

Notes on *Pueraria*, DC., correctly referred by the author to *Phaseoleæ*. By GEORGE BENTHAM, P.L.S.

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DECANDOLLE first published the genus *Pueraria* in the 'Annales des Sciences Naturelles,' iv. p. 97, and in his 'Mémoires sur les Légumineuses,' p. 252, for the *Hedysarum tuberosum*, Roxb., which has the habit and foliage of the large twining Phaseoleæ, besides differing from *Hedysarum* in the inarticulate pod, which, however, he did not possess quite ripe. With this he associated a second, Nepalese species, which had certainly a flat 2-valved Phaseoleous pod. Wight and Arnott (Prod. Fl. Pen. Ind. Or. p. 205) at first followed De Candolle in including the genus among Clitorieæ, but subsequently some specimens in the Hookerian herbarium induced them to believe the pod to be really articulate; and in the Addenda et Corrigenda, p. 445, they express their fear that the genus must be reduced to *Desmodium*. Presuming that this was correct, and seeing that the articulation of the pod was confirmed by the figure in Wight's 'Icones,' t. 412, I proposed, in the 'Plantæ Junghuhnianæ,' i. p. 234, to reduce *Pueraria* to the single *P. tuberosa*, and to add the other species to a new genus *Neustanthus*, which I there established for the *Dolichos phaseoloides*, Roxb., and some allied species. Having now, however, many specimens of *P. tuberosa* with the pod nearly ripe, showing no signs of articulation, I turned to the specimens which had misled Arnott, and find that the supposed articulation is only a contraction between the seeds where an ovule has failed, which appears to be frequently the case; and as to Wight's figure, I find that in the original drawing from which it was taken, the deceptive transverse lines indicating the joints do not exist; they must have been added by Dr. Wight's artist with a view to correcting the drawing to suit the written character. It follows, therefore, that my genus *Neustanthus* must now be merged in *Pueraria*, slightly modifying the character I gave in the 'Plantæ Junghuhnianæ' and in the 'Flora Hongkongensis,' so as to include the flat-podded species. The genus thus established has the habit and pod of *Phaseolus* or of some allied genera, with the flowers more like those of *Dioclea*. It comprises nine species, differing often considerably from each other in the calyx, the form of the petals, or in the degree of adherence of the upper stamen, as well as in the pod, but all, I

believe, most conveniently considered as congeners. The following is a short synopsis of their characters.

*PUERARIA*, DC.

*Calycis* lobi v. dentes 2 superiores in unum integrum v. bifidum connati.

*Vexillum* obovato-orbiculatum, auriculis inflexis sæpissime appendiculatum; *alæ* falcatæ carinæ medio plus minus adhærentes; *carina* rectiuscula v. apice incurva v. rostrata, alis paullo brevior v. sublongior. *Filamentum* vexillare ima basi liberum medio cum cæteris connatum v. rarius omnino solutum. *Antheræ* uniformes. *Ovarium* sessile,  $\infty$ -ovulatum; *stylus* superne incurvus, filiformis, imberbis, stigmatibus parvo capitato. *Legumen* lineare, rectum v. rarius apice incurvum, planum v. demum subteres, 2-valve, intus inter semina nudum fæctum v. septatum. *Semina* parva, estrophiolata, hilo brevi.—*Herbæ* suffrutescentes alte volubiles. *Folia* pinnatim 3-foliolata, foliolis latis integris v. sinuato-trilobis, stipellatis. *Stipulæ* herbacæ v. striatæ. *Flores* in pedunculis elongatis axillaribus v. ad apices ramorum subpaniculatis fasciculato-racemosi, fasciculorum rhachi nodiformi v. rarius in ramulum evoluta. *Bractæ* angustæ v. parvæ caducissimæ; *bracteolæ* parvæ interdum diutius persistentes.

Species omnes Asiaticæ. Genus a *Dioclea* differt legumine et sæpius calyce, a *Galactia* nunc calyce nunc staminibus et semper habitu, a *Phaseolo* affinibusque carina et stylo.

