

Chlorospatha of Antióquia (Colombia)

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ABSTRACT

This paper treats all the species of *Chlorospatha* from the Department of Antióquia in Colombia. A total of 8 new species are described, all of which are endemic to Colombia. These are *C. amalfiensis* Croat & L. Hannon, *C. antioquiensis* Croat & L. Hannon, *C. betancurii* Croat & L. Hannon, *C. callejasii* Croat & L. Hannon, *C. cogolloi* Croat & L. Hannon, *C. luteynii* Croat & L. Hannon, *C. macphersonii* Croat & L. Hannon and *C. nicolsonii* Croat & L. Hannon. Four additional previously described taxa (3 species; 1 subspecies) occur in Antióquia, namely *C. corrugata* Bogner & Madison, *C. gentryi* Grayum, *C. mirabilis* (M. T. Masters) Madison, and *C. croatiana* Grayum ssp. *enneaphylla* Grayum, and

are included in a key to the species in Antióquia.

KEY WORDS

Chlorospatha, Antióquia, Colombia.

INTRODUCTION

The Missouri Botanical Garden and the Universidad de Antióquia are currently completing a *Checklist for the Flora of Antióquia*. In order to include new species of *Chlorospatha* from Antióquia in this checklist, these species are here being described for the first time. An upcoming revision of the genus by the same authors will describe the remaining species in the genus. In order to make this paper more useful in Antióquia, all of the species that occur in the department will be included in a key.

KEY TO SPECIES OF CHLOROSPATHA IN ANTIÓQUIA

- 1a. Leaf blades simple, ovate-cordate, sagittate or subhastate at the base; style attenuate.
 - 2a. Leaf blades ovate-cordate; upper surface bullate; lower surface reticulate; petiole sheathed ca. $\frac{3}{4}$ of its length; spathe ca. 15 cm long; sterile flowers branched; Colombia (Antióquia), 2,750–2,830 m *C. macphersonii* Croat & L. Hannon
 - 2b. Leaf blades sagittate or subhastate; upper surface smooth, not bullate; lower surface smooth, not reticulate; petiole sheathed $\frac{1}{3}$ – $\frac{1}{2}$ of its length; spathe less than 10 cm long; sterile flowers subprismatic or irregularly lobed.
 - 3a. Leaf blades subhastate; posterior lobes long, more than 3 times longer than wide; petiole sheathed ca. $\frac{1}{3}$ of its length; Colombia (Antióquia), 1,500–1,800 m *C. nicolsonii* Croat & L. Hannon
 - 3b. Leaf blades sagittate; posterior lobes less than 2 times longer than wide; petiole sheathed ca. $\frac{1}{2}$ of its length.
 - 4a. Primary lateral veins 4–7 pairs; spathe tube green; spathe blade green or yellow; spadix adnate to spathe for entire length of pistillate portion; style comprising $\frac{1}{3}$ of length of pistil; sterile flowers densely arranged in 5 whorls; Colombia (Antióquia), 1,800–3,000 m *C. antioquiensis* Croat & L. Hannon
 - 4b. Primary lateral veins 2 pairs; spathe tube purplish-brown; spathe blade white; spadix adnate to spathe $\frac{1}{3}$ of length of pistillate portion; style comprising $\frac{1}{2}$ – $\frac{2}{3}$ of length of pistil; sterile flowers laxly arranged in 9 whorls; Colombia (Antióquia), 1,200–1,300 m *C. amalfiensis* Croat & L. Hannon
- 1b. Leaf blades with 3 or more lobes; style not attenuate.
 - 5a. Leaf blades with 5 or more lobes.

- 6a. Plants large, ca. 1 m tall; leaf blades deeply lobed, narrowly to broadly confluent between segments; petiole \pm glabrous, sheathed $\frac{1}{2}$ – $\frac{2}{3}$ of its length; all venation \pm glabrous on lower blade surface; peduncle and spathe glabrous.
- 7a. Leaf blades 7–9-lobed, narrowly confluent between segments; confluent portion less than 5 mm wide; petiole drying matte and \pm fibrous; spathe 6.5–8 cm long; Colombia (Antióquia, Boyacá, Chocó), 150–820 m *C. croatianae* Grayum ssp. *enneaphylla* Grayum
- 7b. Leaf blades 5-lobed, broadly confluent between segments; confluent portion 1.5–4 cm wide; petiole drying glossy, with the epidermis in part separated \pm intact and semi-transparent; spathe 9–12 cm long; Colombia (Antióquia), 2,440–2,800 m *C. luteynii* Croat & L. Hannon
- 6b. Plants small, 50 cm tall or less; leaf blades with segments free to the base; petiole \pm puberulent to pubescent, sheathed ca. $\frac{1}{4}$ – $\frac{1}{3}$ of its length; all venation \pm puberulent on the lower blade surface; peduncle and spathe \pm puberulent; Colombia (Antióquia), 1,200–1,800 m *C. gentryi* Grayum
- 5b. Leaf blades with 3 lobes.
- 8a. Leaf blades with lower surface entirely or in part purple or purple-tinged, occasionally green with only the midrib and major veins dark purple.
- 9a. Occurring only above 1,200 m; cataphylls persisting semi-intact along the length of the stem; petiole sheathed $\frac{3}{4}$ or more of its length; midrib and major veins drying raised; sterile portion of spadix comprising $\frac{1}{10}$ of total length; sterile flowers densely arranged in 4–5 whorls; Colombia (Antióquia), 1,250–1,800 m *C. cogolloi* Croat & L. Hannon
- 9b. Occurring only below 1,000 m; cataphylls not persisting along the stem; petiole sheathed $\frac{1}{3}$ – $\frac{2}{3}$ of its length; midrib and major veins drying \pm flattened; sterile portion of the spadix comprising ca. $\frac{1}{3}$ of total length; sterile flowers laxly arranged in 7–9(11) whorls; Colombia (Antióquia, Chocó, Valle), 0–900 m, and Panamá *C. mirabilis* (M. T. Masters) Madison
- 8b. Leaf blades with lower surface and all venation green.
- 10a. Petiole sheathed $\frac{1}{4}$ – $\frac{1}{3}$ of its length, entirely or in part minutely puberulent or granular-puberulent; upper surface of leaf blade corrugate; lower surface reticulate, narrowly colliculate along all orders of venation; all venation drying raised and \pm puberulent on lower surface; styles broadly spreading; Colombia (Antióquia), 890–1,350 m *C. corrugata* Bogner & Madison
- 10b. Petiole sheathed ca. $\frac{1}{2}$ of its length, glabrous; upper surface of leaf blades \pm smooth, not corrugate; lower surface smooth, not reticulate or colliculate; all orders venation glabrous; midrib and major veins drying raised or flattened; minor veins drying flattened; styles disc-like, not broadly spreading.
- 11a. Leaf blades drying green on upper surface, with paler maculations; segments long-acuminate at apex; major and secondary veins drying moderately darker than lower surface; spathe tube green; spadix less than 6.5 cm long *C. betancurii* Croat & L. Hannon
- 11b. Leaf blades drying yellow-brown on upper surface, lacking maculations; segments acute at apex; major and secondary veins drying almost black, much darker than surface; spathe tube dark purple; spadix more than 8 cm long *C. callejasii* Croat & L. Hannon

Chlorospatha amalfiensis Croat & L. Hannon, **sp. nov.** Type: COLOMBIA. Antióquia: Along Amalfi–Fraguas rd. NE of Salazar, 23–26.5 km from center of Amalfi, 1,220–1,300 m, 6°58'N, 74°59'W, 14 Feb. 1989, *J. MacDougal, J. Betancur, W. J. Kress & B. Echeverry* 4034 (holotype, HUA). Figure 1.

Planta terrestris; cataphylla ca. 20 cm longa; petiolus 36–37 cm longus, vaginata 20–24 cm; lamina sagittata, 19–21 cm longa, 11–11.5 cm lata; lobulas posterioribus

7–8 cm longus, 5.2–5.8 cm latus; nervis lateralibus primariis 2 utroque; inflorescentia 5 in quoque axila; pedunculus 18–23 cm longus, 1–1.5 mm diam.; spatha 6–7.5 cm longa; tubo 3.8 cm longo, 4.5–5 mm diam.; lamina alba.

Terrestrial herb, ca. 50 cm tall; stem (possibly decumbent), length not known, remnants of old cataphylls persisting \pm intact at upper nodes (all measurements made from dried material); internodes 1–1.5 cm long, 1.2–1.5 cm diam., drying

matte, medium grayish brown, prominently wrinkled; cataphylls ca. 20 cm long, acuminate at apex, drying semi-glossy, dark reddish brown. LEAVES 5, erect-spreading; **petioles** 36–37 cm long, drying glabrous, matte to weakly glossy, dark reddish brown, sheathed 20–24 cm (8–12 cm on foliage leaves), ca. ½ of total length; sheath decurrent at apex; free portion 2–2.5 mm diam., midway; **blades** sagittate, 19–21 cm long, 11–11.5 cm wide (9.8–10 cm wide at base, measured tip to tip across posterior lobes), 1.7–1.8 times longer than wide, long-acuminate at apex, broadest across anterior lobe, drying thin, weakly bicolorous; upper surface drying matte to weakly glossy, dark yellow-brown, weakly grayish; lower surface drying weakly glossy to semi-glossy; anterior lobe 14.5 cm long, 11–11.5 cm wide, 1.3 times longer than wide, 1.8–2 times longer than posterior lobes, broadest near base, ± symmetrical; posterior lobes directed toward the base, 7–8 cm long, 5.2–5.8 cm wide, 1.3–1.4 times longer than wide, narrowly rounded to bluntly acute at apex, broadest at base, prominently inequilateral, the inner side narrower, ± acute and narrowly confluent with opposite lobe at base, the confluent portion obscuring petiole apex; outer side 3.4–4.5 times wider than inner side midway; midrib and major veins drying weakly raised or flattened on lower surface, moderately darker than surface; **basal veins** 6, the 1st free to the base, 5 coalesced into a prominent posterior rib, 3 acroscopic, 2 basisopic; primary lateral veins 2 pairs, arising at 25–32°, weakly arcuate; secondary veins drying weakly raised, weakly darker than lower surface; tertiary veins drying flattened, weakly darker than lower surface; reticulate veins drying obscure, in part weakly

darker than lower surface; collective veins 3, the innermost arising from the lowermost lateral vein on inner side of posterior lobe, ± parallel to margin. INFLORESCENCES erect, 5 per axil; peduncle held within the sheath, 18–23 cm long, 1–1.5 mm diam., drying matte to weakly glossy, dark brown; **spathe** erect, 7–7.5 cm long, cuspidate at apex, weakly or not at all constricted between tube and blade; spathe tube purplish brown on outer surface, 3.8 cm long, 4.5–5 mm diam., drying matte, dark brown; spathe blade white, 3.7 cm long, 4–4.5 mm diam., drying matte, medium reddish brown on outer surface, paler on inner surface, marcescent, erect after anthesis; **spadix** erect, 5.7 cm long, sessile, adnate to spathe 8 mm at base, ca. ½ of the length of pistillate portion; pistillate portion 2.2 cm long, 3 mm diam., drying brownish; fertile staminate portion 1.8–1.9 cm long, 3 mm diam., clavate, narrowly rounded at apex, drying medium dark brown; sterile staminate portion 1.3 cm long, 1.5 mm diam., ± cylindrical, drying tan; pistils laxly arranged, ca. 3 across the axis (viewed from above), ca. 1.5–2 mm long; ovaries subglobose, ca. 1 mm long, 1–1.5 mm diam., drying dark brown; style mantle-like, 0.7–1 mm long, ca. 1.5 mm diam., comprising ca. ½ of the length of pistil, long-attenuate, broadly spreading, appressed to ovary, slightly wider than ovary apex, the margins weakly coherent with margins of adjacent styles; **stigma** elevated on and weakly broader than narrowed portion of style, ca. 0.3 mm diam., drying dark brown; synandria ca. 1 mm long, 1–1.2 mm diam., coherent, truncate, 3-lobed, 3-androus; sterile flowers ca. 1 mm long, 1 mm diam., subprismatic to irregularly lobed, laxly arranged, in 9 whorls. BERRIES not known.

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Figs. 1–4. —1 (top L.) *Chlorospatha amalfiensis* Croat & L. Hannon (*MacDougal et al.* 4034). Type specimen. —2 (top R.) *Chlorospatha antioquiensis* Croat & L. Hannon (*Cardona et al.* 1050). Herbarium specimen. —3 (bottom L.) *Chlorospatha betancurii* Croat & L. Hannon (*Betancur et al.* 782). Type specimen. —4 (bottom R.) *Chlorospatha callejasii* Croat and L. Hannon (*Callejas et al.* 6212). Type specimen.

Flowering is known to occur in *Chlorospatha amalfiensis* only during the month of February.

Chlorospatha amalfiensis is known only from the type and is endemic to the eastern slopes of the Cordillera Central in Antioquia Department, Colombia, at 1,200–1,300 m elevation. It would be expected to occur elsewhere in the department. The species is distinguished by its ovate-sagittate leaf blades that are narrower at the base than across the anterior lobe and dry grayish yellow-brown on the upper surface, with the inner margins of the posterior lobes narrowly confluent at the base, obscuring the petiole apex. *Chlorospatha amalfiensis* is also distinguished by its purplish brown spathe tube, white spathe blade and short spadix (5.7 cm long), the sterile portion comprising about $\frac{1}{4}$ of its length, with the sterile flowers laxly arranged. The fertile staminate portion is clavate, with the synandria unusual in being strictly 3-androus.

Chlorospatha amalfiensis could be confused with only one species, *C. antioquiensis* Croat & L. Hannon (described below), which also occurs on the eastern slopes of the Cordillera Central but at higher elevations, 1,800–3,000 m. The petiole of the latter species dries with the epidermis partially separated intact from the main body of the petiole and semi-glossy, with the sheath free-ending at the apex, differing from that of *C. amalfiensis*, which dries matte, with the epidermis not separated and the sheath decurrent. The leaf blades of the latter species have 2 pairs of primary lateral veins and dry more or less yellow-brown, whereas those of *C. antioquiensis* have 4–7 pairs and dry greenish. The spathe of *C. antioquiensis* has a green tube and green or yellow blade, differing from *C. amalfiensis*, which has a purplish brown tube and white blade. The spadix of the latter species is adnate to the spathe only $\frac{1}{3}$ of the length of the pistillate portion and the pistils are somewhat laxly arranged, with the style long-attenuate, appressed to the ovary and comprising about $\frac{1}{2}$ of the length of the pistil. The spadix of *C. antioquiensis* is ad-

nate the entire length of the pistillate portion and the pistils are comparatively densely arranged, with the style briefly attenuate, comprising $\frac{1}{3}$ of the length of the pistil, and not appressed to the ovary. The fertile staminate portion is cylindrical to tapering in the latter species, with the synandria 3–4(5)-androus, whereas that of *C. amalfiensis* is clavate, with the synandria no more than 3-androus. The sterile staminate portion comprises about $\frac{1}{4}$ of the length of the spadix in the latter species, with the sterile flowers laxly arranged, differing from that of *C. antioquiensis* in which that portion comprises about $\frac{1}{10}$ of total length, with the sterile flowers densely arranged.

Etymology—Named for the town of Amalfi, in Antioquia Department, Colombia, near which the type was collected.

Chlorospatha antioquiensis Croat & L. Hannon, **sp. nov.** Type: COLOMBIA. Antioquia: Along Medellín–Sonsón rd., 5–6 km SE of La Unión, 2,400 m, 26 Mar. 1979, *J. Luteyn & M. Luteyn* 7110 (holotype, NY; isotype, COL). Figure 2.

Planta terrestris vel hemiepiphytica, 50–60 cm; internodia 1.5–3 cm longa, 0.6–1.3(4) cm diam., cataphylla 11–24 cm longa; petiolus 29–52 cm longus, vaginata 17–31 cm; lamina sagittata vel ovato-sagittata, (16.5)20–26 cm longa, 8.5–14.5 cm lata; lobulas posterioribus (6.1)7.3–11 cm longus, (3.2)4–6.8 cm lata; nervis lateralibus primariis 4–7 utroque; inflorescentia 2 in quoque axile; pedunculus (21)26–29 cm longus; spatha 7.2–9 cm longa; tubo 2.8–4 cm longo, 3–5 mm diam.; lamina viridis vel luteus.

