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FOLIA TAXONOMICA 12. *PARADRYMONIA* (GESNERIACEAE: EPISCIEAE) FROM THE GUIANA SHIELD: *P. MAGUIREI*, A NEW SPECIES FROM AMAZONAS, AND DISTRIBUTION AND FLORAL MORPHOLOGY OF *P. MACULATA*

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ABSTRACT

Paradrymonia maguirei is described from the state of Amazonas, Venezuela. The distribution of *Paradrymonia maculata* in Venezuela and the Guianas is documented, as well as its unusual corolla morphology.

RÉSUMÉ

Paradrymonia maguirei est décrit de l'état d'Amazonas, Venezuela. La répartition de *Paradrymonia maculata* au Venezuela et dans les Guyanes est documentée, ainsi que sa corolle de forme inhabituelle.

RESUMEN

Se describe **Paradrymonia maguirei** del estado de Amazonas, Venezuela. También se documenta la distribución de *Paradrymonia maculata* en Venezuela y las Guianas, así como su inusual morfología de la corola.

Hanstein (1854: 206) described the genus *Paradrymonia* Hanst. with only one species, *P. glabra* (Benth.) Hanst. (1854, p. 207, fig. 43), which is currently a synonym of *P. ciliosa* (Mart.) Wiehler. The name *Paradrymonia* was in use only for a short time as Hanstein (1864) reduced it to a synonym of *Episcia* Mart. When Wiehler (1973) re-established *Paradrymonia*, he transferred species from other genera. From *Drymonia* Mart. he took species that did not have the typical *Drymonia* anther dehiscence through a basal pore, and from *Episcia* Mart. he moved species that lacked stolons and did not otherwise belong to *Nautilocalyx* Linden ex Hanst. Currently *Paradrymonia* includes 38 species.

Recent molecular studies (Clark et al. 2006) have shown that it is likely that the species of *Paradrymonia* will separate into two natural groups of species, mostly with large leaves (20–50 cm long) and small axillary inflorescences, and a few isolated species. The larger group, true *Paradrymonia*, would mostly include species with petioles longer than the inflorescences and either with stems 5–10 mm thick and rooting at nodes on the substrate, and the smaller group has thinner and shorter stems and a "rosette-like" habit (Wiehler 1978). Those two groups are likely to stay in *Paradrymonia*. They are present in continental America from Mexico (Oaxaca) to Bolivia (Cochabamba) and eastward to Brazil (Amapá).

A few species in *Paradrymonia* have uncertain affinities. *P. anisophylla* Feuillet & L.E. Skog is an epiphyte with hanging stems and leaves strongly unequal in a pair; the molecular data (Clark et al. 2006) suggest that it may not be a *Paradrymonia*. The same data set places outside *Paradrymonia* an epiphyte with erect thick stems, *P. longifolia* (Poepp.) Wiehler. *Paradrymonia campostyla* (Leeuwenb.) Wiehler and *P. barbata* Feuillet & L.E. Skog from the Guianas are climbers with smaller leaves (3–15 cm long) and 1(–3) axillary flowers. Here two other hard-to-place species are dealt with: *P. maguirei*, a new species from Amazonas (Venezuela), which is vegetatively unlike other *Paradrymonia* species with a rosette-like habit, short petioles, and sharply biserrate paper-thin leaves, when dry; and *P. maculata* (Hook. f.) Wiehler with large condensed inflorescences and large bracts (see below) that is endemic to the Guiana Shield.

A.—*Paradrymonia maguirei* Feuillet, sp. nov.

Although it seems obvious that the genus *Paradrymonia* will prove to be polyphyletic (Clark et al. 2006), in the absence of a comprehensive molecular study of *Paradrymonia*, along with *Nautilocalyx* and *Chrysothemis* Decne., the only reasonable option at the moment is to place this new species in *Paradrymonia* as *P. maguirei*. It does not belong in any of the other genera of the Episcieae (Weber 2004; Skog & Boggan 2006) and anticipating the split of *Paradrymonia* by describing a new genus without the proper data would be taking a high risk of creating a generic synonym.

Paradrymonia maguirei Feuillet, sp. nov. (**Fig. 1**). Type: VENEZUELA. Amazonas. Depto. Alto Orinoco: Cerro Marahuaca, slope forest, 1000 m, 3 May 1949, *B. Maguire & B. Maguire, Jr. 29185* (holotype: NY, pro parte: specimen A and material in the pocket).

