

**SEVEN NEW SPECIES OF THE GENUS *GAGEA* SALISB.
(LILIACEAE) FROM WESTERN HIMALAYAS
AND ADJOINING REGIONS**

I. G. LEVICHEV AND S. I. ALI*

*Herbarium, Komarov Botanical Institute of the Russian Academy of Sciences,
Prof. Popov Str. 2, Saint Petersburg 197376, Russia*

Email: ilevichev@yandex.ru

**Department of Botany, University of Karachi, Karachi-75270, Pakistan*

Email: flora@super.net.pk

Abstract

Seven new species of the genus *Gagea* are described from Western Himalayas and adjoining regions. Four species (*G. punjabica* Levichev & Ali, *G. quettica* Levichev & Ali, *G. wallichii* Levichev & Ali, *G. baluchistanica* Levichev & Ali) belong to the section *Platyspermum*; two species (*G. rawalpindica* Levichev & Ali and *G. pakistanica* Levichev & Ali) belong to section *Graminifoliae* and *G. drummondii* Levichev & Ali belongs to section *Plecostigma*.

1. ***Gagea drummondii*** Levichev et Ali, sp. nov. (sect. *Plecostigma* (Turcz.) Pasch., ser. *Euchloranthae* (Pasch.) Grossh.)

Affinitas. A speciebus omnibus ser. *Euchloranthae* (Pasch.) Grossh. radicibus sclerificatis nullis et folio radicali nervis biserialibus, a speciebus omnibus ser. *Vvedenskyiformes* Levichev inflorescentia multiflora, angusta differt.

Plantae solitariae, verticaliter protractae ad 10-15 cm alt. (folium radicale ad 27 cm lg.). Bulbus 6-9 mm in diam., oblique guttiformis, tunicis firme coriaceis, fassis, pallide fuscis, in collum breve (0.5-1.5 cm lg.) fibrilloso-fissum continuatis tectus, sine radicibus sclerificatis. In statu generativo ad bulbi basin bulbillis nullis. Pedunculus 1-5 cm lg., alternifolius, ex axillis unius-duorum foliorum infimis pedunculi bulbilli pendentes. Folium radicale solitarium, lineare, inflorescentiam subduplo superans, 1.5-2 mm lt., sectione canaliculatum, nervi biserialis. Folium pedunculi infimum inflorescentiam fere attingens, ca 2.5 mm lt., anguste lanceolatum, sensim longe attenuatum, superiora decrescentia. Flores in inflorescentiam anguste protractam 3-10(15)-floram dispositi, pedicellis inaequilongis (1-6 cm). Perianthii phylla lanceolata, 14-17(21) mm longa, 2-2.5 mm lata, apice rotundata, ab interiore viridulo-flava, extus viridia, interiora late dilute limbata, exterioribus breviora. Antherae flavae, oblongae, ad 2.5 mm lg., dehiscentes ovali-oblongae, ad 1.5 mm lg. Ovarium oblongum, sessile. Capsula perianthii phyllis duplo brevior, elliptica, sessilis.

Species in honorem florum Himalaicae investigatoris cl. J.R. Drummond nominata est.

Differs from all other species of ser. *Euchloranthae* (Pasch.) Grossh., by the absence of sclerificatous roots and two veins in the basal leaf and from all species of ser. *Vvedenskyiformes* Levichev in having a multiflorous narrow inflorescence.

Plant single, vertically extended, c. 10-15 cm (basal leaf up to 27 cm) in height. Bulb 6-9 mm in diameter, obliquely-ovate, tunic densely-coriaceous, breaking up, light brown,

continued into a short (0.5-1.5 cm) fiber-like neck, without sclerificatous roots. In generative stages at the base of the bulb bulbils are not present. Peduncle 1-5 cm long; peduncle leaves alternate. From axils of lower 1-2 leaves bulbils hang down. Basal leaf single, linear, almost twice as long as the inflorescence, 1.5-2 mm broad, section canaliculate, veins two. Lowest leaf on the peduncle almost as long as the inflorescence, c. 2.5 mm broad, linear, elongated gradually. Flowers in long 3-10 (15)-flowered inflorescence, on pedicles of varying length (1-6 cm). Tepals 14-17 (21) mm long, 2-2.5 mm broad, tip rounded, greenish yellow inside, green outside. Anthers yellow, oblong, nearby 2.5 mm long, opening ovate-oblong, c. 1.5 mm long. Ovary oblong, sessile. Capsule twice as short as the tepals, elliptic, sessile.

