

*CROTALARIA LOTIFOLIA* LINNAEUS AND *CROTALARIA PURDIANA*  
SENN, A CLARIFICATION OF THE SPECIES (WITH NOTES ON  
*CROTALARIA AXILLARIS* AITON)

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ABSTRACT

A study of the closely similar Central and South American taxa *Crotalaria lotifolia* L. and *C. purdiana* Senn, shows that they are indeed distinct species. A scatter diagram, a series of graphs and a new key summarize their differences. The African species *C. axillaris* Aiton appears to be related.

KEY WORDS: Taxonomy, Leguminosae, *Crotalaria*, West Indies, Central America, South America, Africa

*Crotalaria lotifolia* L. is a shrub which can be readily differentiated from most other native American species of the genus by its axillary inflorescences. It was first reported (in polynomial form) by Sloane (1725) from Jamaica and subsequently by Dillen (1732) in *Hortus Elthamensis*. When Linnaeus treated the species in *Species Plantarum*, he cited both polynomials and chose Dillen's words "*loti folio*" as the basis for his trivial name. An orthographic error led to the publication of the name in *Species Plantarum* as "*latifolia*," the correct spelling being *lotifolia*.

In 1920, Fawcett & Rendle selected the Sloane collection (Sloane Herbarium, Vol. 6, #5, BM!) as the lectotype for *Crotalaria lotifolia*. Previously, the species had been chosen as the lectotype species for the genus (Britton & Brown 1913; see also Farr, *et al.* 1979).

In 1938, H.A. Senn described a new species from Colombia which is morphologically related to *Crotalaria lotifolia* and named it *C. purdiana* Senn, after the collector, William Purdie. In his revision of the North American crotalaris, Senn (1939) separated the two species in the following way:



- Q. Inflorescence few-flowered (1-3 flowers), leaves glabrous above (West Indies) ..... *C. lotifolia*
- Q. Inflorescence several-flowered (4-8 flowers), leaves hirtellous above (Colombia and Cuba) ..... *C. purdiana*

During preparation of a revision of the American species of *Crotalaria*, the senior author questioned whether *C. lotifolia* and *C. purdiana* might better be treated as varieties of a single species or as a single variable species. Both are trifoliolate shrubs with axillary inflorescences and similarly shaped fruits. Senn's use of flower number per inflorescence as his main character was brought into question by the difficulty of counting flower pedicel scars on the short inflorescences. In addition, the leaf pubescence was found to be more variable than Senn had indicated in his key. All specimens of both species are pubescent beneath, usually with appressed trichomes, 0.2-0.3(0.5) mm long. The upper leaf surfaces of all *C. lotifolia* specimens and of *C. purdiana* from Barbados, Jamaica, and Martinique are glabrous. The upper leaf surfaces of *C. purdiana* specimens from Cuba, Colombia, and Venezuela have very short trichomes (0.1-0.2 mm) on the upper surface, either generally distributed or distributed in patches between glabrous areas.

With these factors in mind, the authors further examined Senn's delineation of the two species. During a preliminary survey of the material, the senior author observed that flowers of *Crotalaria lotifolia* had twisted carinal beaks, that those of *C. purdiana* lacked the twist, and that in general the leaves of *C. lotifolia* were smaller than those of *C. purdiana*. An analysis of 22 specimens of *C. lotifolia* and 30 specimens of *C. purdiana* for leaf measurements, inflorescence length, and number of flowers per inflorescence resulted in the data plotted in Figure 1. A more graphic comparison of the two species is shown in the scatter diagram (Figure 2).

Based on our observations, we accept *Crotalaria lotifolia* and *C. purdiana* as distinct and offer the following couplet to separate the species.

- A. Terminal leaflets 35-82 mm long, petioles 20-90 mm long; inflorescence 2-12 mm long, bearing 4-8 flowers; carinal beak not twisted ..... *C. purdiana*
- A. Terminal leaflets 13-30 mm long, petioles 14-30 mm long; inflorescence 1-2 mm long, bearing 1-3 flowers; carinal beak twisted ..... *C. lotifolia*

Senn (1939) recognized a variety of *Crotalaria lotifolia* and named it after the collector of the type, H.F. Eggers. The plants are small and in our view are facultative dwarf responses to dry conditions. We do not view his variety as distinct from the typical variety. Our concepts of the taxa are documented by the following citations.



