

HELICONIAS (MUSACEAE)  
OF THE RIO PALENQUE SCIENCE CENTER, ECUADOR

C. H. Dodson<sup>1</sup> and A. H. Gentry<sup>2</sup>

The genus *Heliconia* is notoriously difficult taxonomically. This is largely because the bulky banana-like plants do not lend themselves to convenient herbarium study, and general collectors tend to avoid filling their plant presses with them. The treatment of the genus in Central America by Smith (1968, 1975a & b) has helped to clarify the situation. Much of Smith's work is based on field studies with living populations in Central America. Gilbert Daniels (*Brenesia*, in press) is also doing field work with the genus, mostly in Costa Rica, which promises further clarification, and Barreiros (1972, 1974) is studying Brazilian species. Almost nothing is known of the genus in Ecuador to date, although preparation of a much needed account of Musaceae for "Flora of Ecuador" by G. Harling and L. Anderson is now underway.

At the Río Palenque Science Center, Los Ríos Province, Ecuador, we recognize nine distinct species of *Heliconia*, two of which may hybridize, and a tenth species occurs just across the river.

This large number of sympatric species, most of them with numerous individual plants in flower throughout the year, has provided a convenient subject for field studies of floral ecology for groups of students at Río Palenque over the last seven years. Some interesting observations of pollination ecology have resulted from various student studies and this information is summarized here for each species.

The students have had no difficulty in distinguishing the taxa which we recognize. The major problem has been the application of names to the biological entities. Five of the Río Palenque species are well known plants from other regions, and names for these have been supplied by Daniels (pers. comm.) and verified by Harling. Four species are apparently undescribed and we describe them below. The status of the final species, which may be part of a hybrid complex, is not clear at this time.

Following is a presentation of the *Heliconia* species which will be treated in the Flora of Río Palenque to be published in the next issue of this journal. We also include for each species our and our students' observations on pollination biology of *Heliconia* at the Science Center.

KEY TO THE SPECIES OF *HELICONIA* OF THE RÍO PALENQUE SCIENCE CENTER

1. Inflorescence erect.
  2. Branch bracts green; peduncle longer than the rachis .....  
.....*Heliconia metallica*
  2. Branch bracts red or red and yellow; peduncle shorter than the rachis.
    3. Branch bracts red.
      4. Branch bracts flattened, spreading; flowers green, pubescent  
.....*Heliconia amygdiana*
      4. Branch bracts boat shaped, overlapping; sepals white, petals  
green; flowers glabrous .....*Heliconia marmoliana*
    3. Branch bracts a combination of red and yellow.

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5. Branch bracts red at the apices, yellow toward the base; flower yellow with a green stripe along the margin of the sepals . . . . . *Heliconia latispatha*
5. Branch bracts yellow-green with a broad red blotch on each side; flower white with a green band around the distal third and with white tips . . . . . *Heliconia wagneriana*
1. Inflorescence pendent.
  6. Branch bracts rosy-red with the upper and distal portion of the bract yellow-green. . . . . *Heliconia riopalenquensis*
  6. Branch bracts red or maroon.
    7. Inflorescence short, less than 50 cm long; branch bracts maroon . . . . . *Heliconia obscura*
    7. Inflorescence 1-2 m long; branch bracts bright red.
      8. Branch bracts completely red.
        9. Peduncle and pedicel red, villous; peduncle 50 cm to 1 m long . . . . . *Heliconia longa*
        9. Peduncle and pedicel yellow, short-puberulous; peduncle 1-2 m long . . . . . *Heliconia curtispatha*
      8. Branch bracts red with apical third black . . . . . *Heliconia nigripraefixa*

### 1. *Heliconia aemygdiana* Burle-Marx

Plate 1-A

Plant to 2 m tall. Leaves 20-25 cm broad. Inflorescence erect, to 80 cm long; branch bracts red, the basal branch bracts flattened, to 70 cm long and relatively broad (to 6 cm). Flowers green, pubescent. Fruits large, purple when ripe. Infrequent, in mature forest particularly in damp places. On both sides of the Andes in Ecuador, and in Brazil.

