes. Achenes with a short hamate-curved beak.

R. bulbosus L. L., Sp. Pl., 778(1753); Boiss., Fl. Or. 1: 39(1867); Parsa, Fl. de l'Ir. 1: 387(1951).

N: Guilan. — C: N. of Tehran, Darband.

b. Stems without a proximal tuberous thickening. Leaves with palmate segments, sometimes the lateral segments pinnate. 29

29a. Plants mostly to 25 cm high. Stems mostly solitary, simple or occasionally slightly branched. 30

b. Plants mostly to 1 m high. Stems mostly many branched. 36

30a. Peduncles simple, 1 — flowered. 31

b. Peduncles more or less branched. 1—3 flowered (occasionally 4). 32

31a. Leaves glabrous; blades parted to the middle or somewhat beyond; floral leaves palmately parted with a short broad semiamplexicaul basal sheath. Achenes glabrous, with a short hamate beak.

R. brachylobus Boiss. & Hohen. Boiss. & Hohen. in Boiss., Diagn. Ser. 1(8): 6(1849); Parsa, Fl. de l'Ir. 1: 389(1951).

Syn.: *R. villarsii* DC. var. *brachylobus* (Boiss. & Hohen.) Boiss.

Fl. Or. Suppl. 10(1888).

N: Noor; Kojoor; Alamout. Alborz. Gachsar; Kandavan, 3300 m.; Gardaneh-Bari; Emamzadeh Dawood; Towchal. — W: mount Alvand, Tooserkan.

b. Leaves hairy; leaf blades tripartite to base, acutely incised-dentate with triangular or serrate teeth, Achenes small, hairy. *R. trisectilis* Ovcz. Ovcz. in Komarov Fl. of the USSR 7: 743(1937).

Syn.: *R. astrantiaefolius* (Rupr.) Boiss. Var. *alpinus* Freyn in Somm. & Lev., Pl. Cauc. 7(1900). — *R. caucasicus* M. B. var. *alpina* N. Busch in Fl. Cauc. Crit. 3(3); 159(1903).

NW: Azarbayejan.

32a. Leaf blades palmatilobed, dissected almost to the middle. Cauline leaves trilobed with linear segments. Receptacle slightly hairy, ciliate. Achenes small, inflated with a strong caducous beak. *R. demissus* DC. DC. Syst. 1: 275(1817); Boiss., Fl. Or. 1: 41(1867); Parsa, Fl. de l'Ir. 1: 275(1951).

Syn.: *R. marschalinsii* Steud.?, Nomencl. Bot. ed. 2, 2: 434(1841).

NW: Azarbayejan: Sahand.

b. Leaf blades palmatipartite dissected beyond the middle almost to base.

- Achenes glabrous. 33
- 33a. Sepals thickened, persistent, densely hairy beneath. Achenes elliptic and setose-hispidous, flat with a hamate-curved beak.
- R. trichocarpus* Boiss. & Ky. Boiss. & Ky. in Boiss., Fl. Or. 1: 47(1867); Parsa, Fl. de l'Ir. 1: 393 (1951).
- N: Mazandaran: Ramsar; Noor; Kojoor. Alborz: Damavand, Dozdareh; Shahrestanak; Kandavan; Piazhchal.
- b. Achenes semielliptic, inflated or globose, glabrous or slightly hairy, never hispidous. 34
- 34a. Rootstock short with a bundle of short slender root fibers. Achenes obovoid, laterally flattened with a hamately involute tipped beak.
- R. anemonifolius* DC. DC., Syst. 1: 282(1817); Parsa, Fl. de l'Ir. 1: 396(1951).
- Syn.: *R. elegans* C. Koch in Linnae 15: 284(1841). — *R. armeniacus* Boiss. & Huet. in Boiss., Diagn. Ser. 2(5): 9(1856).
- N: Alborz: Damavand, Cheshmeh Asalak between Azadbar and Garmab. — NW; Azerbaijan: Guilash, 2800 m.; N. of Gardaneh Kharzan. — S: Fars: Mount Dena.
- b. Rootstock thickened, tuberous. Achenes ended to a uncinata or circinate or hamate beak. 35
- 35a. Leaves homomorphe, caulines and radicals palmatisect.
- R. dissectus* M. B. M. B., Fl. Taur. — Cauc. 2: 25 (1808); Parsa Fl. de l'Ir. 1: 391 (1951).
- NW: Azerbaijan: Ardabil, Sabalan, Ghotorsso.
- b. Leaves heteromorphe; radicals palmatisect, caulines and florals oblong lanceolate. Peduncles with 3 floral leaves at branching point.
- R. sabalanicus* Moboyen & Mal-eki sp. nov.
- NW: Azarbaidjan, Sabalan.
- 36a. Blandes deeply and palmately divided into petiolate segments; segments unequally 2–3 lobed-incised; lobes rhombic. 37
- b. Blades deeply palmatipartite or palmatilobed; segments sessile, unequally or equally divided. 39
- 37a. Stems to 80 cm high, rigid, covered with scattered hairs. Leaves more or less coriaceous, with setose hairs beneath especially along the veins. Achenes flat, obovate with a hamate beak inclined to the side.
- R. sahandicus* Boiss. & Buhse Boiss. & Buhse in Nouv., Mem. Soc. Nat. Mosc. 12: 6(1860); Boiss., Fl.