Terrestrial or hemiepiphytic herb, 50–60 cm tall; stem decumbent, at least 20 cm long, remnants of old leaf bases and cataphylls persisting intact along its length (all measurements made from dried material); internodes 1.5–3 cm long, 0.6–1.3(4) cm diam., drying weakly glossy, dark brownish green; cataphylls 11–24 cm long, obtuse with acumen at apex, drying weakly glossy to semi-glossy, medium to

dark reddish brown. LEAVES 2–4, erect-spreading; **petioles** 29–52 cm long, drying glabrous, weakly glossy to semi-glossy, medium-dark to dark reddish brown or almost black, with epidermis in part separated \pm intact and semi-transparent, sheathed 17–31 cm, more than $\frac{1}{2}$ of total length; sheath free-ending at apex; free portion 2–5 mm diam. midway; **blades** sagittate and broadly triangular or ovate-sagittate, (16.5)20–26 cm long, 8.5–14.5 cm wide, 1.9–2.2 times longer than wide, gradually to scarcely acuminate at apex, occasionally abruptly acuminate, usually broadest at base, rarely weakly narrower, (0.8)1.1 times wider at base than across anterior lobe (measured tip to tip across posterior lobes), weakly or not at all constricted in area of petiole attachment (at least on one side), drying thin, weakly to moderately bicolorous, occasionally concolorous; upper surface drying matte, medium to dark yellow-green to olive-green; lower surface drying semi-glossy to glossy; anterior lobe (11)14–17 cm long, (7.5)9–14.5 cm wide, 1.1–1.5 times longer than wide, 1.4–1.9 times longer than posterior lobes, broadest near base, \pm symmetrical; posterior lobes directed toward the base or weakly outward, (6.1)7.3–11 cm long, (3.2)4–6.8 cm wide, 1.5–1.9 times longer than wide, bluntly acute to narrowly rounded or rarely bluntly rounded at apex, broadest midway, weakly broader than at base, weakly inequilateral, the inner side narrower, \pm rounded at base, briefly attenuate and frequently weakly confluent with opposite lobe, the confluent portion obscuring apex of petiole; outer side \pm straight toward base; midrib and major venation drying \pm flattened on lower surface, usually moderately darker to much darker than surface, rarely weakly darker; midrib round-raised on lower surface; **basal veins** 3–5 pairs, coalesced into a prominent posterior rib; primary lateral veins 4–7 pairs, arising at 50–65(90) $^{\circ}$, weakly arcuate or straight, convex on lower surface; secondary veins drying in part weakly raised or prominulous on lower surface, otherwise \pm flattened, in part concolorous, otherwise weakly darker than

surface; tertiary veins drying visible, \pm flat on lower surface, in part weakly darker than surface, otherwise concolorous; reticulate veins drying in part visible on lower surface; collective veins 3, the innermost arising from apex of posterior rib or from one of the lateral veins on inner side of posterior lobe, \pm parallel to margin, occasionally moderately scalloped, 4–6(12) mm from margin. INFLORESCENCES erect, 2 per axil; peduncle held within the sheath, (21)26–29 cm long, ca. 2 mm diam., drying matte to weakly glossy, medium-dark brown; **spathe** erect, 7.2–9 cm long, abruptly acuminate at apex, weakly or not at all constricted between tube and blade; spathe tube green or pale green on outer surface, 2.8–4 cm long, 3–5 mm diam., drying matte, dark reddish brown on outer surface, weakly glossy and paler on inner surface; spathe blade green or yellow, 4.5–6 cm long, 5–7 mm diam. (ca. 2 cm wide when flattened), drying matte, pale to medium reddish tan on both surfaces, marcescent, erect after anthesis; **spadix** erect, (6)6.5–8.4 cm long, sessile, adnate to spathe 2.6–3 cm at base, the entire length of pistillate portion; pistillate portion green or white, 2.6–3 cm long, 2.5–3.5 mm diam., drying reddish brown; fertile staminate portion red, yellow or green, 3–5.1 cm long, 3–6 mm diam., cylindrical or tapering, frequently curving forward, acute to narrowly rounded at apex, drying dark reddish brown; sterile portion 7–10 mm long, 2–4 mm diam., axis naked 1–1.5 mm at base, broadest at apex, rarely broadest at base, drying medium reddish brown; pistils weakly coherent, 3–4 across axis (viewed from above), ca. 2 mm long; ovary subglobose, 1–1.5 mm long, 1.5–2 mm diam., drying creamy tan with darker veins; style mantle-like, ca. 0.6 mm long, ca. 2 mm diam., comprising ca. $\frac{1}{3}$ of the length of pistil, briefly attenuate, the attenuate portion less than 0.5 mm long, the mantle broadly spreading, prominently wider than ovary apex, the margins weakly coherent with margins of adjacent styles; **stigma** weakly elevated on and drying weakly broader than narrowed portion of style; synandria 1–1.5 mm long, 1–

1.5 mm diam., coherent, truncate, 3–4(5)-lobed, mostly 3–4-androus; sterile flowers 1–1.5 mm long, 1.5–2 mm \times 1–1.5 mm diam., \pm elongated in direction of axis, coherent, truncate, irregularly subprismatic, in ca. 5 whorls. BERRIES green.

Flowering occurs in *Chlorospatha antioquiensis* in March, April, October and November.

Chlorospatha antioquiensis is endemic to the eastern and western slopes of the Cordillera Central in Antioquia Dept., Colombia, to the north and south of Medellín, at 1,800–3,000 m elevation, 3,000 m being the highest elevation recorded for the genus. *Chlorospatha antioquiensis* is distinguished by its sagittate leaf blades that dry matte on the upper surface, more or less glossy on the lower surface, with the inner margins of the posterior lobes weakly confluent at the base, obscuring the petiole apex, and by its red, yellow or green fertile staminate spadix, a range of coloration unique in the genus. Consequently, the possibility that more than one species is involved was considered. All collections examined proved to be virtually identical in all other respects, both floral and vegetative, and were therefore determined to be representative of the same species. *Chlorospatha antioquiensis* is known only from dried material and perhaps future examination of living material will confirm this. The drying color of the blades is somewhat variable, from dark yellow-green to olive-green, as is the blade shape which can be broadly triangular-sagittate and broadest at the base, or ovate-sagittate and weakly wider across the anterior lobe than at the base.

Chlorospatha antioquiensis could be easily confused with only one species, *C. amalfiensis* Croat & L. Hannon, which also occurs on the eastern slopes of the Cordillera Central but at lower elevations, 1,220–1,300 m. The petiole of *C. antioquiensis* dries with the epidermis partially separated intact and semi-glossy, with the sheath free-ending at the apex, differing from that of *C. amalfiensis*, which dries matte, with the sheath decurrent and the epidermis not separated. The leaf blades

of the latter species have 2 pairs of primary lateral veins and dry more or less yellow-brown, whereas those of *C. antioquiensis* have 4–7 pairs and dry greenish. The spathe of *C. antioquiensis* has a green tube and green or yellow blade, differing from *C. amalfiensis*, which has a purplish brown tube and white blade. The spadix of the latter species is adnate to the spathe only $\frac{1}{3}$ of the length of the pistillate portion and the pistils are somewhat laxly arranged, with the style appressed to the ovary and long-attenuated, comprising about $\frac{1}{2}$ of the length of the pistil. The spadix of *C. antioquiensis* is adnate the entire length of the pistillate portion and the pistils are comparatively densely arranged, with the style comprising $\frac{1}{3}$ of the length of the pistil, briefly attenuated and not appressed to the ovary. The fertile staminate portion is cylindrical to tapering in the latter species, with the synandria 3–4(5)-androus, whereas that of *C. amalfiensis* is clavate, with the synandria no more than 3-androus. The sterile staminate portion of the spadix comprises about $\frac{1}{4}$ of total length in the latter species, with the sterile flowers laxly arranged, differing from that of *C. antioquiensis*, which comprises about $\frac{1}{10}$ of total length, with the sterile flowers densely arranged.

Madison (1981) determined *J. Luteyn & M. Luteyn 7110*, the type of *C. antioquiensis*, as *C. lehmännii* (Engl.) Madison. It differs from that species in a number of ways and was found to be distinct. In the latter species, the posterior lobes are comparatively narrow, 3–4 times longer than wide and directed outward, whereas those of *C. antioquiensis* are directed toward the base and are relatively broad, less than 2 times longer than wide, and weakly confluent across the petiole apex. In *C. lehmännii*, the posterior rib is naked 5–7 mm per side, with the posterior lobes not at all confluent. The blades of *C. lehmännii* dry dark brown and densely dark purple-brown-punctiform on the upper surface, whereas those of *C. antioquiensis* dry medium to dark green, with no speckling present. In *C. lehmännii*, the lower surface dries matte and moderately to conspicu-

ously paler than the upper surface. That of *C. antioquiensis* dries more or less glossy and concolorous to weakly paler than the upper surface. Both the spathe and spadix of *C. lehmannii* are longer than those of *C. antioquiensis*, with the pistillate portion of the spadix longer than the fertile staminate portion. In the latter species, the fertile staminate portion is longer than the pistillate portion. The style of *C. lehmannii* is long-attenuated, comprises more than $\frac{1}{2}$ of the length of the pistil and is about as wide as the ovary apex. In *C. antioquiensis*, the style is briefly attenuate, comprises $\frac{1}{3}$ of the length of the pistil and is prominently wider than the ovary apex. The sterile flowers of *C. lehmannii* are either fungiform or branched (on the same spadix) and those of *C. antioquiensis* are subprismatic. The two species could not be confused even in the sterile state. *Chlorospatha lehmannii* is known only from the western slopes of the Cordillera Occidental in Cauca Department, a considerable distance from the northern end of the Cordillera Central, where *C. antioquiensis* is endemic.

Gomez 201 differs from the other collections in having the posterior lobes significantly broader midway and overlapping at the base, in dried material.

Etymology—Named for Antioquia Department, Colombia, where the species is endemic.

Paratypes—COLOMBIA. **Antioquia:** Mpio. Sonsón, vía Sonsón–La Soledad, rd. to Río Verde de los Montes, end of La Palmita–Río Verde de los Montes trail, Paramo de los Palomas, 3,000 m, 8 Apr. 1988, *R. Callejas et al. 6408* (HUA); Mpio. Yarumal, “El Cedro” trail, along route from Alto de Ventanas to El Cedro, 127 km NE of Medellín, 1,600–1,800 m, 7°06'N, 75°32'W, 7 Mar. 1993, *R. Callejas et al. 10815* (HUA); Mpio. Envigado, high part of Escobero hill, 6°12'N, 75°40'W, 11 Nov. 2000, *F. Cardona et al. 1050* (HUA); Mpio. Envigado, Pantanillo trail, along route from La Ceja to Airport, Km 4, NE between Medellín and Las Palmas, 2,200–2,420 m, 6°15'00"N,

75°30'00"W, 20 Oct. 1991, *A. Gomez 201* (HUA).

Chlorospatha betancurii Croat & L. Hannon, **sp. nov.** Type: COLOMBIA. Antioquia: Cordillera Central, Mpio. Amalfi, 8–15 km from Amalfi on Amalfi–Rumazón rd., sites “Salazar” & “La Playa”, 1,550 m, 6°56'N, 75°04'W, 28 Sep. 1988, *J. Betancur, F. Roldán & O. Escobar 782* (holotype, HUA). Figure 3.

Planta terrestris, 80 cm; internodia 9–10 cm longa, 8–11 mm diam., cataphylla ca. 37 cm longa; petiolus 77 cm longus, vaginata ca. 38 cm; lamina 3-lobata, 30 cm longa, 29 cm lata; nervis lateralibus primariis 7–8 utroque; inflorescentia usque ad 5 in quoque axile; pedunculus 37–44 cm longus; tubo 2.5–3.0 cm longa, 3.5 mm diam.; lamina alba.

Terrestrial herb, ca. 1 m tall; stem elongate, remnants of old cataphylls persisting in part as short fibers, the fibers pale to dark brown (all measurements made from dried material); internodes (of juvenile plants) 9–10 mm long, 8–11 mm diam., drying weakly glossy, dark greenish brown; cataphylls ca. 37 cm long, acuminate at apex, drying semi-glossy, medium tan or brown. **LEAVES** 1; **petioles** 77 cm long, drying glabrous, weakly glossy to semi-glossy, dark reddish brown, with epidermis much paler and in part separated \pm intact, semi-transparent, sheathed ca. 38 cm, ca. $\frac{1}{2}$ of total length; sheath decurrent at apex; free portion 5–7 mm diam. midway; **blades** deeply 3-lobed, 30 cm long, 29 cm wide, about as long as wide, drying thin, weakly bicolorous; upper surface green, sparsely, irregularly whitish-maculate, drying weakly glossy, dark green, the maculations pale-medium green; lower surface drying semi-glossy to glossy, the maculations pale yellow-green; **medial lobe** 28 cm long, 10 cm wide, 2.7 times longer than wide, acuminate at apex, broadest below middle, weakly shorter than to weakly longer than lateral lobes, weakly inequilateral, briefly attenuate toward base, broadly attached, ca. 3.5 cm

wide at point of attachment; **lateral lobes** directed toward the apex, 26.5–28.5 cm long, 8–8.5 cm wide, 3.4–3.6 times longer than wide, gradually acuminate to long-acuminate at apex, broadest near base, markedly inequilateral, the inner side always narrower, long-attenuate toward base and moderately confluent with medial lobe, the confluent portion ca. 1.5 cm wide; outer side ca. 2.2 times wider than inner side midway, \pm rounded or obliquely attached at base; midrib round-raised on lower surface, drying \pm flattened, darker than surface; posterior rib naked 1.3–1.5 cm per side; primary lateral veins (of medial lobe) 6 pairs, arising at 30–45°, straight to weakly arcuate, round-raised on lower surface, drying raised at base, otherwise \pm flattened, darker than surface; primary lateral veins (of lateral lobes) 7–8 pairs, the basal pair briefly fused toward the base, straight to weakly arcuate; secondary veins drying weakly raised on lower surface, weakly darker than surface; tertiary veins drying in part weakly prominulous, otherwise flat, mostly concolorous on lower surface, in part weakly darker than surface; reticulate veins drying obscure; collective veins 3, the innermost arising from the lowermost lateral vein at base, loop-connected with all preceding lateral veins, moderately scalloped, 3–10 mm from margin. INFLORESCENCES erect, to 5 per axil; peduncle held within the sheath, 37–44 cm long, ca. 2 mm diam., drying matte to weakly glossy, dark brown; **spathe** erect, total length not known; spathe tube green, 2.5–3 cm long, 3.5 mm diam., drying matte to weakly glossy, dark reddish brown on outer surface, weakly glossy on inner surface and densely pale tan-punctiform (speckles regularly rounded, appearing as subepidermal cellular inclusions); spathe blade white, length not known; **spadix** erect, 6 cm long, sessile, adnate to spathe ca. 1 cm at base, ca. $\frac{1}{2}$ of the length of pistillate portion; pistillate portion ca. 2.2 cm long, ca. 2 mm diam., drying brown; fertile staminate portion brown, ca. 2.8 cm long, 1.5–3 mm diam., clavate, bluntly rounded at apex, drying dark reddish brown; sterile staminate portion ca. 1 cm

long, 1–1.5 mm diam., broadest at base, drying medium yellow-brown; pistils weakly coherent (laxly arranged in basal whorls), 2–4 across the axis (viewed from above), ca. 1 mm long; ovaries subglobose, ca. 0.8 mm long, 1–1.5 mm diam., drying medium brown; style disc-like, 0.8–1 mm diam., the margins not coherent with those of adjacent styles; **stigma** 0.2–0.3 mm diam., sessile; synandria ca. 1 mm long, ca. 1 mm diam., coherent, truncate, deeply (2)3–4-lobed, 3–4-androus (mostly 3); sterile flowers ca. 0.5 mm long, 1.7–2 mm \times 1 mm diam., \pm elongated in direction of axis, \pm coherent, truncate, irregularly subprismatic, arranged in 6 whorls. INFRUCTESCENCE 4–6.3 cm long, 0.9–1.4 cm diam., drying matte to weakly glossy, dark reddish brown. BERRIES 3–4 mm diam., drying dark brown; seeds not known.

Flowering and fruiting are known to occur in *Chlorospatha betancurii* only during the month of September.

