Revision of *Anthurium* sect. *Calomystrium* (Araceae) of the Lita-San Lorenzo Region (Esmeraldas Province, Ecuador)

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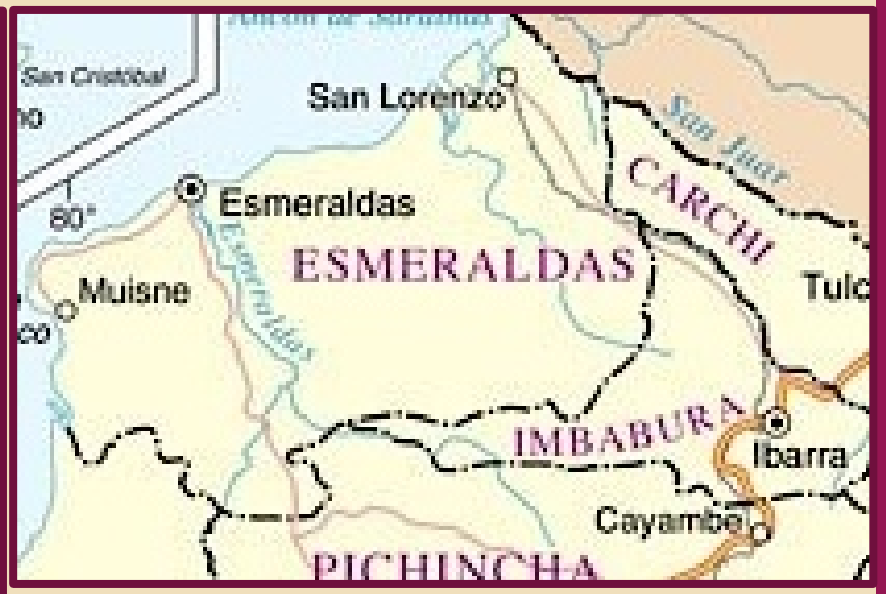
Overview

- Introduction to the Lita-San Lorenzo Region, Ecuador and *Anthurium* sect. *Calomystrium*
- Morphology and Methods
- Results, species new to science

Introduction

- The distribution and diversity of species in the genus *Anthurium*, is still not fully known.
- Demonstrating a high species richness and endemism may contribute to a decrease in deforestation or an increase in protected habitat area to aid in conservation efforts to preserve tropical biodiversity.
- As part of the NSF REU program, we have constructed a revisionary flora of *Anthurium* sect. *Calomystrium* of the Lita-San Lorenzo Region, Esmeraldas Province, Ecuador, as well as a dichotomous key for future studies in the same region.

Lita-San Lorenzo Region
Esmeraldas Province, Ecuador



The northwestern part of Ecuador, especially the Esmeraldas Province constitutes one of the most species-rich part of Ecuador. Esmeraldas ranges south of the Río Mira to the Pacific Ocean with its attended lowland coastal forests.

Anthurium section *Calomystrium* (Araceae)

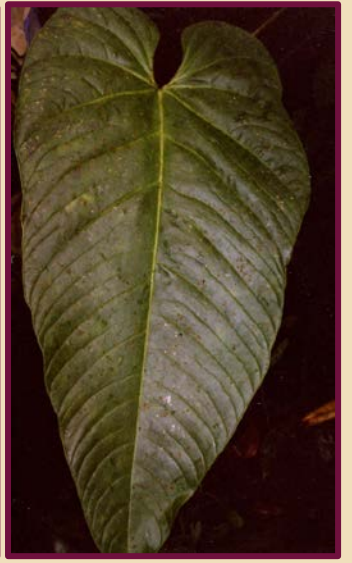
- *Anthurium* ~2,000 est. species
- *Calomystrium* ~350 est. species
- High endemism in Ecuador and Colombia
- Epiphytic or Terrestrial

