

An Account of Phelipanche Pomel (Orobanchaceae) in Iraq

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Abstract

Full taxonomical descriptions were given to eight species of Phelipanche Pomel (Orobanchaceae) recorded in Iraq. A key for species identification, habitat, flowering period, distribution in Iraq, general distribution and comment on species relationships were presented. Floral characteristics, photographs and maps of distribution of species were illustrated.

Keyword: Broomrapes; Phelipanche; Orobanchaceae; Parasitic plant; Iraq.

1. Introduction

All floras in the past treated all species of Broomrapes in one genus *Orobanche* L. s.l. including *Phelipanche* but divided into 2 sections *Trionychon* Wallr. to include species with 2 bracteoles and section *Orobanche* to include species that lacking bracteoles [1]. Recently researchers admit recognition the genus *Phelipanche* Pomel as a separate and distinct genus on the basis of DNA analysis of the nuclear ribosomal and the plastid genome. [2, 3] showed that *Orobanche* falls into 2 phylogenetic distinct clades that coincide with the 2 *Orobanche* sections. This finding lead to the decision to split *Orobanche* L. s.l. into 2 distinct genera *Orobanche* and *Phelipanche* Pomel [3]. Since the admission of recognition of the genus *Phelipanche* Pomel as a separate genus, researchers follow this terminology. Reference [5- 8, 1]. No detailed taxonomical study on the family Orobanchaceae in Iraq is available, the only floristical study available on the family is that of Rechinger [9] who dealt only with species of broomrapes occur in the lowland of Iraq.

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In addition, Salih, [10] (not publish data) dealt with species of Orobanche in its broad sense in the provinces of Arbil, Dohok and Sulaimanyia. This is the first account to deal with the species of the genus Phelipanche in whole Iraq. Species are alphabetically arranged, according to their current accepted name. For each species, original publication, basionym, the most relevant synonyms are reported. Species description were based on fresh and herbarium Iraqi materials. Plant host, habitat, flowering period, the general, regional and local distribution are given. The broomrapes with its host were collected together, photographed and pressed. Reference [11-15] were consulted for species determination.

2. Phelipanche Characters of Taxonomic importance

2.1 Size, Colour and indumenta

Most of species population of Phelipanche are variable with regards to size, colour and amount of indumenta. Colour and degree of stem pubescence and pubescence and size of bracts have of considerable taxonomic importance.

2.2 Scale, Bract, Bracteoles and calyx

Length, shape kind and density of indumenta are considerably variable within and among species.

2.3 Corolla, Stamens and stigma

Size, shape and pubescence of corolla and corolla lobes, especially lobes of the upper and lower corolla lips, the position of the filament insertion, the degree and position of the filament and anther pubescence, and the colour and degree of fusion of the lobes of stigma are taxonomically important. Unfortunately many of the useful characters may be lost when drying and species which are very distinguishable in the field turned into a brown uniform colour when dried and vouchered. Therefore care should be taken not to rely on one character. Characters examined by SEM especially pollen surface ornamentation showed clear differences among species of Phelipanche, but seed surface ornamentation showed very little variation among species.

3. Generic Description

PHELIPANCHE Pomel

Phelipanche Pomel, in Bull. Sci. Phys. Algérie 11:102 (1874). Orobanche Sec. Trionychon Wallr. (1822); =Kopsia Dumort (1822), nom. Rejic.; =Phelypaea sect. Trionychon (Wallr.) C.A. Mey. (1830); = Orobanche subgen. Trionychon (Wallr.) Spach. (1838); Orobanche subgen. Phelypaea (Desf.) Nyman (1854-1855); = Orobanche subgen. Phelipanche (Pomel) Tzvelev (1981) comb. Superfl. **Lectotype** *O. ramosa* L. Holoparasitic, without chlorophyll, herbs. Stem almost branched or occasionally simple. Inflorescence terminal spike. Flowers bracteates, subtended by 2 bracteoles. Calyx gamosepalous, 4-toothed; teeth distinctly acute. Corolla bilabiate, with a curved tube, the upper lip with 2 lobes, the lower lip with 3 spreading lobes, almost blue-lavender, rarely white. Stamens 4, included. Stigma often white, seldom creamy.

Key to the species of Phelipanche

- 1- Corolla 10-17mm long..... 2
- 1- Corolla 17-40mm long.....4
- 2- Calyx teeth \pm shorter than tube *P. ramosa*
- 2- Calyx teeth equaling or longer than tube 3
- 3- Corolla violet *P. nana*
- 3- Corolla white *P. umqasrensis*
- 4- Corolla not more than 20(22)mm 5
- 4- Corolla 22-40mm 8
- 5- Lobes of lower lip of corolla acute-acuminate6
- 5- Lobes of lower lip of corolla rounded 7
- 6-Calyx teeth equaling or slightly longer than tube *P. oxyloba*
- 6- Calyx teeth distinctly longer than tube..... *P. orientalis*
- 7- Presence of glandular- pubescent or glandular hairs on the stems *P. mutelii*
- 7- Presence of a densely arachnoid-tomentose glandular on the stems *P. hypertomentosa*
- 8- Stem usually branched *P. aegyptiaca*
- 8- Stem usually simple *P. coelestis*

3.2 Species Description

1. Phelipanche aegyptiaca (Pers.) Pomel 1874

Sny: *Orobanche aegyptiaca* Pers. Syn. Pl. 2:181(1806); DC. Prodr., 11:5(1847); Schman-Czeika in Rechinger, Fl. Lowland Iraq, 553(1964); Al-Rawi in Dep. Agr. Iraq Tech. Bull. 12:148(1964); Schiman-Czeika in Fl. Iranica, 5: 7(1964); A. Gilli in Fl. Turk., 8(1982).