Identification of the Río Palenque plant with this Brazilian species has been questioned by Harling (pers. comm.) on phytogeographic grounds but our material seems an excellent match for that illustrated by R. Burle-Marx (Bradea 1: 379-382. 1974). A very similar plant also occurs on the eastern side of the Andes at Limon Cocha but the branch bracts are pink (Dodson, unpubl.). The Río Palenque form occurs only in the narrow strip of lowland wet forest on the western side of the Ecuadorian Andes at elevations from 150 to 300 m.

Students' observations at Río Palenque indicate that this species is pollinated by bats. Claw marks are frequent on the curiously large and erect green flowers, which are fragrant only at night. During six years of intermittent observation, no hummingbirds have been seen to visit the flowers. A Riordinid butterfly, *Eurybia patrona* commonly visits the flowers during the day, but is not of sufficient size to pollinate them effectively. Interestingly, this butterfly does not visit any other *Heliconia* at Río Palenque.

### 2. *Heliconia curtispatha* Peters.

Plate 1-B

Plant to 5 m tall. Leaves to 2.5 m long by 60 cm broad. Inflorescence pendent, to 3 m long, the peduncle yellow to orange, to 2 m long; branch bracts red-orange, 15 × 5 cm. Flowers yellow. Fruits black when ripe. Infrequent in mature forest.

This plant is apparently specifically distinct from *H. longa* although Harling (pers. comm.) suggests not. It is the same as the common Panaman-