Chlorospatha betancurii is known only from the eastern slopes of the Cordillera Central in Antióquia Department, Colombia, at 1,550–1,850 m elevation, a region with a high level of endemism in the genus. It is distinguished by its deeply 3-lobed, whitish-maculate, green leaf blades that dry green on both surfaces, with the lateral lobes long-acuminate at the apex and narrower than and nearly as long as the medial lobe. The petiole dries semi-glossy, with the epidermis partially separated intact from the main body and semi-transparent. The spadix is relatively small (6 cm long), with the fertile staminate portion brown.

Chlorospatha betancurii is one of only 3 trilobed species that occur in the region east of the Cordillera Occidental and it could be confused with only one of these, *C. callejasii* Croat & L. Hannon (described below), also from Antióquia, near Yarumal. The leaf blades of the latter species are not maculate and dry rich, reddish brown on both surfaces, with the upper surface matte-subvelvety and the major and secondary venation almost black on the lower surface. All segments are acute

at the apex, with 9–11 pairs of primary lateral veins on the lateral segments. The blades of *C. betancurii* are maculate and dry green on both surfaces, with the upper surface weakly glossy, the abaxial venation only moderately darker than the surface and all segments long-acuminate at the apex, with 7–8 pairs of primary lateral veins on the lateral segments. The petiole of *C. callejasii* dries matte, with the epidermis not separated, whereas that of *C. betancurii* dries semi-glossy, with the epidermis partially separated from the main body. The spathe tube of *C. callejasii* is dark purple on both surfaces, whereas that of *C. betancurii* is entirely green, with the spadix only 6 cm long vs. 8.2 cm long in *C. callejasii* (in specimens of comparable size). The fertile staminate spadix of *C. callejasii* is white, whereas that of *C. betancurii* is brown.

Chlorospatha betancurii might also be confused with *C. cogolloi* Croat & L. Hannon (described below), but the latter species occurs only on the western slopes of the Cordillera Occidental and differs in having the petiole usually sheathed $\frac{3}{4}$ or more of its length, with the epidermis not separating (on drying), and the lower blade surface purple. In *C. betancurii*, the petiole is sheathed about $\frac{1}{2}$ of its length, with the epidermis partially separated (on drying), and the lower blade surface is green. In *C. cogolloi*, there are more pairs of primary lateral veins on all segments (in mature specimens), with 10 pairs on the medial lobe and 8–10 pairs on the lateral lobes vs. 6 pairs on the medial lobe and 7–8 pairs on the lateral lobes in *C. betancurii*. The spadix is also longer than that of *C. betancurii*, in specimens of comparable size, with the fertile staminate portion white, while that of *C. betancurii* is brown.

Chlorospatha betancurii bears a superficial resemblance to *C. mirabilis* (M. T. Masters) Madison, both having deeply 3-lobed blades, however, in Colombia, the latter species occurs only on the western slopes of the Cordillera Occidental and the lower surface of the blade is entirely purple or purplish, as is the petiole, thus dif-

fering from *C. betancurii* in which both structures are green. The sterile staminate portion of the spadix comprises only $\frac{1}{5}$ of total length in the latter species, with the sterile flowers densely arranged, and about $\frac{1}{3}$ of total length in *C. mirabilis*, with the sterile flowers laxly arranged.

The second collection cited, *L. Escobar et al.* 7961, is a very small, sterile specimen from the same general area as the type and is therefore included here.

Etymology—Named for Dr. Julio Betancur, (Herbario Nacional de Colombia, Bogotá), noted Colombian botanist and the collector of the type specimen.

Paratypes—COLOMBIA. **Antióquia:** Mpio. Gautapé, Santa Rosa trail, Finca Montepinar, 1,850 m, 24 Sep. 1987, *L. Escobar et al.* 7961 (MO).

Chlorospatha callejasii Croat & L. Hannon, **sp. nov.** Type: COLOMBIA. Antióquia: Mpio. Yarumal, vic. El Cedro, between Ventanas and El Cedro, Kms 1–9, 1,710–1,900 m, 7°15'N, 75°30'W, 23 Mar. 1988, *R. Callejas, F. Roldán & A. Arbeláez* 6212 (holotype, HUA). Figures 4, 5.

Planta terrestris, ca. 1 m; internodia 1.5–2.5 cm longa, 1.5–2.5 cm diam.; petiolus 82.5 cm longus, vaginata 45 cm; lamina profunde 3-lobulata, ca. 33 cm longa, ca. 30 cm lata; nervis lateralibus primariis (lobulas medium) 5 utroque; inflorescentia 2 in quoque axile; pedunculus 46 cm longus, 2–3 cm diam.; spathe 9 cm longa; tubo purpurea, 4.2 cm longo, 7 mm diam.; lamina alba.

Terrestrial herb, ca. 1 m tall; stem elongate, remnants of old cataphylls persisting in part semi-intact, otherwise as pale, reddish brown linear fibers (all measurements made from dried material); internodes 1.5–2.5 cm long, 1.5–2.5 cm diam., drying weakly glossy, medium-dark brown; cataphylls not known. LEAVES 2, probably erect-spreading; **petioles** 82.5 cm long, drying glabrous, weakly glossy, dark reddish brown, almost black, sheathed 45 cm, slightly more than $\frac{1}{2}$ of total length; sheath

decurrent at apex; free portion ca. 5 mm diam. midway; **blades** deeply 3-lobed, nearly trisect, ca. 33 cm long, ca. 30 cm wide, 1.1 times longer than wide, broadest below middle, drying thinly coriaceous, weakly bicolorous; upper surface green, drying matte-subvelvety, weakly green-tinged, dark reddish brown; lower surface drying semi-glossy; **medial lobe** 29.5 cm long, 12 cm wide, 2.5 times longer than wide, acute at apex, broadest at or above middle, 1.1–1.2 times longer than lateral lobes, cuneate and broadly attached at base, ca. 3 cm. wide at point of attachment, weakly inequilateral; **lateral lobes** weakly falcate, directed toward the apex, 24.5–28 cm long, 8.5–9.2 cm wide, 3 times longer than wide, acute at apex, broadest below middle, markedly inequilateral, the inner side always narrower, weakly attenuate to long-attenuate toward base, narrowly confluent with medial lobe, the confluent portion ca. 4 mm wide; outer side 3.2–4.8 times wider than inner side midway, moderately to narrowly rounded at base, briefly attenuate onto posterior rib; midrib and major venation convex on lower surface, drying \pm flattened, much darker than surface, almost black; posterior rib naked 1–1.5 cm per side; primary lateral veins (on medial lobe) 5 pairs, arising at 35–45°, weakly arcuate; primary lateral veins (on lateral lobes) 9–11 pairs, arising at 40–120°, weakly arcuate, aggregated toward base, the basal 3 fused near base; secondary veins drying in part weakly raised, otherwise prominulous on lower surface, much darker than surface; tertiary and reticulate veins drying weakly prominulous on lower surface, weakly darker than surface; collective veins 3, the innermost arising from one of the lowermost lateral veins at base, loop-connected with all preceding lateral veins, moderately scalloped, 5–10 mm from margin. INFLORESCENCES erect, 2 per axil; peduncle

held within the sheath, 46 cm long, 2–3 mm diam., drying weakly glossy, blackish brown; **spathe** erect, ca. 9 cm long, apex not known, weakly or not at all constricted between tube and blade; spathe tube dark purple on both surfaces, 4.2 cm long, 7 mm diam., drying weakly glossy, weakly purple-tinged dark brown on both surfaces; spathe blade white, ca. 4.5 cm long, 8 mm diam., drying matte, pale tan, marcescent, erect after anthesis; **spadix** erect, 8.2 cm long, sessile, adnate to spathe ca. 1.5 cm at base, ca. $\frac{1}{2}$ of the length of pistillate portion; pistillate portion red, 3.6 cm long, 3–4 mm diam., broadest below middle; fertile staminate portion white, 3.2 cm long, 3.5–6 mm diam., broadest just above base, weakly tapering, narrowly rounded at apex, drying medium yellowish brown; sterile staminate portion 1.4 cm long, ca. 3 mm diam., \pm cylindrical, drying medium-dark reddish brown, weakly darker than fertile staminate portion; pistils \pm densely arranged, ca. 4 across the axis (viewed from above), ca. 1 mm long; ovaries cylindrical, 1–1.5 mm long, 1–1.5 mm diam., drying dark tan with darker veins; style disc-like, 1–1.5 mm diam., the margins not coherent with those of adjacent styles; **stigma** sessile, ca. 0.2 mm diam., \pm capitate; synandria ca. 1 mm long, ca. 1.5 mm diam., coherent, truncate, deeply 3–4-lobed, 3–4-anded; sterile flowers ca. 0.5 mm long, 2–3 mm \times 1 mm diam., markedly elongated in direction of axis, coherent, truncate, irregularly prismatic to subprismatic, in 5 whorls. INFRUCTESCENCE (immature) 5.5 cm long, 8 mm diam., drying matte, blackish brown. BERRIES not known.

Flowering is known to occur in *Chlorospatha callejasii* only in the month of March.

Chlorospatha callejasii is known from a single collection made near Yarumal, in Antioquia Department, Colombia, at

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rospatha corrugata Bogner & Madison (*Spear s.n.*). Close-up showing inflorescence at anthesis. Photo J. Bogner.

1,710–1,900 m elevation, at the northern end of the Cordillera Central, in the region of the Magdalena River drainage. It is distinguished by its entirely green, nearly tri-sect leaf blades that dry matte-subvelvety, dark reddish brown on the upper surface and glossy below, with the major and secondary venation almost black and all segments acute at the apex. It is also distinguished by its spathe tube, which is dark purple on both surfaces, and red styles.

Chlorospatha callejasii is one of only 3 trilobed species that occur in the region east of the Cordillera Occidental in Colombia and it might be confused with only one of these, *C. betancurii* Croat & L. Hannon. The leaf blades of the latter species differ in being prominently maculate, drying weakly glossy, green on the upper surface, with the abaxial venation only moderately darker than the surface (not at all blackish) and all segments long-acuminate at the apex. The blades of *C. callejasii* are not maculate and dry matte-subvelvety, dark reddish brown on the upper surface and glossy below, with the major and secondary venation almost black and all segments acute at the apex. *Chlorospatha betancurii* also differs in having 7–8 pairs of primary lateral veins on the lateral segments vs. 9–11 pairs in *C. callejasii*. The petiole of *C. betancurii* dries more or less glossy and reddish brown, with the epidermis partially separated and semi-transparent, thus differing from that of *C. callejasii*, which dries intact, matte and almost black. The spathe tube of *C. betancurii* is entirely green, with the spadix only 6 cm long vs. 8.2 cm long in *C. callejasii* (in specimens of comparable size). The spathe tube of *C. callejasii* is dark purple on both surfaces and the fertile staminate portion of the spadix is white, not brown as in *C. betancurii*.

It could be argued that *C. callejasii* is possibly conspecific with *C. mirabilis*, since one specimen of the latter species (*Hort. Veitch s. n.*), from an undetermined locality, has the spathe tube purple on the inner surface. However, all known Colombian collections of *C. mirabilis* are from the western slopes of the Andes at

lower elevations. These, including the specimen of undetermined origin, differ from *C. callejasii* in having the lower blade surface and petiole purple or purplish and the upper blade surface drying somewhat glossy. *Chlorospatha callejasii* is entirely green, with the upper blade surface drying matte-subvelvety. There are fewer pairs of primary lateral veins on the lateral segments in *C. mirabilis*, 3–6 vs. 9–11 in *C. callejasii*. The sterile staminate portion of the spadix comprises about $\frac{1}{3}$ of total length in *C. mirabilis*, with the flowers laxly arranged in 7–9(11) whorls, and comprises only $\frac{1}{5}$ of total length in *C. callejasii*, with the flowers densely arranged in 5 whorls.

Etymology—Named for Ricardo Callejas, Colombian botanist, professor at the Universidad de Antioquia and expert on the Piperaceae. Callejas has collected widely in Antioquia and collected the type of this species.

Chlorospatha cogolloi Croat & L. Hannon, **sp. nov.** Type: COLOMBIA. Antioquia: Parque Nacional Natural Las Orquídeas, vic. Calles, on ridge to NW of La Cabaña Calles, Quebrada Honda, Parcel W, subparcels W8–W9, 1,300 m, 6°29'N, 76°14'W, 11 Dec. 1992, J. Pipoly, A. Cogollo, D. Cárdenas, M. Villa, O. Alvarez & L. Velez 16992 (holotype, MO; isotype, JAUM). Figures 6, 7.

Planta terrestris vel hemiepiphytica, ca. 1 m; internodia ca. 1.5 cm longa, 0.7–2 cm diam; cataphylla 15–30 cm longa; petiolus 35–73(95) longus, vaginata 34.5–70 cm; lamina trisecta vel profunde 3-lobulata, 23–43(56) cm longa, 22–55(65) cm lata; nervis primariis lateralibus 8–10 utroque (lobula lateralis); inflorescentia ad 4 in quoque axila; pedunculus (37.5)42.5–53 cm longus, 1–2 mm diam., spatha (7)8.5–10.5 cm longa, tubo (2.7)4.3–4.5 cm longo, 5–6 mm diam.; lamina 4.2–6 cm longa, ca. 5 mm diam.; spadix (5.4)7–8 cm longus; parte pistillata 2.3–3.3 cm long a 3–4 mm diam.

Terrestrial or hemiepiphytic herb, ca. 1

m tall (all measurements made from dried material); stem elongate, with remnants of old cataphylls persisting (at least at upper nodes) semi-intact, mostly as linear fibers; fibers usually paler; sap pink or creamy white; internodes ca. 1.5 cm long, 0.7–2 cm diam., drying matte, dark brown; cataphylls 15–30 cm long, obtuse with acumen at apex (acumen ca. 7 mm long), drying \pm fibrous, matte to weakly glossy, medium to dark reddish brown. LEAVES 1–3, erect-spreading; **petioles** 35–73(95) cm long, glabrous, drying matte to weakly glossy, dark brown, sheathed 34.5–70 cm, usually $\frac{3}{4}$ or more of total length (in mature specimens); sheath decurrent at apex; free portion 2–4 mm diam. midway, minutely many-ribbed; **blades** trisect to deeply 3-lobed (simple or with conspicuously short, broadly confluent lateral lobes in juvenile plants), 23–43(56) cm long, 22–55(65) cm wide, as wide as long or weakly wider than long, drying thin to thinly coriaceous, moderately to conspicuously bicolorous; upper surface green, occasionally sparsely pale-maculate, drying weakly glossy to semi-glossy, dark brown to dark green; lower surface usually entirely purple, rarely entirely green with major veins purple, drying weakly glossy to semi-glossy, gray-tinged green to greenish brown; **medial lobe** elliptical to narrowly long-ovate, 22–36.5(46) cm long, 8–15(18) cm wide, 2.4–2.7 times longer than wide, 1.2–1.4 times longer than lateral lobes, acuminate at apex, usually broadest below middle, occasionally midway, acute to cuneate toward the base and narrowly attached, 1–4 cm wide at point of attachment, weakly or not at all inequilateral; **lateral lobes** directed toward the apex, (22)25–30.5(40) cm long, (6)9–12(15) cm wide, (2.2)2.5–3.6 times longer than wide, moderately acuminate to broadly or narrowly long-acuminate at apex, broadest at or below middle, moderately to markedly inequilateral, the inner side always narrower, weakly to moderately attenuate or rarely \pm straight toward base, narrowly or not at all confluent with medial lobe, the confluent portion 1–3(8) mm wide; outer side 1.5–4.7 times wider than inner side

midway, moderately to broadly rounded at base, briefly attenuate onto posterior rib; midrib purple, round-raised and finely many-ribbed on lower surface, drying raised, weakly flattened, much darker than surface; posterior rib naked 1–2(5) cm per side; primary lateral veins (on medial lobe) ca. 10 pairs (fewer in younger plants), arising at 30–45°, straight to weakly arcuate, purple, minutely many-ribbed on lower surface, drying \pm raised to weakly flattened, brown or green, moderately darker than surface; primary lateral veins (on lateral lobes) 8–10 pairs (fewer in younger plants), arising at 35–80°, most acutely toward apex, straight to weakly arcuate, prominently aggregated toward base; secondary veins drying raised on lower surface, weakly to moderately darker than surface; tertiary veins drying in part weakly raised or prominulous on lower surface, in part weakly to moderately darker than surface, otherwise concolorous; reticulate veins occasionally drying in part prominulous on lower surface, otherwise \pm obscure; collective veins 3, the innermost arising from one of the lowermost lateral veins at base, loop-connected to all preceding lateral veins, moderately scalloped, 2–13 mm from margin. INFLORESCENCES erect, to 4 per axil; peduncle held within the sheath, (37.5)42.5–53 cm long, 1–2 mm diam., glabrous, drying matte, dark brown to blackish brown; **spathe** erect, (7)8.5–10.5 cm long, cuspidate at apex, weakly or not at all constricted between the tube and blade; spathe tube green, (2.7)4.3–4.5 cm long, 5–6 mm diam., drying matte, dark blackish brown on outer surface, matte and concolorous to weakly paler on inner surface; spathe blade creamy white, rarely pale green, 4.2–6 cm long, ca. 5 mm diam., drying matte, blackish brown on outer surface, weakly paler on inner surface, marcescent, erect after anthesis; **spadix** erect, (5.4)7–8 cm long, sessile, adnate to spathe ca. 1.7 cm at base, slightly more than $\frac{1}{2}$ of the length of pistillate portion; pistillate portion 2.3–3.3 cm long, 3–4 mm diam., drying purplish brown; fertile staminate portion yellowish, ca. 3.5 cm long, 2.5–4 mm

diam., narrowly rounded at apex, \pm cylindrical, weakly narrowed at base, drying medium-dark reddish to pinkish brown; sterile staminate portion 5–9 mm long, 1.5–2.5 mm diam., weakly narrowest midway, drying dark tan to dark brown; pistils weakly coherent, ca. 4 across the axis (viewed from above), ca. 1–1.5 mm long; ovaries subglobose, 1–1.5 mm diam., drying tan; style disc-like, 1.2–1.5 mm diam., the margins weakly broader than ovary apex, frequently \pm coherent with margins of adjacent styles; **stigma** 0.3–0.5 mm diam., sessile, obtusely truncate; synandria ca. 1–1.2 mm long, 1–1.5 mm diam., or occasionally 0.75–2 mm diam. and elongated in direction of axis in basal 4 whorls, coherent, weakly obtusely truncate, deeply (2)3–4-lobed, (2)3–4-androus (mostly 3); sterile flowers 0.5–1 mm long, 1.5–2.5 mm \times 0.5–1.5 mm diam., \pm elongated in direction of axis, coherent, truncate, subprismatic, arranged in 4–5 whorls. **BERRIES** not known.