Type: In Aegypto (Egypt), holo. G-DC, photo!

Parasitic herb, 16-41cm tall, glandular-pubescent. Stem 10-29cm long, branched or unbranched, yellowish-violet, usually slender, 2-7mm diameter, thickened at base. Scales few, ovate-lanceolate, 4-10mm long. Inflorescence cylindrical, 4-16cm long, lax, many flowered (6-44 flowers) sessile or subsessile. Bract ovate-lanceolate, 5-10mm long, as long as calyx or shorter. Bracteoles lanceolate-subulate or linear, 5.5-7mm long, usually shorter than calyx. Calyx gamosepalous, 8-12mm long, 4-teeth, calyx tube 4-5.5mm long, equaling calyx teeth or shorter; teeth lanceolate or filiform form a triangular base. Corolla 22-35mm long, lavender-blue, at base of tube lighter coloured, almost whitish, glandular-pubescent outside, sparsely white hairy folds and lobes of limb, lobes of upper lip rounded or acute; lobes of lower lip nearly equal, large, rounded or broadly ovate. Stamens inserted 3-5mm above base of corolla; Filaments, 12-15mm long, hairy at base; Anther 2-3mm long, densely lanate-hairy along. Style 14-20mm long, glandular. Parasitize on Tomato, *Ammi visnaga*; *Vicia* sp.; *Plantago boissieri*

HAB. Under populous trees, weeds in fields, at buttum of valley, sandy, red stony, rocks soil, slope and side of mount. Altitude: 200-1700mm high. **Fl. & Fr.** February-May (-Des.).

DISTRIB. **MAM**, 7km E. of Sury, about 46km of Amadiya, 680m, *Al-Shehbaz, M. Al-Hilli & E. Weinert*, 3350; **MAM**, Matine mt. Shimdinan voicer, 13km N. of sury, ca. 39km E. of Amadiya, 700-720m, *Al-Shehbaz, M. Al-Hilli & E. Veinelt*, 2900; **MAM**, Sharanish, *Al-Rawi*, 8656; **MAM**, S. of Sharanish village 25km N.E. Zakho, 900m, *Al-Rawi, Nuri & Tikriti*, 29075; **MAM**, Zakho to Sharanish, *F. Karim, H. Hamide & M. Jasim*, 41128; **MAM**, Near Khabor Bridge, *F. Karim, M. Nuri & K. Hamad*, 44858; **MAM**, Zakho, 900m, *S.H.S. Miran*, 787, 788, 789; **MAM**, Batufa 30km E. of Zakho, 920m, *S.H.S. Miran*, 942, 943, 944; **MAM**, Duhok, 860m, *S.H.S. Miran*, 970; **MRO**, Potin, *Faisal Abdul Kadher*, 1465; **MRO**, QurQah; **MRO**, Gali Ali Beg, *Gillett*, 9435; **MRO**, Sarcal- Arbil liwa, *A. Agnow*, 2400; **MRO**, Shaqlawa, Arbil; **MRO**, Khan man Sherin N. of Potin-Arbil; **MRO**, Potin Mt. N. of Shirwan Mazin- Arbil liwa, 7-8,000ft, *A.D.Q. Agnow, R.W. Haines, E. Hadac & F. Kadir*, 6222a; **MSU**, between Kujar and Kani Qardad, 1500-1700m, *Al-Kas, Nuri & Sarhank*, 27627; **MRO**, Qorra 38km. E. of Arbil, 900-950m, *S.H.S. Miran*, 1072, 1073, 1074; **MSU**, Kani Ipushki, 1600-1800m, *Y.S. Faris*, 114; **MSU**, Sharbasher, *Al-Mayah & Al-Asadi*, 1452; **MSU**, Pira-magrun Mt. *Al-Mayah & Al-Asadi*, 15065, **MSU**, Pira-magrun Mt. W. facing slop Down to meerquills, 1500-1700m, *Y.S. Faris*, 33; **MSU**, 110km N. Jaloula, Sulaimaniya.; **MSU**, 8mil S.W. Dokan Dam, Sulaimaniya liwa; **MSU**, Shwa soor near Chamchemal, *Al-Shahbaz & Y. Faris*, 1925; **MSU**, Bazian at Baynijan, *Al-Shahbaze & Y. Faris*, 1402; **MSU**, Searsunq; **MSU**, Siwia; **MSU**, Quradagh-Sulaimaniya; **MSU**, Qaradagh, 900m, *Gillett*, 7902; **MSU**, 10km N. Dorbondikun-Sulaimaniya; **MSU**, Zawiya; **MSU**, Khormal, *Al-Rawi*, 86927; **MSU**, Kashkdii near rjokan, 420-500m, *Al-Shehbas & B.V. Faris*, 2289; **MSU**, Penjwin, Alt. 1800m, *Al-Rawi*, 12263; **MSU**, Pira-magrun-Zawiya; **MJS**, Kursi, *Gillett*, 11024; **MJS**, J.Singar, *Alizzi & S. Omar*, 35329; **MJS**, J.Singar 2km E. of Kursi; **FUJ**, Near Ain Dibs, 200-400m, *Al-Rawi & Gillett*, 7234; **FUJ**, Rabe city-Mosul, *M.Noora*, 40736; **FKI**, Ghurfa, near Injana; **FPF**, 10km, S.E. Khanaqin, *Al-Musawi*, 42584, **FPF**, N. Wadi Tib, *Al-Mayah & Al-Asadi*, 1448; **FPF**, Near police station in Wadi Tib, *Al-Mayah & Al-Asadi*, 1451; **FPF**, Near police station in Wadi Tib, *Al-Mayah & Al-Asadi*, 15081; **FPF**, Wadi Tib, *Al-Mayah & Al-Asadi*, 1661; **FPF**, Wadi Tib-chlat, *Al-Mayah & Al-Asadi*, 1688; **DWD**, 4km S. Rutba; **LCA**, Baghdad, *H.P. Parauyfue*, 60; **LCA**, Kadhemia, Baghdad; **LCA**, 20km N. of Taji-Baghdad.

