

Altitude, m a.s.l.	1200 – 2000	1900 – 2400
Habitat	Forests, forest glades	Subalpine meadows, screes, rocks
Floristic regions of Armenia	Gegh., Zang., Meghri	U. Akhur., Lori., Ijev., Apar., Sevan., Dar., Zang.

There is a need of assessment of the risk of extinction for *B. oroboides* using the categories and criteria of the IUCN.

Acknowledgements

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Websites

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ABOUT *POTENTILLA PORPHYRANTHA* AND *P. CRYPTOPHILA* OF THE AUTHORS OF CAUCASIAN FLORA

Potentilla porphyrantha and *P. cryptophila* differ well. The species *P. petraea* remains unclear and is currently treated as an independent species, known to us only by type. In the Caucasus, only *P. porphyrantha* is distributed in Armenia and Nakhichevan. It is also known from Zuvand. This species is also common in S. and S.-W. Iran. Presence in Zuvand of *P. cryptophila* (or *P. petraea*?) is very likely. The studied Iranian material on *P. cryptophila* is confined to S. and C. Iran (Elburz range).

Potentilla, taxomomy, Caucasus, Iran

Հովհաննիսյան Մ. Է., Ջանջուգազյան Կ. Ջ. Կովկասի ֆլորայի հեղինակների *Potentilla porphyrantha* և *P. cryptophila*-ի մասին: *Potentilla porphyrantha* և *P. cryptophila* տեսակները լավ տարբերվում են: *P. petraea* տեսակը մնում է անհասկանալի և ներկայումս դիտվում է որպես ինքնուրույն տեսակ, մեզ հայտնի միայն ըստ տիպի: Կովկասից Հայաստանում և Նախիջևանում տարածված է միայն *P. porphyrantha* տեսակը: Այն հայտնի է նաև

Ջովաննոպից: Այս տեսակը տարածված է նաև Իրանի հյուսիսում և հյուսիս-արևմուտքում: Ջովաննոպյում *P. cryptophila* (կամ *P. petraea*?) տեսակի աճելը շատ հավանական է: Ուսումնասիրված իրանական *P. cryptophila*-ին վերաբերվող նյութը կենտրոնացված է հյուսիսային և կենտրոնական Իրանում (Էլբուրսի լեռնաշղթա):

Potentilla, կարգաբանություն, Կովկաս, Իրան

Оганесян М. Э., Джанджугазян К. З. О *Potentilla porphyrantha* и *P. cryptophila* авторов кавказской флоры. *Potentilla porphyrantha* и *P. cryptophila* отличаются хорошо. Вид *P. petraea* остается неясным и в настоящее время трактуется как самостоятельный вид, известный нам только по типу. На Кавказе в Армении и Нахичеване распространен только *P. porphyrantha*. Он известен также из Зуванда. Этот вид распространен также в С. и С-З. Иране. Произрастание в Зуванде *P. cryptophila* (или *P. petraea*?) весьма вероятно. Изученный иранский материал по *P. cryptophila* приурочен к С. и Ц. Ирану (хр. Эльбурс).

Potentilla, систематика, Кавказ, Иран

INTRODUCTION

Our attention to related species *Potentilla porphyrantha*, *P. cryptophila*, *P. petraea* was attracted as N. S.

Khanjyan (2009), for the first time bringing *P. cryptophila* for Armenia, as well as in the Red Data Book of Armenia (2010), indicates in distribution of it the Vayk (Darelegis) ridge in the close vicinity of the *locus classicus* of *P. porphyrantha*. This was understandably perplexing. To clarify the question, which species from this group grow in Armenia, the present study was undertaken. Herbarium material from LE (in 2017 only the isotype of *P. porphyrantha* was found), ERE, W, as well as a number of Websites were studied.

The first species described from this group was *Potentilla petraea* Willd. ex D. F. K. Schlecht. (Schlechtendal 1816: 292) with an unprecise "Habitat in Gilan" label on Pallas' collections. The description of Schlechtendal is short and it does not say much.