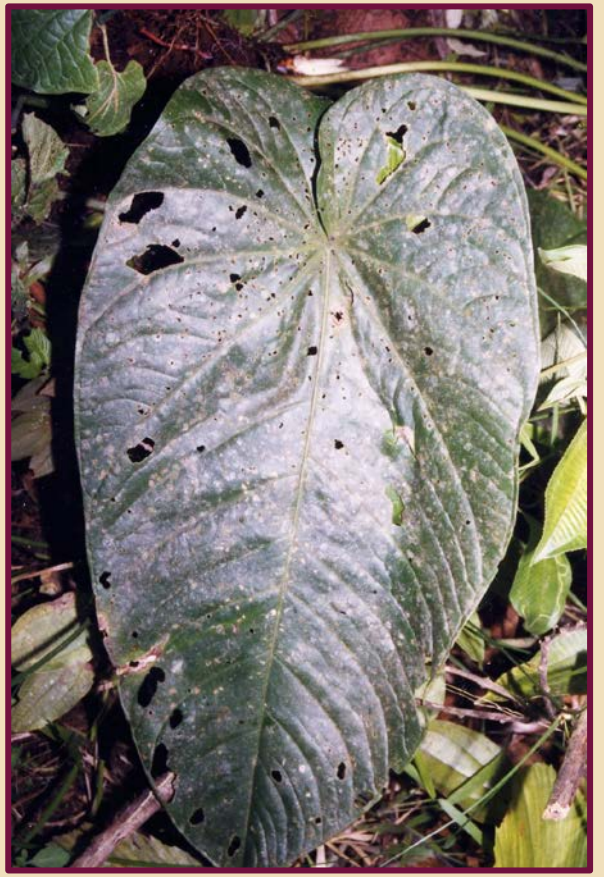
Unique Morphology

- Large ovate-cordate to ovate-sagittate blades
- Deeply lobed
- Cataphylls persistent
- Erect Spathe and Spadix with pastel colors








Objective

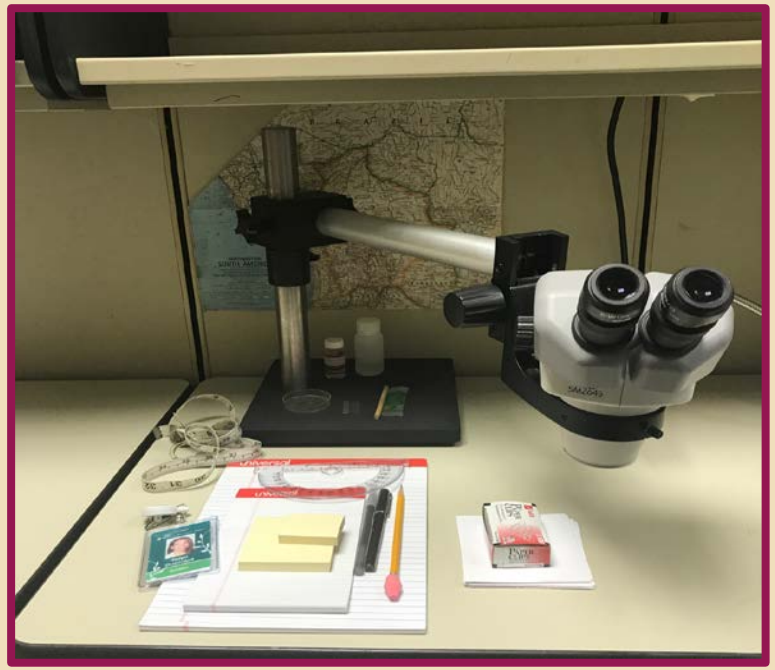
To determine if there are *Anthurium* sect. *Calomystrium* species in the Missouri Botanical Garden herbarium that are new to science.