Egyptian Broomrape (E), Haluk هالوك, Haluk Mutfra هالوك متفرع, Shotila شوتله, GuRGA كوراكه (Ku.). very common in Kurdistan mountain districts in cultivated and weed fields; Also common in Tip 70km north Amara. Saudi Arabia, Kuwait, Syria, Jordan, Lebanon, Egypt, Iran, Turkey, Afghanistan, Algeria, Azerbaijan, Bangladesh, China, Cyprus, France, India, Palaestina, Italy, Kazakhstan, Libya, Morocco, Nepal, Pakistan, Russia, Tunisia, Uzbekistan.

2. *Phelipanche coelestis* (Reut.) Soják in Čas. Nár. Muz. Přír. 140: 130 (1972)

Syn.: = *Phelypaea coelestis* Reut. In DC. Prod. 11:5(1847); Boiss., Fl. Orient., 4:496(1879); *Orobanchae coelestis* (Reut.) G. Beck in Monogr. Orob. 114(1890); Schiman-Czeika in Rechinger in Fl. Lowland Iraq: 553:(1964); Rawi in DC. P. Agr. Iraq Tech. Bull. 14: 148(1964); Schiman-Czeika in Fl. Iranica, 5:9(1964); A. Gilli in Fl. Turk. 7(1982).

Lectotype: Turkey, Prodr. (G-DC) Boissier 1843. Photo!

Parasitic herb, Biennial or Perennial, Plant up to 20-30cm tall, glandular-pilose. Stem 12-17cm long, simple, thick 4-8mm diameter. Scales 7-12mm long, lanceolate. Inflorescence cylindrical, 8-13cm long, dense and multi-flowered, (19-75 flowers). Bract lanceolate, 10-14mm long, as long as calyx, glandular-pilose. Bracteoles, lanceolate, 8-10mm long, shorter than calyx, glandular-pilose. Calyx short-campanulate, 11-18mm long, glandular-pubescent, calyx teeth 8-13mm long, lanceolate or filiform, 2x as long as calyx tube, calyx tube 4-6mm long. Corolla 18-28mm long, violet-blue, glandular-pubescent outside, sparsely white hairy on folds and lobes of limb, lobes of lower lip acute. Stamens inserted 4-6mm above base of corolla; Filaments, 14-20mm long, glabrous with few hairs at base; Anther 1.75-2.25mm long, hairy. Style 15-22mm long, glandular under stigma. **Parasitize on** *Quercus aegilops*.

HAB. Cultivated fields, On the side of water, rocky mount., mount slope near streams, clay, limestone. Alt.: 800-2610m high. **Fl. & Fr.** May-Jun.

DISTRIB. **MAM**, 2km before Sulaf, *Al-Mayah & Al-Asadi*, 1438; **MJS**, Singar mount. *Al-Kasi & Wedad*, 52045; **MRO**, Sei-wate village (near S. focat of Karoukh), alt. 600m, *Kass & Nasir*. 27571; **MSU**, Kopi Qaradagh Sul., alt. 4000-4500ft, *A.D.Agnew*, 1867; **MSU**, Averoman mount. N. of Halabja (on Persian border), alt. 1500-1839m, *Al-Rawi*, 22096; **MSU**, Zewe vill, Pira-magrun mount. *S.H.S. Miran & Y.S. Faris*, 1231; **LEA**, Blad Ruz, E. of Baghdad morck 23, not seen, cited by *Rechinger*. Syria, Iran, Turkey, S.W.C.Asia, Afghanistan, N. Africa, Armenia.

3. *Phelipanche hypertomentosa* (M.J.Y Foley) M.J.Y. Foley Edinb. Jour. Bot. 64(2): 209-211 [16]

Basionym: *Orobanchae hypertomentosa* M.J.Y. Foley. Orobanchaceae of the Arabian peninsula, *Candollea* 59, [17].

Type: Saudi Arabia, South-west of Zabirah 200km north of Buraydah, red sand dunes, 22. IV.1981, Collette 2506 (holo.: E; iso: K).

Parasitic herb, annual, Plant 12-25cm tall, densely arachnoid-tomentose glandular or eglandular hairs on the stems. Stem 10-14.5cm long, simple or sometime branched, slender, middle part of 2.5-4mm thin, purplish. Scales few, lanceolate, up to 10-15mm long, arachnoid-tomentose glandular or eglandular hairs. Inflorescence cylindrical, 4-12cm long, lax few-flowered (9-29 flowers). Bract lanceolate, 6-11mm long, densely arachnoid-tomentose glandular or eglandular hairs. Bracteoles linear, 4-6mm long, shorter than calyx, arachnoid-tomentose glandular or eglandular hairs. Calyx 7-11mm long, densely arachnoid-tomentose glandular or eglandular hairs, calyx teeth lanceolate at apex, 2-3.5mm long, equaling calyx tube, 2-3.5mm long. Corolla 15-22mm long, pale blue, sparsely glandular-pubescent outside, lobes of lower lip rounded, folds white hairy. Stamens inserted 4-6mm above base of corolla tube; Filaments 9-10mm long, glandular at base with few shorter hairs; Anther 2-2.5mm long, glabrous or hairy. Style 6.5-9mm long, glandular. **Parasitize on** Reseda sp. and Cruciferae sp. (*Eremobium aegyptiacum*)

HAB. grown on sandy or compact sandy soil, **Alt.:** 59m. **Fl. & Fr.** March to April.

