

NEW PHANEROGAMS FROM THE ARID NEOTROPICS

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In course of field work in Mexico in connection with a projected revision of *Dalea*, and in routine identification at New York Botanical Garden, several undescribed phanerogams have come to light. Descriptions and diagnoses of these are presented:

Psoralea holosericea Barneby, sp. nov., *P. mexicana* (L. f.) Vail affinis, ob pubem densam sericeo-tomentosam omnium fere partium solum cum ejus var. *Trianae* (Vail) Macbr. comparanda, sed ab hac (in Ecuadoria australi sympatrica) pube longiori (pilis ad 1.2-1.6 nec 0.5-1.1 mm usque longis) et praesertim calycis albonec fusco-hirsuti tertia parte longioris dente dorsali subduplo longiori petala subsuperanti absimilis.

Verosimiliter frutex 1-2-metralis habitu *P. mexicana* simillima, praeter foliorum paginam superiorem tantum secus nervos subapresse pilosulam pilis patulis undique molliter cano-hirsuta; foliorum petiolus 1-1.5 cm longus, foliola ovato-acuminata (3) 3.5-5.5 cm longa; racemi spiciformes paniculatim dispositi ineunti anthesi densiflori 3-3.5 cm longi, $\pm$ 1.5 cm diametro, breviter pedunculati et subsessiles; calycis barbato-sericei eglandulosi pube ablata membranacei viridis $\pm$ 7 mm longi tubus ad anthesin 2.5-3 mm longus, dens dorsalis aliis paullo longior fere 4 mm longus petala aequans vel breviter superans; petala azureo-marginata, vexillum alaeque 5.7 mm, carina 5 mm longae; calyx fructifer verosimiliter accrescens cum legumine ignotus.

ECUADOR. Azuay: locally common, km 83 out of Cuenca on road to Loja, alt. 3000 m, September 25, 1959, *Bassett Maguire & Celia K. Maguire* 44,307. — Holotypus, NY; isotypi, K, US, USM.

In general habit, in shape and size of leaves, stipules and bracts, and in form of calyx and petals, *P. holosericea* closely resembles *P. mexicana* (L. f.) Vail as interpreted by Macbride (in Field Mus. Bot. 133: 358-360. 1943). Because of the dense, soft, hirsute (and on the stems also subtomentose) pubescence of all parts except the upper leaf surface which is pubescent only in lines along the principal nerves, the new species suggests *P. mexicana* var. *Trianae* (Vail)

Macbride; but the vesture of var. *Trianae*, although similar in quality, is much shorter, and in the inflorescence differs in color. The bracts and calyces of *P. holosericea* are shaggy with long, soft, lustrous, white hairs, whereas those of var. *Trianae* are hirsutulous with shorter and stiffer, mostly ascending and black or fuscous (mixed with a few longer pale) hairs among which arise many stalked or sessile glands. However the presence of glands is a variable feature in the Andean psoraleas and cannot be relied on as a differential character. More important differences are found in the relative proportions of the calyx and petals. In *P. mexicana* (sens. lat.) the petals are ± 5 mm long, but at early anthesis project well beyond the small, relatively short-toothed calyx; in *P. holosericea* they are of nearly the same size but are included in the much longer calyx. In consequence the young flowering spike of *P. holosericea* appears substantially thicker than that of any form of *P. mexicana*. The differences may be summarized:

Stem (at least upward), lower leaf-surface and inflorescence densely silky-hirsute with spreading hairs up to 1.2-1.6 mm long; calyx at anthesis ± 7 mm long, pale green beneath the white vesture, eglandular or nearly so, the dorsal tooth ± 4 mm long, equaling or slightly surpassing the petals *P. holosericea*

Stem, lower leaf-surface and inflorescence hirsutulous with antrorsely ascending and spreading hairs up to 0.5-0.9(1.1) mm long; calyx at anthesis ± 4.5 mm long, livid beneath the largely or partly black vesture, usually glandular, the dorsal tooth 2.2-2.5 mm long, shorter than the petals. *P. mexicana* var. *Trianae*

Polygala (§ *Adenophora*) **evolvulacea** Barneby, sp. nov., *P. macradeniae* Gray affinis sed caulibus gracillimis flexuosis et praesertim floribus subdimidio brevioribus, alis 2-2.7 (nec 4-5.5) mm longis carinae brevioribus nec aequilongis vel longioribus, ulterius ab ejus var. *glanduloso-pilosa* (Chod.) Blake cum qua pube parciuscula brevi congruit foliis anguste obovatis duplo latioribus absimilis.