Ch. Lehmann (1820: 25, 119, tab. 11), who studied the original material of *Potentilla petraea*, already gives a good description: "... Foliola sessilia, cuneiformi-rhomboidea, antice inciso-serrata... Calyces dense-tomentosi: foliolis subaequantibus, ovatis, obtusiusculis. Corolla parva, ut videtur hepatica: petalis obcordato-subrotundis calyce longioribus..." The figure shows that the folioles of digitate leaves are sessile, their middle lobe is longer than the lateral ones, and the petals are emarginate, longer than the sepals. About the same description he gives later (Lehmann, 1856: 93-94): "foliolis cuneiformis-subrhomboideis... segmentis aequalibus erectis obtusis... sepalis obtusiusculis externis paullo brevioribus oblongis, reliquis ovatis; petalis obcordato-suborbiculatis calyce dense tomentoso sesquolongioribus (ut videtur hepaticis)".

E. Boissier (1872: 720) who also investigated the type of *C. petraea*, writes: "foliolis cuneiformis-rhomboideis superne obtuse inciso-serratis ... calycis laciniis oblongis obtusiusculis externis subbrevioribus, petalis obcordatis calyce dense tomentoso sesquolongioribus. Hab in montibus provinciae Ghilan Persiae borealis (Pall. In herb. Willd.!) ... corolla esicca hepatica videtur".

In 1906, based on the Bornmüller's collections from North Iran, and in his work (Bornmüller, 1906: 614-616, tab. 16), *P. cryptophila* was described, initially (on the Bornmüller's printed labels), designated as *P. petraea*. It is clearly noted, that the diagnosis belongs to Th. Wolf. The following diagnostic features are given: "... foliola fol. rad. late cuneato-obovata, basi integra, antice subtruncata et subflabellatim profunde inciso-serrata... Sepala externa parva oblongo-lineararia obtusa, internis ovato-lanceolatis acutiusculis duplo breviora; petala cuneato-obovata acute emarginata, calyce sesquilonga, alba, venis tenerrimis purpurascensibus notate; stamina 20 rubra..." On an excellent photo in the work it is clearly visible that the petals are distinctly emarginate, longer than the sepals, the outer sepals are twice shorter than the inner ones, and the folioles of the palmate leaves

are truncate at apex, ie, the middle lobe is shorter or equal to the lateral ones.

In his monography Th. Wolf (1908) cites *P. cryptophila* (pp. 442-443, tab. 14, fig. 1) with the same features as in the protologue, and *P. petraea* (pp. 443-444) (according to the investigated original material).

A. A. Grossheim (1934: 305) first brings *P. cryptophila* for the Caucasus (Lenkoran). His description is more or less in accordance with original one, but he cites obovate (not emarginated) petals. It's unclear, what material was studied.

S. V. Yuzepchuk (1940) describes a new species *P. porphyrantha* from Nakhichevan (Daraleghis ridge). He had studied the isotype of *P. cryptophila* in LE, (in 2017 it was not found in LE). He gives excellent diagnosis: "arcte affinis *P. cryptophilae* Bornm. Aqua tamen discedit foliolis distincte petiolatis apice rotundatis obtusangulisve neque truncates, dente terminali paullo prominente, dentibus omnibus subpectinatum neque flabellatim dispositis, sepalis exterioribus interiorius vix brevioribus vel subaequilongis, petalis integris purpureis. *A. C. petraea* Willd. dignoscitur habitu graciliore (scil. petiolis, caulibus pedunculisque tenuioribus), foliolis petiolatis plerumque late obovatis apice obtusioribus, dentibus profundis incisibus subdivaricatis neque antrorsum directis, sepalis subaequilongis, petalis calycem ab subduplo superantibus hahud emarginatis, forsan etiam eorum colore". Yuzepchuk also investigated the question of presence of *P. cryptophila* in the Caucasus. According to him, in the Caucasus, *P. cryptophila* was noted based on two samples determined by Th. Wolf. Plant collected by Lewandowski (1898, Talysh) does not belong to *P. cryptophila*, as the flowers are yellow (Yuzepchuk had seen the herbarium). Plant of Grossheim (1912, Talijon) also has yellow flowers, according to oral communication of Grossheim. So, at that time no reliable specimen of *P. cryptophila* was known from the Caucasus.