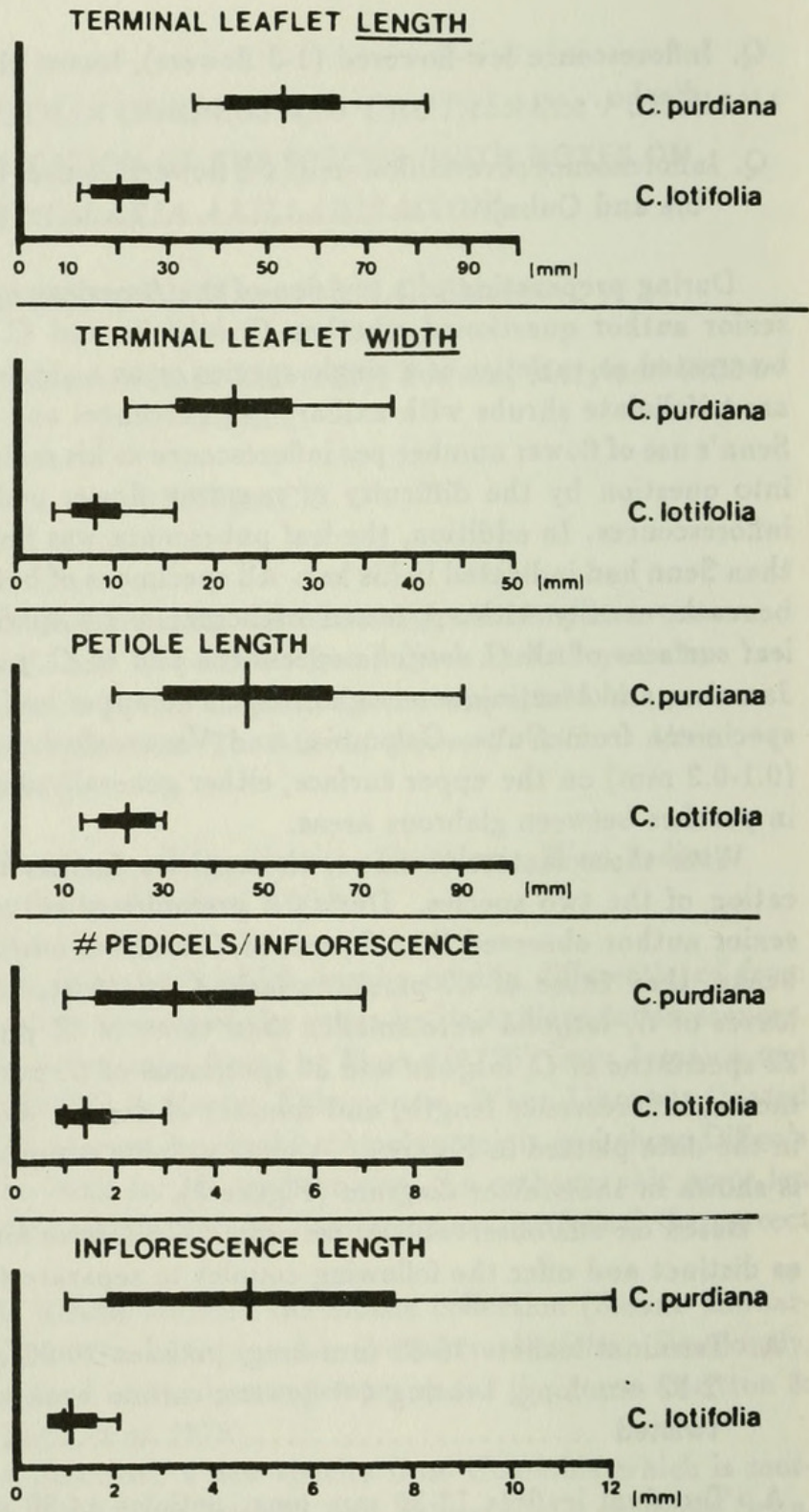


Figure 1. A comparison of diagnostic characters which separate two species of *Crotalaria*. Mean, range, and standard deviation are indicated for each character.