DISTRIB. DSD, Southern desert of Iraq on Jrishan Khadhr al-Mai road 15km before Khadhr al-Mai, *Al-Mayah & Al-Asadi*, 1690. Bahrin and Saudi Arabia.

4. *Phelipanche mutelii* (F.W. Schultz) Pomel 1874

Syn: *Orobanche mutelii* F.W. Schultz in *mutel*, Fl. Franc. 2: 353(1835); DC. Prodr., 11:2(1847); Boiss., Fl. Orient., 4:499(1879); Schiman-Czeika in Rechinger in Fl. Lowland Iraq: 553: (1964); Rawi in Dep. Agr. Iraq Tech. Bull. 14: 148(1964); Schiman-Czeika in Fl. Iranica,5:7(1964); A. Gilli in Fl. Turk. 7(1982).

Type: [Algeria] Bon (Annaba), Mutel, (Lecto. GRM, photo!).

Parasitic herb, annual or biennial, Plant 9-22cm tall, glandular-pubescent. Stem 3.5-8cm long, simple or branched, slender, middle part of 3.5-6mm thin, purplish. Scales few, ovate-lanceolate, up to 6.5-11mm long, glandular-pilose. Inflorescence cylindrical, 2.5-7cm long, lax few-flowered (4-25 flowers). Bract ovate-lanceolate, 5.5-8mm long, glandular-pubescent. Bracteoles linear, 4.5-7mm long, shorter than calyx, glandular-pubescent. Calyx 6-8mm long, glandular-pilose, calyx teeth lanceolate or filiform at apex, 3-4mm long, equaling calyx tube, 3-4mm long. Corolla 15-20mm long, violet-bluish, sparsely glandular-pubescent outside, lobes of lower lip rounded, folds white hairy. Stamens inserted 3.25-4mm above base of corolla tube; Filaments 8.5-11mm long, glandular at base with few shorter hairs; Anther 1.2-1.7mm long, glabrous or hairy. Style 8.5-10mm long, glandular. **Parasitize on** *Vicia* sp., *Rhus coriaria* (Anacardiaceae).

HAB. Clay gravelly soil, stony clay hillside, mount. Slope, rocky lime stone dry soil.

Alt.: 100-1200m. **Fl. & Fr.** Apr.-Aug.

DISTRIB. MAM, Khatur mount. N.E. of Zakho, alt. 1200m, *Al-Rawi*, 23302; **MRO,** Haibat Sultan Dagh mount. N. of Korsanjaq, alt. 850m, *Al-Rawi, Nuri & Kass*, 28175A; **MSU,** Jajla vellage 3-5km Sul. After Mawit to words Basi, *Al-Mayah & Al-Asadi*, 15072; **MJS,** Jabal Sinjar S.E. slop curve No.126, alt. 800m, *Widad &*

Al-Khayat, 53383; **MJS**, Jabal Sinjar, 900-1200m, *Gillett*, 11113; **FPF**, near general road 15km., *S.H.S. Miran & Kh. Musa*, 1272; **DWD**, 40km W. Ramadi to Rutba, 100m, *Al-Kaisi & K.Hamad*, 48934; **DSD**, 15km, S.E. of Ashuriya (50km W.N.W. of Shabicha), 360m *Guest, Al-Rawi & Rechinger*, 19359; **LCA**, 60km S. of Baghdad to Kut, 30m, 18384.

Haluk , Dwarf Broomrape الهالوك القزم, Mutel's Broomrape, Jafal(Sy. Pal.) جعفل

Syria, Palestine, Egypt, Iran, Turkey, Morocco, Algeria, Tunisia, Libya, Afghanistan, Armenia, Australia, Cyprus, Italy, Spain.

5. **Phelipanche nana** (F.W. de Noë ex Rchb. fil.) Soják 1972

Syn.: *Orobanche nana* F.W. de Noë (1842) [in Sched, nom. nud.]. *O. nana* (F.W. de Noë ex Rchb. fil.) Beck in Biblioth Bot. 19: 91(1890); Schiman-Czeika in Rechinger in Fl. Iranica, 5:7(1964); A. Gilli in Fl. Turk. 7(1982); DC. Prodr., 11:9(1847); Boiss., Fl. Orient., 4:499(1879).

Lectotypus: (désigné ici) Slovénie [Croatia], 1842. (W, photo!)

Annual or biennial, Plant 7-14cm tall, glandular-pubescent. Stem 5-10cm long, simple or branched, slender. Scales 6.5-9mm long, ovate-lanceolate, glandular-pubescent. Inflorescence short-cylindrical, 4-5cm long, few flowered (4-7 flowers). Bract 6.5-9mm long, lanceolate, glandular-pubescent. Bracteoles linear, 4.5-6mm long, glandular-pubescent. Calyx 5-7mm long, glandular-pilose, calyx teeth 2.5-4mm long, lanceolate-sublate, equaling calyx tube, calyx tube 2.5-4mm long, somewhat longer. Corolla 10-15mm long, blue, glandular-pubescent outside, lobes of lower lip rounded or broadly oval, folds white hairy. Stamens inserted 4.5-6mm above base of corolla; Filaments 6-9.5mm long, glabrous at base; Anther 1.3-2mm long, glabrous or few hairy at base, whitish-violate. Style 6-8mm long, glandular under stigma. **Parasitize on** Cruciferae.