Flowering is known to occur in *Chlorospatha cogolloi* during the months of February, June and December.

Chlorospatha cogolloi is known only from Parque Nacional Las Orquídeas and the Nutibara-La Blanquita area near Frontino, on the western slopes of the Cordillera Occidental in Antioquia Department, Colombia, at 1,250–1,800 m elevation. The species is distinguished by its petiole, which is usually sheathed $\frac{3}{4}$ or more of its length, its trisect to nearly trisect leaf blades with the lower surface usually purple but usually drying weakly gray-tinged green, and by its relatively small inflorescence with the fertile staminate portion of the spadix yellowish.

Chlorospatha cogolloi would be most easily confused with *C. mirabilis* (M. T. Masters) Madison, especially juvenile or young flowering specimens, the leaf blades of both species having 3–6 pairs of primary lateral veins at this stage of development. However, fully mature specimens of *C. cogolloi* have 8–10 pairs on all segments. The major and secondary venation in *C. cogolloi* dries more or less raised on the lower blade surface but flat-

tened in *C. mirabilis*. The blades of *C. cogolloi* are thin, whereas those of *C. mirabilis* are thinly coriaceous to subcoriaceous. The mature petiole is usually sheathed about $\frac{3}{4}$ of its length in *C. cogolloi* vs. $\frac{1}{2}$ – $\frac{2}{3}$ in *C. mirabilis*. In *C. cogolloi*, the spadix is shorter (in plants of comparable size), with the sterile staminate portion comprising only $\frac{1}{10}$ of total length and the sterile flowers densely arranged in 4–5 whorls, whereas that portion in *C. mirabilis* comprises approximately $\frac{1}{3}$ of total length, with the sterile flowers laxly arranged in 7–9(11) whorls. The ovary is subglobose in *C. cogolloi* but subcuboidal or cylindrical in *C. mirabilis*. *Chlorospatha cogolloi* occurs only above 1,200 m and all Colombian collections of *C. mirabilis* were made below 150 m, except *Callejas et al.* 6742, which was made at 900 m, the only collection of that species from Antioquia and one that appears to be somewhat intermediate between *C. mirabilis* and *C. cogolloi*. In that collection, the sterile staminate portion of the spadix comprises only about $\frac{1}{4}$ of the total length, with the sterile flowers more or less coherent.

Chlorospatha cogolloi is also similar to *C. betancurii* Croat & L. Hannon, but the latter species occurs only on the eastern slopes of the Cordillera Central, in Antioquia, at 1,550–1,850 m elevation, and differs in having entirely green leaf blades with fewer primary lateral veins and the petiole sheathed about $\frac{1}{2}$ of its length. The blades of *C. cogolloi* are usually entirely purple on the lower surface, rarely green with the major veins purple, and the petiole is usually sheathed $\frac{3}{4}$ or more of its length. In *C. betancurii*, the epidermis of the petiole dries in part separated intact, semi-transparent and semi-glossy. In *C. cogolloi*, the petiole dries matte to weakly glossy and the epidermis is not separated.

Luteyn et al. 12060 is included with reservation and possibly represents another species. It is a small, fertile specimen collected at somewhat higher elevation, to the north of the type locality, and has the petiole sheathed only $\frac{1}{3}$ of its length and the spathe entirely pale green.

Etymology—Named for Alvaro Cogollo, Colombian botanist and Director of the Herbarium at the Jardín Botánico in Medellín, Colombia. Cogollo has collected widely in Antioquia and collected the type of this species.

Paratypes—COLOMBIA. **Antioquia:** Parque Nacional Natural Las Orquídeas, Sector Calles, right bank of Río Calles, 1,280–1,320 m, 6°32'N, 76°19'W, 2 June 1988, *Cogollo & J. Ramirez 3160* (JAUM), 20 Feb. 1989, *Cogollo et al. 4127* (JAUM); Mpio. Frontino, Nutibara district, Nutibara-La Blanquita rd., Murri region, Alto de Cuevas, 1,700–1,800 m, 06°45'N, 076°20'W, *Luteyn et al. 12060* (HUA); Parque Nacional Natural Las Orquídeas, vic. Calles, right bank of Río Calles, 1,350–1,450 m, 6°32'N, 76°19'W, 6 Dec. 1993, *Pipoly et al. 17820* (MO), 8 Dec. 1993, *Pipoly et al. 17952* (MO).

Chlorospatha corrugata Bogner & Madison, *Aroideana* 8(2): 48–51. 1985. Type: COLOMBIA. Antioquia: vic. Sopetrán, 2 ½ hrs. NW of Medellín, near Río Cauca & Río Aurra, 1970s, *E. Spear s. n.* (holotype, M; isotypes, COL, K). Figures 8, 9, 13.

Terrestrial herb, to 1 m tall; stem possibly erect, 10 cm long or longer, with remnants of old cataphylls persisting ± intact along its length and weakly fibrous, the fibers pale; sap milky; internodes 1–2 cm long, 1.5–2.5 cm diam., brown, drying 1–2 cm diam., matte, dark brown; cataphylls (6)10–23 cm long, green, drying weakly glossy to semi-glossy, medium brown, with some pale, linear fibers. LEAVES 3–4, erect-spreading; **petioles** (13)30–63 cm long, entirely weakly minutely puberulent to granular-puberulent or in part only toward apex, medium green, drying matte, dark brown to greenish brown, sheathed 6–18 cm, ca. (¼)½ of total length; sheath decurrent at apex; free portion (0.25)0.5–1 cm diam. midway; **blades** deeply 3-lobed or trisect (in some mature specimens), 26–35 cm long, 30–42 cm wide, 1.1–1.2 times wider than long, thinly coriaceous (dry), concolorous; upper surface

conspicuously corrugate, weakly glossy, medium green, drying weakly glossy, medium to dark brown to brownish green or olive-green; lower surface reticulate, narrowly minutely colliculate along all veins, medium green, drying weakly glossy to semi-glossy, weakly to moderately paler; **medial lobe** 16–23.5 cm long, 9–12 cm wide, ± elliptical, broadest at or above middle, 1.7–2.2 times longer than wide, shorter and narrower than lateral lobes, abruptly acuminate at apex, cuneate to acute toward base, narrowly attached, 1.4–1.8 cm wide at point of attachment (dry), weakly to moderately inequilateral, with one side to 1.8 times wider than opposite side midway; **lateral lobes** oblique or directed toward the apex, 15–30 cm long, (7)11–14.5 cm wide, 1.6–2.4 times longer than wide, abruptly acuminate to gradually acuminate at apex, broadest at or below middle, markedly inequilateral, the inner side always narrower, attenuate toward base, markedly narrowly or not at all confluent with medial lobe, the confluent portion 1–2 mm wide (moderately confluent in young plants); outer side to 7.3 times wider than inner side midway, usually broadly rounded at base and abruptly attenuate onto posterior rib or with a weakly to well developed posterior lobe or auricle 5.5–11.5 cm long, 6–10 cm wide, narrowly rounded to rarely bluntly acute at apex, separated from the lateral lobe by a slender posterior rib 1.5–2.2 cm long, the inner side ca. 3–5.5 cm wide, abruptly attenuate at base, the outer side broadly rounded, weakly to prominently or not at all constricted in area of petiole attachment; all orders of venation ± raised, granular-puberulent to crispy-puberulent on lower surface, drying ± raised, concolorous to weakly darker than surface; midrib deeply sunken on upper surface, weakly paler than surface, drying ± concolorous, round-raised on lower surface; posterior rib naked 1.3–2 cm per side, round-raised on lower surface; posterior rib of posterior lobe (when present) naked 2–3 cm per side (including rachis), markedly curved, round-raised on lower surface, with 7–10 veins branching off, ca. 4



Figs. 9-12. —9 (top L.) *Chlorospatha corrugata* Bogner & Madison (*Spear s.n.*). Close-up showing inflorescence at anthesis. Photo J. Bogner. —10 (top R.) *Chlorospatha croatica*

acrosopic, 5 basiscopic, quilted-sunken on upper surface, occasionally weakly paler than surface toward base, drying concolorous; primary lateral veins (on medial lobe) 4–6 pairs, arising at 25–35°, straight to weakly arcuate, quilted-sunken on upper surface, weakly paler than surface, round-raised on lower surface, drying concolorous; primary lateral veins (on lateral lobes) (7)8–10 on outer side, arising at 40–45°, moderately arcuate, aggregated toward base; secondary veins quilted-sunken on upper surface; tertiary veins in part sunken on upper surface; reticulate veins drying prominently prominulous on lower surface; collective veins 3, the innermost arising from one of the lowermost lateral veins at base, loop-connected with all preceding lateral veins, weakly scalloped, 3–8 mm from margin. INFLORESCENCES erect, to 3 per axil; peduncle held within the sheath, (3–3.5)8–13 cm long, 2.5–3 mm diam., granular-puberulent, pale green, drying ca. 2 mm diam., matte, dark brown; **spathe** erect, 4.5–5.3 cm long, acuminate at apex, margins in-rolled in apical 1–1.5 cm, weakly or not at all constricted between tube and blade; spathe tube pale to medium green or white on both surfaces, granular-puberulent to weakly minutely puberulent on outer surface, ca. 2.3 cm long, drying 3.5–4.5 mm diam., matte to weakly glossy, dark brown to reddish brown on outer surface, weakly paler on inner surface and densely cream-punctiform (speckles regularly rounded, appearing as subepidermal cellular inclusions), most densely so toward base; spathe blade white, green or yellowish, ca. 3 cm long, drying ca. 5 mm diam., paler than tube, marcescent, reflexing after anthesis; **spadix** erect, 3.5–4.9 cm long, sessile, \pm cylindrical, adnate to spathe 6–9 mm at base, $\frac{1}{2}$ – $\frac{2}{3}$ of the length of pistillate

portion; pistillate portion whitish, 1–1.3 cm long, drying 2.5–3 mm diam., drying orangish; fertile staminate portion yellowish or white, 2–2.5 cm long, 2–4 mm diam., bluntly acute at apex, \pm cylindrical to tapering, occasionally weakly narrowed at base, drying medium pinkish-tan; sterile staminate portion creamy yellow, 0.5–1 cm long, ca. 2.5 mm diam., cylindrical, weakly narrower than pistillate and fertile staminate portions, drying yellowish; pistils weakly coherent, ca. 4 across the axis (viewed from above), 1–1.5 mm long; ovaries 1.5–1.9 mm diam., subglobose, with axile placentation, drying pale yellowish; ovules hemianatropous; style mantle-like, 1–1.5 mm diam., broadly spreading, moderately broader than ovary apex, the margins \pm coherent with those of adjacent styles; **stigma** lemon-yellow, 0.7–0.8 mm diam., sessile or apparently so (possibly weakly elevated on narrowed portion of style), obtusely truncate, weakly depressed medially, drying medium reddish brown; synandria ca. 1.3 mm long, 1.8–2 mm diam., coherent, truncate, irregularly 3–4-lobed, 3–4-androus, with a few at apex sterile; pollen in tetrads, ca. 42 microns diam; sterile flowers ca. 1 mm long, 1.5–3 mm \times 0.8–1.3 mm diam., \pm elongated in direction of axis, coherent, truncate, irregularly subprismatic, arranged in 3–6 whorls. CHROMOSOMES $2n = 26$. INFRACTESCENCE 3.5 cm long, 1 cm diam. midway, drying dark brown, almost black, weakly minutely puberulent on outer surface. BERRIES not known.

Flowering occurs in *Chlorospatha corrugata* in March, April and July, with fruiting recorded for the month of July.

Chlorospatha corrugata is known only from Antióquia Department, Colombia, at 890–1,350 m elevation and is the only species that occurs on the western slopes of

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tiana Grayum (Croat 22932). Petioles and inflorescences (at anthesis). —11 (bottom L.) *Chlorospatha gentryi* Grayum (Gentry & E. Rentería 24585). Leaves and inflorescences (one at anthesis) —12 *Chlorospatha luteynii* Croat & L. Hannon (*Callejas et al.* 6361). Type specimen.

both the Cordillera Central and Cordillera Occidental. The type locality, in the vicinity of Sopetrán near the Río Cauca, in the Cordillera Central, is possibly incorrect. The type is the only collection from this area and the information regarding the collection was obtained only recently, by way of personal communication with Mrs. Elaine Spear, the collector of the type. However, it is unlikely that these widely separated collections represent more than one species. They appear to accord in all ways except in the size of the leaf blades and the presence of a posterior lobe in the collections from the Cordillera Occidental, which is reasonably attributed to maturity or age, and in the color of the synandria, which are yellowish in the type and white in the other collections.

Chlorospatha corrugata is distinguished by its deeply 3-lobed to trisect, concolorous, corrugate, medium green leaf blades with the lower surface densely reticulate, with all orders of venation raised and puberulent to granular-puberulent. The lateral lobes are distinctive, being unusually long and broad, usually longer and wider than the medial lobe, and markedly inequilateral. *Chlorospatha corrugata* is also distinguished by its short peduncle, to 13 cm long, and small inflorescence, less than 6 cm long, with the spathe blade reflexing after anthesis.

Chlorospatha corrugata could not be easily confused with any published species. Although *C. betancurii* Croat & L. Hannon and *C. callejasii* Croat & L. Hannon also have green blades that are not at all purplish on the abaxial surface, the upper and lower surfaces are smooth, with the abaxial venation glabrous. The upper blade surface is corrugate and the lower surface reticulate, with the abaxial venation more or less puberulent in *C. corrugata*. In the latter species, the lateral lobes are conspicuously broader than the medial lobe but of approximately equal widths in *C. betancurii* and *C. callejasii*. In *C. corrugata*, the petiole is also more or less puberulent and sheathed $\frac{1}{4}$ – $\frac{1}{2}$ of its length, whereas in the other two species, the petiole is glabrous and sheathed about $\frac{1}{2}$ of

its length. The most significant difference lies in the morphology of the styles, with the style mantle-like and broadly spreading in *C. corrugata* and disc-like and comparatively narrow in the other two species.