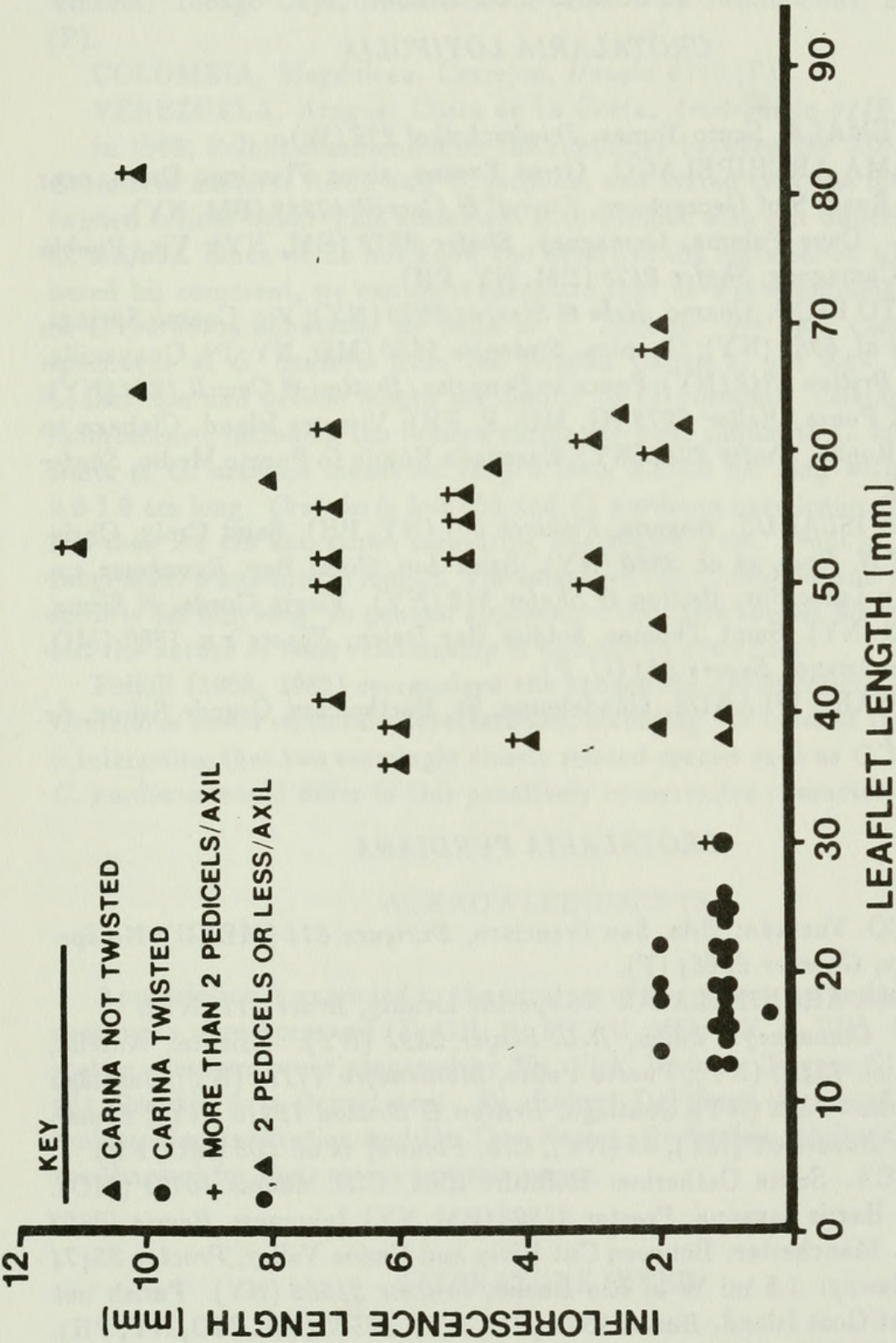


Figure 2. Scatter diagram depicting the separation of *Crotalaria lotifolia* and *Crotalaria purdiana*.



## SPECIMENS STUDIED

## CROTALARIA LOTIFOLIA

GUATEMALA. Santo Tomas, *Friedrichsthal* 272 (W).

BAHAMA ARCHIPELAGO. Great Exuma, along Flamingo Drive, near Palm Hill Road, S of Georgetown, *Correll & Correll* 47929 (BM, NY).

CUBA. Cayo Paloma, Camaguey, *Shafer* 2572 (BM, NY); Vic. Puebla Romano, Camaguey, *Shafer* 2478 (BM, NY, PH).

PUERTO RICO. Coamo, *Hess & Stevens* 3975 (NY); Vic. Coamo Springs, *Britton, et al.* 6364 (NY); Guanica, *Sintensis* 3650 (MO, NY, P); Guayanilla, *Britton & Britton* 9342 (NY); Ponce to Penuelas, *Britton & Cowell* 1281 (NY); 8 mi W of Ponce, *Heller* 6273 (G, MO, P, PH); Vieques Island, Clabaza to Ensenada Honda, *Shafer* 2944 (NY); Ensenada Honda to Puerto Medio, *Shafer* 3016 (NY).