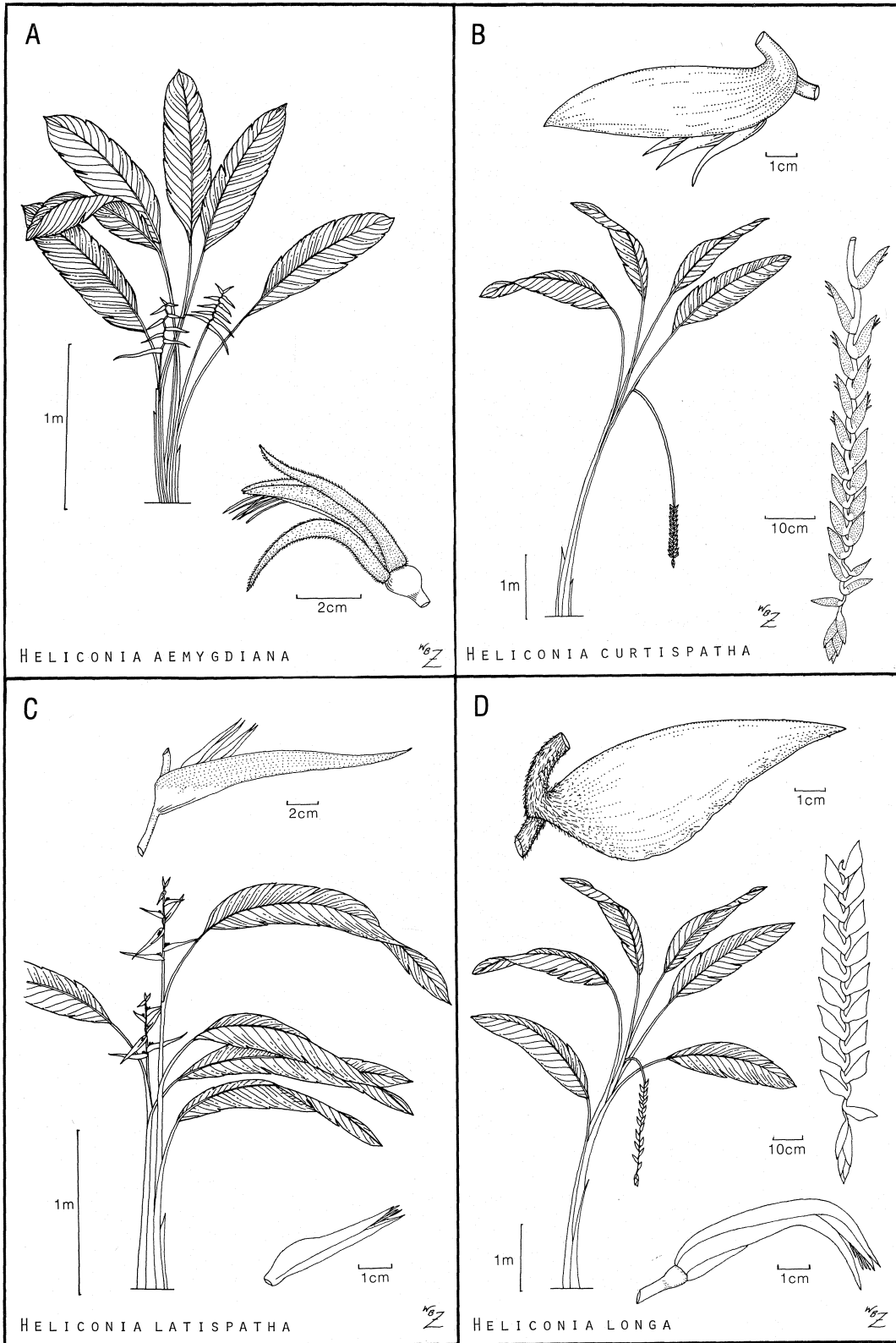


Plate 1

ian species which Barreiros has identified as *H. longa* but differs from our other "*H. longa*" in a longer, finely puberulous, yellow peduncle 1.5-2 m long and larger branch bracts yellow at the base with more strongly curved margins. Relatively few plants of this form are encountered at Río Palenque and they are always found in mature forest, whereas *H. longa* is common in second growth and along roadsides.

Pollination observations indicate that the primary pollinator of *H. curtispatha* is the Long-tailed Hermit. The White-tipped Sicklebill does not visit this species. Occasional hybridization could occur since the Long-tailed Hermit visits both species even though it is primarily a robber of *H. longa*. The intermediates between *H. longa* and *H. curtispatha* are found in mature forest along with *H. curtispatha*.

### 3. *Heliconia latispatha* Benth.

Plate 1-C

Plant to 3.5 m tall. Leaves 25-30 cm broad. Inflorescence erect, to 60 cm long, the peduncle yellow; branch bracts red at the apices, yellow toward the base, moderate in length (the basal branch bracts 40 cm long), and relatively narrow (to 5 cm); perianth parts yellow with a green marginal stripe. Fruits black when ripe. Common, in second growth areas and along the river bank in the sun. Widespread in tropical America.

Our plant is clearly the same as this widespread weedy entity of Central America. This species is visited at Río Palenque by the white-whiskered Hermit, *Phaethornis yaruqui*, and several other species of hummingbird.

### 4. *Heliconia longa* (Griggs) Winkler

Plate 1-D

Plant to 5 m tall. Leaves to 2.5 m long by 60 cm broad. Inflorescence pendent, to 2 m long, densely villous; peduncle red, 50 cm to 1 m long; branch bracts red, 10 × 4 cm, the margins strongly curved. Fruits black when ripe. Common, in second growth and degraded forest. Nicaragua to coastal Ecuador.

Our species (*Dodson 5185*) was identified as *H. longa* by Daniels. It matches Costa Rican material at MO determined as *H. longa* by Daniels, but not Panamanian material determined with the same name by Barreiros. At Río Palenque most of the plants have red branch bracts and a red peduncle 50 cm to 1 m long and densely villous with trichomes ca. 2 mm long. Some plants have longer peduncles with more yellowish color, possibly indicating introgression from *H. curtispatha* Peters.

The White-tipped Sicklebill, *Eutoxeres aquila*, is apparently the only effective pollinator of *H. longa* at Río Palenque, although the Little Hermit, *Phaethornis longuemareus*, and the Long-tailed Hermit, *Phaethornis superciliosus* are more frequent visitors. The later two hummingbirds appear only to rob the flowers from the side.

### 5. *Heliconia marmoliana* Dodson & A. Gentry, sp. nov.

Plate 2-A

Differt a speciebus ceteris generis inflorescentiis saepe lateralibus basalibus, bracteis rubris arcte imbricatis et floribus albis.

