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## PLAGIOBOTHRYIS, Fisch. &amp; Meyer, nunc maxime ampliatus.\*

Calyx, corolla, stamina, etc. *Krynitzkiæ*. Nuculæ lato-ovatæ vel subtrigonæ, sæpius incurvæ, crustacæ vel coriacæ, dorso convexo rugosæ vel asperatæ, rarissime læves, aut erecto-incumbentes, aut 2 vel 3 abortientibus succumbenti-horizontales, intus versus apicem carinatae, versus (nunc infra raro supra) medium per pseudo-carunculam (perforatam vel solidam) gynobasi latæ adfixæ, dum secedentes foveas vel areolas depressas totidem in gynobasi nudantes. — Herbæ annuæ, Occidentali-Americanæ, humiles, sæpius diffusæ, corolla alba in plurimis parva. — *Plagiobothrys*, Fisch. & Meyer, Ind. Sem. Hort. Petrop. ii. (1835) 46, & A. DC. Prodr. x. 134; spec. typica solum. *Eritrichium* § *Plagiobothrys*, Gray, Proc. Am. Acad. x. 57, Syn. Fl. ii. 191, & Proc. Am. Acad. xvii. 226.

\* AMBIGUI: gynobasis oblongo-pyramidata, foveis vel fossis nuculiferis elongatis ovato-oblongis seu lineari-oblongis exarata: caruncula angusta, subcarinæformis, trientem nuculæ longitudine subæquans: pubes hispido-hirsuta: flores mediocres, corollæ fere rotatæ limbo lin. 3-4 lato.

P. KINGII. *Eritrichium Kingii*, Watson, Bot. King Exped. 243, t. 23; Gray, Syn. Fl. ii. 192, maxima parte. — Eastern side of the Sierra Nevada at Truckee Pass, &c., California (first coll. by Watson), and adjacent borders of Nevada, Lemmon, Mrs. Layne-Curran, by the last two at length with mature fruit.

\* \* GENUINI: gynobasis subglobosa vel convexa: nuculæ reticulato-rugosæ vel muriculatæ, raro lævigatæ, pseudo-caruncula aut annulari aut strumæformi (nec stipitiiformi) pl. m. indurata arcte persistente instructæ, tarde secedentes, areolas depressas totidem orbiculatas in gynobasi relinquentes: flores aut pseudo-spicati nudi, aut rarius glomerati: pubes mollis (villosa vel hirsuta) necnon cum setis debilibus e basi papillosa ortis in foliis inferioribus.

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\* *Plagiobothrus* was evidently intended, *Βόθρος* being the word for pit or hollow, and there is no Greek word answering to *bothrys*. Although we may not correct the form of the name, we must hold to the masculine gender. Although the name, in its original application to the hollow in the face of the nutlet, is good only for the single original species, it is not far amiss for the others also, in view of the hollows left on the gynobase after the nutlets fall. These are shallow pits or depressions, or areolæ with raised borders, orbicular or nearly so except in the first species, in two or three of them with the borders so thickened or salient that the gynobase after the nutlets fall is cruciform when all four nutlets mature. More commonly only one or two nutlets ripen.

+ *Typici, Perforati*: nuculæ parum incurvæ, dorso lato convexo angustissime carinatæ, intus supra basim in pseudo-umbilicum profundum caruncula depressa annuliformi marginatum excavatæ: herbæ laxæ, graciles; spicis vel racemis cymæ uni- vel bipari demum elongatis sparsifloris fere ebracteatis; calyce alte 5-partito laxe erecto persistenti. — *Plagiobothrys*, Fisch. & Meyer, & DC. Prodr. l. c.