Holotype: India, Punjab, Simla, 7.3.1887, *J. R. Drummond* (K!, Iso-E!).

Species is named in honour of the researcher of the flora of Himalayas, J.R. Drummond.

Other specimens seen: Pakistan: Mt. Tilla, Jhelum distt., N. slope, 2500', fls. yellow, on rocky place, 13.3.1981, *E. et Y. Nasir* 9425 (KUH!, RAW!). India: Simla, 5000', March 1886, *R. Johnson* (LE!); [India] Uttar Pradesh, Tehri distt., Simlasu, 700 m, on boulders in association with mosses on N. facing slopes, small herbs, flowers large, yellow, stigma-style 1, bulbils in the leaf axils, 18.2.1979. *A.K. Goel* 64662 (BSD, photo LE!), [India, N. Wallich, sine ind. loci] sub: *Ornithogalum unifolium* W. [manus N. Wallich] et *Gagea elegans* 5065 [manus J.F. Royle], *pro min. parte* (LIV!).

2. *Gagea punjabica* Levichev et Ali, *sp. nov.* (sect. *Platyspermum* Boiss.)

Affinitas. A speciebus omnibus sect. *Platyspermum* Boiss. inflorescentia compressa, angusta fasciculiformi differt.

Plantae solitariae, graciles, tenues, verticaliter protractae ad 10 cm alt. Bulbus 4-8 mm diam., orbiculari-ovoideus, tunicis fibrillosis tenuiter coriaceis pallide fuscis tectus, radicibus sclerificatis tenuibus paucis circumcinctus. Pedunculus 1-5(7) cm lg., costatus, 0.7-1 mm in diam. Folium radicale solitarium, filiforme, inflorescentiam duplo superans, 16-20 cm alt., 0.4-0.5 mm in diam., sectione canaliculato-guinquangulare. Folia pedunculo verticillata, inferius inflorescentiae aequilongum vel eam superans, anguste lanceolatum, a basi ad 3 mm lt., sensim in cuspidem longam attenuatum, superiora diminuta. Inflorescentia anguste fasciculiformis, (2)3-6 (10)-flora, pedicellis inaequilongis 0.5-4.5 cm lg. Perianthii phylla lineari-lanceolata, apice attenuata, sub anthesi elongata ad 18 mm lg., 1-2 mm lt., ab interiore flava, ab exteriori viridia, exteriora longiora et latiora. Antherae flavae, dehiscentes oblongae, 1.5 mm lg. Ovarium anguste oblongum. Capsula ovoidea, 4-5 mm in diam., perianthii phyllis duplo brevior. Semina tenuiter plana.

Differs from all other species of the sect. *Platyspermum* Boiss., in having the compressed inflorescence in a narrow cluster.

Plant single, slender, up to 10 cm in height. Bulb 7-10 mm in diameter, roundish-oviform, covered by thin coriaceous, light brown, fiber-like tunic, roots few thin, sclerificatous. Peduncle 1-5 (7) cm long, ridged, 0.7-1 mm in diameter. Basal leaf single, filiform, twice the size of inflorescence, 16-20 cm long, 0.4-0.5 mm in diameter, in T. S.

grooved-pentahedral. Peduncle leaf, verticillate, lower equal to or longer than the inflorescence, narrowly-lanceolate, up to 3 mm broad at the base, gradually cuspidate, top reduced. Inflorescence narrowly-fasciculate, (2) 3-6 (10)-flowered; pedicels unequal, 0.5-4.5 cm long. Tepals linear-lanceolate, tip narrowly elongated, get extended during flowering up to 18 mm long, 1-2 mm wide, yellow within, green outside, external tepals longer and broader. Anthers yellow, oblong, 1.5 mm long. Ovary narrow-oblong. Capsule oviform, 4-5 mm in diameter, twice shorter than tepals. Seeds thin flat.