Small plants with musoid habit to 1.5 m tall. Leaves 3-5 per stem; leaf blades to 70 × 35 cm, broadly elliptic-ovate, the apex acuminate, the base obtuse, green with a dark red blotch down the midrib on the upper side, the underside red; petiole to 40 cm long. Inflorescence often produced basally on a separate stem without foliage, erect; peduncle to 30 cm long; rachis about 20

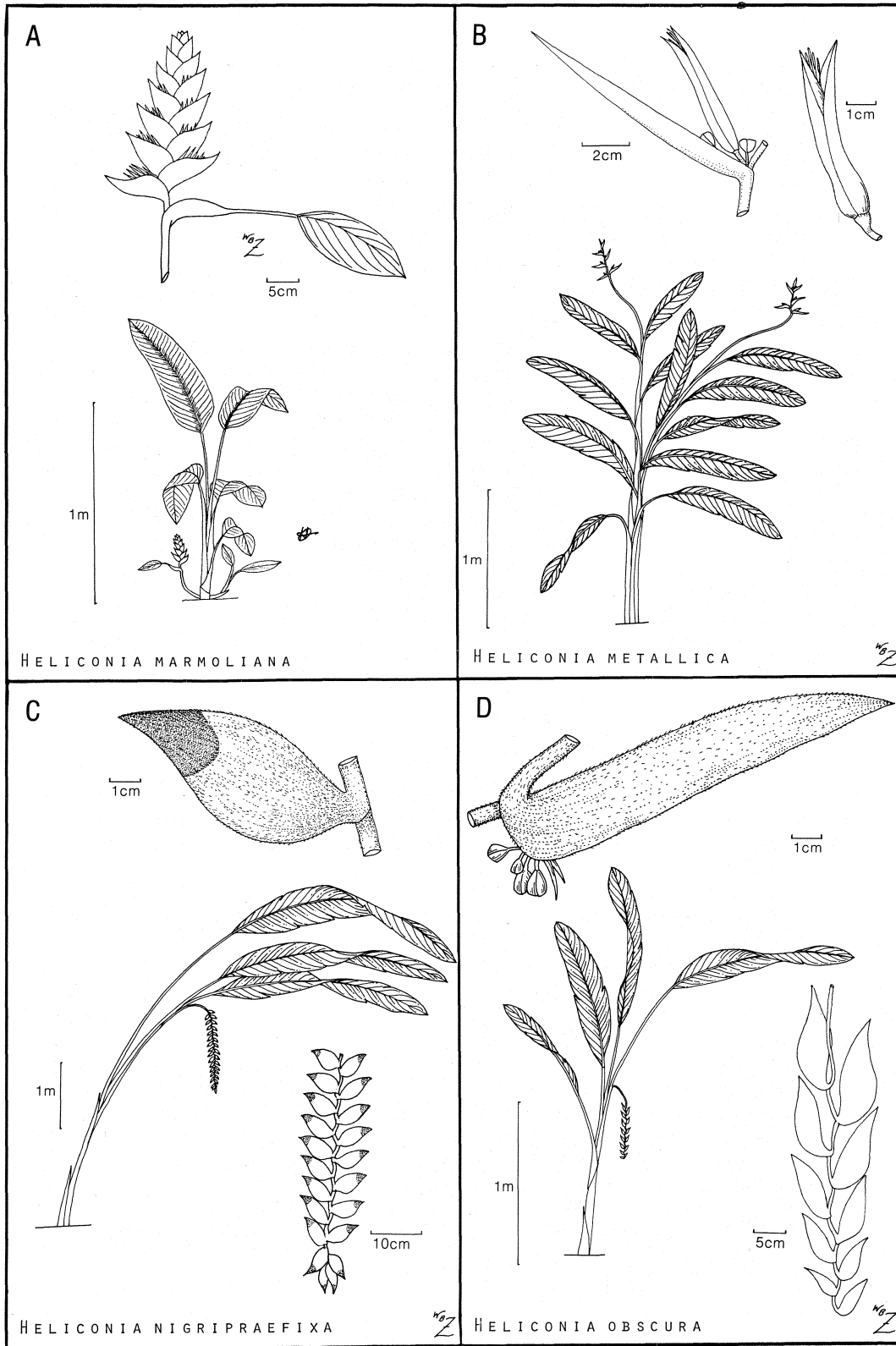


Plate 2

cm long; inflorescence about 10 cm wide; branch bracts 12-15, tightly imbricated, dark red, deeply boat-shaped, the basal bract sometimes developed at the apex into a small leaf; floral bracts whitish to transparent. Flowers erect; sepals white; petals green; perianth 5 cm long; ovary red. Fruit not seen.