One specimen of *Callejas et al.* 6706 is unusual in having a well developed posterior lobe at the base of one lateral lobe and an auricle on the opposite lobe.

Etymology—From the Latin *corrugatus*, meaning ‘corrugated, furrowed or in folds’, referring to the leaves.

Additional specimens examined—COLOMBIA. **Antióquia:** Mpio. Frontino, La Blanquita District, Region Murri, between Nutibara & La Blanquita, 14.5 km W of Nutibara, 15–16 km from Alto de Cuevas-La Blanquita, 890–900 m, 6°45'N, 76°25'W, 13 July 1988, *Callejas et al.* 6706 (MO, HUA); Mpio. Urrao, Parque Nacional Natural Las Orquídeas, Sector Calles, Quebrada “La Agudelo”, 1,300–1,350 m, 6°31'N, 76°19'W, 31 Mar. 1991, *J. Ramírez et al.* 4102 (MO).

Chlorospatha croatianae Grayum, *Ann. Missouri Bot. Garden* 73: 464–467. 1986. Type: PANAMA. Coclé: N slope and summit of Cerro Pilón, 900–1,173 m, 13 Mar. 1973, *Croat* 22932 (holotype, MO; isotypes, B, K, PMA, US). Figures 10, 14.

Chlorospatha croatianae* ssp. *enneaphylla Grayum. Type: COLOMBIA. Boyacá: El Humbo, 130 mi. N of Bogotá, 1933, *Lawrance* 794 (holotype: K).

Terrestrial or rarely hemiepiphytic herb, ca. 1 m tall or less; stem elongate, with remnants of old cataphylls persisting as pale medium brown fibers along its length (all measurements made from dried material); sap milky or transparent; internodes 0.8–3.3 cm long, 1–1.3 cm diam., drying matte, dark brown; cataphylls marcescent, becoming fibrous, lanceolate, 10–32 cm long, acute to obtuse with acumen at apex, 1-ribbed abaxially, drying matte to weakly glossy, dark reddish brown. LEAVES 2–4, erect-spreading; **petioles** 47–

74 cm long, glabrous, drying matte to weakly glossy, dark brown or reddish brown, sheathed 22–50 cm, $\frac{1}{2}$ – $\frac{2}{3}$ of total length; sheath decurrent at apex; free portion 5–7 mm diam.; **blades** deeply 7–9-lobed, almost pedatisect, 19–30 cm long, 20–40 cm wide, wider than or as wide as long, thin to thinly coriaceous, glabrous, moderately to prominently bicolorous; upper surface occasionally white-maculate, drying weakly gloss to matte-subvelvety, dark brown to reddish brown, rarely dark green; lower surface drying weakly glossier, occasionally with a silvery sheen, rarely gray-green; all segments \pm narrowly elliptical, ovate or obovate, rarely lanceolate, weakly acuminate to \pm acute at apex, markedly narrowly confluent between segments, the confluent portion 0.5–3 mm wide, narrowly attached at base; **medial lobe** 19–30 cm long, 4–10 cm wide, (0.3)1–3 cm wide at point of attachment, 3.6–4.8 times longer than wide, equal in length to or slightly longer than innermost lateral segments, weakly to moderately inequilateral; **lateral lobes** 19–25 cm long, 2–9 cm wide, 2.1–5 times longer than wide, progressively shorter and weakly to moderately narrower toward outermost segments, with sides progressively inequilateral, the inner side always narrower; outer side ca. 2 times broader than inner side midway; outer segments \pm acute or truncate at base on posterior side; midrib and major veins raised on lower surface, drying raised, concolorous to weakly paler or darker than surface; posterior rib naked 4–8 cm per side; primary lateral veins 2–4 pairs, arising at 15–35°, \pm straight to weakly arcuate; secondary veins occasionally drying in part raised on lower surface, otherwise visible and distinct; tertiary veins drying flat and \pm obscure on lower surface; reticulate veins drying obscure on lower surface; collective veins 2–3, arising from the lowermost lateral vein at base, loop-connected with all preceding lateral veins, 0.3–2 cm from margin, markedly scalloped and remote from margin. INFLORESCENCES 4–6 per axil; peduncle held within the sheath, 20–50 cm long, 1–1.5 mm diam, drying matte, dark brown to

blackish brown; **spathe** \pm cucullate, 6.5–8 cm long, 6.5–8 cm long, 5–10 mm diam., weakly or not at all constricted between tube and blade, drying matte, dark brown; tube green or white, ca. 3.5–4 cm long; blade green or white, the same or different from tube, 3–4 cm long, marcescent, erect after anthesis; **spadix** 5.5–6.5 cm long, sessile, adnate to spathe ca. 1 cm at base, ca. $\frac{1}{3}$ of the length of pistillate portion; pistillate portion 3–3.5 cm long, ca. 2–3 mm diam., drying \pm dark purplish brown; fertile staminate portion white or yellow, 1.7–2.3 cm long, 2.5–3.5 mm diam., \pm cylindrical, bluntly rounded at apex, drying yellowish tan to pale reddish brown; sterile staminate portion 5–10 mm long, 2–3 mm diam., drying dark brown; pistils \pm laxly arranged, 3–4 on the axis (viewed from above); ovaries subglobose; style disc-like, as broad as ovary apex, the margins not coherent with those of adjacent styles; **stigma** sessile, disc-like; synandria (2)3–4(5)-androus (mostly 3–4 or mostly 3); sterile flowers irregularly lobed, weakly coherent or \pm laxly arranged, in 2–3 whorls. INFRACTESCENCE ca. 5 cm long, 7 mm diam. BERRIES subglobose, 3 mm diam.

Flowering is known to occur in *Chlorospatha croatianana* ssp. *enneaphylla* in May, July and August, with fruiting collections having been made in May and July.

Chlorospatha croatianana ssp. *enneaphylla* is known from northwestern Colombia, in Antióquia, Boyacá and Chocó Departments, at 150–820 m elevation. The six collections were made in only three areas separated by considerable distance. The type locality is on the western slopes of the Cordillera Oriental, in Boyacá Dept. and is represented by a single collection. Four collections were made in Antióquia, on the eastern slopes of the Cordillera Central, in the areas near Anorí and Remedios. The two collections from Chocó were made near the border with Panamá, near Acandí, at 150–250 m elevation, notably remote from the other collections, with the taxon reported as abundant in that area. Considering the close proximity of these two collections to the Panamanian

border, the subspecies would be expected to occur in Panamá, also eastward, in the intervening areas in Colombia, in Santander, Cundinamarca and possibly Córdoba Departments. *Chlorospatha* has not been reported from any of these departments.

Chlorospatha croatianana ssp. *enneaphylla* is terrestrial or hemiepiphytic and distinguished by its deeply 7–9-lobed, almost pedatisect leaf blades with the segments narrowly attached at the base, 0.5–2 cm wide at the point of attachment, narrowly confluent or alate between segments, the confluent portion 0.5–3 mm wide, and occasionally white-maculate. *Chlorospatha croatianana* ssp. *enneaphylla* has only 2–4 pairs of primary lateral veins arising at 15–35° and usually only the midrib, major and occasionally the secondary venation dry raised on the lower surface, with the tertiary and reticulate venation more or less obscure. The subspecies is also distinguished by its relatively long internodes, 1–3.3 cm long, and petiole, which is sheathed $\frac{1}{2}$ – $\frac{2}{3}$ of its length. The pistils are more or less laxly arranged, 3–4 on the axis (viewed from above). The sterile flowers are irregularly lobed.

Chlorospatha croatianana ssp. *enneaphylla* could not be easily confused with any species but could possibly be confused with *C. luteynii* Croat & L. Hannon (described below), both species having maculate leaf blades. The latter species has 5-lobed leaf blades and is known only from much higher elevations, 2,400–2,800 m, whereas *C. croatianana* ssp. *enneaphylla* has 7–9-lobed blades and occurs only below 1,000 m. In the latter species, the segments are nearly free to the base, with the confluent portion 1–3 mm wide, whereas those of *C. luteynii* are broadly confluent, with the confluent portion 1.5–4 cm wide. There are 2–4 pairs of primary lateral veins on all segments in *C. croatianana* ssp. *enneaphylla*, and 4–6 pairs in *C. luteynii*. In *C. croatianana* ssp. *enneaphylla*, the innermost collective vein is conspicuously scalloped and remote from the margin, whereas that of *C. luteynii* is only moderately scalloped and not markedly remote from the margin. The petiole of the latter spe-

cies is unusual in drying with the epidermis partially separated from the main body of the petiole, intact and semi-glossy, whereas that of *C. croatianana* ssp. *enneaphylla* dries matte and more or less fibrous, with the epidermis not separated. The spathe is 9–12 cm long in *C. luteynii* and 6.5–8 cm long in subspecies *enneaphylla*. The most noteworthy differences occur in the spadix, which is adnate to the spathe most or all of the length of the pistillate portion in *C. luteynii* but less than $\frac{1}{3}$ of the length in *C. croatianana* ssp. *enneaphylla*. In the latter species, the fertile staminate portion is no more than 2.3 cm long (in plants of comparable size) and shorter than or equal in length to the pistillate portion. The fertile staminate portion is 5–6 cm long in *C. luteynii*, and almost twice as long as the pistillate portion.

One 7-lobed specimen (*Callejas et al.* 4570), deviates from the type in having the segments more or less lanceolate and (4)4.2–5 times longer than wide vs. 2.1–3 times longer than wide in typical specimens of *C. croatianana* ssp. *enneaphylla*. The leaf blade of the specimen is similar to that of *C. kolbii* Engl. and this condition, combined with the more or less laxly arranged and similar pistils, would suggest a possible relationship between the two taxa.

Etymology—From the Greek *ennea-*, meaning 'nine', and *-phyllus*, meaning 'leaved' = 'with 9 leaves or leaflets'.

Additional specimens examined—COLOMBIA. **Antióquia**: Mpio. Anorí, via Providencia, inlet at Algibes, along Río Anorí, 310 m, 7°18'N, 75°08'W, 12 Jul. 1987, *Callejas et al.* 4570 (COL, HUA, MO); Mpio. Remedios, Sitio Otú, 3 km N of Sta. Isabela district, vic. Los Lagos, 11 km from Remedios, via Remedios–Vegachi, in forest on bank of hwy, 820 m, 6°56'N, 74°45'W, 14 July 1987, *Callejas et al.* 4719 (HUA); Río Anorí valley, near Planta Providencia, between Dos Bocas and Anorí, 350–700 m, 7°30'N, 75°50'W, 5 Aug. 1977, *Shepherd* 899 (COL, WIS); Anorí, Providencia area, between Providencia & Alhibe, 400–800 m, 20–25 Feb. 1976, *D. Soejarto et al.* 4394

(HUA). **Chocó**: Mpio. Acandí, vic. Coquitál, 150–250 m, 24 May 1989, *Fonnegra et al. 2914* (HUA), *Fonnegra et al. 2928* (HUA).

Chlorospatha gentryi Grayum, *Ann. Missouri Bot. Gard.* 73: 468–470. 1986. Type: COLOMBIA. Antioquia: Trail from Encarnación to Parque Nacional Natural Las Orquídeas, W slope of W Cordillera, 1,600–1,800 m, 27 Jan. 1979, *Gentry & E. Rentería 24585* (holotype, MO-2715461; isotypes, COL, HUA). Figure 11.

Terrestrial herb, to ca. 50 cm tall; stem erect, at least 10 cm tall, with remnants of old cataphylls persisting semi-intact along its length and \pm fibrous, the fibers pale; internodes 1–2 cm, drying 0.6–1.3 cm diam., dark reddish brown; cataphylls 6–15 cm long, obtuse with acumen at apex, 1-ribbed abaxially, drying \pm fibrous, matte to weakly glossy, tan to dark tan or medium-dark brown. LEAVES 2–7, erect-spreading; **petioles** 12–25 cm long, scurfy-pubescent in apical $\frac{1}{4}$ – $\frac{1}{2}$, usually more densely so near apex, drying weakly glossy, dark brown to occasionally almost black, sheathed 4–8 cm, ca. $\frac{3}{4}$ – $\frac{2}{3}$ of total length, sheath decurrent at apex; free portion 2–4(5) mm diam. midway (dry); **blades** 5–7-pedatisect or occasionally obscurely alate between segments, 13–22 cm long, 11–23 cm wide, about as wide as long, thin to thinly coriaceous (dry), bicolorous, the margins of all segments crispate-undulate; upper surface drying weakly glossy to semi-glossy, dark brownish green; lower surface reticulate, drying weakly glossy to semi-glossy, weakly to moderately paler, rarely concolorous; all segments with the margins straight to attenuate toward base, occasionally cuneate, \pm acute at base; **medial lobe** elliptical, 6.5–15.5 cm long, 2.5–6.8 cm wide, 2.3–2.8 times longer than wide, 1.1–3.9 times longer than lateral lobes, acuminate at apex, occasionally equal in length to or weakly shorter than innermost lateral lobes, broadest midway, \pm symmetrical, usually free to the base, rarely narrowly attached and weakly confluent with inner-

most lateral lobes, the confluent portion ca. 1 mm wide; **lateral lobes** (2)4.5–15 cm long, (1)1.2–6 cm wide, 2.2–3.7 times longer than wide, acuminate at apex, occasionally acute on outermost 1–2 segments (rarely bluntly acute), broadest at or below middle (rarely above middle), progressively shorter and narrower toward outermost segments, the outermost much smaller than innermost; sides (of lateral lobes) moderately progressively inequilateral, most prominently so on outermost segments, the inner side always narrower; outer side 1.5–2.1 times wider than inner side midway; all orders of venation crispy-puberulent and raised or prominulous on lower surface; midrib round-raised on lower surface, drying raised to weakly flattened, moderately darker than surface; posterior rib naked 1.2–3.5 cm per side, densely scurfy-pubescent; primary lateral veins on all segments (3)4–6 pairs, arising at 25–40°, straight to weakly arcuate, drying weakly raised to \pm flattened on lower surface, weakly to moderately darker than surface; secondary veins drying weakly raised on lower surface, weakly darker than surface; tertiary veins drying weakly raised or prominulous on lower surface, weakly darker than surface; reticulate veins drying in part prominulous, otherwise flat on lower surface, concolorous to weakly darker than surface; collective veins 3, the innermost arising from the lowermost lateral vein at base, loop-connected with all preceding lateral veins, occasionally markedly scalloped and remote from margin, 3–15 mm from margin. INFLORESCENCES erect, 2–3 per axil; peduncle held within the sheath, 6.5–10 cm long, 1–1.5 mm diam. (dry), \pm crispy-puberulent, most densely so near apex, drying matte to weakly glossy, blackish brown; **spathe** erect, ca. 4.2 cm long, cuspidate at apex, weakly or not at all constricted between tube and blade; spathe tube green, greenish or whitish, densely crispy-puberulent on outer surface, white on inner surface, 2–2.5 cm long, 3.5–5 mm diam., drying matte to weakly glossy, dark blackish brown on both surfaces, densely cream punctiform on inner surface; spathe

blade whitish or yellow, 2–2.4 cm long, 3–3.5 mm diam., narrowly crispy-puberulent along veins toward base abaxially, drying weakly glossy, dark tan to dark brown on outer surface, semi-glossy on inner surface, opening broadly at anthesis, marcescent, erect after anthesis; **spadix** erect, ca. 3.8 cm long, sessile, adnate to spathe 0.7–1 cm at base, ca. $\frac{1}{2}$ of the length of pistillate portion; pistillate portion 1.2–2.2 cm long, drying 2.5–3.5 mm diam., broadest midway, medium reddish brown to dark brown; fertile staminate portion green, ca. 1.4 cm long, drying ca. 2 mm diam., narrowly rounded at apex, cylindrical, weakly pink-tinged medium brown; sterile staminate portion ca. 6 mm long, drying 1–1.75 mm diam., broadest at apex, pale to medium yellowish tan, axis bare 1–1.5 mm at base; pistils \pm weakly coherent, 3–4 across the axis (viewed from above), 1–1.2 mm long; ovaries subglobose, 1.5–2 mm diam., drying tan; style disc-like, drying 0.3–0.5 mm diam., narrower than ovary apex, the margins not coherent with those of adjacent styles; **stigma** ca. 0.1–0.3 mm diam., sessile, disc-like, truncate at apex, drying medium reddish brown to dark blackish brown; synandria ca. 1 mm long, 1–1.3 mm diam., deeply (2)3–4-lobed, (2)3–4- androus, coherent, truncate; sterile flowers drying ca. 0.5 mm long (or less), ca. 1 mm diam., weakly elongated in direction of axis, coherent, truncate, \pm prismatic, in 4–5 whorls. INFRUCTESCENCE green, drying 2.5–4.2 cm long, 5–8 mm diam., weakly glossy dark brown to blackish brown. BERRIES green, drying 2–5 mm diam.