Or. 1: 46(1867); Parsa, Fl. de l'Ir. 1: 393(1951).

NW: Azarbaijan: Koohe-Sahand, between Lighwan and Esperkhan; Margheh, Karjoo, 1900 — 2000 m.

- b. Stems to 40 cm high, weak. Stems and leaves covered with soft hairs.

38

- 38a. Rootstock short, almost undeveloped. Leaf blades broad, ovate-elliptic, tripartite almost to base; the middle segment with 3 ovate-oblong incised-dentate lobes; the lateral segments bilobed. Achenes with a short hamately involute beak.

R. caucasicus M. B.

M. B. Fl. Taur. — Cauc. 2: 27 (1808); Parsa, Fl. de l'Ir. 1: 392(1951).

NW: Takhte-Belgheis; Guilan: Asalem, Guileh-Darreh.

- b. Rootstock horizontal, elongated. Stems and leaves covered with scattered weak-hairs. Leaf blades oblong-elliptic. Achenes with a long straight or somewhat curved beak.

R. brutius Ten.

Ten., Prod. Fl. Nap. 1: 61, t. 50 (1811–15); Boiss., Fl. Or. 1: 45 (1867); Parsa, Fl. de l'Ir. 1: 392 (1951).

N: Alborz, Kandavan, 2000 m.

- 39a. Stems tall, densely covered with

drooping silky hairs, many flowered. Leaf blades pentagonal with oblong lanceolate segments. Achenes inflated, elliptic with a short flat straight beak.

R. sericeous Banks & Sol.

Banks & Sol. in Russel, Aleppo, 254(1794); Parsa, Fl. de l'Ir. 1: 394(191) sub. *R. cassius* Boiss.

Syn.: *R. cassius* Boiss. in Ann. Sci. Nat. 16: 354(1841).

NW: Oroomieh, Solookh. — W: Hamadan, near Jalpan; Arak, mount Garroo; Anchedan.

Var. *chrysanthus* Mobayen & Maleki var. nov.

Peduncles and sepals covered with long yellowish hairs.

W: Bakhtaran: Koohe-Bimar near Hookani village, south of Kerend.

- b. Plants without silky hairs. Achenes with straight or curved beak. 40

- 40a. Leaf blades deeply parted to base. 41

- b. Leaf blades parted to the middle. 43

- 41a. Radical leaves tripartite almost to base; segments obovate, broadened apically and tapering to base, covered with scattered appressed setose hairs, with radiate prominent veins beneath; lateral segments dissected to the middle into 3 lobes. Achenes

compressed laterally with a short one sided straight hamate-tipped beak.

R. buhsei Boiss. Boiss., Fl. Or. 1: 45(1867); Parsa, Fl. de l'Ir. 1: 392(1951).

Syn.: *R. caucasicus* M. B. Var. *buhsei* Busch in Fl. Cauc. crit. 3(3): 158(1903). — *R. boissieri* Simonk. in Termeszetráje Fuz. 11: 212 (1887 — 8).