ETYMOLOGY: Named in honor of Sr. Alcides Marmol, manager of the Río Palenque Science Center, who brought the species to our attention several years ago.

TYPE: ECUADOR: PICHINCHA: Junction of the Río Chiguilpe and Río Baba, alt. 450 m, 24 May 1975, C. H. Dodson 6064 (HOLOTYPE: SEL; ISOTYPE: RPSC).

DISTRIBUTION: Western Ecuador from the region of Santo Domingo south to Río Palenque, 150-600 m alt.

*Heliconia marmoliana* is readily distinguished by its erect inflorescence often produced on a separate stem from the foliage. The species is remarkable as the only member of the genus producing its inflorescence on a lateral shoot rather than apically. The dark red branch bracts make a spectacular setting for the white flowers. Its small stature and spectacular inflorescence should make it horticulturally desirable.

Harling (pers. comm.) confirms that this species is undescribed on the basis of the description and illustration in the Río Palenque Flora manuscript.

Though this species has not yet been found at Río Palenque, it is present immediately across the river and may occur at the Science Center. No pollination observations have been made on this species.

#### 6. *Heliconia metallica* Planch. et Linden

Plate 2-C

Plant to 2.5 m tall. Leaves relatively narrow, 10-12 cm wide. Inflorescence erect, to 3 m long; peduncle long, slender, commonly from a separate branch of the rhizome at the base of the plant; bracts erect, green; flowers red with green apices on the perianth parts. Common, in mature forest. Panama through tropical South America.

This small-flowered species is common in mature forest and persists in plantations. The flowers are erect with a cerise-red tube. The Little Hermit and the Purple-crowned Fairy, *Heliothryx barroti* have been observed as frequent visitors.

#### 7. *Heliconia nigripaefixa* Dodson & A. Gentry

Plate 2-D

*Heliconiae longae* (Griggs) Winkler affinis sed bracteis brevioribus apicibus nigris conspicue differt.

Large plants with musoid habit to 5 m tall. Leaves 3-5 per stem; leaf blades to 2.5 m × 45 cm, elliptic-ovate, the apex acute, the base obtuse, green; petiole to 2 m long. Inflorescence pendent; peduncle to 50 cm long; rachis slightly fractiflex, to 1.5 m long; branch bracts distichous, somewhat reflexed, bright red for basal 3/4, black for apical 1/4, boat-shaped, broadly ovate with strongly curved margins and a noticeably curved keel, the margin curving sharply near the base, the keel most strongly at or beyond the middle, acute at the apex, 7-8 × 6-8 cm, rather asperously pubescent with a tomentum of short stiff rufescent trichomes, the floral bracts numerous, white, 5 × 2 cm, glabrous. Flowers numerous; sepals and petals yellow; perianth 3.5 cm long; pedicel 8 mm long; ovary white. Fruit black when ripe, globose, glabrous, to 1.2 cm in diameter.

ETYMOLOGY: Named for the black apices of the branch bracts.

TYPE: *ECUADOR*: Los Ríos: Río Palenque Science Center, km. 56 Quevedo to Santo Domingo, 220 m alt., 15 Oct. 1972, *C. H. Dodson 5188* [HOLOTYPE: SEL, ISOTYPE: RPSC, MO (fragment)].

DISTRIBUTION: Panama to Ecuador, in lowland wet forest.

ADDITIONAL MATERIAL EXAMINED: *PANAMA*: CHIRIQUI: San Bartolo Limite, 20 km W of Puerto Armuelles, alt. 400-600 m, *Busey 551* (MO). *COLOMBIA*: CHOCÓ: Río Mutata near Bahía Solano, ca. 6° 5' north, 77° 25' west, 7 Jan. 1973, *Forero and Gentry 732* (COL).

*Heliconia nigripraefixa* is a spectacular species with the contrasting black tips on the bright red bracts. It is related to *H. longa* from which it differs in the shape and color of the bracts. Daniels (pers. comm.) has suggested an affinity with *H. pogonantha* Cufod. but it lacks the strikingly villous corolla of that species. The Panamanian collection was identified as *H. curtispatha* Petersen.