Holotype: India, Punjab: alv. Chakki flum. versus fines dit[ionis] Kangra, Hanak, in graminosis c. 1200' s.m., 9 Mar. 1885, *J. R. Drummond* 1747 (K!, K000400113).

Other specimens seen: Pakistan: Swat, Lindla, above Dubair, 4000', 26. 4. 1969, *Y. Nasir & Zaffar Ali* 5568, *pro parte* (RAW!); Punjab: Wah, Attock Dist., small flos, April 1, 1939, *R. R. Stewart* (KUH!); Base of mt. Tilla, 1400', Jhelum Dist., 13. 3. 1981, *E. & Y. Nasir* 9419 (RAW!). India: N.W. Himalaya: Dehra Dun, 5.3.1897, *P.W. Mackinnon* (LE!).

3. *Gagea rawalpindica* Levichev *et* Ali, *sp. nov.* (sect. Graminifoliae Levichev,)

Affinitas. A *G. conjugens* (Pascher) Wendelbo radicibus sclerificatis crassis nullis, a *G. graminifolia* Vved. *et* *G. pakistanica* Levichev *et* Ali folio radicali solitario *et* antheris atro-fuscis differt.

Plantae nanae, 3-6(8) cm alt., solitariae vel plerumque in greges perpaucos congestae. Bulbus 4-8 mm diam., oblique guttiformis, tunicis fibrillosis tenuiter coriaceis pallide fuscis tectus, radicibus sclerificatis tenuibus paucis circumcinctus. Specimina generativa bulbis destituta, bulbillus semiguttiformis in statu juvenili enatus, anno sequenti in plantam filialem transformatus. Pedunculus 0.5-2 cm lg. subimmersus. Folium radicale solitarium, anguste lineare, ad 1 mm lt., sensim attenuatum, flexuosum, gramineum, inflorescentia subduplo longius. Folia pedunculo verticillata, inferius inflorescentiae aequilongum, ca 1 mm lt., superiora decrescentia. Inflorescentia 3-6-flora, fasciculiformis, pedicellis inaequalibus, elongatis, 7-15(25) mm lg. Perianthii phylla lineari-lanceolata, apice attenuata, sub anthesi elongata, 8-16 mm lg., 0.8-1.2 mm lt., ab interiore pallide flava, albo-paleaceo-marginata, exteriora longiora *et* latiora. Antherae atro-fuscae, oblongae, 1.4 mm lg., dehiscentes rotundato-oblongae, 0.8 mm lg. Capsula subgloboso-oblonga, perianthii phyllis subduplo brevior.

Differs from *G. conjugens* (Pascher) Wendelbo in the absence of thick sclerificatous roots, from *G. graminifolia* Vved., and *G. pakistanica* Levichev *et* Ali in having a single basal leaf and dark-brown anthers.

Plant small, 3-6 (8) cm in height, single or mainly in small groups. Bulb 4-8 mm in diameter, obliquely ovate, covered is thin coriaceous light brown fiber-like tunic, with rare thin sclerificatous roots. Generative specimens without bulbils, the semi-ovate-shaped bulbil is formed in juvenile stages, which will turn next year to the daughter plant. Peduncle 0.5-2 cm long. Basal leaf single, narrowly-linear, up to 1 mm broad, gradually narrowed, bending, grass-like, twice as long as the inflorescence. Peduncle leaves, verticillate, lower most as long as the inflorescence, c. 1 mm broad, upper leaves decreasing in size. Inflorescence 3-6-flowered, pedicels unequal, 7-15 (25) mm long. Tepals linear-lanceolate, get longer during flowering, 8-16 mm long, 0.8-1.2 mm broad,

pale yellow within, white-palea-bordered, external tepals longer and broader. Anthers dark-brown, oblong, 1.4 mm long, opening roundish-oblong, 0.8 mm long. Pod roundish-oblong, almost twice as short as the tepals.

Holotype: Tasala-Haryan rd., Hazara, 1700', fls. pale yellow, 8.3.1985, Y. Nasir & Rubina Akhtar 11184 (RAW! 67365).