Later Yuzepchuk (1941: 178-179) brings *C. porphyrantha* for Southern Transcaucasia, and *C. cryptophila* for Talysh, noting: "we did not see specimens of this plant from the Caucasus; A. A. Grossheim, however, confirms its presence in Talysh (Zuvant) (oral communication)".

Grossheim (1949: 79): brings *P. cryptophila* for Zuvand and *P. porphyrantha* for Nakhichevan, differing them in the key by the colour of petals and stem height: "stems ... up to 40-50 cm. Petals pale pink -- *P. cryptophila*; stems 5-15 cm. Petals purple or bright pink. -- *P. porphyrantha*".

Grossheim (1952: 76-77, Map 97) gives *C. porphyrantha* for Nachichevan (Daralagez ridge), and *C. cryptophila* for Talish (Diabar: Kyz-Yurdy mount). On p. 62 the key is the same, but in description he notes white petals with purple veins for *C. cryptophila*.

S. G. Tamamshyan (1954: 107, Tab. 10, Fig. 1) was the single author who treated *P. porphyrantha* as synonym of *P. cryptophila*. The features she gives are a mixture of the features of the both species. It's strange, that she insists that the petals of *P. cryptophila* at the foto in protoloque aren't emarginate, though they are distinctly emarginate. It's unclear, whether she had seen the original material of *P. cryptophila*. In Tab. 10, Fig. 1 is given the drawing of typical *P. porphyrantha*.

An. A. Fedorov (1958: 113) for Armenia brings only *C. porphyrantha* and only from Darelegis floristic region. It is unclear what material he studied, as in 1947 the species was already collected by F. Akhverdov and N. Mirzoyeva on the Gegham Ridge (they were defined by collectors as *P. cryptophila*)

H. Schiman-Czeika (1969: 81, 107-108, tab.41, fig.2) for the flora of Iran recognizes *P. cryptophila* (N, C) and *P. petraea* (only the type, for which she had seen only the photo). The features given in the key (p. 81) are very proper: "Caules et petioli ±tenuis. Folia antice late obtusa vel truncata, profunde inciso-serrata, dentibus subaequalibus. Sepala externa acuta, quam interna ultra duplo longiora – *P. cryptophila*; Caules et petiolo validiores. Folia antice profunde inciso-serrata, dente mediano lateralibus longiore. Sepala externa subacuta, quam interna sesquialongiora – *P. petraea*. In the key she gives for the both species "petala alba, rubro-venosa", but in description of *P. petraea* (p. 107) writes: "petala... calycem paulo superantia, probabiliter in stato vivo alba vel rubella, sicco "hepatica". In description she gives for the both species ± emarginated petals.

M. Assadi & P. Wendelbo (1977: 104- fig.5, 105) first found in Iran *C. porphyrantha* (Azarbayejan: Shabil on E side of Kuh-e Sabalan, 4200 m, between rocks and cliff ledges, Foroughi et Assadi 13913) indicating that the specimen fully fits the description. They also bring a collection of *C. petraea*, the first after the type: (Azarbayejan: Gardaneh Almas, the highest pass on road from Assalem to Khalkhal, 2350-2400 m, Wendelbo & Assadi 18505), indicating that it differs from the protologue: "in our plant the outer sepals are narrowly elliptic-oblong (not ovate), and the white petals with slender purplish veins are distinctly longer than the sepals (6-7 mm long)". It's possible, that this specimen belongs to *P. cryptophila*.