This large species is found commonly in second growth areas along with *H. longa*. It occurs less frequently in mature forest. The black tips of the branch bracts immediately distinguish it from *H. longa*. It is visited by the Little Hermit and the Long-tailed Hermit, both of which also visit *H. longa*, but no hybrids have been seen.

8. *Heliconia obscura* Dodson & A. Gentry, sp. nov.

Plate 2-D

A *H. longa* (Griggs) Winkler statura minore, inflorescentia brevior et bracteis marroninis differt.

Plant slender with musoid habit, 1.5-2.5 m tall. Stems spotted with red at the base. Leaves 3-5 per stem, the leaf blades to 120 × 30 cm, elliptic, the apex attenuate, the base obtuse, green; petiole to 70 cm long. Inflorescence pendent, not spiralled; peduncle to 20 cm long; rachis fractiflex, to 7 cm between bracts; branch bracts distichous, sharply reflexed to lie against the rachis, dark wine red or maroon, pubescent with trichomes mostly ca. 1 mm long, boat-shaped, the basal bracts long-acuminate, to 15 × 2.5 cm, the apical bracts acute, to 8 × 2.5 cm, both margins and keel slightly curved; floral bracts numerous, white, 3-4 × 2.5-2 cm, glabrous. Flowers numerous, sepals and petals yellow; perianth 4 cm long; pedicel 1.2 cm long; ovary white. Fruit dark blue when ripe, globose, glabrous, to 9 mm in diameter.

ETYMOLOGY: Named for the obscure light conditions to which the species is restricted.

TYPE: *ECUADOR*: Los Ríos: Río Palenque Science Center, km. 56 Quevedo-Santo Domingo, 220 m alt., 18 Dec. 1972, *C. H. Dodson 5219* (HOLOTYPE: SEL, ISOTYPE: RSPC).

DISTRIBUTION: Known only from the Río Palenque Science Center.

ADDITIONAL MATERIAL EXAMINED: *ECUADOR*: Los Ríos: Same locality, *Gentry 9913* (MO).

This species is most like *H. paulii* Lane ex R. R. Sm. among Panamanian and Central American collections. The latter species, apparently inedited, may itself be no more than a variant of *H. pogonantha* Cuf., and is known only from above Santa Fé de Veraguas. Both *H. paulii* and *H. pogonantha* differ strongly from *H. obscura* in reddish-villous corollas and glabrescent, red, inflorescence bracts.

Among Río Palenque species, *H. obscura* is related to *H. longa*, but the former plant occurs in deep shade in the mature forest, the inflorescence is much shorter, the branch bracts are dark wine-red, pubescent, long-attenuate, and sharply reflexed, and the stems are spotted with red.

No intermediates between this species and *H. longa* or *H. curtispatha* have been found. *Heliconia obscura* is visited by hummingbirds, but the species have not been identified due to the poor visibility in its dark, shaded habitat.

#### 9. *Heliconia riopalenquensis* Dodson & A. Gentry

Plate 3-A

A *H. rostratae* Ruiz et Pavon et *H. marginatae* (Griggs) Pittier affinis sed bracteis roseis et fructu albo maturatione caerulescentibus notabilis.

Medium-sized plants with musoid habit, to 4 m tall. Leaves 4-7 per stem; leaf blade to 1.5 m × 30 cm, narrowly elliptic, the apex shortly acuminate, the base long-attenuate, green; petiole to 1.5 m long. Inflorescence pendent; peduncle to 40 cm long, the rachis slightly fractiflex, to 30 cm long; branch bracts spiraled, horizontal, not reflexed, shallowly boat-shaped, distinctly pubescent with slender trichomes ca. 1 mm long, yellow down the back, rosey-red to the margin, 7-22 × 4-5 cm; floral bracts numerous, 4 × 1 cm, glabrous. Flowers numerous; sepals and petals pale yellow; perianth 4 cm long; pedicel 9 mm long; ovary white. Fruit white when immature, light blue when mature, globose, 1.4 cm in diameter, when dried broader than long, and ca. 0.8 cm long.

ETYMOLOGY: Named for the Río Palenque Science Center.