N: Alborz.

b. Blades 3—5 partite, often narrowly oblong-linear with setose hairs. Achenes with a hamate beak. 42

42a. Stems covered with scattered hairs or rarely glabrate. Blades 3—5 partite to base; segments with elongate, linear, unequally incised-dentate lobes. Achenes with a short, somewhat displaced, straight cylindrical, distally rather curved beak.

R. polyanthemos L. L., Sp. Pl. 554(1753); Boiss., Fl. Or. 1: 39(1867); Parsa, Fl. de l'Ir. 1: 389(1951).

N: Karadj, Alangeh. — NW: Azarbaijan: Yam; Meshoodagh, Khoi.

b. Stems covered with long silky hairs. Leaves large to 8 cm; blades tripartite to base. Segments with oblong apically broadened lobes. Achenes with a straight short and proximally broad beak, triangular in outline.

R. meyerianus Rupr.

Rupr., Fl. Cauc. 1: 25(1869).

N. of Iran.

43a. Stems many branched, many flowered, densely covered with spreading somewhat setose oblique dull hairs. Leaves long petioled. Sepals hairy, recurved. Achenes with a twisted laterally displaced hamate beak.

R. constantinopolitanus Urv. Urv., Enum. Pl. Archip., 61(1822); Boiss. Fl. Or. 1: 49(1867); Parsa, Fl. de l'Ir. 1: 394(1951).

Syn.: *R. tauricus* Freyn. in Bull. Herb. Boiss. 2 Ser. 1: 248(1901).

Var. *farsicus* (Rech. f.) Mobayen & Maleki **comb. nov.**

Syn.: *R. farsicus* Rech. f. in Anz. Osterr. Akad. wiss., Math. — Nat. 89: 222(1951).

Var. *villosus* (DC.) Mobayen & Maleki **comb. nov.**

Syn.: *R. villosus* DC.; *R. constantinopolitanus* Urv. var. *persicus* Boiss.

Plants with appressed long hairs.

N: Guilan; Mazandaran: Darrehel Lar. — NW: Tabriz; Meshoodagh; Yeilagh Arasbaran. — W: Hamadan, Kabootarkhan. — S: Fars: Dasht-e Arjan. — C: S. of Alborz.

b. Stems slightly branching without setose oblique hairs, with scattered spreading hairs at base. Peduncles sulcate somewhat long. Achenes inflated with a turning black tip beak.

R. ambliolobus Boiss. & Hohen. Boiss. & Hohen. in Boiss., Diagn. Ser 1(8): 5(1849); Boiss., Fl. Or. 1: 39(1867); Parsa, Fl. de l'Ir. 1: 389(1951).

C: Alborz, Darband, north of Tehran.

***Ranunculus sabalanicus* Mobayen & Maleki, sp. nov.**

Description. Plantae perennes, robustae, rhizomatibus crassis bulbiformibus, pilis brevibus densis obsitis, radicibus numerosis fibrosis. Caulis in parte inferiore ramosis, rami duo, ramificatio cum foliis 2—3 simplicibus oblongis parallelinervis longipetiolatis. Folia basalia longe petiolata; laminae palmatipartitae, irregulariter dentatae; dentes acuti. Folia caulina sessilia, profunde incisa; segmenta 3, rare elongata, linearia, pilosa. Rami in parte superiore dichotome ramosi. Bracteae 2, lanceolatae, inaequales. Flores \dagger grandes. Sepala 5 \dagger reflexa, utrinque pilosa. Petala 5, lutea, obovata. Carpelli rostrum hamatum a carpello brevioribus.

Typus: Persia, prov. Azarbaijan, Ardabil, Ghotour-Sou, Kuh-e Sabalan, 2400—2700 m, 25. 5. 1974, Terme & Moussavi,

s. n. (holotypus EVIN).

Diagnose. *R. dissecto* M. B. Proxima est, sed caulibus ad basim ramosis, ramis duobus in quoque 2—3 flores praeditis, foliis caulibus simplicibus elongatis, longipetiolatis, venis parallelis, foliis basalibus non linearibus et crassis.