Methods

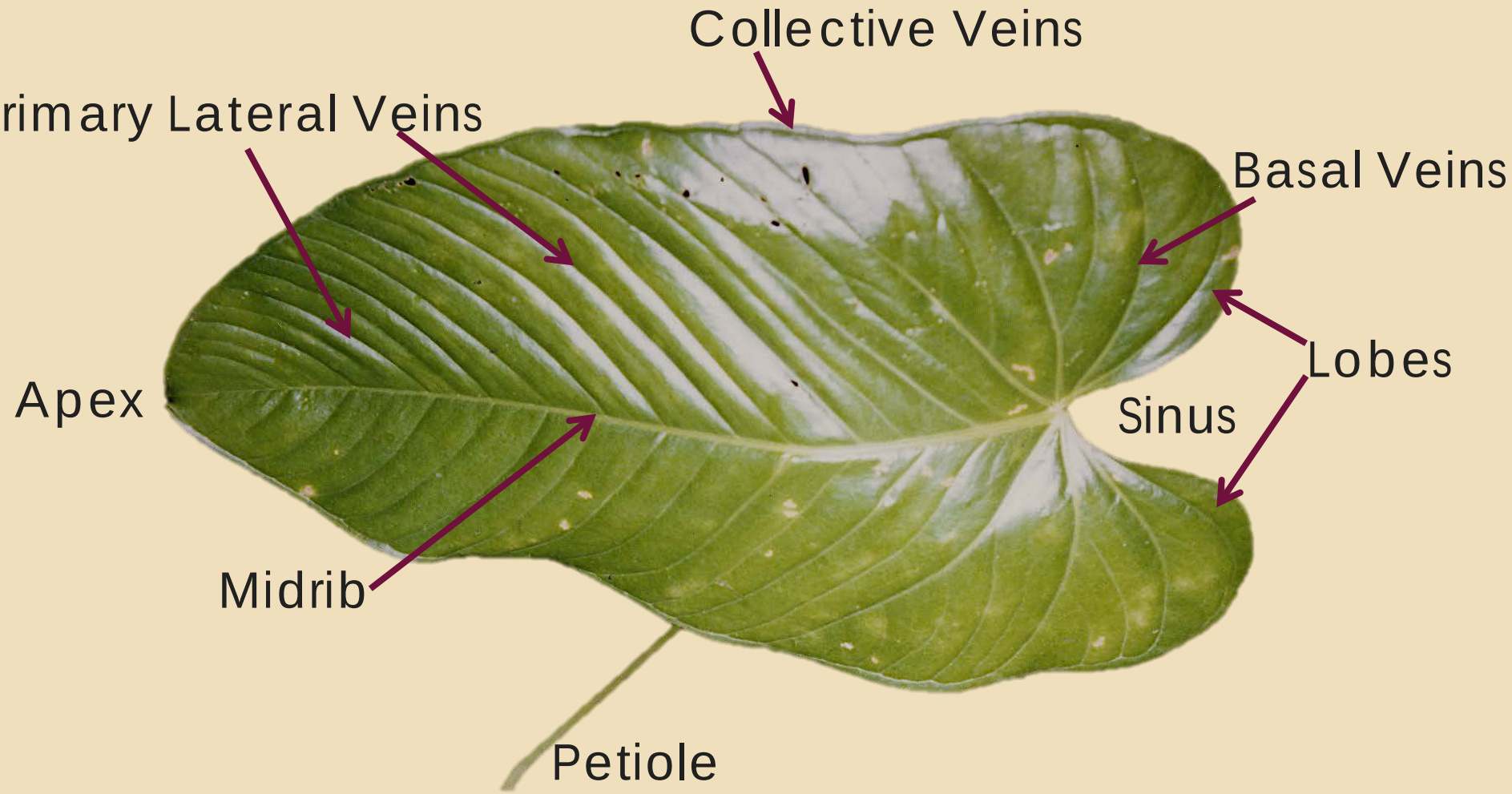
- Sorted herbarium material into species groups
  - Collected by multiple researchers over a period from (1904)1976-2013