VIRGIN ISLANDS. Angada, *Fishlock* 001 (NY, PH). Saint Croix, Christiansted, *J.N. Rose, et al.* 3620 (NY). Saint Jan, Coral Bay, *Raunkiaer s.n.* II-1906 (P); Lameshur, *Britton & Shafer* 512 (NY). Virgin Gorda, N Sirma, *Fishlock* 23 (NY). Saint Thomas, Soldier Bay Dalen, *Eggers s.n.* 1880 (MO, PH). Water Island, *Eggers* 531 (G, P).

WINDWARD ISLANDS. Guadeloupe, St. Barthelemy, Grande Saline, *Le Gallo* (NY).

## CROTALARIA PURDIANA

MÉXICO. Yucatán: Hda. San Francisco, *Enriquez* 811 (MEXU); No specific locality, *Gaumer* 24264 (F).

BAHAMA ARCHIPELAGO. No specific locality, *Brace* 411 (NY).

CUBA. Camaguey: Tiffen, *R.L. Shafer* 2891 (NY). Oriente: Antella, *Britton, et al.* 12441 (NY); Puerto Padre, *Montenegro* 17116 (NY); Santiago harbor, *Britton* 1882 (NY); Santiago, *Britton & Britton* 12915 (NY), *Ekman* 7761 (NY), *Havard* 80 (NY), 85 (NY), *C.L. Pollard, et al.* 268 (MO, PH).

JAMAICA. Santa Catherine: Hellshire Hills, *C.D. Adams* 10771 (MO). Clarendon: Harris Savanna, *Proctor* 34308 (BM, NY); Inverness, *Harris* 12723 (BM, MO). Manchester: Between Cut River and Canoe Valley, *Proctor* 35474 (NY). Trelawny: 1.5 mi W of Rio Bueno, *Proctor* 31562 (NY). Parish not given: Great Goat Island, *Harris* 9323 (BM, NY), 12520 (BM, MO, NY, PH).

HAITI. Near Jean Rabel, *Leonard & Leonard* 13024 (NY).

DOMINICAN REPUBLIC. Bellomar to Chedo, 10 mi NE of Cabo Rajo, *Liogier* 16937 (NY, P); Near Boca de Yuma, *Liogier* 12279 (NY, P).

WINDWARD ISLANDS. Martinique: Presquile de la Caravelle, commune Trinite, *Egler* 39-236 (NY); also *C. lotifolia* (Herbarium Lamarck, P!); Saint



Vincent: Tobago Cays, *Howard 11030* (BM, NY). Beadimouns, *Eggers 7354* (P).

COLOMBIA. Magdalena: Cerrejon, *Haught 6718* (P).

VENEZUELA. Aragua: Costa de La Costa, *Aristeguieta 5142* (G, P).

In 1968, Polhill commented on the similarity between the African species *Crotalaria axillaris* Aiton and *C. lotifolia*, and stated that the latter lacks a twisted carinal beak. This statement is in conflict with our understanding of *C. lotifolia*. Since we do not know the nature of the material on which Polhill based his comment, we can only speculate that he was examining specimens of *C. purdiana* annotated by Senn as *C. lotifolia*. We have examined nine specimens of *C. axillaris* from the Belgian Congo at the Kew Herbarium. Leaflet size and petiole length are similar to *C. purdiana*. Characters of the inflorescence, including the twisted carina are more similar to *C. lotifolia*. The fruits of *C. axillaris* measured ranged from 3.5-5.0 cm long with a stipe of 0.6-1.0 cm long. *Crotalaria lotifolia* and *C. purdiana* have legumes measuring less than 2.5 cm and stipes measuring less than 0.3 cm. Seeds of *C. axillaris* range from 4 to 5 mm in length. The largest of the *C. lotifolia* and *C. purdiana* seeds is 3.8 mm long. In general appearance the three species are very similar, but the nature of their relationship is difficult to determine.

Polhill (1968; 1982) reorganized the subgeneric classification of the genus *Crotalaria* based on floral characteristics, including the twist of the carina. It is interesting that two seemingly closely related species such as *C. lotifolia* and *C. purdiana* would differ in this putatively conservative character.

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