Perennial, robust plants, with bulbiform thick rhizomes, covered by short and dense hairs. Roots many and fibrous. Stem divided at the base to 2 branches, bearing at the place of branching 2—3 simple leaves, the petioles of these leaves are long and the limbs oblong provided with parallel veins. Basal leaves long-petiolate; limb palmatipartite, irregularly toothed; teeth pointed. Stem and floral leaves sessile, divide deeply to the base into 3 or rarely 4 elongated, linear and hairy segments. Each branch divided at the top and bearing a simple flower or redivided and provided with two short, simple, unequal, lanceolate bracts. Flowers \dagger large. Sepals 5 \dagger reflexed and hairy in both sides. Petals 5, yellow, obovate. Carpels ending in a hooked beak; beak much shorter than the carpels.

differs from *R. dissectus* M. B. by divided stems at the base in 2 branches, elongated, long-petiolated and parallel veined stem leaves; not linear and thick basal leaves.



Fig. 1. *Ranunculus sabalanicus* (x 0.7; achene x4; capitule x 1.4).

Ranunculus syroussii Mobayen, sp. nov.

Description. Plantae perennes. Radices tuberosae, ovatae, in statu sicco denigricantes. Caulis 20 — 25 cm altus, erectus, ad apicem breviter ramosus, pilis albis gossypinis obtegens. Folia basalia † longipetiolata, usque ad bases divisa; segmenta 2—3, integra, elongata, acuta, venis parallelis, ad marginem † convoluta. Folia caulina foliis basalibus similia, sed petiolis brevissimis. Folia floralia sessilia et parvula. Flores grandes laete lutei. Sepala 5, reflexa, viridia, margine membranacea, in facie exteriori pilosa, in facie interiore glabra. Petala 5, late obovata. Carpella ovato-conica, glabra, rostris induratis, † erectis instructa.

Typus: Persia, Azerbaidjan, between Makou and Khoy, Arab-Disachi, 2150 m, 29. 6. 1978, Assadi & Mozaffarian 30267 (nototypus TARI).

Diagnose. species nova *R. strigillosa* proxima est, sed radicibus tuberosis, foliis tridactylis gossipino-pilosis, carpellis glabris, rostris erectis, floribus majoribus differt.

Perennial, with ovate tuberous roots blackening in the dried state. Stem 20 — 25 cm long, erect, lightly branched at the top, covered with the white cottony hairs. Basal leaves with † long petioles; limb divided in 2—3 entire elongated segments; segments pointed at the tip;