\* *Stipulæ peltatim affixæ (infra insertionem productæ). Calycis* lucinæ tubo longiores. *Legumen planum latiusculum.*

1. P. THOMSONI, Benth. sp. n. *Calycis* lobis acuminatis tubo multo longioribus, vexillo suborbiculato, alis carina obtuse rostrata subbreavioribus, legumine plano latiusculo membranaceo pilis longis rufis hirsutissimo.

*Rami* alte volubiles pilis longis patentibus plus minus hirsuti. *Foliola* late rhombea v. lateralibus late et oblique ovata, breviter et acute acuminata, integra v. late sinuato-triloba, sæpe 4-5 poll. diametro. *Stipulæ* herbacæ semipollicares et longiores, paullo infra medium affixæ; *stipellæ* setacæ, longiusculæ. *Pedunculi* elongati, supra medium floriferi. *Bractæ* lineari-subulatæ, longe ante anthesin deciduæ; *bracteolæ* breves, ovatæ, striatæ. *Pedicelli* ad nodos crassiusculos plures, per anthesin 1 lin., demum 2 lin. longi, reflexi. *Calyx* fere 6 lin. longus. *Vexillum* 8-9 lin. longum, basi auriculis inflexis appendiculatum; *carina* vexillum subæquans. *Filamentum* vexillare ima basi brevissime solutum. *Legumen* rectum, usque ad 4 poll. longum  $\frac{1}{2}$  poll. latum. *Semina* suborbiculato-compressa.

*Hab.* Khasia, J. D. Hooker and Thomson.

2. P. THUNBERGIANA. *Calycis* lobis tubo longioribus, vexillo obovato,

alis carinam incurvo-dilatatam obtusissime subrostratam æquantibus, legumine plano latiusculo membranaceo pilis longis rufis hirsutissimo. — *Pachyrrhizus Thunbergianus*, *Sieb. et Zucc. Fam. Nat. Fl. Jap.* ii. 113; *Neustanthus Chinensis*, *Benth. Fl. Hongk.* 86.

Habitus folia et inflorescentia fere *P. Thomsoni*, sed minus villosa. *Radix* (v. rhizoma?) tuberosa. *Foliola* in speciminibus omnia integra glabriuscula v. subtus pilis adpressis conspersa. *Stipulæ* lanceolatæ, petatæ; *stipellæ* setacæ longiusculæ. *Calycis* tubus 1 lin. longus; lobi lanceolati, supremus latus et infimus angustior 2–2½ lin. longi, laterales paulo minores. *Vexillum* 7–8 lin. longum, reflexum, biauriculatum et supra unguem intus leviter 2-callosum; alæ carina multo angustiores, basi inæqualiter biauriculatæ; carinæ 6–7 lin. longa. *Filamentum* vexillare ima tantum basi brevissime solutum. *Legumen* omnino *P. Thomsoni* nisi sæpius incurvum. *Semina* *P. Thomsoni*.

*Hab.* Japan, *Sieb.*; Nagasaki and Simoda, *Oldham*; Hongkong, *Harland*,

The style and fruit are quite different from those of *Pachyrrhizus*, to which genus Zuccarini had referred it from a similarity of habit and foliage and, in many respects, of flowers.

\*\* *Stipulæ* basi non productæ. *Calycis* dentes v. lobi breves v. tubo æquilongi. *Legumen* planum latiusculum.

3. *P. TUBEROSA*, *DC. Prodr.* ii. 240. *Calycis* tomentoso-villosi lobis tubo brevioribus, vexillo suborbiculato reflexo biappendiculato, alis falcato-obovatis carinam late incurvam obtusam æquantibus, filamento vexillari subsoluto, legumine plano latiusculo pilis longis rufis hirsuto. — *Hedysarum tuberosum*, *Roxb. Fl. Ind.* iii. 363; *Pueraria tuberosa*, *Wight, Ic.* t. 412 (quoad legumen falsa).