Other specimens seen: Pakistan: Ayub Park, Rawalpindi, found in the plains up to 2000 m in early spring, flowers yellow. 9.3.1975, Y. Nasir 49 (KUHI!).

4. *Gagea quettica* Levichev et Ali, *sp. nov.* (sect. *Platyspermum* Boiss.)

Affinitas. A *G. taschkentica* Levichev bulbi tunicis albulis, radicibus sclerificatis nullis et stolonibus longis, a *G. anonyma* Rech.f. et *G. eleonora* Levichev radicibus sclerificatis nullis et plantae minutie differt.

Plantae solitariae, inaequalitae (5-10 cm alt., folium radicale ad 20 cm lg.). Bulbus 7-10 mm in diam., orbiculari-ovoideus, tunicis fibrillosis chartaceis pallide fuscis, in collum breve (0.3-1 cm) productis tectus, radices capillares, geotropae (radicibus sclerificatis nullis). Plantae juveniles et immaures stolonem (vel duo) horizontalem 3-10 cm lg. bulbillo vegetativo globoso terminatum quotannis formant. Pedunculus 1-5(7) cm lg., costatus. Folium radicale solitarium, lineare, arcuatum, inflorescentiam duplo superans, ad 1 mm lt., sectione canaliculato-guinquangulare. Folia pedunculo verticillata, inferius inflorescentiae aequilongum vel eam superans, anguste lanceolatum, a basi ad 3 mm lt. Flores 2-5(7) in inflorescentiam congesti, pedicellis 0.5-4.5 cm lg. Perianthii phylla anguste lanceolata, apice attenuata, sub anthesi elongata, ad 18 mm lg., 2-3 mm lt., ab interiore flava, ab exteriori viridia, paleimarginata, exteriora longiora et latiora. Antherae flavae, dehiscentes oblongae, 2.5-3 mm lg., apice acuminatae. Capsula perianthio subduplo brevior, elliptica, 4 mm lt. Semina tenuiter plana.

Differs from *G. taschkentica* Levichev in having whitish tunic of the bulb, absence of sclerificatous roots and the presence of long stolons, from *G. anonyma* Rech.f. and *G. eleonora* Levichev in the absence of sclerificatous roots and in the small sizes of the plant parts.

Plant single, 5-10 cm in height (basal leaf up to 20 cm). Bulb 7-10 mm in diameter, roundish-oviform, covered by the papery light brown fiber-like tunic, continued in a short neck (0.3-1 cm). Roots hair-like, geotropic (without sclerificatous roots). Juvenile and immature specimens annually form a horizontal stolon (2), 3-10 cm long, terminating in a spherical vegetative bulbil. Peduncle 2-5 cm long, ridge c. 1 mm broad. Basal leaf single, linear, bow-shaped, exceeding the inflorescence, nearly 1 mm broad, in T.S. grooved-pentahedral. Leaves on peduncle verticillate, lowest is shorter or it is equal to an inflorescence, at the base up to 3 mm wide. Flowers contorted in 2-5 (7)-flowered inflorescence, pedicels 0.5-4.5 cm long. Tepals narrowly-lanceolate, up to 18 mm long, 2-3 mm broad, yellow within, green outside, palea-bordered, outer tepals bigger. Anthers yellow (opening oblong 2.5-3 mm long) pointed at the tip. Capsule twice as short as the perianth, elliptic, 4 mm wide. Seeds thin-flat.

Holotype: [Pakistan] British Beluchistan: secundum viam e Sorob ad Khuzdar, 11.3.1943, V.I. Ulijanischev (LE!).

Other specimens seen: Pakistan: Baluchistan, Saryab, nr. Quetta, in sand, c. 10 cm, flowers yellow, 7.4.1970, *Sultanul Abedin* 4562 (RAW!); Hanna, 7 miles from Quetta, flowers yellow, gravel sandy clay, 8.4.1970, *Sultanul Abedin* 4606 (RAW!); Baluchistan: 10 km from Panjgur, on Panjgur - Awaran Road, flowers yellow, among the stores, 28.2.1988, S. Omer, M. Qaiser et Y. Nasir 2084 (RAW!, KUH!); Baluchistan, Saryab, nr. Quetta, in sand, c. 10 cm, flower yellow, 7.4.1970, *Sultanul & Tasawwur Abedin* 4562 (RAW!, KUH!).