= [*P. marahuacana* Wiehler] invalid: in sched.

Paradrymonia maguirei ab aliis speciebus a characteribus sequentibus differt. Planta pro parte majore, praeter infra foliis intervenia, indumento dense vestita, petiolo 2–2.5 cm longo, lamina foliorum supra velutina vel appressa pubescens, 10–11 × 7–8 cm, basi asymmetrica, apice obtuso rotundo, margine bi-serrata, in sicco membranacea.

Epiphyte or saxicolous. Stem creeping, 0.5 cm thick or more, 5 cm long (in the type collection), with a dense brown-red indumentum, apical few internodes with leaves, about 3 mm long, forming some kind of a loose pauci-leaved rosette. Leaves opposite, strongly unequal in a pair, the smaller about 2 cm long including petiole, ligulate, 2–3 mm wide; the larger with petiole 2–2.5 cm long, thick, covered with dense, long, brown-red trichomes; blade membranous when dry, elliptic, 10–11 × 7–8 cm, asymmetrically acute to obtuse at base, widely rounded at apex, margin sharply biserrate, above velutinous or appressed-pubescent, beneath appressed-pubescent or hirsute on veins. Inflorescence axillary, fasciculate; pedicels up to 2 cm long, with a dense, long, brown-red indumentum. Flowers with sepals lanceolate, long acuminate, 0.8–1.3 × 0.2 cm, with a dense, long, brown-red indumentum; corolla oblique in the calyx, with red trichomes outside, basal gibbosity 1–1.5 × 2 mm, tube cylindric, 1.8–2 cm long, lobes suborbicular, 0.8 × 0.6 mm, undulate at margin. Fruit not seen.

Distribution.—*Paradrymonia maguirei* is known only from the type collection from the area North of La Esmeralda in the Duida-Marahuaca National Park, on a forested slope of the Cerro Marahuaca (Amazonas, Venezuela), 65°24'W 3°40'N according to maps, at 1000 m elevation. It was blooming in May.

The color of the corolla is not known. There are two specimens that I marked A and B on the herbarium sheet in the New York herbarium. Specimen A, including the fragments in the pocket, is the type of the new species; it is on the middle left of the sheet and the pocket on the lower right above the label. Specimen B (sterile), on the upper right, is probably *Nautilocalyx cordatus* (Gleason) L.E. Skog. The only open corolla, preserved in the pocket, is very unlike the corolla of *N. cordatus* and is the one described here. The affinities of *Paradrymonia maguirei* in the genus are not clear. This species shows a unique combination of characters: rosette-like habit, petioles short, with dense, long, appressed pubescence, leaf blade drying paper-thin, asymmetric at the base, broadly rounded at the apex, and sharply biserrate at the margin. Other species with short petioles have leaf blades long-decurrent or are long stemmed epiphytic climbers. This species was *Paradrymonia* "sp. E" in the text and the key (Feuillet & Steyermark 1999).

Etymology.—The epithet *maguirei* refers to the senior collector, a great botanist, collector, and student of the flora of the Guiana Shield.

B.—Subgenus *Pagothyra*

Like other infrageneric taxa, *Episcia* sect. *Pagothyra* Leeuwenb. coined for *E. maculata* Hook. f. (Leeuwenberg 1958: 312) was never transferred to *Paradrymonia*, although *P. maculata* stands alone there as well as in *Episcia*.

Paradrymonia subg. **Pagothyra** (Leeuwenb.) Feuillet, comb. et stat. nov. Basionym: *Episcia* sect. *Pagothyra* Leeuwenb., Blumea 7:312. 1958.

Fig. 1. *Paradrymonia maguirei*, photograph by C. Feuillet of the holotype *B. Maguire & B. Maguire, Jr. 29185* (NY).

Paradrymonia maculata (Hook. f.) Wiehler, Selbyana 5:57. 1978. *Episcia maculata* Hook. f., Bot. Mag. 116: pl. 7131. 1890. [*Nautilocalyx maculatus*] Wiehler 1970, invalid: in sched. TYPE: CULTIVATED. Origin GUYANA: Cult. Hort. Kew., 2 Sep 1889 (*fl*), *collector unknown s.n.* (HOLOTYPE: K; ISOTYPE: K; photographs of holotype BH, NY, U, US, WAG).