HBT. Mount. Slope, rocky lime stone dry soil. **Fl. & Fr.** March-Jun.

DISTRIB. **MSU**, Jabal Samaralwa, Dara Tri above Twiala 3-5km Sul., *Al-Mayah & Al-Asadi*, 15067.

Palestine, Iran, Egypt, Morocco, Turkey, Algeria, Armenia, Cyprus, Francia, Italy, Portugal, Russia, Spain, Tunisia, USA.

6. **Phelipanche oxyloba** (Reut.) Soják 1972

Syn.: ≡ *Phelypaea oxyloba* Reut. (1847) basionym; Boiss., Fl. Orient., 4:497(1879); *Orobanche oxyloba* (Reut.) Beck in Koch in Entw.-Gesch. Orob.: 209 (1887); Schiman-Czeika in Fl. Iranica, 5:9(1964); A. Gilli in Fl. Turk. 9:1982; Salih in J. Pl. Prod. Man. Univ. 4(10):1635-1642(2012).

Isotype: in Turkey, Heldrieich (holo, G Iso, LE).

Parasitic herb, annual or biennial, Plant 30cm tall, glandular-pubescent. Stem 15.5cm long, simple, slender,

middle part of 4.5-6mm thick, yellowish in dry. Scales few, lanceolate, 6.5-12mm long, glandular-pilose. Inflorescence cylindrical, 14.5cm long, dense many-flowered (60 flowers). Bract lanceolate, 7.5-12mm long, glandular-pubescent. Bracteoles linear-subulate, 9.5-12mm long, glandular-pubescent. Calyx 10-12mm long, glandular-pilose, calyx teeth, lanceolate or filiform, 5-6mm long, equaling calyx tube, calyx tube 5-6mm long. Corolla 18-20mm long, violet, sparsely glandular-pubescent outside, lobes of lower lip acute, folds white hairy. Stamens inserted 4-6mm above base of corolla tube; Filaments 6-8mm long; Anther 0.15-2mm long, glabrous. Style 8.5-11mm long, glandular. **Parasitize on *Centaurea* L.**

HAB. Alluvial and sandy soils. **Alt.** 250-270m. **Fl. & Fr.** Apr.-May.

DISTRIB. MSU, 10km N. of Dorbendi-khan on Sul., road Sul., A. Agnew, 5926 .

Iran, Asia, Turkey. European, Armenia,

7. *Phelipanche ramosa* (L.) Pomel 1874

Syn.: ≡ *Orobanche ramosa* L. sp. pl. 635 (1753). DC. Prodr., 11:8(1847); Boiss., Fl. Orient., 4:498(1879); Schiman-Czeika in Fl. Iranica, 5:4(1964); A. Gilli in Fl. Turk. 6(1982).

Type: From Europe, Hh. Linn. 798/9, Lect. BM 646204, photo!.

Annual, plant 10-16cm tall, glandular-pubescent. Stem 5-7cm long, branched or unbranched, slender, thin, yellowish. Scales few, ovate, up to 3-6.5mm long, glandular-pilose. Inflorescence cylindrical, 5-9cm long, lax few-flowered (4-15 flowers). Bract ovate-lanceolate, 5.5-7mm long, glandular-pubescent. Bracteoles linear-subulate, 5.5-8mm long, glandular-pubescent. Calyx 5-7mm long, glandular-pilose, yellowish, calyx teeth, lanceolate, 2.5-3.5mm long, equaling calyx tube, calyx tube 2.5-3.5mm long. Corolla 10-15mm long, violet, sparsely glandular-pubescent outside, lobes of lower lip rounded, folds white hairy. Stamens inserted 3-5mm above base of corolla tube; Filaments 6-8mm long, pilose at base; Anther 1-2mm long, hairy. Style 6-8mm long, sparsely glandular under stigma. **Parasitize on Tomato.**

HAB. Clay soils, Alluvial soils, Rocky mountain, cultivated fields. **Fl. & Fr.** Apr.-Jun.

DISTRIB. MAM, Galy Zakho, near Zakho, alt. 600-850m, S.H.S. Miran, Al-Khayat & J. Saeed, 1273, 1274; MRO, Chewa Rash N.E. of Rania, 650-700m, Al-Rawi, Nuri & Kassi, 28448; MSU, Darbandikan, Al-Shehbaz & Husian, 1624; MSU, Tawela, 1360m, Al-Rawi, 21868; MJS, Richloam of mount. Near Derbendikan Dam-Sul., Hikmat Abbas Al-Ali, Elizabeth D. Barkley & Fred A. Barkley, 0019599; MSU, Hasa Galla on the road, towards Qala Chawlan, Shahrabashir, Sul., Al-Mayah & Al-Asadi, 1444; MJS, Kursi, 550-700m, Gillett, 10885; MJS, J. Sinjar, Al-Shahbaz & W. Al-Hashimi, 0030516; FPF, near Talwasat (Nasr) police post, about 21km N.N.W. of Mandali, Al-Shahbaz & Al-Mayah, 0029749. Bulgaria, S. Euro., N. Africa, N. Amrica.

8. *Phelipanche orientalis* (Beck) Soják 1972

Syn.: ≡ *Orobanche orientalis* Beck in Biblioth. Bot. 19: 110(-111) (1890);

Type: in London [K], Isotype in Leningrad [LE]." (cf. Novopokrovskii & Tzvelev, 1958).