*Caulis* e radice (v. rhizomate?) tuberosa altissime volubilis per anthesin sæpius aphylli. *Indumentum* breve molle sæpe tomentosum imprimis in inflorescentia. *Foliola* ampla (½–1-pedalia ex *Roxb.*) rhomboidea v. lateralia oblique ovata. *Stipulæ* ovatæ subcordatæ; *stipellæ* subulatæ. *Pedunculi* rigiduli, ad nodos superiores defoliatos subfasciculati v. paniculati. *Pedicelli* brevissimi, sæpius terni, rhachi fasciculorum minuta nodiformi. *Bractæ* ovato-lanceolatæ, caducissimæ; *bracteolæ* parvæ ovatæ subpersistentes. *Calyx* 2–3 lin. longus mollis, lobis obtusis v. infimo acuto, vix dimidia tubi longitudine. *Vexillum* circiter 5 lin. longum, lateribus reflexis, basi auriculis inflexis appendiculatum. *Legumen* 2–3 poli. longum, 3–4 lin. latum, inter semina sæpe constrictum.

*Hab.* Hill forests throughout E. India.

4. *P. CANDOLLEI*, *Grah. in Wall. Cat. Herb. Ind.* n. 5353. *Calycis* glabriusculi lobis acutis tubo paullo longioribus, vexillo orbiculato biappendiculato, alis late falcatis carinam subincurvam obtusam superantibus, filamento vexillari medio cum cæteris connato, legumine plano latiusculo glabro v. vix puberulo.

*Caulis* altissimus ut videtur more *P. tuberosæ* per anthesin aphyllus. *Foliola* ampla stipulæ et stipellæ *P. tuberosæ*. *Pedunculi* longissimi, fere a basi floridi, ad nodos defoliatos paniculati, apice bracteis linearibus breviter comosi. *Nodi floriferi* vix conspicui, pedicellis sub-solitariis v. fasciculatis 1-2 lin. longis. *Calyx*  $3\frac{1}{2}$  lin. longus, lobis lanceolatis; *bracteolæ* parvæ. *Vexillum* 6 lin. longum, lateribus reflexis. *Carina* alis non latior. *Legumen* fere *P. Wallichii*, sed non nisi immaturum vidi.

*Hab.* Pegu, Wallich, Lobb, Maclellan.

5. *P. PEDUNCULARIS*, Grah. in Wall. Cat. Herb. Ind. n. 5354. Calycis glabriusculi laciniis tubo brevioribus, vexillo obovato angustè biauriculato, alis carinam apice inflexo-dilatatam erostrem subsuperantibus, filamento vexillari soluto, legumine plano latiusculo glaberrimo.—*Neustanthus peduncularis*, Benth. in Pl. Jungh. i. 255.

*Herba* alte volubilis, villosa. *Foliola* ampla, integra, acuminata, uti stipulæ et stipellæ, iis *P. Wallichii* similia. *Pedunculi* elongati, tenues. *Pedicelli* graciles, fasciculorum rhachi parva nodiformi. *Calyx* latus, tenuis,  $2\frac{1}{2}$  lin. longus, lobo supremo latissimo 2-dentato, inferioribus acutiusculis tubo paullo brevioribus. *Petala* fere 7 lin. longa, in sicco pallida, carina apice intensius colorata. *Vexillum* basi angustatum, ecallosum. *Filamentum* vexillare latiusculum et vaginæ cæterum arete appressum, at non adhærere videtur. *Legumen* rectum, nitidulum, 2, rarius 3 poll. longum, 3 lin. latum, valvis submembranaceis.

*Hab.* Nepal, Wallich; Khasia and Sikkim, J. D. Hooker and T. Thomson.

6. *P. WALLICHII*, DC. Prodr. ii. 240, et Mem. Leg. t. 43. Calycis glabriusculi truncati dentibus brevissimis latis, vexillo obovato vix auriculato, alis carina leviter incurva subbrevioribus, filamento vexillari cum cæteris connato, legumine plano latiusculo glabro subcoriaceo. Alte volubilis, tenuiter pubescens v. glabrescens. *Foliola* ampla, obliqua, acuminata, integra. *Stipulæ* lanceolatae, caducissimæ; *stipellæ* minutæ, setaceæ. *Pedunculi* elongati, graciles. *Pedicelli* graciles, fasciculorum rhachi in forma normali parva subnodiformi. *Calyx* vix 2 lin. longus, membranaceus, dentibus nunc obsoletis nunc brevissimis latis, infimo paullo eminentiore. *Vexillum*  $\frac{3}{4}$  poll. longum, basi in unguem brevem angustatum, exauriculatum v. auriculis angustissimis inflexis subappendiculatum. *Carina* vexillum æquans. *Filamentum* vexillare ima basi brevissime solutum, cæterum per anthesin cum cæteris in tubum clausum connatum. *Legumen* rectum, 3-5 poll. longum, 3-6 lin. latum.