Paradrymonia maculata climbs by way of short roots at the nodes and along internodes, similar to *Hedera helix* L. The stems are tightly applied to the bark and have been reported to grow 1–3 meters high. The leaves are opposite and equal or subequal in a pair with a long petiole; the blade is large and broadly elliptic, with serrate margins. The pedunculate inflorescences are axillary, unilateral cymes, with bracts that are large, greenish yellow with purplish or reddish veins. The corolla is creamy yellow with reddish dots and the ventral lobe acts as a cover closing the tube. Longer descriptions can be found in Leeuwenberg (1958) and Skog & Feuillet (2008).

Distribution.—*Paradrymonia maculata* is known from the forests of French Guiana, Guyana, and Venezuela (Delta Amacuro) at 0–500 m. It has been collected in bloom every month of the year and in fruit in March, June, August, and December.

Corolla.—As noted and illustrated in Hooker (1890), the ventral lobe of the corolla of *Paradrymonia maculata* closes the tube (Fig. 2). The nectary gland is in dorsal position at the base of the ovary, next to the basal gibbosity forming a nectar chamber at the base of the 2.7–3.5 cm long corolla tube. The ventral corolla lobe is effectively a barrier between the nectar produced at the base of the tube and most pollinators. Exerting pressure on both sides on the apical third of the tube flips the ventral lobe from its position of convex lid closing the throat to a more classic concave corolla lobe by moving it more than 90°. It allows access to the nectar to strong pollinators, possibly carpenter bees. The bracts and sepals are pale yellow with red or purple veins. In the Guianas similar corolla morphology is found in a Solanaceae, *Markea formicarum* Dammer, where the lower lobe closes the throat. That species is lacking bracts, but the large calyx is cream- or straw-colored with purple veins, showing a similar color pattern as the bracts and calyces of *P. maculata*. It might be of interest to note that an Asian Gesneriaceae, *Agalmyla chorisepala* (C.B. Clarke) Hilliard & B.L. Burtt, has orange corollas with the ventral lobe closing the tube, but in this example the lobe flips at anthesis and opens the access to the tube without further obstacle to pollination.

The type of *Paradrymonia maculata* (Hook. f.) Wiehler from an unknown collector, comes from a plant cultivated at the Royal Botanic Gardens, Kew. It was blooming in September 1889. The plant was grown from material collected in British Guiana, now Guyana. Subsequent collections all came from Guyana and this limited distribution was acknowledged by Leeuwenberg (1958) and Wiehler (1978). During the completion of the treatment of the Gesneriaceae for *Flora of the Guianas* (Skog & Feuillet 2008), collections of *P. maculata* from Venezuela and French Guiana came to my attention. That species was not mentioned in the treatment for *Flora of the Venezuelan Guayana* (Feuillet & Steyermark 1999) but is present in the Antonio Díaz Department, the part of the state of Delta Amacuro neighboring Guyana. No collections from Surinam have been made, but it is likely that it is, or has been, present there.

Material studied: **VENEZUELA. Delta Amacuro. Depto. Antonio Díaz:** low forest, 12 km S of San José de Amacuro, 8°28'N 60°27'W, sea level, Feb 1987 (*fl*), *A. Fernandez 3903* (MO, MYF, NY, PORT, US); primary rain forest, Río Grande, 60 km NE of El Palmar, about 8°25'N 61°45'W, 120 m, 15 Mar 1987 (*fl*), *G. Aymard 5411* (PORT).