TYPE: ECUADOR: Los Ríos: Río Palenque Science Center, km. 56 Quevedo to Santo Domingo, 220 m alt., 15 Oct. 1972, C. H. Dodson 5187 [HOLOTYPE: SEL, ISOTYPE: RPSC, MO (fragment)].

DISTRIBUTION: Known only from the Science Center.

Relationship with *H. griggsiana* L. B. Sm. has been suggested by G. Daniels (pers. comm.) but that Colombian and Panamanian species differs in larger glabrescent bracts with more strongly curved margins and especially in much larger more elongated fruits, over 1.5 cm long when dried.

This intermediate-sized species occurs in second growth areas. It is unusual among our species in having pendent inflorescences with open and spiraled, rather than close-together and imbricate branch bracts, and in the white immature fruits which turn light blue upon ripening. No pollination observations have been made.

#### 10. *Heliconia wagneriana* Peters.

Plate 3-B

Plant to 2.5 m tall. Leaves to 30 cm broad. Inflorescence erect, to 70 cm long; bracts broad, red-blotched on each side with a yellow base color. Uncommon, in mature and disturbed forest. Southern Mexico to Brazil.

Several naturally occurring individuals of this species have been found at Río Palenque in addition to the plants cultivated around the Dodson house. No visits by pollinators have been observed and the plants produce viable seeds autogamously in the greenhouses at the Marie Selby Botanical Gardens indicating that they are probably autogamous at Río Palenque as well.



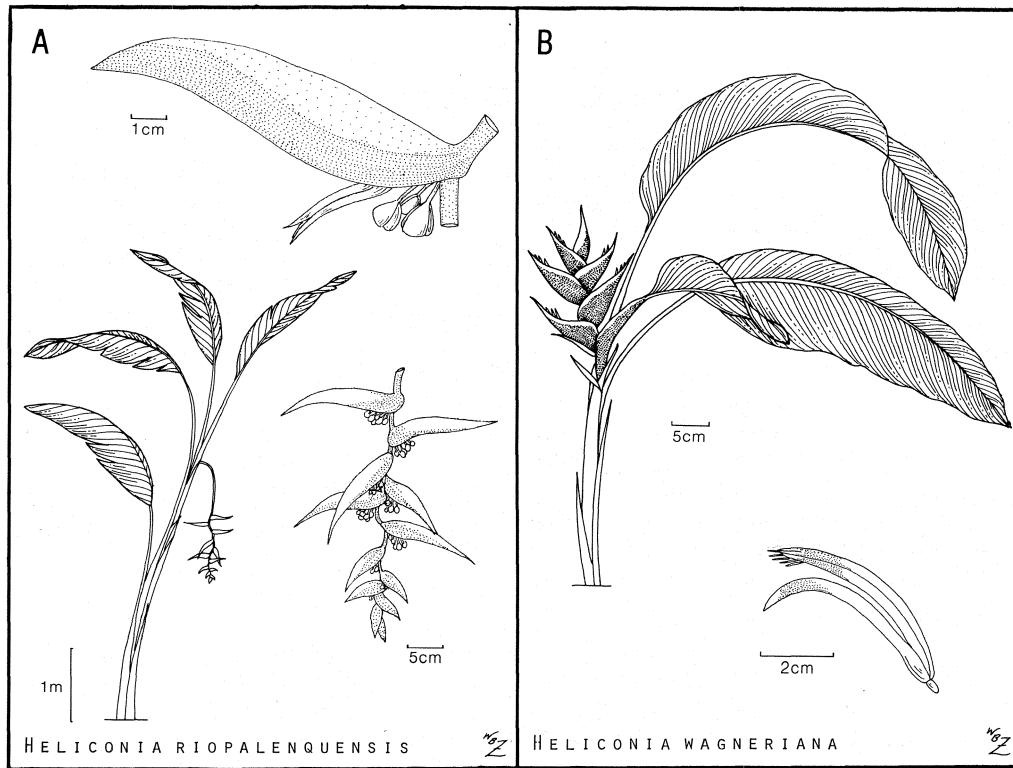


Plate 3

## ACKNOWLEDGMENTS

We express our gratitude for help with the taxonomy of this difficult group from Drs. Gilbert Daniels and Gunnar Harling. We also thank the many students for the tedious hours observing pollinators and for the use of the resulting observations.

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