5. *Gagea wallichii* Levichev et Ali, sp. nov. (sect. *Platyspermum* Boiss.)

Affinitas. A speciebus omnibus sect. *Platyspermum* Boiss. habitu tenero, eleganti et floribus minutis, a *G. reticulata* (Pall.) Schult. et Schult. f. var. *tenuifolia* Boiss. radicibus sclerificatis et tunicis in collum longum productis nullis differt.

Plantae solitariae, tenues, graciles, protractae, 3.5-13 cm alt. Bulbus (4)8-10 mm in diam., orbiculari-ovoideus, tunicis fibrillosis tenuiter coriaceis pallide fuscis, in collum breve 0.5(1.5) cm lg. productis tectus. Pedunculus 1.5-8.5 cm lg., costatus, 07 mm in diam. Folium radicale solitarium, filiforme, suberectum, ad 23 cm lg., 0.5-0.7 mm in diam., sectione canaliculato-guinquangulare. Folia pedunculo verticillata, inferius inflorescentia brevius, anguste lanceolatum, a basi ad 1.5 mm lt., sensim acutatum, superiora deminuta. Inflorescentia umbelliformis, 1-3-flora, diffusa, pedicellis inaequilongis 0.5-3.5 cm lg. Perianthii phylla lineari-lanceolata, apice attenuata, sub anthesi elongata, ad 12 mm lg., 0.8-1 mm lt., ab interiore flava, ab exteriori viridia, exteriora longiora et latiora. Antherae flavae, lineares, 1 mm lg., dehiscentes oblongae, curvae, 0.8 mm lg.

Species in honorem florum Himalaicarum investigatoris cl. N. Wallich nominata est.

Differs from all the other species of sect. *Platyspermum* Boiss. in having graceful elegant minute flowers; *G. reticulata* (Pall.) Schult. et Schult. f. var. *tenuifolia* Boiss., differs in the absence of sclerificatus roots and the continuation of the tunic into a long neck.

Plant single, slender, 3.5-13 cm in height. Bulb (4) 8-10 mm in diameter, roundish-oviform, covered in thin coriaceous, light brown, fiber-like tunic continued into a short 0.5 (-1.5) cm long neck. Peduncle 1.5-8.5 cm long, ridge, 0.7 mm in diameter. Basal leaf single, filiform, up to 23 cm long, 0.5-0.7 mm in diameter, in T.S. groove-pentahedral. Peduncle leaves verticillate, lower narrowly-lanceolate, lower leaf up to 1.5 mm, gradually pointed, upper leaves smaller. Inflorescence umbelliform, 1-3-flowered, sprawling; pedicels unequal, 0.5-3.5 cm long. Tepals linear-lanceolate, get extended during flowering, up to 12 mm long, 0.8-1 mm broad, yellow within, green outside, external tepals bigger. Anthers yellow, linear, 1 mm long, opening oblong, curved, 0.8 mm long.

Holotype: Punjab, Mergakh, 26th March 1955, *Majida Akhtar* 45 (RAW!)

Other specimens seen: India, Dehra Dun, Pauri dist., on the to Pauri 800 m, on north facing gentle grassy slope, bulbous delicate herb, fls., yellow 8.3.1980, D.C. Bhattacharyya 65606 (BSD, photo LE!).

The systematics and the nomenclature of this group of taxa is discussed in the following publications: Levichev and Tison, 2004a, 2004b, Levichev, 2005, 2006.

6. *Gagea baluchistanica* Levichev et Ali, sp. nov. (sect. Platyspermum Boiss.)

Affinitas. A *G.taschkentica* Levichev pedicellis brevibus et capsulis majoribus fere aequante perianthii phyllis, a *G.alexenkoana* Misch. magnitudine et perianthii phyllis angustis a *G.pseudoreticulata* Vved. bulbillo solitario in statu juvenili differt.