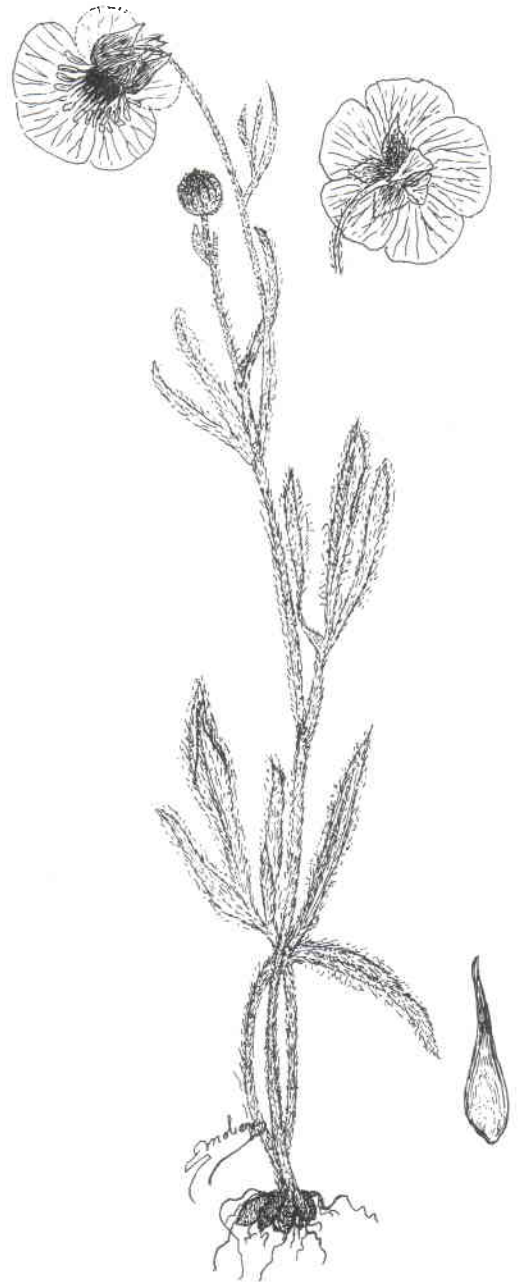


Fig. 2. *Ranunculus syroussii* (x 0.75; achene x7).



Fig. 3. *Ranunculus thala* (nat. size; achene x5).

veins parallel, \dagger convoluted at the margin. Stem leaves with much shorter petioles, resembling the basal ones. Floral leaves sessile and very small. Flowers \dagger large, bright yellow. Sepals 5, reflexed, green, at the margin membranous, hairy in outer surface and glabrous on the inside. Petals 5, widely obovate, covering each other along the marginal line. Carpell ovate-conical, glabrous, provided with a

hard \dagger straight beak.

New species akin to *R. strigillosus*, from which differs by its tuberous roots, tri-dactyl and cottony-hairy leaves, glabrous carpel with erect beak and large flowers.

***Ranunculus thala* Mobayen, sp. nov.**

Description. Planta perennis, 7–10 cm alta. Caulis floriferus ascendens, unicus tantum vel duo evolutus, simple, glaber;

caudex crassus, leate pilosus. Radicibus paucis filiformibus. Folia basalia longe petiolata usque ad bases tripartita vel trisecta; folia floralia multo minima, simplicia. Flores 10—15(18) mm diametro. Sepala 5, flavida, acuta, ovata, glabra vel leviter pilosa, pilis albidis, Petala 5 — 6, sepalis duplo longiora, late obovata, fulvida vel fulvida rubronervibus. Capitulum globosum vel globoso-ovoideum; carpella glabra, 1—1.5 mm longa, [†]ovoidea, rostro gracilia, erecto instructa.

Typus: Persia, prov. Fars, Kuh-e Dena, Sichani pass, Behboudi 1070 E (holotypus EVIN, isotypus TARI).

Diagnose. Species nova proxima *R. straussii* (Persia occidentalis), a quo petalis 5 — 6, fulvidis glabris, late obovatis, etc. differt.

Perennial, small plants 7—10 cm high. Rhizome stout with few filiform roots; collar pilose clothed with appressed dried sheaths. Stems ascending, simple, glabrous, 1—2 flowered. Radical leaves petiolate; lamina tripartite at base; segments trisect; lobes oblong linear, subacute, sometimes with few teeth. Floral leaves small, simple or obscurely palmate. Flowers 10 — 15(18)mm across. Sepals 5, ovate, yellowish, glabrous or slightly pilose Petals 5 — 6, 2—times longer than sepals, broadly obovate, yellow or yellow with reddish veins. Fruiting head globose

or rounded-oval. Fruitlets 1 — 1.5 mm long, glabrous, more or less ovoid, beak slender, erect.

New species closely resembling to *R. straussii* (from western part of Iran), but differs from it by: petals 5 — 6, yellow-reddish; fruitlets glabrous, ovate.

Ranunculus oxyspermus Willd. var. *curvirostris* Mobayen & Maleki, var. nov.

Achena cum rostris [†]recurvis instructis.

Typus: Persia, Fars, Abadeh Kaftar, Kuh Gabri, 2300 — 3350 m, Terme & Izadiar 13532 (holotypus EVIN).

Ranunculus sericeous Banks & Sol. var. *chrysanthus* Mobayen & Maleki, var. nov.

Pedunculi et sepala cum pilis longis flavidis tectis.

Typus: Persia, Bakhtaran, Kuh-e Bimar near Hookani village, S. of Kerend, 1400 m, Wendelbo & Assadi 16749 (holotypus TARI).

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