Flowering occurs in *Chlorospatha gentryi* in January and December, with fruiting recorded for the month of December.

Chlorospatha gentryi is known only from the Parque Nacional Natural Las Orquídeas in Antioquia Department, Colombia, on the western slopes of the Cordillera Occidental, at 1,200–1,800 m elevation.

Chlorospatha gentryi is a small, erect-growing plant distinguished by its 5–7-pedatisect leaf blades with the segments acute at the base and crispate-undulate along the margins, and all abaxial venation more or less raised and crispy-puberulent.

The petiole is scurfy-pubescent for $\frac{1}{4}$ – $\frac{1}{2}$ of its length, prominently so toward the apex and onto the posterior rib. The inflorescence of *C. gentryi* is unusually small, with the spathe 4.2 cm long and the peduncle short (to 10 cm long) and crispy-puberulent, with the indumentum extending onto the outer surface of the spathe tube and narrowly onto the outer surface of the blade. The innermost collective vein is noteworthy in being markedly scalloped and remote from the margin, relative to the size of the segments. The species is also distinguished by its green synandria.

Chlorospatha gentryi could not be confused with any published species but is similar to *C. croatianana* Grayum ssp. *enneaphylla* Grayum and *C. luteynii* Croat & L. Hannon (described below) in having leaf blades with 5 of more lobes. *Chlorospatha gentryi* is a small plant, about 50 cm tall, in which the petiole, all venation on the lower surface of the leaf blade, peduncle and spathe are to some degree puberulent or pubescent. The other two species are about 1 m tall, with all of the aforementioned structures glabrous. Additionally, the lower blade surface is smooth in these two species, whereas that of *C. gentryi* is conspicuously reticulate.

The synandria of *C. gentryi* appear to be unusual, at least in dried material. The lobes are conspicuously deeply divided and appear to be quite separate from each other, with the two pores on each lobe separated by a considerable distance.

Additional specimens examined—COLOMBIA. **Antióquia**: Mpio. Frontino—Mpio. Urrao, Parque Nacional Natural Las Orquídeas, Calles—Carauta rd., 1,200–1,540 m, 6°30'N, 76°30'W, 3 Dec. 1986, *Callejas et al. 3086* (HUA, MO, NY); Mpio. Urrao, Parque Nacional Natural Las Orquídeas, vic. Calles, right side of Río Calles, 1,350–1,450 m, 6°32'N, 76°19'W, 3 Dec. 1993, *Pi-poly et al. 17803* (JAUM, MO).

Chlorospatha luteynii Croat & L. Hannon, **sp. nov.** Type: COLOMBIA. Antioquia: Mpio. Carmen del Viboral, vic. La Milagrosa, vía “El Canada”, Finca La Soledad, 2,400–2,600 m, ca.

6°5'N, 75°25'W, 27 Oct. 1987, *J. Luteyn & R. Callejas 11780* (holotype, NY; isotypes, NY, HUA). Figures 12, 17.

Planta terrestris, ad 1 m; petiolus 40–90 cm longus, vaginata 20–55 cm; lamina profunde quinqueloba, ca. 35 cm longa, 31–40 cm lata; lobus medius 24–31 cm latus; nervis primariis lateralibus 5–6 utroque; inflorescentia 3 in quoque axila; pedunculus 20–43 cm longus, ca. 2 mm diam.; spatha viride, 9–12 cm longa; tubo 4.3–5 cm longo, 5–6 mm diam.; lamina 5.5–7 cm longa; spadix 8.5–9.5 cm longus; parte pistillata 2.9–3.7 cm longa, ca. 4 mm diam.

Terrestrial herb, to 1 m tall; stem not known; internodes not known (all measurements made from dried material); cataphylls not known. LEAVES 2–3, erect-spreading; **petioles** 40–90 cm long, glabrous, drying glossy, dark blackish brown, the epidermis in part separated \pm intact, semi-transparent, sheathed 20–55 cm, $\frac{1}{2}$ or more of total length; sheath decurrent at apex; free portion 4–6 mm diam. midway; **blades** deeply 5-lobed, occasionally weakly auriculate on outermost segments, ca. 35 cm long, ca. 31–40 cm wide, almost as wide as long, drying thin, weakly bicolorous; upper surface dark green, irregularly pale yellow-green-maculate (maculations 7–30 mm long, 3–12 mm wide), drying (matte) weakly glossy to semi-glossy, dark green to olive-green, maculations paler than surface; lower surface drying semi-glossy to glossy, maculations weakly paler than surface or not visible; **medial lobe** 24–31 cm long, 12–16 cm wide, 1.8–2.5 times longer than wide, abruptly acuminate at apex, broadest at or slightly above middle, cuneate and narrowly attached at base, 3–4 cm wide at point of attachment, \pm symmetrical; **lateral lobes** confluent with all adjacent lobes, the confluent portion 1.5–4 cm wide; innermost segment 20–27 cm long, 8–10.5 cm wide, 2.3–2.8 times longer than wide, acuminate at apex (rarely acute), broadest at or above middle, narrowly attached at base, 3–3.5 cm wide at point of attachment, moderately inequilateral, the

inner side narrower, the margin \pm straight to weakly convex toward base, occasionally weakly attenuate; outer side to 1.9 times wider than inner side midway, the margin weakly convex toward base; outermost segment 15–18.5 cm long, 5–7 cm wide, 2.6–3 times longer than wide, acuminate at apex, broadest midway, narrowly to broadly attached at base, 2–3.5 cm wide at point of attachment, moderately inequilateral, the inner side narrower, the margin \pm straight toward base; outer side 1.3–1.5 times wider than inner side midway, weakly to broadly rounded toward base or forming an auricle 5.5 cm long, 2 cm wide; midrib and major venation round-raised on lower surface, drying much darker than both surfaces, almost black, \pm flattened on lower surface; posterior rib naked 2–3.5 cm per side; primary lateral veins (on medial lobe) 5–6 pairs, arising at 25–40°, \pm straight; primary lateral veins (on lateral lobes) 4–5 pairs, arising at 25–35°, weakly arcuate; secondary veins drying in part raised, otherwise prominulous or occasionally flattened on lower surface, moderately darker than surface; tertiary and reticulate veins drying in part prominulous, otherwise visibly distinct on lower surface, usually moderately darker than surface; reticulate veins obscure; collective veins 3, the innermost arising from the lowermost lateral vein at base, loop-connected with all preceding lateral veins, moderately scalloped, 0.4–1.2 cm from margin. INFLORESCENCES erect, to 3 per axil; peduncle held within the sheath, 20–43 cm long, ca. 2 mm diam., drying weakly glossy, dark blackish brown; **spathe** pale green, erect, 9–12 cm long, weakly or not at all constricted between tube and blade; spathe tube 4.3–5 cm long, 5–6 mm diam., drying matte, dark brown on outer surface, weakly glossy, paler and densely tan punctiform on inner surface (speckles regularly rounded, appearing as subepidermal cellular inclusions); spathe blade 5.5–7 cm long, 7–8 mm diam., acuminate at apex, drying matte, dark reddish brown (paler than tube), marcescent, erect after anthesis; **spadix** erect, 8.5–9.5 cm long, weakly

stipitate 1–2 mm (stipe emerging from a small sheath in the spathe), adnate to spathe 2.7–3.6 cm, most of the length of pistillate portion; pistillate portion 2.9–3.7 cm long, ca. 4 mm diam., broadest midway, drying brownish; fertile staminate portion white, 5–6 cm long, ca. 3–6 mm diam., bluntly acute at apex, narrowed at base, tapering, drying medium-dark brown to reddish brown; sterile staminate portion 1.4–1.6 cm long, 1.5–2.2 mm diam., narrowest midway, drying dark tan; pistils weakly coherent, ca. 4–5 across the axis (viewed from above), ca. 1.2 mm long; ovaries subglobose, 1.5–2 mm diam., drying cream to tan; style disc-like, 1–2 mm diam., weakly broader than ovary apex, the margins not coherent with those of adjacent styles; **stigma** 0.3–0.5 mm diam., sessile; synandria ca. 1–1.5 mm long, 1–2 mm diam., coherent, truncate, deeply (2)3–4-lobed, (2)3–4-androus (either mostly 3- or mostly 4-androus on different specimens); sterile flowers ca. 1 mm long, 1.8–3 mm × 1 mm diam., ± elongated in direction of axis, coherent, truncate, subprismatic, in 6–7 whorls. BERRIES not known.

Flowering is known to occur in *Chlorospatha luteynii* during the months of April and October, with fruiting occurring in October.

Chlorospatha luteynii is known only from the northern portion of the Cordillera Central in Antióquia Department, Colombia, at 2,440–2,800 m elevation. It would be expected to occur elsewhere in the department, on both sides of the Cordillera Central, possibly to the south in Caldas and on the eastern slopes of the Cordillera Occidental in Risaralda. The species is distinguished by its deeply 5-lobed, dark green, conspicuously pale yellow-green-maculate leaf blades that dry dark green to olive-green on both surfaces and more or less glossy on the lower surface, with the midrib and major venation almost black on both surfaces. The species is also distinguished by its petiole, which dries glossy, almost black, with the epidermis partially separated intact, and by its entirely pale green spathe. The spadix is note-

worthy in having the fertile staminate portion much longer than the pistillate portion, almost twice as long. In *Chlorospatha*, the fertile staminate portion is usually shorter, weakly longer than or equal in length to the pistillate portion. The sterile staminate portion is also relatively long, 1.4–1.6 cm long and densely flowered, with the sterile flowers markedly elongated in the direction of the axis, to 3 mm long.

Grayum (1986) predicted that *C. croatiana* Grayum ssp. *croatiana*, known only from Central America, at 200–1,173(1,400) m elevation, would ultimately be found in Colombia, and although that taxon and *C. luteynii* have in common 5-lobed leaf blades, *C. luteynii* should be considered distinct. *Chlorospatha luteynii* differs in having prominently maculate leaf blades. Weak maculations were observed on only one blade of a sterile collection of what is presumably *C. croatiana* ssp. *croatiana* from Costa Rica, with the other blades lacking maculations (on the same plant). The petiole of *C. luteynii* dries with the epidermis partially separated from the main body, intact and semi-transparent, differing from that of *C. croatiana* ssp. *croatiana*, which usually dries more or less fibrous, with the epidermis not separated. The spathe of *C. croatiana* ssp. *croatiana* is usually shorter, 6–9.5(10) cm long vs. 9–12 cm long in *C. luteynii*. The most noteworthy differences lie in the inflorescences, particularly the structure of the spadix. The spadix of *C. luteynii* is adnate to the spathe most of the length of the pistillate portion and is significantly longer, 8.5–9.5 cm long vs. 3.9–8 cm long in *C. croatiana* ssp. *croatiana*, in which the spadix is adnate $\frac{1}{5}$ – $\frac{2}{3}$ of the length of the pistillate portion, rarely to $\frac{3}{4}$. The fertile staminate portion in *C. croatiana* ssp. *croatiana* is cylindrical to weakly and evenly tapering from the base, narrowly rounded at the apex and approximately as long as or slightly shorter than the pistillate portion, differing from that of *C. luteynii* which is prominently tapering, acute at the apex and more than 2 cm longer than the pistillate portion, occasionally almost

twice as long. The sterile staminate portion in *C. croatiana* ssp. *croatiana* frequently has the axis naked 1–4 mm at the base and the sterile flowers are usually laxly arranged and only occasionally subprismatic, differing from *C. luteynii* in which that portion is densely flowered to the base, with the flowers consistently subprismatic. Most of the comparisons stated above hold true also for *C. croatiana* ssp. *enneaphylla* Grayum, a taxon with 7–9 lobes, from lower elevations (below 1,000 m), which frequently has maculate leaf blades. In the latter species, the segments are nearly free to the base, with the confluent portion 1–3 mm wide, whereas those of *C. luteynii* are broadly confluent, with the confluent portion 1.5–4 cm wide. In both subspecies of *C. croatiana*, the innermost collective vein is conspicuously scalloped and remote from the margin, whereas that of *C. luteynii* is only moderately scalloped and not markedly remote from the margin.

L. Escobar et al. 8482 is a sterile collection that differs from the type in having leaf blades that dry matte to weakly glossy on the upper surface, with the major and secondary venation raised on the lower surface. This is possibly another species.

Three collections (in fruit only) from Risaralda Department, Colombia, were examined in the course of this treatment and are possibly this species: *W. Vargas 4026* (COL), *O. Rangel & Gentry 5776* (COL) and *5903* (COL). The collections are from above 2,000 m elevation but dry brown, not green, and the segments are much broader, with the lateral segments not as inequilateral as those of *C. luteynii*. *O. Rangel & Gentry 5776* (COL) occasionally has only three lobes. Both *O. Rangel & Gentry* collections have the major and secondary venation drying more or less raised (not flattened) on the lower surface and neither appears to be maculate.

Etymology—Named for James Luteyn (New York Botanical Garden), one of the collectors of the type and collector of many new and interesting species of Araceae.

Paratypes—COLOMBIA. **Antióquia:** Mpio. Sonsón, vía Sonsón–La Soledad, 1.1 km E of the branch in the rd. leading N to La Morelia, vic. Manzanares, 2,800 m, 8 Apr. 1988, *Callejas et al. 6361* (HUA); Mpio. Caldas, vic. La Corrala, Finca “La Zarza”, 2,440 m, 1 June 1988, *L. Escobar et al. 8482* (HUA).

Chlorospatha macphersonii Croat & L. Hannon, **sp. nov.** Type: COLOMBIA: Antióquia: Mpio. Jardín, vic. Ventanas, Jardín–Ventanas–Riosucio rd, ca. 19.3 km SSE of Jardín, at border with Caldas, forest at high point of rd. (Ventanas), 2,830 m, 5°40'N, 75°47'W, 4 May 1989, *J. Luteyn & O. Escobar 12757* (holotype, NY; isotypes, COL, HUA). Figures 18, 19.

Planta terrestris, ad. 50–60 cm; internodia 2–6 cm longa, 0.6–2 cm diam.; cataphylla 12–18 cm longa; petiolus 25–34 cm longus, vaginata 21–26.5 cm; lamina ovato-cordata, 17–25 cm longa, 9–12.5 cm lata; nervis primariis lateralibus 4–5 utroque; inflorescentia 2–3 in quoque axila; pedunculus 17–20 cm longus; spatha ca. 15 cm longa, tubo 8–8.5 cm longo, 6–7 mm diam.; lamina ca. 6.3 cm longa, 7–7.5 mm diam.; spadix erect, ca. 12.2 cm longus; parte pistillata ca. 6.7 cm longa, ca. 4 mm diam.