*Hab.* Nepal, Khasia, Assam, Burma.

Var. *composita*, florum fasciculorum rhachi in ramulum brevem excurrente.—*P. composita*, Grah. in Wall. Cat. Herb. Ind. n. 5570.

*Hab.* With the normal form.

\*\*\* *Stipulæ infra insertionem non productæ. Calycis lacinia tubo longiores v. paullo breviores. Legumen angustum (1½–2 lin. latum) compressum v. subteres, intus sæpius septatum.*

7. *P. PHASEOLOIDES.* Calycis pilosi dente infimo setaceo-acuminato tubo longiore cæteris brevioribus, alis carinam breviter rostratam superantibus, legumine angusto subtereti piloso.—*Dolichos phaseoloides*, Roxb. *Fl. Ind.* iii. 316; *D. viridis*, Ham. in Wall. *Cat. Herb. Ind.* n. 5559; *Phaseolus decurrens*, Grah. in Wall. l. c. n. 5612; *Neustanthus phaseoloides*, Benth. in *Pl. Jungh.* i. 234.

Tota pilis rufescentibus v. in pagina inferiore foliolorum subcanescentibus plus minus vestita. *Foliola* ovato-rhombea, integra v. sæpe triloba, subtus dense sericeo-villosa. *Stipulæ* ovato-lanceolatae, striatae. *Stipellæ* longiuscule setacæ. *Pedunculi* subsemipedales, supra medium interrupte floridi, fasciculorum rhachi nodiformi. *Flores* vix 4 lin. longi. *Calyx* 2 lin. longus, lobo v. dente summo triangulari 2-dentato, lateralibus parvis, infimo multo longiore. *Legumen* 2, v. interdum 3 poll. longum, 1½ lin. latum, intus inter semina septatum. *Semina* parva, transverse oblonga, hilo laterali.

*Hab.* Common in Northern and Eastern India, Malacca, and S. China.

8. *P. JAVANICA.* Calycis puberuli dentibus obtusis omnibus tubo brevioribus, alis carinam arcuato-subrostratam subæquantibus, legumine angusto subtereti piloso.—*Neustanthus Javanicus*, Benth. in *Pl. Jungh.* i. 235; *Miq. Fl. Ind. Bat.* i. pars i. 218. t. 4.

*P. phaseoloidi* affinis, sed omnibus partibus major. *Caulis* pilis longis hirsutus v. fere glaber. *Foliola* integra v. triloba, subtus pilis adpressis nunc raris nunc densis vestita. *Indumentum* inflorescentiæ breve subsericeum. *Flores* quam in *P. phaseoloide* multo majores. *Calyx* 3 lin. longus, petala 7–8 lin. longa.

*Hab.* Java, Zollinger, Junghuhn, Horsfield, and others.

*Neustanthus sericans* (Miq. *Fl. Ind. Bat.* i. part 1. 218) appears to be a slight variety, with very few or none of the long spreading hairs of the common one.

9. *P. SUBSPICATA.* Calycis lobis setaceo-acuminatis tubo longioribus, alis carina arcuato-rostrata brevioribus, legumine angusto compresso piloso.—*Dolichos spicatus*, Wall. *Cat. Herb. Ind.* n. 5557; *Neustanthus subspicatus*, Benth. in *Pl. Jungh.* i. 234.

*Habitus et folia P. Javanicæ.* *Racemi* superne densiflori, fasciculis multifloris, rhachi nodiformi. *Bractæ* lato-lanceolatae caduæ; *bracteolæ* ovato-lanceolatae, striatae, subpersistentes. *Pedicelli* 1–2 lin. longi. *Calyces* rufo-pilosi, 4–6 lin. longi. *Vexillum* et *carina* ¾-poll. *Legumen* 3–5 poll. longum, vix 2 lin. latum, subplanum.

*Hab.* Assam and Khasia.