P. RUFESCENS, Fisch. & Meyer, l. c., A. DC. l. c. *Myosotis alba*, Colla, Act. Taur. (Pl. Bert. no. 88), fide A. DC. *M. fulva*, Hook. & Arn., Bot. Beech. 38, non 369. *Eritrichium fulvum*, A. DC. Prodr. x. 132; Gray, Proc. Am. Acad. xvii. 226. — Chili, *Bertero, Bridges*, and others. W. California on the border of Oregon, *Howell*, and in Colusa and El Dorado Counties, *Mrs. Layne-Curran*, 1884. Also near Los Angeles, coll. *J. C. Nevin*, 1882, recently received. Only in the North American specimens which have now happily come to hand, first from Mr. Howell and then from Mrs. Layne-Curran, have I mature fruit, verifying the original character. But I am now able to verify it on a specimen of Bertero's no. 443, immature though it be. The mature nutlets in the Californian plant are from a line and a half to two lines long. Their size is not mentioned by Fischer and Meyer; by De Candolle they are said to be hardly over a line in length; probably not well grown in the cultivated plant. Neither of the authorities mentions the narrow keel on their back. Their form, "illis *Echii* sub-similis," is well given by the founders of the genus; also the "rugosa, tuberculata" by them, and the reference of this to the inner side of the nutlet by De Candolle. There is considerable variation in these respects, as well as in the texture of the pericarp, which commonly becomes cartilagineous or thin-crustaceous, the back either rugose with slender and elevated transverse wrinkles, and with or without minute papillæ in the interspaces, or with these and no rugosity, or with both obsolete. The keel and an obscure or manifest acute crest or angle on each side, between the back and inner face, are sometimes almost entire, sometimes denticulate or even muriculate, as are the sharp ventral rugæ. The "strophiole," or as I prefer to call it the (false) caruncle, is well developed in all mature fruit as a tumid ring around the orbicular cavity. It is never left behind on the gynobase, as De Candolle describes: what was taken for such may be the thickened and projecting portions of the gynobase between the insertions, which are in the hollows. These hollows when fresh are more or less umbonate, the umbo fitting into the round and ample cavity of the nutlet. The caruncular ring is complete, but the basal side is thicker than the

upper, where it connects with the narrow and salient ventral carina. There is hardly a doubt of the essential identity of the Californian with the Chilian species, although mature specimens of the latter are to be desired. And it is most probable that it is indigenous to both regions.

+ + *Scutellati*: nuculæ fere rectæ, intus supra basim caruncula ovato-deltoidæ applanata scutelliformi sub centro pervio vix excavata instructæ: folia inferiora opposita.

P. PROCUMBENS. *Eritrichium procumbens*, DC. Prodr. x. 133 (*Myosotis procumbens*, Colla, l. c., ex DC.); Pl. Chili, Bertero, no. 145. A slender little plant, which, by the well-developed caruncle (the centre of which is perforate, although the nutlet is hardly at all excavated underneath it) apparently should belong to this genus, rather than to *Krynitzkia*. The nutlet is little over half a line in length.

+ + + *Imperforati*: nuculæ magis incurvæ, medio-fixæ, ad insertionem haud excavatæ, caruncula parvula imperforata strumæformi vel linguæformi instructæ: gynobasis parva, vix hemisphærica.

+ + *Chilensis*, tenellus, "papyros violaceo colore tingens" (Ruiz & Pavon), microcarpus.

P. TINCTORIUS. *Lithospermum tinctorium*, Ruiz & Pav. Fl. Per. ii. 4, t. 114. *L. tingens*, Lehm. *Eritrichium tinctorium*, A. DC. Prodr. x. 132.

+ + + Amer. Bor.-Occidentales.

= Nuculæ maturæ intus concavæ, basi apiceque abrupte contractis quasi cruciatim quadrilobæ, vitreo-crustaceæ, nitidulæ, dorso transversim lineato-rugosæ, nempe lineis rectis angustissimis impressis inter rugas latas a marginibus subcristatis ad carinam parum elevatam percursæ: herbæ parvulæ, erectæ; calyce alte 5-fido persistente vel sero juxta basim imperfecte circumscisso, lobis lato-lanceolatis pube primum rufescente demum fulva villosis.

P. TENELLUS. *Myosotis (Dasymorpha) tenella*, Nutt. in Hook. Kew Jour. Bot. v. 295. *Eritrichium tenellum*, Gray, Proc. Am. Acad. x. 57, & Syn. Fl. ii. 192. *E. fulvum*, Watson, etc., non A. DC. Calyx fructifer lin. 2 longus. Nuculæ lineam longæ, insigniter quadrilobæ (basi fere ut apice contracta), pl. m. muriculato-asperatæ. — Not uncommon from British Columbia east to Idaho and south to San Bernardino Co., California, chiefly in the western part of the interior region.