M. Khatamsaz (1992: 135) appears to be the first to classify *C. cryptophila* as a synonym for *C. petraea*. She recognizes *P. porphyrantha* as a separate species. Unfortunately, the work is in Farsi, the features and distribution are unclear. There are no maps. On the drawing (p. 96) the leaf of *C. petraea* seems to belong to *P. cryptophila*.

J. Soják (1996: 116) discovered syntype (or isotype?)

of *P. petraea* in herbarium of Lehmann (PR): "*P. petraea* /HBrn/ Hab in Gilan [Lehm] *Potentilla petraea* Monogr. Potnt. Pag. 119. Tab. 11 [Lehmann's assistant] one fertile specimen; PR 378100 [!; the species is identical with *P. cryptophila* Bornm.] Syntype".

In 2004 Soják published treatment of *Potentilla* for the former USSR. He investigated the material from LE, MHA, MW, TBI, TB, TAD, AA, DR, TASH and had extensive studies in the field (Caucasus, Central Asia, Siberia and Mongolia) and in the experimental garden. In this work he also treats *P. cryptophila* as a synonym of *P. petraea* and recognizes *P. porphyrantha* as separate species. He differs these species in the key (p. 266) by the colour of petals: white with pink venation for *C. petraea* (SE. Caucasus) and purple for *C. porphyrantha* (S. Caucasus). On Fig. 24, p. 331 he gives drawings of the leaves, which, however, do not correspond to our understanding of species. Fig. 246, pro *P. petraea* ("Sojak, s. n., a. 1977") – corresponds to *P. cryptophila*; Fig. 251, pro *P. petraea* ("Sojak, s. n., a. 1977") – corresponds to the type of *P. petraea* or to *P. porphyrantha*; Fig. 252, pro *P. porphyrantha* ("Termé s. n., a. 1971") – corresponds to *P. cryptophila*.

In the later work Soják (2009: 206-207) writes: "The name *P. cryptophila* Bornm. used by Grossgeym (1949,1952) and Czerepanov (1981, 1995) should be replaced by *P. petraea*. I compared the specimens of both plants (in PR) and found them identical (cf. also Assadi & Wendelbo 1977, Khatamsaz 1992). Only the type of *C. petraea* is a bit stouter form of the species. In the former USSR *C. petraea* was detected only on the Azerbaijan-Iranian boundary (Kyz-jurdy in Talis-Daglari, coll. Lomakin 1894). This rare species with a small distribution area is frequent in the Iranian part of Talys mountains (authors own field study)".

N. S. Khanjyan (2009: 34-35) first publishes *P. cryptophila* for Armenia – from Gegham, Darelegis (Darelegis ridge) and Zangezur floristic regions and brings *P. porphyrantha* from the same regions. She describes additional diagnostic features of caudex ("rhizome") for these species according to the material of ERE. In the Red Book of Armenia Khanjyan (2012: 432) cites *C. cryptophila* for Armenia from the Gegham (Spitaksar mount), Zangezur (Darabas) and Darelegis (Goghi mount) floristic regions, and *C. porphyrantha* (c.434) for the Gegham (Sevsar, Agusarka mounts) and Zangezur (Mets Ishkhanasar mount) regions. The points of 2 species from Gegham and Zangezur on the map almost coincide, and the point in the Darelegis for *C. cryptophila* is very close to *locus classicus* of *C. porphyrantha*.

J. Noorozi et al. (2011) on the basis of field investigations in the mountains of Central Alburz (Tuchal, Alamkuh, Damavand), Azarbayjan mountains

in NW Iran (Sahand, Sabalan) and southeastern Zagros (Hezar Mts.) treat *P. porphyrantha* as atropatene element, hemicyptophyte, subnival-nival form and give a map of its distribution in Iran (p.1333).

Data of the karyological study of *P. porphyrantha* ($2n = 14$, $x = 7$) as well as data on the distribution of *P. porphyrantha* and *P. cryptophila* in the Khanjian's interpretation are given in the work of Ghukasyan & Janjugazian (2016).