GUYANA. Arawai Creek, right bank of Essequibo Riv., Feb 1952 (*fl*), *C.A. Persaud 140 = F.D. (Forestry Department) 6897* (K, NY, U); Essequibo River, Kamuni Creek, Groete Creek, 14 Apr 1944 (*fl*), *B. Maguire & D.B. Fanshawe 22826* (F, GH, K, NY, U, US); Morawhanna, Oct 1905 (*fl*), *A.W. Bartlett 8600* (K); Rockstone, 15 July – 1 Aug 1921 (*fl*), *H.A. Gleason 664* (NY); Unabaruka Creek, Aug 1930 (*fl*), *E.B. Martyn 225* (BRG). **Barima. Waini:** Barima Riv., 15 mi E of Arakaka, 7°37'N 59°54'W, 38 m, 26 July 1986 (*fl*), *J.J. Pipoly 8059* (BRG, CAY, NY, US); Barima Riv., May 1907 (*fl*), *R.D. Ward s.n.* (K); Baramita airstrip – Millionaire trail, 7°22'N 60°28'W, 91 m, 3 Apr 1991 (*fl*), *T.D. McDowell et al. 4182* (NY, US); Matthews Ridge, Barima Riv., 23 Jan 1955 (*fl*), *R.S. Cowan 39337* (NY, US); Portage between Aruau Riv. & Yarikita Riv., 8°00'N 59°55'W, 17 Jan 1920 (*fl*), *A.S. Hitchcock 17601* (GH, K, NY, S, US); Sebai Riv., ± 5 km SW of Sebai Village, 15–20 m, 7°49'N 59°57'W, 16 Dec 1991 (*fr*), *B. Hoffman et al. 615* (US); Upper Aruau Riv., Aruka Riv., Apr–May 1929 (*fl*), *E.B. Martyn 53* (K); Upper Kaituma R.; 3 km w of Port Kaituma, 7°42'N 59°54'W, 0–5 m, 8 Dec 1991 (*fl*), *B. Hoffman & H. Benjamin 525* (US); Waini Riv., July 1906 (*fr*), *J.E. Beckett s.n.* (K, U). **Cuyuni. Mazaruni:** Aurora, helicopter landing, 6°47'N 59°44'W, 4 Oct 1989 (*fl*), *L.J. Gillespie 2084* (US; Bartica, 12–15 mi from town, 28 Aug 1935 (*fr*), *D. Potter 5358* (GH); Essequibo county, near Mazaruni Forest Station, 9 Aug 1934 (*fl*), *W.A. Archer 2432* (BRG, K, US); id., July–Sep 1942 (*fl*), *D.B. Fanshawe 785 = F.D. 3521* (K). **Essequibo Islands. West Demerara:** Macouria Riv., right bank of Lower Essequibo Riv., Nov 1886, *G.S. Jenman 2419* (K); Upper White Creek, near Blue Mountain, 6°35'N

Fig. 2. *Paradrymonia maculata*, photograph by Chris Davidson (Idaho Botanical Research Foundation).

58°43'W, 5–20 m, 14 Apr 1993 (*fl*), *T.W. Henkel et al. 1879* (NY, US). **Pomeroon. Supenaam:** Pomeroon District, Mt. Russell, Mar 1886 (*fl*), *G.S. Jenman 2097* (K); Pomeroon Riv., 20 Aug 1959 (*fl*), *V. Graham 352* (K); Pomeroon Riv., Yawiami Creek, Aug 1882 (*fl*), *G.S. Jenman 1939* (K); Pomeroon Riv., Pomeroon District, 17–24 Dec 1922 (*fl*), *J.S. de la Cruz 3124* (F, GH, MO, NY, PH, UC, US); id., 14–20 Jan 1923 (*fl&fr*), *J.S. de la Cruz 3022* (GH, NY, PH, US); id., Mar 1884 (*fl*), *G.S. Jenman 2002* (K, NY); Abrahms Creek, Mar 1904 (*st*), *"G.S. Jenman" 7808* (BRG); 3 km SW of Kabakaburi Mission village, 7°15'N 58°45'W, 0–10, 25 Sep 1992 (*fl bud*), *B. Hoffman & L. Roberts 2839* (NY, US). **Potaro. Siparuni:** Garraway stream, 102,5 mi on Bartica – Potaro rd., 5°22'25"N 59°7'20"W, 38 m, 12 Mar 2004 (*fl*), *K.M. Redden 2231* (US); Iwokrama Rainforest Reserve, Karupukari – Annai Road, 4°28'14"N 58°47'16"W, 400–500 m, 21 Mar 1997 (*fl*), *H.D. Clarke, S.A. Mori & S. Heald 4181* (US); Kaieteur Falls, 5°10'N 59°29'W, 23 Oct – 3 Nov 1923 (*fl*), *J.S. de la Cruz 4395* (F, GH, NY, PH, US, VEN); Potaro, 10 mi S of Potaro landing, 5°10'N 59°00'W, 7–8 Jan 1920 (*fl*), *A.S. Hitchcock 17397* (GH, K, NY, S, US); North Fork Riv., 0.5–1.5 km N of Konawark Riv., 5°9'N 59°8'W, 137 m, 18 May 1991 (*fl*), *T.D. McDowell, C.L. Kelloff & A. Stobey 4819* (US). **Upper Demerara. Berbice:** Haiowa Falls, Essequibo Riv. basin, 5°7'N 58°49'W, 27 Sep 1937 (*fl*), *A.C. Smith 2123* (F, G, GH, K, NY, S, U, US); Mabura region, W Pibiri compartment, 5°01'95"N 58°37'73"W, 12 Oct 1993 (*fl*), R.C. *Ek, P.J.M. Maas, H. Mass & C. Görts 942* (U, US); Mabura region, Ekuk compartment, Holder Falls, 5°20'N 58°10'W, 21 Aug 1993 (*fl*), *R.C. Ek, R. Zagt, L. Brouwer & N. Eernisse 896* (US). **Upper Takutu. Upper Essequibo:** Maparri R., S bank, 3°20'N 59°15'W, 3 June 1996 (*st*), *H.D. Clarke & T. McPherson 1928* (US); Upper Rupununi Riv., near Dadanawa, 2°45'N 59°31'W, 13 June 1922 (*fl&fr*), *J.S. de la Cruz 1518* (CM, F, MO, NY, PH, US); id., 13 June 1922 (*fl*), *J.S. de la Cruz 1535* (CM, GH, F, MO, NY, PH, UC, US).