Caules gracillimi flexuosi debiles prostrati ac incurvi 1-2.5 dm longi ut folia pilis incurvis ± 0.15 mm longis puberuli virides nunc purpureo-tincti; folia 2.5-4.5 mm longa secus ramulos sparsa nec conferta

nec imbricata anguste obovata vel oblanceolata acutiuscula 1-1.9 mm lata glandulis pellucidis utrinque obsessa; racemi brevissime 1-4-flori folio suffulcranti superati; sepala ovata cymbiformia 0.6-0.9 mm longa 0.4-0.5 mm lata extus puberula; alae obovato-cuneatae obtusae 2-2.7 mm longae, 0.9-1.5 mm latae extus pilosulae, totae vel supra medium violascentes; carinae exsertae 2.6-3.6 mm longae luteae lamina oblongo-quadrata obtusa integra 1.3-1.7 mm longa; capsula semenque nisi arillus paullo brevior iis *P. macradeniae* similes.

MEXICO. Tamaulipas: vertical bank of soft crumbling rotted limestone, ± 300 m (1000 ft.), brushy hillside on the first bench of Sierra Madre Oriental ± 6.5 km (4 mi) W of Antiguo Morelos, November 22, 1966, *Ripley & Barneby* 14,755. — Holotypus, NY; isotypi, CAS, GH, MICH, US.

The center of diversity of *Polygala* subsect. *Adenophora* Blake (Cont. Gray Herb., New Ser. 42: 54. 1916, subsequently treated as sect. *Adenophora* in N. Am. Fl. 25: 334-5. 1924) extends through central and southeastern San Luis Potosí into Nuevo León, on the limestones of the Sierra Madre Oriental and the contiguous plateau. All three species known to Blake are either endemic to this region or occur in it. Of the three, *P. glandulosa* H. B. K. and *P. phoenicistes* Blake have broadly obovate leaves and flowers much larger than those of *P. evolulacea*, which is therefore likely to be confused only with *P. macradenia* Gray and in particular, because of its green, sparsely and shortly puberulent foliage, with the relatively southern and more nearly sympatric *P. macradenia* var. *glanduloso-pilosa* already mentioned in the diagnosis. The new species differs from *P. macradenia* as a whole in its smaller, differently proportioned flower in which the wings are both absolutely and relatively shorter. Furthermore the pliantly flexuous, distally incurved or trailing, very slender and sparsely leafy stems are markedly different from the crowded, stiff and usually erect, densely leafy tufts of *P. macradenia*. From var. *glanduloso-pilosa*, still known only from two Purpus collections from west of the Sierra Madre crest at over 1000 m in San Luis Potosí, it differs in its leaves of lance-obovate rather than almost linear outline, and in its habitat

in a quite alien vegetational belt at only 300 m in the Sierra's eastern foothills.

Polygala (§ *Eurhinotropis*) **erythrorrhiza** Barneby, sp. nov., *P. Tweedyi* Britt. proxime affinis sed caulibus debilibus flexuosis ex ipso radicis carnosae rubro-aurantiacae collo (nec e caudice suffruticuloso) ortis, foliisque latioribus iis racemo oppositis ellipticis membranaceis 2-4 (nec linearibus vel lineari-ellipticis 1-1.5 mm latis absimilis.

Caules graciles omnino herbacei (1) 1.5-3.5 dm longi, ut folia pilis mollibus incurvis minutim densiuscule puberuli virides; folia nisi ima et summa breviora subhomomorpha lanceolato-elliptica vel elliptica acuta mucronata margine revoluta pinnatim paucinervia, saltem media 1-2.2 cm longa 2-5 mm lata; racemi oppositifolii subsessiles geniculati 5-12-flori; flos, capsula semenque fere ut in *P. Tweedyi*; alae pallide roseae glabrae; petala interiora basin versus ciliata, carinae rostro obtusissimo vix 0.5 mm longo.

MEXICO. Guerrero: hanging down out of crevices of soft gypseous-conglomerate rock face, low cliff $\pm$ 18 km (11 mi) S of Iguala, 870 m (2600 ft), November 9, 1964, *Ripley & Barneby* 13,737. Holotypus, NY; isotypi, CAS, K, MICH, US.