Terrestrial herb, 50–60 cm tall (all measurements made from dried material); stem occasionally weakly woody, decumbent, with remnants of old cataphylls persisting semi-intact along its length; internodes 2–6 cm long, 0.6–2 cm diam., drying finely wrinkled, matte to weakly glossy, pale-medium brown, occasionally weakly gray-tinged; cataphylls 12–18 cm long, acuminate at apex, drying matte to weakly glossy, medium reddish brown. LEAVES 3, erect-spreading; **petioles** 25–34 cm long, drying glabrous, matte, dark brown, frequently blackish toward apex, sheathed 21–26.5 cm, slightly more than $\frac{3}{4}$ of total length; sheath free-ending at apex; free portion 2.5–4 mm diam. midway, sulcate; **blades** ovate-cordate, 17–25 cm long, 9–12.5 cm wide, 1.7–2 times longer than

wide, gradually or abruptly acuminate at apex, broadest at or slightly below middle, weakly broader across anterior lobe than at base (measured tip to tip across posterior lobes), rarely much broader, fleshy; upper surface weakly bullate, drying matte to weakly glossy, dark yellow-brown; lower surface reticulate, drying semi-glossy, yellow brown to yellow green, weakly to moderately paler; anterior lobe 13–19 cm long, 9–12.5 cm wide, 1.3–1.6 times longer than wide, (2.8)3.8–4.8 times longer than posterior lobes, broadest at or below middle, \pm symmetrical to weakly inequilateral; posterior lobes directed toward the base, 3–5 cm long, 3.5–5 cm wide, usually as wide as long, occasionally wider than long, bluntly to narrowly rounded at apex, broadest at base, the sinus oblong to narrowly V-shaped or closed with the lobes overlapping; sides \pm symmetrical, the inner side acute to weakly rounded toward base, briefly attenuate and weakly confluent with opposite lobe, obscuring apex of petiole; outer side weakly convex; all orders of venation \pm sunken on upper surface, moderately to prominently raised, \pm granular-puberulent on lower surface, drying \pm raised, concolorous or weakly paler to weakly darker than surface, frequently tan-colored; midrib round-raised on lower surface; **basal veins** 4–5 branching off, 3–4 acroscopic, 1–2 basicopic, the 1st usually free to base, 2nd and/or 3rd fused, forming a short posterior rib 0.5–2 cm long; primary lateral veins 4–5 pairs, arising at 40–60°, weakly arcuate; collective veins 3, the innermost arising from one of the lowermost basal veins, loop-connected with all preceding lateral veins, moderately scalloped, 3–11 mm from margin. INFLORESCENCES erect, 2–3 per axil; peduncle held within the sheath, 17–20 cm long, 1–3 mm diam., drying matte, dark blackish brown; **spathe** erect, ca. 15 cm long, acuminate at apex, weakly or not at all constricted between tube and blade; spathe tube green or greenish red on outer surface, 8–8.5 cm long, 6–7 mm diam., drying matte, dark blackish brown on outer surface, weakly glossy and red-tinged on inner surface; spathe blade whitish green to yellow-

ish green on outer surface, ca. 6.3 cm long, 7–7.5 mm diam., drying weakly glossy, dark blackish brown on outer surface, weakly glossier on inner surface; **spadix** erect, ca. 12.2 cm long, sessile, adnate to spathe ca. 7.5 cm at base, the entire length of pistillate portion and onto sterile staminate portion ca. 7 mm; pistillate portion ca. 6.7 cm long, ca. 4 mm diam., weakly broadest midway; fertile staminate portion white, ca. 4.7 cm long, 3–4.5 mm diam., narrowly rounded at apex, clavate, drying medium-dark orangish brown; sterile staminate portion ca. 1.5 cm long, 2–3 mm diam., broadest at apex, the axis naked in basal 3 mm, drying medium-dark orangish brown; pistils \pm laxly arranged, ca. 3 across the axis (viewed from above), ca. 2 mm long; ovaries subglobose to \pm cylindrical, ca. 1–1.5 mm long, 1.5–2 mm diam., drying dark reddish brown; style mantle-like, ca. 0.5 mm long, 1.5–1.8 mm diam., comprising ca. $\frac{1}{4}$ – $\frac{1}{3}$ of the length of pistil, as broad as ovary apex, briefly attenuate, the margins weakly or not at all coherent with those of adjacent styles; **stigma** ca. 0.5 mm diam., weakly elevated on and weakly broader than narrowed portion of style; synandria 1–1.5 mm long, ca. 2 mm diam., coherent, truncate, (2)3–4-lobed, (2)3–4-androus (mostly 4); sterile flowers 1–1.5 mm long, 1.5–2 mm diam., weakly coherent, in 6 whorls, 2–5-branched, the branches truncate and broadest at apex, weakly narrower below. INFRUCTESCENCE 11–12.5 cm long, ca. 1 cm diam., drying matte, dark reddish brown (almost black) on outer surface. BERRIES ca. 5 mm long, 5 mm diam., drying dark reddish brown.

Flowering occurs in *Chlorospatha macphersonii* during the months of May and October, with fruiting reported in October.

Chlorospatha macphersonii is known only from the eastern slopes of the Cordillera Occidental, in the vicinity of Jardín at the southern end of Antióquia Department, Colombia, near the borders with Caldas and Risaralda, at almost 3,000 m elevation. The species would be expected to occur elsewhere in Antióquia and in the

adjoining departments to the south, possibly also on the western slopes.

Chlorospatha macphersonii is distinguished by its long internodes (2–6 cm long), long-sheathed petiole (more than $\frac{3}{4}$ of its length), with the sheath free-ending at the apex, and ovate-cordate leaf blades that are weakly bullate on the upper surface and reticulate on the lower surface. Also noteworthy is the extraordinarily large inflorescence, which is approximately 15 cm long, although the plant is small, 50 cm tall. The inflorescences are half as long to nearly as long as the peduncles and some petioles. The species is also distinguished by its green to greenish red spathe tube and whitish to yellowish green spathe blade. The spadix is adnate to the spathe the entire length of the pistillate portion and half of the length of the sterile staminate portion, with the styles briefly attenuate and the sterile flowers 2–5-branched.

Chlorospatha macphersonii could not be easily confused with any published species. The species differs from all species that occur in Antióquia and have leaf blades that are not divided. In *C. macphersonii*, the leaf blades are bullate on the upper surface and reticulate on the lower surface, thus differing from *C. amalfiensis* Croat & L. Hannon, *C. antioquiensis* Croat & L. Hannon and *C. nicolsonii* Croat & L. Hannon (described below), in which both surfaces are smooth. The petiole of *C. macphersonii* is sheathed about $\frac{3}{4}$ of its length and the spathe is approximately 15 cm long. In the other 3 species, the petiole is sheathed between $\frac{1}{2}$ and $\frac{1}{2}$ of its length and the spathe is less than 10 cm long. The sterile flowers are branched in *C. macphersonii* and either subprismatic or irregularly lobed in the other 3 species.

McPherson et al. 12903 differs from the type in having a greenish red spathe tube and whitish green blade. The type has a green spathe tube and a yellowish green blade.

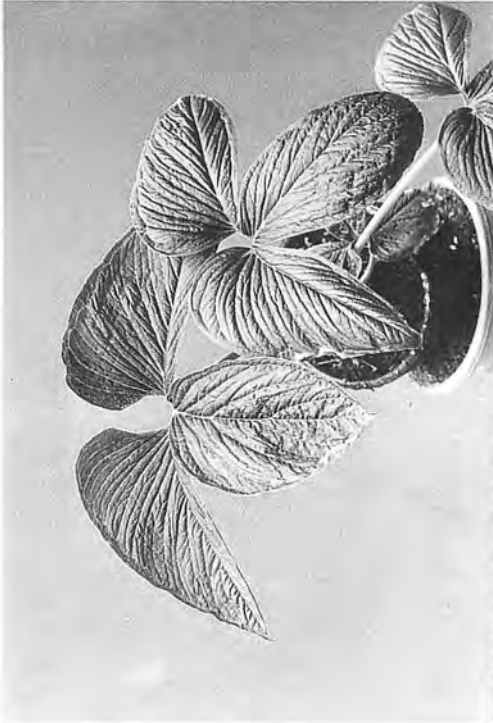
Etymology—Named for Dr. Gordon McPherson of the Missouri Botanical Garden,

the first person to collect the species and noted collector of excellent specimens, especially from Panamá.

Additional specimens examined—COLOMBIA. **Antióquia**: Mpio. Jardín, S of Jardín, 2,750 m, 5°30'N, 75°50'W, 29 Oct. 1988, *McPherson et al. 12903* (HUA, MO).

Chlorospatha mirabilis (M. T. Masters) Madison, *Selbyana* 5(3–4): 351. 1981. *Xanthosoma mirabile* M.T. Masters. **TYPE**: Tropical South America: *Roezls. n.*, cultivated by nurserymen Carter and Bull, and at Kew Gardens. The illustration in *Gardeners' Chronicle* (1874, p. 259, Fig. 54) serves as the type. Figures 15, 16.

Terrestrial herb, to 1.5 m tall; stem erect, in part subterranean, elongate; sap milky; internodes short, 5–12 mm, 1–3 cm diam., scurfy brown, drying ca. 2 cm diam.; cataphylls ultimately deciduous, 17–25 cm long, obtuse with acumen at apex, purplish, obtusely 1-ribbed abaxially in apical $\frac{1}{2}$, drying weakly glossy to semi-glossy, medium-dark to dark reddish brown. **LEAVES** 1–3, erect-spreading; **petioles** (23)33–96(125) cm long, moderately spongy, glabrous, matte to weakly glossy, entirely dark purple or purple-tinged, or in part medium to dark olive-green in apical $\frac{1}{3}$ – $\frac{2}{3}$, occasionally with a glaucous bloom toward base, drying weakly glossy to semi-glossy, dark brown to occasionally blackish brown, sheathed 30–69 cm, ($\frac{1}{3}$) $\frac{1}{2}$ – $\frac{2}{3}$ of total length; sheath decurrent at apex; free portion 6–12 mm diam. midway, subterete, obtusely or sharply flattened adaxially, with margins acute to acutely ribbed or obtuse throughout and acute toward apex, frequently 1-ribbed medially, rarely obtusely and shallowly sulcate in apical $\frac{1}{3}$; **blades** deeply 3-lobed, rarely trisect, 30–54 cm long, 30–75 cm wide, 1–1.4 times wider than long, thinly coriaceous to subcoriaceous, moderately bicolorous; upper surface semi-glossy to glossy, dark green, with or without irregular white, cream, yellowish or pale green maculations, drying weakly glossy to semi-glossy, dark green or olive-green to



brownish green or weakly reddish brown, the maculations weakly to moderately paler than surface; lower surface weakly glossy to semi-glossy, entirely purple to purple-violet or green to yellow-green and entirely irregularly or moderately to heavily purple-tinged medially, drying semi-glossy to glossy, weakly to moderately paler; **medial lobe** ovate to elliptic, (20)27–44.5 cm long, 11–24 cm wide, 1.9–2.9 times longer than wide, (1)1.2–1.5 times longer than lateral lobes, acute to weakly acuminate at apex, broadest at or below middle, cuneate (rarely weakly attenuate) and narrowly attached at base, 1.2–4.5 cm wide at point of attachment, \pm symmetrical, the margins rarely weakly sinuate; **lateral lobes** oblique or directed toward the apex, (15.5)22–42 cm long, (3.5)6.5–20 cm wide, 1.7–3.6(4.3) times longer than wide, acute to weakly acuminate at apex, rarely bluntly acute, broadest at or below middle, usually markedly inequilateral, the inner side always narrower, long-attenuate (rarely straight) toward base, moderately to markedly narrowly confluent with medial lobe (confluent portion (0)2–5(10) mm wide), rarely free to the base and not at all confluent; outer side 3–9 times wider than inner side midway, broadly rounded at base, occasionally weakly rounded, obliquely attached or abruptly attenuate onto posterior rib, rarely with a weakly developed auricle 7 cm long, 7 cm wide and narrowly rounded at apex; midrib and major veins usually purple on lower surface, drying \pm flattened; midrib obtusely to deeply sunken on upper surface, concolorous to weakly paler than surface,

round-raised to narrowly rounded on lower surface, occasionally acutely angular on lateral lobes, drying moderately to prominently darker than surface; posterior rib naked 0.5–1.5(2) cm per side; primary lateral veins (of all lobes) 3–6(7) pairs, arising at 30–45°, weakly to moderately arcuate, occasionally straight, weakly to deeply sunken on upper surface, convex to round-raised on lower surface, occasionally purple-striped, drying weakly to prominently darker than surface; secondary veins obtusely sunken on upper surface, raised on lower surface, purple or green, drying \pm flattened, concolorous to weakly darker than surface or entirely green and paler than surface; tertiary veins entirely prominulous or in part moderately or weakly raised and otherwise prominulous on lower surface, purple or green, drying in part weakly prominulous, otherwise flat, brownish and weakly darker than surface or green and weakly paler than surface; reticulate veins obscure; collective veins 3, the innermost arising from one of the lowermost lateral veins at base, loop-connected with all preceding lateral veins, markedly scalloped (in mature specimens), 3–25 mm from margin. INFLORESCENCES erect, 3 per axil; peduncle held within the sheath, 30–59 cm long, 1–3 mm diam., trigonous, drying matte to weakly glossy, dark brown to blackish brown; **spathe** erect, curved forward, (7)8–15.5 cm long, acuminate at apex, weakly or not at all constricted between tube and blade; spathe tube weakly glossy to glossy, green to yellow-green on outer surface, semi-glossy, moderately to prominently paler on inner surface, rarely dark purple, (3.5–4)4.5–7.5 cm long, 6–10 mm diam., drying weakly glossy, medium green or dark brown to reddish brown on outer surface, usually weakly paler on inner surface, rarely dark purplish; spathe blade weakly glossy to glossy, yellow, yellow-green or whitish green, (3)4–7 cm long, 6–7 mm diam. (dry), drying matte to weakly glossy, tan to dark brown, marcescent, erect after anthesis; **spadix** erect, curved forward with the spathe, (5.5)6.5–10.1 cm long, sessile, adnate to spathe

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Figs. 13–16. —13 (top L.) *Chlorospatha corrugata* Bogner & Madison (*Spear s.n.*). Potted plant. Photo J. Bogner. —14 (top R.) *Chlorospatha croatianana* Grayum (*Croat 22932*). Habit. —15 (bottom L.) Habit. —16 (bottom R.) *Chlorospatha mirabilis* (M. T. Masters) Madison (*Croat 83686*, *Spear s.n.*). Flowering plant showing inflorescence at anthesis.

(1.2)2–3.7 cm at base, ca. $\frac{1}{2}$ – $\frac{3}{4}$ of the length of pistillate portion; pistillate portion \pm ellipsoid, pink, pale yellow or pale orange, (2)3–5 cm long, 3–6 mm diam. (dry), broadest at or just above middle, drying pink to orangish tan; fertile staminate portion white, greenish white, cream or creamy tan, (1.8)2.6–3.6 cm long, 4–5 mm diam. (dry), \pm cylindrical, narrowly rounded at apex, weakly narrowed at base, drying pale yellow-tan to medium-dark or dark brown; sterile staminate portion greenish, (1.5)1.7–2.4 cm long, 2–4 mm diam. (dry), \pm cylindrical or weakly broadest at base, drying creamy tan, rarely dark tan; pistils weakly coherent to \pm laxly arranged, 4–6 across the axis (viewed from above), ca. 2–2.3 mm long; ovaries irregularly sub-cuboidal or cylindrical, (1)1.5–2 mm diam., weakly narrower and truncate at apex, drying \pm white, dark purple at apex and irregularly purple down the sides or frequently entirely creamy white to creamy tan, with or without darker reddish veins, 3–4(6)-locular, with axile placentation; ovules numerous, biseriate, hemianatropous, micropyle superior; funicles longer than ovules; style disc-like, (1)1.5–2 mm diam., weakly broader than ovary apex, the margins irregularly weakly sinuate and weakly or not at all coherent with those of adjacent styles; **stigma** 0.5–1 mm diam., ca. $\frac{1}{2}$ as wide as style, prominent, sessile, obtusely truncate, drying orangish tan; **synandria**, ca. 1 mm long, 1–1.5 mm diam., frequently \pm elongated in direction of axis in basal 2–4 whorls, coherent, truncate, deeply (2)3–4-lobed, 3–4-androus (mostly 3 or mostly 4 on different plants); sterile flowers 0.2–0.5 mm long, (1)2–3 mm \times 1 mm diam., \pm elongated in direction of axis, laxly arranged (rarely weakly coherent), truncate, sub-prismatic, in 7–9(11) whorls, frequently drying with weakly darker brownish speckles. **INFRUCTESCENCE** dark green on outer surface, pale green on inner surface. **BERRIES** pale green. **JUVENILE** plants with leaf blades entire, elliptic or frequently with small lobes at the base of medial lobe or with well developed lateral lobes weakly confluent with medial lobe.

Flowering is known to occur in *Chlorospatha mirabilis* during the months of February, April, June, July and August.

Prior to this treatment, *Chlorospatha mirabilis* was known only from the type, an illustration in *Gardeners' Chronicle*, and two herbarium specimens, none of which indicated a specific locality within "Tropical South America" or "Colombia". *Chlorospatha mirabilis* is known only from the western slopes of the Andes in Colombia, in Antióquia, Chocó and Valle Departments, at from sea level to 900 m elevation, and from southern Panamá, in Darién Province. As Madison (1981) rightly noted, the Forget (K) collection sent from Peru, was probably not collected in Peru, no collections of *C. mirabilis* having been made south of the above-mentioned localities in Colombia. The collections from Panamá are somewhat problematic, all being sterile and somewhat geographically isolated from the Colombian collections, with some from well above the elevations recorded for most of the Colombian collections, but all appear to accord with *C. mirabilis*.