Parasitic herb, Plant up to 7-31cm tall. Stem 3-15.5cm long, simple or branched, slender or thick, middle part of 2-10mm thick, purple or yellow. Scales 5.5-10mm long, lanceolate, glandular-pilose. Inflorescence cylindrical, 3-24cm long, many branch or simple spike, lax many flowered (16-38 flowers). Bract 8.5-12mm long, as long as calyx or shorter, lanceolate, glandular-pubescent.

Bracteoles lanceolate to linear-subulate, 8-10mm long, glandular-pubescent. Calyx 9-13mm long, glandular-pilose, calyx teeth 7-9mm long, distinctly longer than calyx tube, calyx tube 4-5mm long, lanceolate or filiform at apex. Corolla 15-17mm long, limb violet, corolla tube violet-whitish, sparsely glandular-pubescent outside, lobes of lower lip acuminate, folds white hairy.

Stamens inserted 4-6mm above base of corolla; Filaments 9-13mm long, glabrous; Anther 1-2mm long, glabrous or sparsely hairy at base, whitish-violate. Style 8-13mm long, glandular under stigma. **Parasitize on** *Galium, Vica*.

HAB: Mount soil. **Fl. & Fr.** Apr.-Jun.

DISTRIB. **MAM**, Amadiya graveyard, about 5-10km N.W. of Amadiay, *Al-Mayah & Al-Asadi*, 1473; **MSU**, Pira-Magron mount. , *Al-Mayah & Al-Asadi*, 1417; **MSU**, J. Samaralwa, Dara Tri above Twiala 3-5km S., *Al-Mayah & Al-Asadi*, 15044; **MSU**, Pira-Magron mount., *Al-Mayah & Al-Asadi*, 15017.

Syria, Jordan, Oman, Iran, Turkey, India, Afghanistan, Pakistan.

9. Phelipanche umqasrensis Al-Mayah & Al-Asadi, Nord. J. Bot. (2016)

Type: Iraq, 5km N.W. Um-Qasr, near the Iraq-Kuwait borders, Al-Mayah & Al-Asadi, 1410 (BSRA Holo).

Parasitic herb, 10-30cm tall. Stem thick, erect, simple or occasionally branched underground sandy color. Inflorescence many flowered, (34- 89) very dense, thick spike, 4-11cm long. Bracts 5-11mm long, ovate-lanceolate glandular. Bracteoles 2,7-10mm long, lanceolate-subulate glandular.

Flowers small, 14-16mm, white. Calyx 7-9.5mm long, glandular puberulent; calyx teeth, 4-5.5mm long acute-acuminate nearly equal to calyx tube. Corolla infundibuliform, white, 12-15 (-16)mm long, 2-lipped, the upper lip 2-lobed, the lower lip 3-lobed variable in shape.

Stamens 4, inserted at 3- 4mm from the base; filaments glabrous-pubescent at base. Anther nearly glabrous; pollen grains with spinulose-perforate ornamentation. Ovary oblong. Style glabrous. Stigma lobed, white-yellowish. Parasitize on *Rhanterium epapposa*.

Hab.: sandy soil, sandy gravel and desert soil. Common in Arfaj community near Iraq-Kuwait frontier. **Fl. &**

Fr. Mar.-April.

DISTRIB. DSD, On the road to port of Khor al-Zubair, 5-10km N.E. Um-Qasr, *Al-Mayah* & *Al-Asadi*, 1423;
DSD, On road of Safwan-Um-Qasr 15km N.W. Um-Qasr near the Kuwait borders, *Al-Mayah* & *Al-Asadi*,
 1414; **DSD**, Jarishan-Khadhar al-Mai road, about 15km before Khidhr al-Mai, *Al-Mayah* & *Al-Asadi*. 1446;
DSD, 8 km N.W. Um-Qasr, near the Iraq-Kuwait Borders, *Al-Mayah* & *Al-Asadi*, 1410; **DSD**, 8 km N.W. Um-
 Qasr, near the Iraq-Kuwait Borders, *Al-Mayah* & *Al-Asadi*, 1648; **DSD**, Jarishan-Khadhar al-Mai road, about
 15km before Khidhr al-Mai, *Al-Mayah* & *Al-Asadi*, 1652.