Plantae firmae, solitariae, inaequialtae (6-19 cm alt.). Bulbus 7-10 mm in diam., oblique guttiformis, tunicis coriaceis fissis fuscis in collum breve (0,5 cm lg.) fibrilloso-fissum continuatis tectus, in statu immaturo radicibus sclerificatis paucis circumcinctus, specimina generativa radicum sclerificatarum et bulbillorum destituta. Bulbillus vegetativus statu juvenili formatus, levis, semiguttiformis. Pedunculus 3-13 cm alt. 0.5-0.7 mm in diam. Folium radicale solitarium, inflorescentiam superans, anguste lineare, 0.8-1 mm lat., circinatum, sectione canaliculato-quinquangulare. Folia pedunculo verticillata, quorum inferius inflorescentiae aequilongum. Inflorescentia 2-3(5)-flora, umbelliformis, pedicelli 5-15(22) mm lg. Perianthii phylla anguste lanceolata, 13-18 mm longa, 1-2(2.2) mm lata, apice attenuata, albo-paleaceo-marginata. Antherae flavae, lineares, dehiscentes 2-2.3 mm lg. Capsula perianthio subaequilonga, ovalis vel obovoidea, sessilis. Semina tenuiter plana, brunnea.

Differs from *G.taschkentica* Levichev in having short pedicles and large capsules, almost equal to tepals, from *G.alexenkoana* Misch., in the large sizes and narrow tepals, and from *G.pseudoreticulata* Vved., in having a single vegetative bulbil in juvenile stages.

Plants single, strong, 6-19 cm in height. Bulb 7-10 mm in diameter, obliquely ovate, covered by the brown, coriaceous, splitting tunic continued in short (0.5 cm), fiber-like neck, in immature stages it is loosely attached by sclerificatous roots; generative specimens are without sclerificatous roots and without bulbils. Vegetative bulbil is formed in juvenile stages, smooth, semi-ovate. Peduncle 3-13 cm long, 1.5-2. mm in diameter. Basal leaf single, exceeds the inflorescence, narrowly-linear, 0.8-1 mm broad, circinate, in T. S. canaliculate-pentahedral. Peduncle leaves verticillate, lower leaf as long as the inflorescence. Inflorescence 2-3 (5)-flowered, umbelliform, pedicles 5-15 (22) mm long. Tepals narrowly lanceolate, 13-18 mm long, 1-2 (2.2) mm broad, tip attenuate, white-palea bordered. Anthers yellow, linear, opening 2-2.3 mm long. Capsule almost as long as the perianth, oviform or obovate, sessile. Seeds thin, flat, brown.

Holotype: Quetta vy., Coll.: Agriculture Department, Quetta 5244 (RAW!).

Other specimen seen: Urak, dry stony area, in faine, 21.4.1987, *Rubina Akhtar* 12517 (RAW).

7. *Gagea pakistanica* Levichev et Ali, sp. nov. (sect. Graminifoliae Levichev)

Affinitas. A speciebus omnibus sectionis Graminifoliae Levichev inflorescentia densa multiflora (ultra 30 flores) in plantis adultioribus, a *G. conjugens* (Pascher) Wendelbo radicibus sclerificatis crassis nullis, *G. graminifolia* Vved. folio infimo inflorescentia longo differt.

Plantae nanae, 5-8 (10) cm alt., solitariae vel in greges perpauca congestae. Bulbus 4-10 mm diam., orbiculari-ovoideus, tunicis fibrillosis tenuiter coriaceis pallide fuscis tectus, radicibus sclerificatis tenuibus paucis circumcinctus. Bulbillus vegetativus

semiguttiformis, solitarius, in axilla folii radicalis secundi et (rarius) unus vel duo bulbilli in axilla foliorum pedunculo infra solum. Pedunculus 0.5-1(2) cm lg. in terra sepultus. Folia radicalia 1-2, subcanaliculata (graminiformia), flexuosa, inflorescentia duplo-triplo longius, basi 2 mm lt., gradatim attenuescens, secundum liberum vel (plerumque in plantis adultioribus) usque ad inflorescentiam pedunculo conrescens. Folia pedunculo verticillata, inferum inflorescentiam duplo superans, basi ad 3.5 mm lt., superiora decrescentia. Inflorescentia 3-30(et ultra)-flora, fasciculiformis, pedicellis inaequalibus, elongatis, 0.5-40(55) mm lg. Perianthii phylla anguste lanceolata, apice attenuata, sub anthesi elongata, 10-17 mm lg., 1-1.7 mm lt., ab interiora flava, albo-paleaceo-marginata, exteriora longiora et latiora. Antherae in alabastris rubro-violaceae, dein flavae, lineares, 2 mm lg., dehiscentes oblongae, 1-1.4 mm lg. Ovarium subgloboso-oblongum. Capsula ovoidea, perianthii phyllis subduplo brevior, maxima (ad 10 mm in diam.) floris terminalis imprimis expandentis, sequentium minoris (ad 4 mm in diam.). Semina tenuiter plana.