Chlorospatha mirabilis is a robust plant, to 1.5 m tall, distinguished by its deeply 3-lobed to nearly trisect and usually maculate leaf blades that are semi-glossy to glossy on the upper surface and purple or purplish on the lower surface, with the petiole also purple. It is also distinguished by its large inflorescences (to 15 cm long in mature specimens), with the sterile staminate portion of the spadix comprising about $\frac{1}{3}$ of total length, an uncommon condition in *Chlorospatha*.

Chlorospatha mirabilis could possibly be confused with *C. cogolloi* Croat & L. Hannon, which differs in usually having the petiole sheathed about $\frac{3}{4}$ of its length, compared to $\frac{1}{2}$ – $\frac{2}{3}$ in *C. mirabilis*, and 8–10 pairs of primary lateral veins on all segments of the blades (in mature specimens), compared to 3–6 pairs in *C. mirabilis*. The blades of *C. cogolloi* are thin, whereas those of *C. mirabilis* are thinly coriaceous to subcoriaceous. The major and secondary venation in *C. cogolloi* dries raised on the lower surface but more

or less flattened or flat in *C. mirabilis*. In *C. cogolloi*, the spadix is shorter (in plants of comparable size), with the sterile staminate portion comprising only $\frac{1}{10}$ of total length and the sterile flowers densely arranged in 4–5 whorls, whereas that portion in *C. mirabilis* comprises $\frac{1}{3}$ of total length, with the sterile flowers laxly arranged in 7–9(11) whorls. The single collection of *C. mirabilis* cited from Antioquia, *Callejas et al.* 6742, appears to be somewhat intermediate between *C. mirabilis* and *C. cogolloi*. It was collected at higher elevation, approximately 900 m, north of the type locality of *C. cogolloi*, which occurs only above 1,200 m, and all other Colombian collections of *C. mirabilis* were made at 150 m or less. *Callejas et al.* 6742 differs from the typical form of *C. mirabilis* in having the sterile staminate portion of the spadix comprising only $\frac{1}{4}$ of total length and the sterile flowers coherent; therefore the collection possibly represents another taxon or an atypical specimen of *C. cogolloi*.

It is noteworthy that all species with which *Chlorospatha mirabilis* might be confused have the same type of style. Among these is *C. ilensis* Madison, known only from the western slopes of the Andes in Ecuador, with no collections of either species or of intermediate forms having been made in the considerable area between the known localities of the two species. However, several specimens of *C. ilensis* have previously been incorrectly determined as *C. mirabilis*, therefore, the differences should be noted here. The leaf blades of *C. ilensis* are entirely green, lack maculations and are only occasionally 3-lobed, thus differing from those of *C. mirabilis*, which are consistently 3-lobed, purple or purplish on the lower surface and usually maculate. The inflorescences are sufficiently similar to indicate a possible relationship between the species, particularly as regards the morphology of the pistils, both species having cylindrical ovaries and disc-like styles. However, the ovary of *C. ilensis* is 2-locular and the style green, whereas the ovary of *C. mirabilis* is 3–4(5–6)-locular, with the style pink, pale yellow

or pale orange. The sterile staminate portion of the spadix of *C. ilensis* differs in occupying only $\frac{1}{10}$ or less of total length, with the flowers densely arranged in only 2–3 whorls, whereas that of *C. mirabilis* occupies about $\frac{1}{3}$ of total length, with the flowers laxly arranged in 7–9(11) whorls.

Croat & Bay 75777 and *Croat & Watt* 71002 differ from the other collections in lacking maculations. It is possibly significant that these and all other collections except *Hort. Veitch*, have no purple in the spathe tube. *Croat & Watt* 71002 is distinctive in having the secondary and tertiary venation green on the lower surface, in both living and dried material, contrasting with the purple laminar surface. The blades of this collection dry only weakly bicolorous and the medial lobe is comparatively narrow.

Hammel et al. 16472, an exceptionally large, sterile specimen from Darién Province, Panamá, is possibly another species. The petiole is 125 cm long and the blade 53 cm long. There is an auricle near the base of the lateral lobe, with 4 basal veins fused into a short posterior rib. This would suggest the possibility of the eventual development of an additional lobe. No other collection of *C. mirabilis* is auriculate. It is included here with some reservation, although it accords with this species in most respects. Another sterile specimen from Darién, *Croat* 38040 (MO), is possibly *C. mirabilis*, however the label notes do not mention maculations and indicate that all veins on the lower surface are raised and the petiole is terete, thus differing from *C. mirabilis*.

Etymology—From the Latin *mirabilis*, meaning ‘wonderful, extraordinary or unusual’.

Additional specimens examined—COLOMBIA. Department not known: sent by Kalbreyer to Hort. Veitch, specimen prepared anonymously 17 Apr. 1882 (K). **Antioquia**: Mpio. Frontino, La Blanquita district, Murri region, 14.5 km W of Nutibara on Nutibara–La Blanquita rd., 890–900 m, 6°45'N, 76°25'W, Jul. 1988, *R. Callejas et al.* 6742 (HUA). **Chocó**: Serranía de Bau-

dó, along Las Ánimas–Pató rd., on Río Pató, ca. 4 km SW of Pató, 150 m, 5°30'N, 76°46'W, 13 Apr. 1983, *Croat 56133* (MO); vic. El Amargal, vic. Nuquí, 20–50 m, 5°34'15"N, 77°30'W, 19 June 2000, *Croat & Mora 83686* (MO) [= *Mora 304* (COL)]; near junction of Río Condoto and Río San Juan, 100–150 m, 20 Apr. 1939, *Killip 35091* (COL); Cabo Corrientes, Estación Biológica “El Amargal”, near sea level, 28 Aug. 1998, *Mora 161*. **Valle:** Mpio. Buenaventura, Bajo Calima region, along Buenaventura–Málaga rd., Km 51.3, less than 100 m, 4°09'N, 77°11'W, 9 Feb. 1990, *Croat & Watt 70380* (MO), 27 Feb. 1990, *Croat & Watt 71002* (M), km 51.7, 4°03'N, 77°05'W, 16 July 1993, *Croat & Bay 75777* (CUVC, MO); vic. of Bahía Málaga, Málaga Naval Base, Río Bongito, 40 m, 4°00'44"N, 77°20'04"W, 29 July 1977, *Croat & Watt 80503* (MO). PANAMA. **Darién:** middle slopes of W side of Cerro Pirre, 550–760 m, *Croat 68888* (MO); Parque Nacional del Darién, slopes of Cerro Mali, 22 km E of Púculo, 1,300–1,400 m, Oct. 1987, *H. Cuadros et al. 3930* (MO); Parque Nacional del Darién, near N and S branches of Río Púculo, N of Tacarcuna, 18 km E of Púculo, 600–800 m, 1987, *Hammel et al. 16472* (MO). PERU: Sent by Forget to Hort. Sanders & Sons, specimen prepared 9 Dec. 1913 (K).

Cultivated specimens examined—COLOMBIA: 1980, *Elaine Spear s. n.* (M).

Chlorospatha nicolsonii Croat & L. Hannon, **sp. nov.** Type: COLOMBIA. Antióquia: Trail from Encarnación to Parque Nacional Natural Las Orquídeas, 1,600–1,800 m, 27 Jan. 1979, *Gentry & E. Renteria 24590* (holotype, MO; isotype, COL). Figure 20.

Planta terrestris vel hemiepiphytica; internodia 2–4 cm longa, 8–10 mm diam.; cataphylla ca. 16–19 cm longa; petiolus 38–60 cm longus, vaginata 15–22 cm; lam-

ina subhastata, 28–35 cm longa, 18–22 cm lata; nervis primariis lateralibus 3–4 utroque; inflorescentia 3 in quoque axila; pedunculus 11–15 cm longus, 1.5–3.5 mm diam.; spatha 7–8.5 cm longa; tubo 3.2–4.4 cm longo, 3–4 mm diam.; spadix 6–8 cm longus; parte pistillata 2.7–3.8 cm long, 2–3 mm diam.

Terrestrial or hemiepiphytic herb, to ca. 1 m tall; stem decumbent, with remnants of old leaf bases and cataphylls persisting ± intact and weakly fibrous at upper nodes (all measurements made from dried material); internodes 2–4 cm long, 8–10 mm diam., drying weakly glossy, dark brown, occasionally finely irregularly transversely-ridged, the ridges darker than surface; cataphylls ca. 16–19 cm long, apex not known, drying weakly glossy to semi-glossy, dark reddish brown, weakly fibrous. LEAVES 2–3, erect-spreading; **petioles** 38–60 cm long, drying glabrous, semi-glossy, dark reddish brown, sheathed 15–22 cm, ca. ½ of total length; sheath decurrent at apex; free portion 3–5 mm diam. midway; **blades** subhastate, 28–35 cm long, 18–22 cm wide, 1.7–2.2 times longer than wide, acute to acuminate at apex, broadest at base, 1.9–2.8 times wider at base than across anterior lobe (measured tip to tip across posterior lobes), weakly to moderately constricted in area of petiole attachment, drying thinly coriaceous, concolorous to moderately bicolorous; upper surface drying matte to weakly glossy, occasionally in part semi-glossy, dark brown to greenish brown; lower surface drying weakly glossy to semi-glossy; anterior lobe 18–20.5 cm long, 9–9.5 cm wide, 2–2.2 times longer than wide, 1.2–1.3 times longer than posterior lobes, broadest below middle, usually near base, ± symmetrical; posterior lobes directed outward, 13.5–17.5 cm long, 4–5.5 cm wide, 3.4–3.8 times longer than wide, narrowly rounded to bluntly acute at apex, broadest below mid-

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Figs. 17–20. —17 (top L.) *Chlorospatha luteynii* Croat & L. Hannon (*J. Luteyn & R. Callejas 11780*). Type specimen. —18, —19 (top R., bottom L.). *Chlorospatha macpher-*

dle, \pm symmetrical to weakly inequilateral, the inner side occasionally weakly narrower, \pm rounded toward base, briefly attenuate and decurrent onto petiole; outer side \pm straight toward base; all venation (except reticulate) drying weakly to moderately darker than surface; midrib round-raised on lower surface, drying \pm raised; **basal veins** 4–6 pairs, coalesced into a prominent posterior rib; primary lateral veins 3–4 pairs, arising at 30–60°, most acutely toward apex, weakly to moderately arcuate, occasionally strongly arcuate or irregularly ascending, convex on lower surface, drying \pm flattened to weakly raised; secondary veins raised on lower surface, drying \pm flattened to weakly raised; tertiary veins drying entirely or in part prominulous and otherwise distinct on lower surface; reticulate veins obscure; collective veins 3, the innermost arising from one of the lowermost lateral veins on inner side of posterior lobe, loop-connected with all preceding lateral veins, parallel to margin to moderately scalloped, 3–7 mm from margin. INFLORESCENCES erect, to 3 per axil; peduncle held within the sheath, 11–15 cm long, 1.5–3.5 mm diam., drying weakly glossy to semi-glossy, dark brown; **spathe** entirely cream-colored or yellow, erect, 7–8.5 cm long, acuminate at apex, weakly or not at all constricted between tube and blade; spathe tube 3.2–4.4 cm long, 3–4 mm diam., drying matte, dark reddish brown on outer surface, weakly glossy on inner surface; spathe blade 4–4.5 cm long, 5–6 mm diam., drying weakly glossy to semi-glossy, pale-medium to medium-dark reddish brown on both surfaces, marcescent, erect after anthesis; **spadix** erect, 6–8 cm long, sessile, adnate to spathe 2.7–3.8 cm at base, the entire length of pistillate portion and occasionally narrowly onto sterile staminate portion; pistillate portion 2.7–3.8 cm long, 2–3 mm diam., wider than thick, drying cream to tan; fertile staminate portion cream or yellow, 2.5–3.5 cm long, 3–4 mm diam., \pm cylindrical, narrowly rounded at apex, drying medium to medium-dark yellowish brown; sterile staminate portion 3–8 mm long, 2–3 mm diam., cylindrical or

weakly broadest at apex, drying medium to medium-dark yellowish brown, minutely darker red-brown-speckled; pistils weakly coherent to laxly arranged, ca. 3 across the axis (viewed from above), ca. 1.5 mm long; ovaries subglobose, ca. 1 mm long, 1.5–2 mm diam., drying dark brown; style mantle-like, ca. 0.5 mm long, 1–1.5 mm diam., comprising $\frac{1}{4}$ – $\frac{1}{3}$ of the length of pistil, as broad as to weakly narrower than ovary apex, briefly attenuate (attenuate portion ca. 0.4 mm long), the margins weakly or not at all coherent with those of adjacent styles; **stigma** ca. 0.5 mm diam., weakly elevated on and weakly broader than narrowed portion of style, drying yellowish tan; synandria 1–1.3 mm long, 1.8–2 mm diam., coherent, truncate, (2)3–4(5)-lobed, (2)3–4(5)-androus (mostly 4); sterile flowers 0.5–1 mm long, 1 mm \times 2 mm diam., elongated in direction of axis, coherent, truncate, irregularly sub-prismatic, in 3–5 whorls. BERRIES not known.

Flowering occurs in *Chlorospatha nicolsonii* during the months of January and February.

Chlorospatha nicolsonii is known only from the Parque Nacional Natural Las Orquídeas on the western slopes of the Cordillera Occidental, in Antioquia Department, Colombia, at 1,500–1,800 m elevation.

Chlorospatha nicolsonii is distinguished by its subhastate, triangular leaf blades with the posterior lobes narrow and nearly as long as the anterior lobe. The posterior rib is not naked, the inner margins of the posterior lobes being decurrent onto the petiole. The species is also characterized by its petiole that is sheathed only $\frac{1}{3}$ of its length, short peduncle (11–15 cm long), entirely yellow or cream-colored spathe and cream or yellow fertile staminate spadix. The spadix is adnate to the spathe the entire length of the pistillate portion and onto half or the entire length of the sterile staminate portion. The species has relatively long internodes, 2–4 cm long, and is occasionally hemiepiphytic.

Chlorospatha nicolsonii could not be easily confused with any published spe-

cies. The species is somewhat similar to *C. amalfiensis* Croat & L. Hannon and *C. antioquiensis* Croat & L. Hannon, however, these species occur only in the Magdalena River drainage, whereas *C. nicolsonii* occurs only on the western slopes of the Cordillera Occidental. The leaf blade in the latter species is subhastate, with the posterior lobes directed outward and narrow, more than 3 times longer than wide, whereas those of the other 2 species are sagittate, with the posterior lobes directed toward the base and broad, less than 2 times longer than wide. The petiole is sheathed about $\frac{1}{3}$ of its length in *C. nicolsonii* and about $\frac{1}{2}$ of its length in *C. amalfiensis* and *C. antioquiensis*. In *C. nicolsonii*, the style is only as broad as the ovary apex, unlike those of *C. amalfiensis* and *C. antioquiensis*, which are either moderately or prominently wider than the ovary apex.

Three sterile specimens from the Parque Nacional de Las Orquídeas possibly represent this species. *J. Pipoly et al. 17284*

(JAUM, MO) was collected along the Río Calles, at 1,450–1,500 m and has relatively broad posterior lobes directed toward the base. *Cogollo et al. 7640* (JAUM, MO) and *Cogollo et al. 4118* (JAUM, MO) are from sites nearly identical to that noted above. *Cogollo et al. 7640* is a small, juvenile specimen. *Cogollo et al. 4118* is reported to have the spathe tube green and the blade white, thus differing from the spathe of *C. nicolsonii*. A sterile collection, *Croat 50131* (MO), made near the Estación Microndas Tokio in Valle Department, is possibly this species, resembling *C. nicolsonii* in most respects but differing in having more primary lateral veins.

Etymology—Named for Dan Nicolson of the Smithsonian Institution, noted authority on the Araceae of Asia and first winner of the H. W. Schott Award for excellence in Araceae research.

Paratypes—COLOMBIA. **Antióquia:** Parque Nacional Natural Las Orquídeas, Calles-Venados rd., 1,500 m, 14 Feb. 1989, *Cogollo et al. 3976* (JAUM).