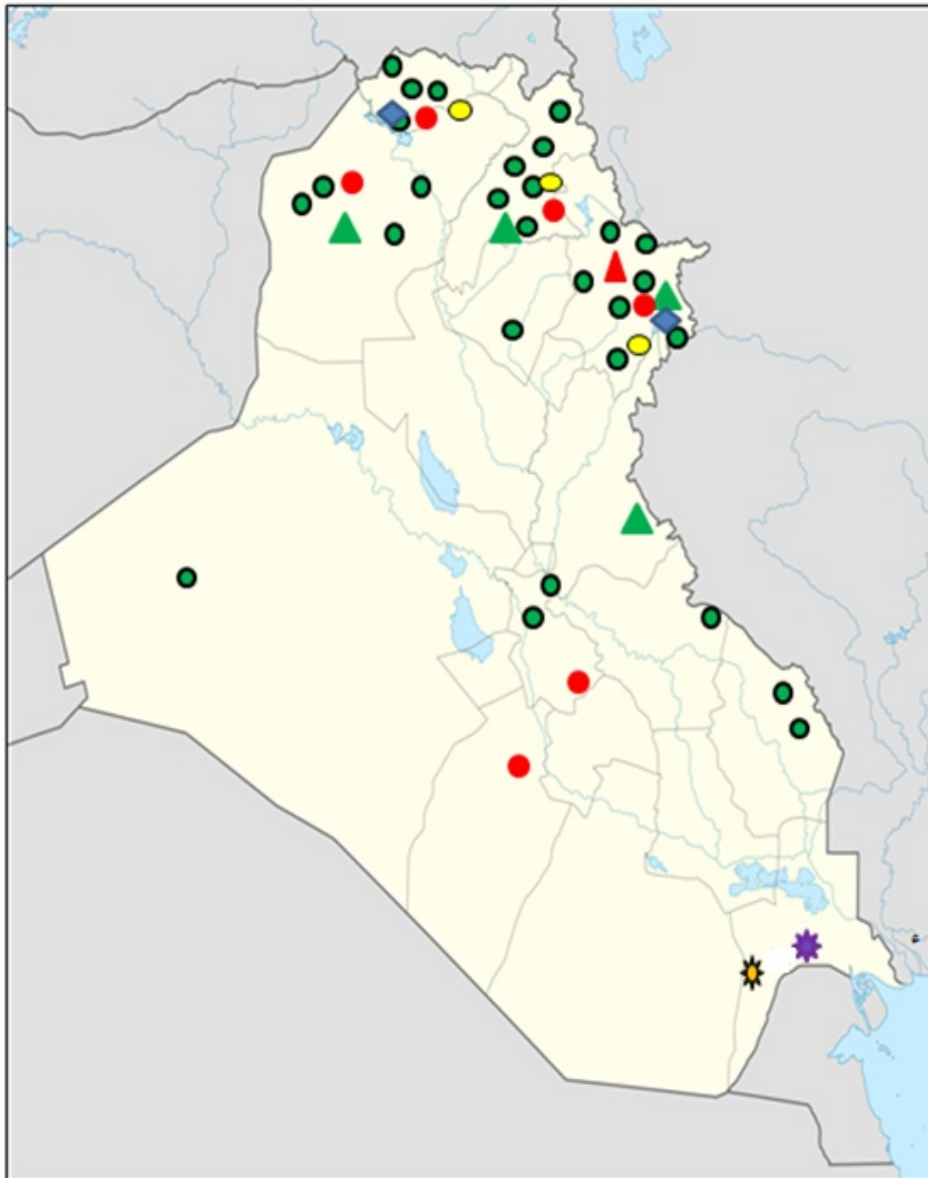


Fig. 1: Distribution in Iraq of ● *P. aegyptiaca*, ● *P. coelistes*, ★ *P. hypertomentosa*,
 ● *P. mutellii*, ★ *P. nama*, ▲ *P. ramosa*, ◆ *P. orientalis*, ▲ *P. oxyloba*, ★ *P. umqasrensis*