P. SHASTENSIS, Greene in herb. Flores majores; calyce fructifero lin. 3 longo; nuculis sesquilineam longis lævibus vel ad margines, tantum muriculatis. — California, in valley at the base of Mount Shasta, *E. L. Greene*, coll. 1876. Perhaps only a variety of the preceding, the calyx of which sometimes approaches this in size.

— = Nuculæ lato-ovatae, haud cruciatae,

a. Vitreo-crustaceæ, vix nitidulæ, obcompressæ, dorso vix carinato lineis angustissimis impressis inter rugas latas rectas transversim percursæ: caules mox ramosi, diffuso-procumbentes, cum foliis oblongis (superioribus flores fulcrantibus) hispidulo-hirsuti, papyros herbarii violaceo colore tingentes: calyx haud circumscissus.

P. TORREYI. *Eritrichium Torreyi*, Gray, l. c. — In the Yosemite Valley and vicinity; coll. only by *Torrey* and *Lemmon*.

b. Nuculæ opacæ, nec vitreæ, nec indurato-crustaceæ, dorso parum carinato rugis sparsis angustis prominentibus subreticulatis areolas multo majores circumscribentibus instructæ, sæpeque minutim granulatae.

1. Calyx 5-partitus vel profunde 5-fidus, sero juxta basim circumscissus vel persistens: spicæ sæpissime simplices (i. e. cymæ uniparæ), hinc inde foliatae, irregulares: herbæ sæpius a basi ramosæ et diffusæ; corolla limbo parvo.

P. ARIZONICUS, Greene in herb. *Eritrichium canescens*, var. *Arizonaicum*, Gray, Proc. Am. Acad. xvii. 227. Hirsutus, subhispidus pilis patentissimis, nunquam canescens, facie præcedenti subsimilis, foliis angustioribus. Calyces fructiferi haud ultra lin. 2 longi, segmentis sæpius supra fructum conniventibus, basi demum circumscissi. Nuculæ maturæ subcrustaceæ, nunc albescentes, rugis acutissimis nunc tuberculis minimis paucis instructis. — Arizona and adjacent borders of Utah, coll. *Greene*, *Palmer*, *Lemmon*, *Pringle*, *Parish*, &c. This apparently quite distinct species has been variously distributed under the names of *Eritrichium canescens* and *E. fulvum*, which in different forms it most resembles.

P. CANESCENS, Benth. Pl. Hartw. 326. *Eritrichium canescens*, Gray, l. c. Pilis mollioribus villosopubescens, subcanescens. Calyces fructiferi lin. 2–3 longi, aut laxè erecti aut patenti-aperti, persistentes, raro imperfectè circumscissi. Nuculæ rugis obtusioribus. — California, from the valley of the Sacramento to Los Angeles and San Bernardino, apparently first collected by *Hartweg*. Varies in the degree of accrescence of the calyx, which in the same plant may be either loosely open or erect, or with the lobes somewhat connivent.

2. Calyx a medio tantum 5-fidus, sesquilineam longus, pube primum rufa demum fulva seu albida sericeo-villosa; fructifer parum accrescens lobis conniventibus, mox supra basim circumscissus nuculas semi-nudans: corolla inter affines insignis, limbo rotato 5-lobo ad lin. 4 diametro: caules erecti, semi- ad bi-pedales, graciles, cum foliis viridibus parce hirsuti vel pubescentes: spicæ cymæ nudæ sæpius conjugatæ vel quasi paniculatæ, demum elongatæ et graciles, ebracteatæ.

P. NOTHOFULVUS. *Myosotis fulva*, Hook. Fl. Bor.-Am., pro parte, & Bot. Beech. 369, non Hook. & Arn. Bot. Beech. 38. *Eritrichium fulvum* (A. DC. Prodr. l. c. quoad Pl. Calif.), Gray, Proc. Am. Acad. x. 57, & Syn. Fl., excl. syn., etc. *E. nothofulvum*, Gray, Proc. Am. Acad. xvii. 227. *Bothriospermi?* sp., Benth. Pl. Hartw., l. c. no. 1873. — Common throughout California and north to Washington Territory.