RESULTS

Diagnostic features, given by Yuzepchuk (1940), were fully confirmed on the material studied. The features given by Khanjyan (2009) are not. Our investigations showed that the plants defined by Khanjyan in herbarium ERE as *P. cryptophila* are simply older specimens of *P. porphyrantha*, which perfectly correspond to the protologue of this species. The features of caudex, which she brings for *C. cryptophila*, are present on the isotype *P. porphyrantha*.

P. cryptophila and *P. porphyrantha* differ quite well, although the features of calyx and leaf occasionally vary. In some young rosette leaves of *P. porphyrantha* (ERE), the leaflets are truncate at apex. The specimen W 1968-16240 also differs: the shape of the leaf on this specimen is the same as in *P. porphyrantha*, but leaflets aren't petiolate, the only preserved petal is emarginate, in dry state yellowish, without purple veins, outer sepals are up to half of inner ones.

P. petraea remains unclear due to the limited type material and the uncertainty of the *locus classicus*. The shape of the petals on the photo of the type (<http://herbarium.bgbm.org/object/BW09980010>) cannot be seen, although a number of authors (Lehmann, 1820, 1856; Boissier, 1872), who studied the type, designates emarginated petals. On a single rosette leaf on the type, the middle (or 2 paired) lobe of the folioles is slightly longer than the neighboring lateral ones, the arrangement of the lobes is pinnate (not palmate), the leaflets seem to be sessile. External sepals are linear, up to the half of inner ones. The petals in the dry state are dark brown. According to the features, this species seems to be closer to *C. porphyrantha* than to *P. cryptophila*.

In Armenia and Nakhichevan, only *P. porphyrantha* grows. It also grows in Zuvand (ERE 17521, earlier (Grossheim, 1937) determined as *P. cryptophila*). Locations of this species in the NW. and S. Iran (Assadi & Wendelbo, 1977; Noorozi & al., 2011) seem quite reliable.

Interesting, that the first collection of *P. porphyrantha* from Mt. Savalan, belong to Seidlitz: "Sawallan ... 15/27 Aug 56. Seidlitz", (determined as *P. petraea*) P03337009,

photo! (<http://colddb.mnhn.fr/catalognumber/mnhn/p/p03337009>); "Sawallan. 15/27 Aug. 56." "1858. Закавказье и Азербайджан. Н. К. Зейдлиц". Det. 11.1996. Н. Шведчикова. MW0679766, photo! (<https://plant.depo.msu.ru/open/public/item/MW0679765>). Later it was collected in 1971, but preliminary determined as *P. petraea*, and determined by Soják as *P. porphyrantha* only in 2005: "K.H.Rechinger. Iter Orientale 1971. Flora of Persia. Prov. Azerbaijan: Kuhhaye Sabalan, rocky volcanic slopes on north side of mountain. Leaves silvery, flowers rosy pink, plant prostrate. Alt. 3500-4000 m. 15 July 1971. Jennifer Lamond N 4742", E 00409757, photo! (<http://data.rbge.org.uk/herb/E00409757>).

The presence of *P. cryptophila* (or *P. petraea*?) in Zuvand is very likely, though we haven't seen any material. Grossheim (1952) cites *P. cryptophila* for Kyz-Yurd (the summit on the Talish Mountains on the very border of Iran and Azerbaijan) already after *P. porphyrantha* was described. Soják (2009) also gives for *P. petraea* (= *P. cryptophila*) "Kyz-jurdy in Talis-Daglari, coll. Lomakin 1894". Unfortunately, the herbarium, where these (or the same?) samples are located, are not cited by the authors. Soják (2009) also indicates his own collection of *P. petraea* (= *P. cryptophila*) from the Iranian part of the Talysh Mountains. However, the limited Iranian material of *P. cryptophila* studied by us, is confined to Elburs ridge.

Below is a checklist of species in our understanding and studied specimens.

Potentilla petraea Willd. ex D. F. K. Schldl. 1816, Mag. Neuesten Endteck. Gesammten Naturk. Ges. Naturf. Freunde Berlin 7: 292.