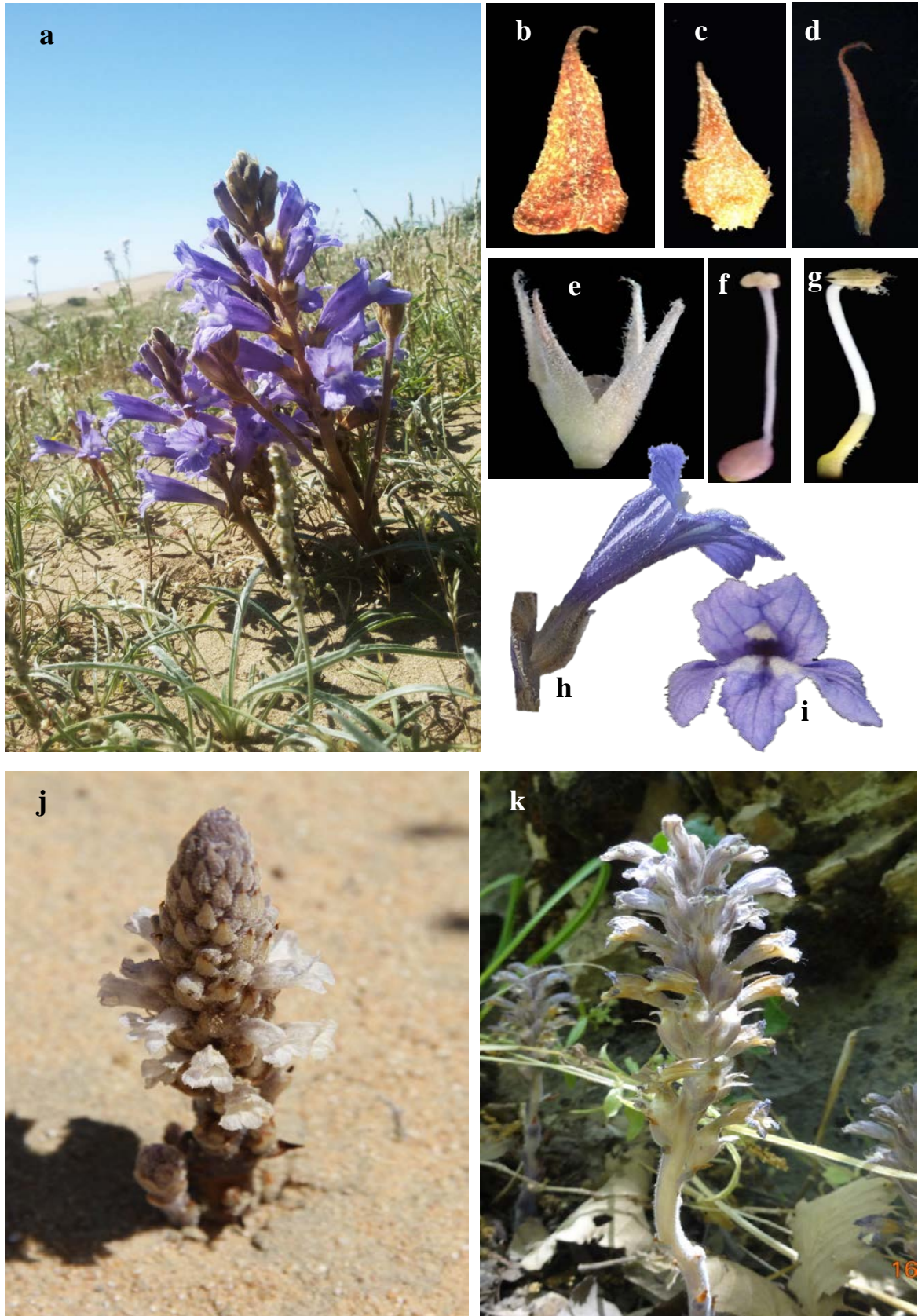


Figure 2: *P. aegyptiaca*: a, Habit b, Scale c, bract d, bracteole e, calyx f, pistil g, stamen h, flower side view i, corolla front view j, *P. umqasrensis* k, *P. nana*

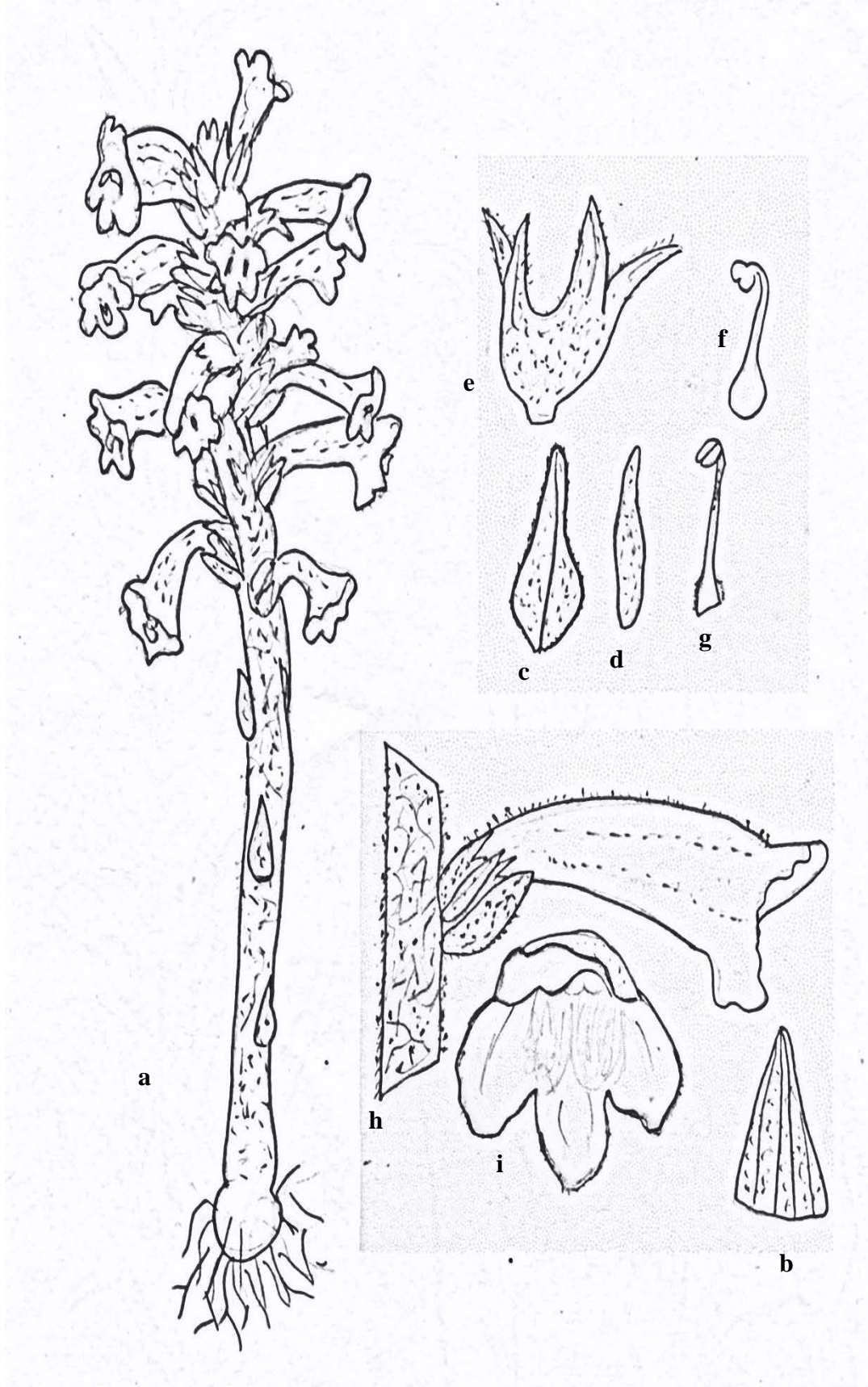


Figure 3: *P. hypertomentosa*: a, Plant habit b, Scale c, bract d, bracteole e, calyx f, pistil g, stamen h, flower side view i, corolla front view



Figure 4: *P. orientalis*: a, Plant habit b, Scale c, bract d, bracteole e, calyx f, pistil g, stamen h, flower side view i, corolla front view

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