\* \* \* STIPITATI: nuculæ rectiusculæ, obliquæ, gynobasi depressæ ope pseudo-carunculam pl. m. stipitiforem induratam adfixæ; areolæ gynobasis orbiculatæ parvulæ: herbæ humiles, e radice annua ramossissimæ, mox prostratæ; calyce profunde 5-partito, fructifero persistente. *Echidiocarya* spec., Gray, Proc. Am. Acad. xii. 164, & Syn. Fl. ii. 199.

P. URSINUS. *Echidiocarya ursina*, Gray, Proc. Am. Acad. xix. 90. Cæspitanti-depressus, undique hispidus, foliosissimus; foliis aut spatulatis aut superioribus flores pleros sæpe glomeratos fulcrantibus oblongis; corolla calycem vix superante, limbo parvo; nuculis tenuiter parciterque rugoso-reticulatis lævibus, caruncula brevi. — S. California, in Bear Valley of the San Bernardino Mountains, *Parish Brothers*, and northern confines of Lower California, *C. R. Orcutt*. Some slight papillosities are occasionally developed on the sides of the nutlets.

P. COOPERI. *Echidiocarya Californica*, Gray, Proc. Am. Acad. xii. 164, etc. Laxe diffuso-ramosus, hispidulus vel hirsutus; ramis gracilibus sparsifoliis demum sparsifloris; foliis angustioribus; floribus perisque ebracteatis; corollæ limbo expanso lin. 2-3 lato; nuculis magis trigonis reticulato-rugosis, rugis acutis hinc inde dentato-muriculatis, caruncula stipitifermi porrecta. — Southern California, common around San Diego and eastward, first coll. by *Cooper*, later by *Parry*, *Lemmon*, *Cleveland*, *Orcutt*, &c., and within the borders of Lower California by *Parry* and *Pringle*. The stipe-like caruncle is variable in length. The comparatively recent discovery of the preceding

species of this section has made it clear that both of them should fall into *Plagiobothrys*, a genus now shown to comprise a good number of species, and considerable diversity in the form and texture of the caruncle-like body by which the nutlets are attached to the gynobase.

\* \* \* ANOMALI: nuculæ rectiusculæ, nec rugosæ nec muricatæ, medio vel supra medium areolis orbiculatis gynobasis depressæ adfixæ, pseudo-caruncula præmolli minus persistente: herbæ (Sierra-Nevadense) diffusæ, ramosissimæ, rudes, hispidæ; caulibus ad apicem usque foliatis; floribus semper glomeratis foliis (superioribus latioribus basi lata arcte sessilibus) fulcratis; calycibus 5-partitis, fructiferis apertis cum pedicellis brevissimis diu persistentibus.

The first of these species would pass unquestioned for a *Plagiobothrys* of a coarser sort, with the habit of *P. Torreji* and *P. ursinus*. The second, of similar aspect, is more anomalous in the smooth and somewhat polished nutlets, with insertion well above the middle. The insertion in both is by a small and depressed central umbo, which fits into the very shallow round areola on the gynobase, the low margins of which are continuous with the soft-fleshy annulus or collar (so soft as to become pultaceous in hot water), which goes with the nutlet when this falls away, and forms a scale-like caruncle, of variable outline, and easily broken up. For both these species we are indebted to the same zealous and sharp-sighted botanist.

*P. HISPIDUS*. Semipedalis; foliis inferioribus lineari-vel angustospathulatis, superioribus oblongis (vix semipollicaribus, flores superantibus; nuculis turgide ovatis acutis dorso leviter obtuseque carinatis undique subpapilloso-granulatis opacis medio vel paullo supra medium insertis. — Truckee, on the eastern border of California, *Mrs. Layne-Curran*, 1884.

*P. GLOMERATUS*. Validior; foliis latioribus sæpius ovato-oblongis; nuculis nitidis fere lævibus ovali-ovatis minus turgidis (paullulum obcompressis) dorso convexiusculo haud carinatis intus inter medium et apicem insertis. — Western part of Nevada, between Carson and Virginia City, 1883 and 1884, *Mrs. Layne-Curran*.

ECHIDIOCARYA, reduced to the typical species, *E. ARIZONICA*, reverts to the original character in Proc. Am. Acad. xi. 89, and Benth. & Hook. Gen. Pl. ii. 854, *E. Californica* and *E. ursina* being now referred to a subdivision of *Plagiobothrys*.