Holotypus: "Habitat in Gilan", Pallas, B-W 09980-010, photo! (<http://herbarium.bgbm.org/object/BW09980010>), iso. PR 378100.

N. Iran

Only the type image was studied.

Potentilla cryptophila Bornm. ex Th. Wolf in Bornm., 1906, Bull. Herb. Boiss. Ser. 2., 6, 8: 614-616, tab. 16.

Holotypus: JE? isotypi: "J. Bornmuller 6968. Iter Iranicum alterum. 1902. Potentilla petraea (species albiflora!). Persia borealis: Elburs occid., in reg. alpine jugi Gerdene Bary dictionis Asadbar. C. 2830 m s. m. 1902.VII.1. Leg. J. et A. Bornmüller", W 1904-0001430!, E00010715, photo! (JSTOR); JE 00000090, photo! (JACQ database); LE 0001547, photo!; LE 00013548, photo! (JSTOR); P03337012, photo! (<http://colddb.mnhn.fr/catalognumber/mnhn/p/p03337012>); P03337013, photo! (<http://colddb.mnhn.fr/catalognumber/mnhn/p/p03337013>); P03337014, photo! (<http://colddb.mnhn.fr/catalognumber/mnhn/p/p03337014>);

Caucasus (Zuvand), N and C. Iran.

Specimen JE 00000090 could be the holotype as Bornmuller's herbarium is in JE.

A part of the authors indicate as author of the name of the species Bornmüller. The diagnosis is indeed published in the work of Bornmüller and the name is given as "*P. cryptophila* Bornm.", but it is clearly indicated that the diagnosis belongs to Th. Wolf. So the author is Wolf.

Upper lobes of leaflets often are paired.

Potentilla porphyrantha Juz. 1940, Not. Syst. (Leningrad) 8, 4: 48-49. – *P. cryptophila* auct.: Tamamschian, 1954, Flora of Azerbaijan, 5: 117; Khandjyan, 2009, Flora, Vegetation and Plant Resources of Armenia, 17: 34.

Photo 1,2.*

Isotypi: «Transcaucasia, respublica Nachitschevan, in monte Ketschaldagh, in rupestribus, 30.VII.1934, leg. L. Prilipko et J. Isaev, LE 01026079! (pro "cotypus"), W 1967-22534!, БАК 0-0000213, 0-0000214 (JACQ database).

Caucasus (Armenia: Gegh., Dar., Zang. (N); Nakhichevan (N); Zuvand), N. and NW Iran.

The holotype should be in LE, but in 2017 only the isotype ("cotypus") was found.

The specimen typified as "specimen authenticum" (anon.) isn't authentic, as it's not cited in protologue and is determined by L. Prilipko: "Transcaucasia, respublica Nachitschevan, in m-te Ajry-kar, in rupestribus, 15.07.1934, L. Prilipko & J. Isaev", MW 0679765, photo! (<https://plant.depo.msu.ru/open/public/item/MW0679765>).

Stems 5-20 cm.

INVESTIGATED SPECIMENS:

P. porphyrantha

Armenia. Gegham floristic region: Вулканическое нагорье Агмаган, гор. Ах-даг, 3400 м, на осыпях, лишенных растит., по южн. скл., 3.09.1947, Ахвердов, ERE 169569; Котайкский р-н, Агмаганский хр., С-В скл. г. Аг-даг, 3400-3500 м, очень крутые почти голые покрытые вулканическим стеклом [склоны], гр[ядка] N 30/9, 28.08.1947, Ахвердов, ERE 169604; Привезена 6.09.47 г. с Агмагана, собрана с участка отд. Флоры и растит. Арм [ении] с гр[ядки] N 30/9, 9.05.1950, Ахвердов, Мирзоева, ERE 169605; ЮВ часть Гегамского хр, гора Спитак Сар, 10.09.1960, Ахвердов, Мирзоева, Гамбарян, ERE 169608, 169609; Центр. часть Гегам [ского] хр., г. Кара-даг, 3350-3450 м, крутые щебнистые склоны, 25.07.1961, Ахвердов, Мирзоева, ERE 114398, 114399; Гегамский хребет, самая высокая вершина Агусарка, 3300-3400 м над ур.