Differs from all the species of sect. Graminifoliae Levichev in having a multiflorous inflorescence (more than 30 flowers) in mature plants, from *G. conjugens* (Pascher) Wendelbo in the absence of thick sclerificatous roots, from *G. graminifolia* Vved. in having the long floral leaf.

Plant 5-8 (10) cm in height, single or in small groups. Bulb 4-10 mm in diameter, roundish-oviform, covered by thin coriaceous light brown fiber-like tunic, having rare thin sclerificatous roots. Vegetative bulbil semi-ovate, single, in the axil of the second basal leaf and (less often) one or two bulbils in the axil of peduncle leaves below the surface of the soil. Peduncle 0.5-1 (2) cm long, covered in soil. Basal leaves 1-2, superficially-grooved (grass-like) 2-3 times longer than inflorescences, base 2 mm broad, gradually diminishing, the second is free or (it is usual in mature plants) accretes with peduncle up to the inflorescence. Peduncle leaves verticillate, lower leaf exceeds the inflorescence, at the base up to 3.5 mm broad, upper leaves smaller. Inflorescence 3-30 (and more)-flowered, fasciculate, pedicel unequal, gets extended, 0.5-40 (55) mm long. Tepals narrowly-lanceolate (tip slender) gets extended during flowering, 10-17 mm long, 1-1.7 mm broad, yellow within, white-palea-bordered, external tepals longer and broader. Anthers in flower buds red-violet, subsequently yellow, linear, 2 mm long, opening oblong, 1-1.4 mm long. Ovary roundish-oblong. Capsule oviform, almost twice shorter than the tepals, up to 10 mm in diameter in the first the flower, subsequently decreasing (up to 4 mm in diameter). Seeds thin-flat.

Holotype: Punjab, Rawalpindi, 1700', flowers yellow, usually in stony soil, March 1926, R. R. Stewart 4 (K!, K000400111).

Other specimens seen: Pakistan: Base of Mt.-Tilla, Jhelum Distr. *E. et Y. Nasir* 9419 (KUH); Swat, Bahrein, 4500' 14.4.1954 *S. Ali* 26043 (RAW 37703); [Pakistan] Kurram 1907, *Harold Deane* (K, H2005/01518/6); Swat, Lindla, above Dubair, 4000 ft, 26. 4. 1969, *Y. Nasir & Zaffar Ali* 5568 (RAW) *pro parte*; India: Dehra Dun district, Ramgarh 2000' *J.S. Gamble* 22634 (K, K000400114).

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References

- Levichev, I.G. and J.-M. Tison. 2004a. Typification of Caucasian *Gagea* (Liliaceae) taxa described by Karl Koch. *Candollea*, 59: 119-133.
- Levichev, I.G. and J.-M. Tison. 2004b. Etude nomenclaturale de *Gagea reticulata* (Pall.) Schult. Et Schult. F. (Liliaceae), de ses varieties b. *tenuifolia* Boiss. et & g. *fibrosa* Boiss., et de *Gagea rigida* Boiss. et Spruner. *Candollea*, 59: 309-324.
- Levichev, I.G. 2005. The new taxa of genus *Gagea* (Liliaceae) in the flora of Caucasus. *Bot. J. (St. Petersburg)*, 90(10): 1580-1592 (in Russian).
- Levichev, I.G. 2006. The review of species of genus *Gagea* (Liliaceae) in the flora of Caucasus. *Bot. J. (St. Petersburg)*, 91(6): in press. (in Russian).

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