The small-flowered herbaceous polygalas of subsect. *Eurhinotropis* Blake (Cont. Gray Herb., New Ser. 42: 71. 1916, raised to rank of sectio in N. Am. Fl. 25: 310 (key) + spp. 99-103 incl. 1924) are a critical group, all of the more widely dispersed members being variable in pubescence of the foliage and flower-parts as well as in size of the individual flower. Specific lines are hard to draw, for the available differential criteria are seldom absolute. The center of speciation lies on the arid altiplano of northern Mexico and adjoining United States; no species has been reported hitherto from south of Hidalgo. The discovery of *P. erythrorrhiza* in the middle Balsas valley south of the Transverse Volcanic Belt thus marks a substantial range extension for the group. The closest relative of *P. erythrorrhiza* is probably the distantly allopatric *P. Tweedyi*. Both have puberulent stems and leaves, and the flower of *P. Tweedyi*, although commonly a little larger, varies in size down to a small extreme hardly different from that of *P. erythrorrhiza*. The best diagnostic features are found in the foliage and habit of

growth. Mature plants of *P. Tweedyi* develop a woody root and suffrutescent caudex, and either all leaves or at least those leaves borne above the middle of the stem and opposed to the racemes are linear to linear-elliptic in outline and of firm, subcoriaceous texture. The stems of *P. erythrorrhiza* spring directly from the truncate apex of a fleshy, coralloid, orange-red taproot, and the homomorphic leaves are all elliptic and of relatively thin texture. In general facies *P. erythrorrhiza* suggests the primarily Texan *P. Lindheimeri* Gray, ordinarily characterized by a vestiture of longer spreading hairs, and the too closely related *P. nitida* T. S. Bdg., which seems to be little more than a puberulent phase of it. However this may be, *P. Lindheimeri* and *P. nitida* differ collectively from *P. erythrorrhiza* in the strong tertiary nervature of the leaves, which become prominently reticulate when mature, not merely penninerved. The other described members of subsect. *Eurhinotropis* are more easily distinguished by their small leaves.

Anisacanthus stramineus Barneby, sp. nov., ob bracteas amplas foliaceas calyci amplexo longiores cum *A. abdito* T. S. Bdg. necnon *A. ochoterenae* Miranda comparanda, ab illo foliis floralibus subsessilibus et corolla straminea, ab hoc corolla bracteisque dimidio minoribus facile distincta.

Frutex submetralis, cortice vetustiori albido, caulibus novellis pilis patulis villosissimis eglandulosis, foliis pilis multicellularibus sparsis cum brevioribus capitato-glandulosis crebris commixtis viscido-pubescentibus; folia difformia, caulina (ad anthesin caduca) majuscula petiolata (petiolo ad 1 cm usque longo), lamina ovata vel ovato-lanceolata basi late cuneata ad 2 cm usque longa dorso elevatim costata et pinnatim nervosa, ea ramulorum axillarium flores suffulcrantia oblongo-lanceolata subsessilia vix 1 cm attingentia; bracteae foliaceae lineari-oblongae obtusae calycem amplectentes 6-9 mm longae fere 1 mm latae; calyx 4.5 mm longus, laciniis lineari-attenuatis 3.5 mm longis glanduloso-puberulis; corollae $\pm$ 2.5 cm longae glaberrimae stramineae tubus cylindricus 0.95-1.1 cm longus 1-1.2 mm diametro ad fauces paulum ampliatus, labia subaequilonga posterius integrum dorso apicem versus pallide violaceo-pictum anterius fere ad basin 3-partitum lobis 4.5 mm latis; filamenta 10-11 mm longa basi incrassata glaberrima; antherarum thecae subexacte collaterales subaequilongae $\pm$ 1.6 mm longae muticae; capsula glabra; semen pallide roseum 1.7 mm longum.

MEXICO. Puebla: arid hills, 1110 m (3700 ft.), near Coxcotlan, November 18, 1966, *H. D. Ripley* 14, 731. Holotypus, NY; isotypus, US.

The only close relative of *A. stramineus* described in the last revision of *Anisacanthus* (Hagen in Ann. Mo. Bot. Gard. 28: 385-404. 1941) is *A. abditus* T. S. Bdg. of the Pacific slope in Sinaloa. The two species are alike in the large bracts which surpass and conceal the calyx; but *A. abditus* differs greatly in having foliage glabrous below the inflorescence, petioled leaves between the flowers, and a longer, red corolla. An apparently nearer relative has been described since: *A. Ochoterenae* Miranda (in Ann. Inst. Biol. Mex. 12: 606. 1941), from Morelos. Through the kindness of Dr. A. Gómez-Pompa I have had access to the holotype (*Miranda* 1327, MEXU) and several subsequent collections of *A. Ochoterenae* which resembles *A. stramineus* in having yellow flowers but is easily distinguished by its narrower corolla. This is a little over 5 cm long, and the strap-shaped free segments of the lower lip are nearly 3 cm long but only 3 mm wide. The corolla of *A. stramineus* is only 2.5 cm long, with oblong free segments about 1.5 cm long and 4.5 mm across, that is 3-4 not 10 times longer than wide.

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