FRENCH GUIANA. Approuague Riv. Basin: Crique Cascade, 390 m, 15 Mar 2002 (*fl&fr*), *J.F. Smith, E. Teppe & C. Davidson 4134* (CAY). **Matoury:** Plateau de Nancibo, 4°40'N 520°30'W, 24 Oct 1983 (*fl*), *F. Billiet & B. Jadin 1857* (BR, CAY). **Oyapock Riv. Basin:** Crique Gabaret, 3°55'42"N 51°48'7"W, 15 Apr 1988 (*fl*), *G. Cremers 9951* (CAY, NY, P, U, US); Roche Touatou, 130 m, 20 May 1995 (*fl*), *J.-J. de Granville & G. Cremers 13009* (CAY).

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REFERENCES

Clark, J.L., P.S. Herendeen, L.E. Skog, and E.A. Zimmer. 2006. Phylogenetic relationships and generic boundaries in the Episcieae (Gesneriaceae) inferred from nuclear, chloroplast, and morphological data. Taxon 55:313–336.

Feuillet, C. and J.A. Steyermark. 1999. Gesneriaceae. In: Steyermark, J.A., P.E. Berry, K. Yatskievych, and B.K. Holst, Flora of the Venezuelan Guayana, vol. 5. Missouri Botanical Garden Press, St. Louis. Pp. 542–573.

Hanstein, J. 1854. Die Gesneraceen des Königlichen Herbariums und der Gärten zu Berlin, nebst Beobachtungen über die Familie im Ganzen I. Abschnitt. Linnaea 26:145–216; fig. 1–68.

Hanstein, J. 1864. Gesneraceae. In: Martius, Flora Brasiliensis 8(1):341–428; pl. 58–68. Fleischer, Leipzig.

Hooker, J.D. 1890. *Paradrymonia maculata*. Bot. Mag. 116: pl. 7131.

Leeuwenberg, A.J.M. 1958. The Gesneriaceae of Guiana. Acta Bot. Neerland. 7:291–444.

Skog, L.E. and J.K. Boggan. 2006. A new classification of the Western Hemisphere Gesneriaceae. Gesneriads 56(3):12–17.

Skog, L.E. and C. Feuillet. 2008. Gesneriaceae. In M.J. Jansen-Jacobs, ed. Flora of the Guianas ser. A, 26. 136 pages. Royal Botanic Gardens, Kew.

Weber, A. 2004. Gesneriaceae. Pp. 63–158 in K. Kubitzki and J.W. Kadereit, eds. The families and genera of vascular plants, Dicotyledons. Lamiales (except Acanthaceae including Avicenniaceae) vol. 7. Berlin: Springer.

Wiehler, H. 1973. Seven transfers from *Episcia* species in cultivation (Gesneriaceae). Phytologia 27:307–308.

Wiehler, H. 1978. The genera *Episcia*, *Alsobia*, *Nautilocalyx*, and *Paradrymonia* (Gesneriaceae). Selbyana 5:11–60.