* See color illustration pages

м., на щебнистой местности, 11.07.1988, С.А. Балоян, ERE 169607. **Darelegis floristic region:** Азизбековский р-н, окр. с. Мартирос, северные склоны г. Гоги, 2500-3100 м над ур. м., 19.07.1972, В. Манакян, К. Таманян, ERE 169606; Зангезурский хр., Амулсар, на скалах, 2800 м, 13.07.2012, Э. Габриэлян, ERE 193013; Вайоц Дзорская область, массив горы Амулсар, привершинная территория горы Тигранес, субальпийский луг, 39°43'58"N /45°43'03"E, 2940 м над ур. м., 19.07.2012, К. Таманян, Г. Файвуш, ERE 193014; Vayots Dzor province, area NW of Vorotan pass, isolated rock below new track on W blank of Mt. Amulsar, c. 4 km NNW of Vorotan pass; 2575 m s. m, dry meadow, 39°43'15"N /45°42'12"E, 24.08.2012, E. Vitek, G. Fayvush, K. Tamanyan & K. Margaryan 12-0081, ERE 193407, W 2014-0007748; Vayotz Dzor region, Amulsar mnt., Artavazdes Peak, cliffs, 39°43'37"N /45°42'59"E, 18.07.2016, G. Fayvush, K. Janjughazyan, ERE 193407. 193408. **Zangezour floristic region (N):** Сисианский р-н, к сев.-зап. от села Дарбас, 27.07.1947, Ш. Асланян, ERE 40520; Сюникское нагорье, г. Мец Ишханасар, южный склон, выс. 3500 м, на щебнистых местах, 10.08.1986, С.А. Балоян, ERE 133237.

Nakhichevan: Transcaucasia, respublica Nachitschevan, in monte Ketschaldagh, in rupestribus, 30.VII. 1934, L. Prilipko et J. Isaev, LE 01026079 (iso., pro "cotypus"), W 1967-22534 (iso.); Transcaucasia, Azerbajdzhan, respublica Nachitshevan, distr. Schachbuz, supra pag. Kju-Kju, ad rupes, 7.06.1939, E. Chalilov, ERE 135964.

Zuvand: Transcaucasia, Azerbajdzhan, distr. Zuvand, in jugo Barnassar supra p. Mistan, in rupestribus, 2.06.1935, A. Grossheim, ERE 17521

P. cryptophila

Iran. N: Prov. Mazanderan: Distr. Kudjur, in monte Ulodj, substr. calc., 3200-3400 m, 9.08.1948, K.H. & F. Rechinger 6469b, W 1968-16165; Persia: N: Gorgan: Ketul, Sharif, v. 1948, N 406, W 1969-7716; **C:** Prov. Shahrud-Bustam: In declivibus australibus montium Shahvar supra Nekarman (Nigarman), in saxosis calc., supra Rahe, 3300 v, 20-26. 07. 1948, K. & F. Rechinger N 6034a, W 1968-16240; Persia borealis: Elburs occid., in reg. alpine jugi Gerdene Bary dictionis Asadbar, c. 2830 m s. m., 1902. VII.1, J. et A. Bornmuller, W 1904-0001430 (Iso.); Plantes de l'Iran, M. Elburs occid., Warwache, Alt.: 3680 m, 30.07.1972, S.C. Klein 3489, W 1979-06532

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WEBSITES

GBIF (Global Biodiversity Information Facility)

-- <https://www.gbif.org>

Global Plants -- <https://plants.jstor.org>

Virtual herbaria JACQ -- <https://herbarium.botanik.univie.ac.at/herbarium-wu/search.php>

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