- Generate descriptions based on morphological characters

  - Taxonomic Treatment: quantitative and qualitative characters of the leaves, inflorescences, and infructescences
  - Resources: herbarium specimens, cultivated specimens, photographs, transcribed field notes, microscope, measuring tape



Morphometric analysis:
measuring morphological characters



Anthurium durangoense Croat

Textbook guidance

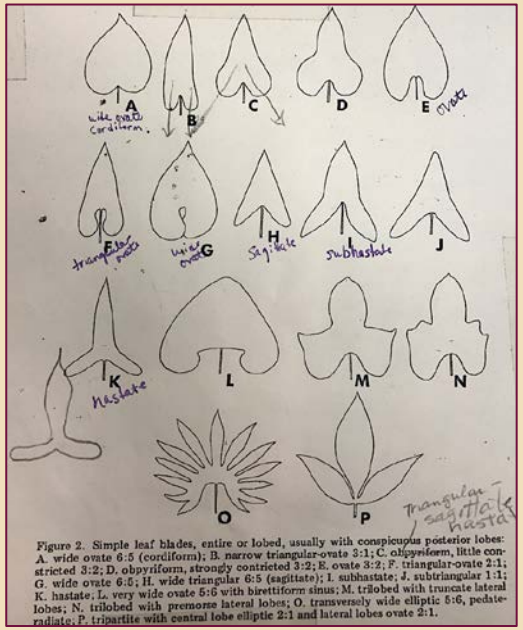
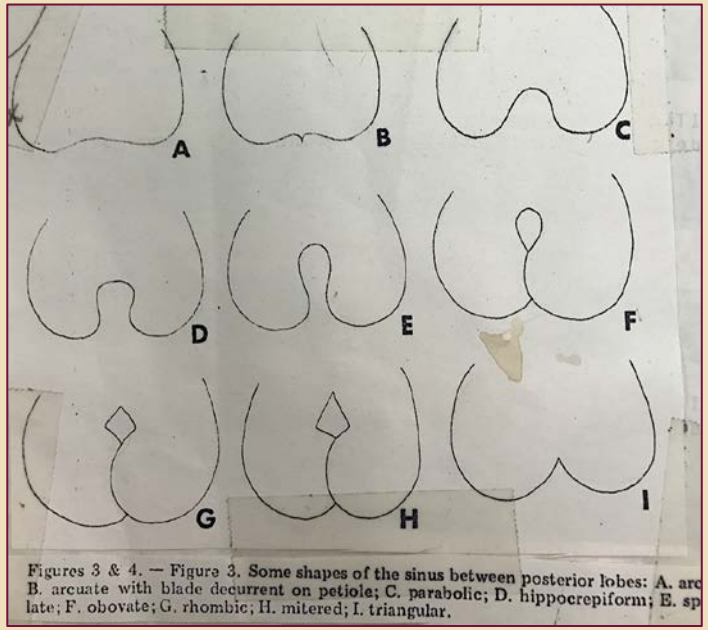


Figure 2. Simple leaf blades, entire or lobed, usually with conspicuous posterior lobes: A. wide ovate 6:5 (cordiform); B. narrow triangular-ovate 3:1; C. obpyriform, little constricted 3:2; D. obpyriform, strongly contricted 3:2; E. ovate 3:2; F. triangular-ovate 2:1; G. wide ovate 6:5; H. wide triangular 6:5 (sagittate); I. subhastate; J. subtriangular 1:1; K. hastate; L. very wide ovate 5:6 with birettiform sinus; M. trilobed with truncate lateral lobes; N. trilobed with premorse lateral lobes; O. transversely wide elliptic 5:6, pedate-radiate; P. tripartite with central lobe elliptic 2:1 and lateral lobes ovate 2:1.



Figures 3 & 4. — Figure 3. Some shapes of the sinus between posterior lobes: A. arc
late; B. arcuate with blade decurrent on petiole; C. parabolic; D. hippocrepiform; E. sp
F. obovate; G. rhombic; H. mitered; I. triangular.

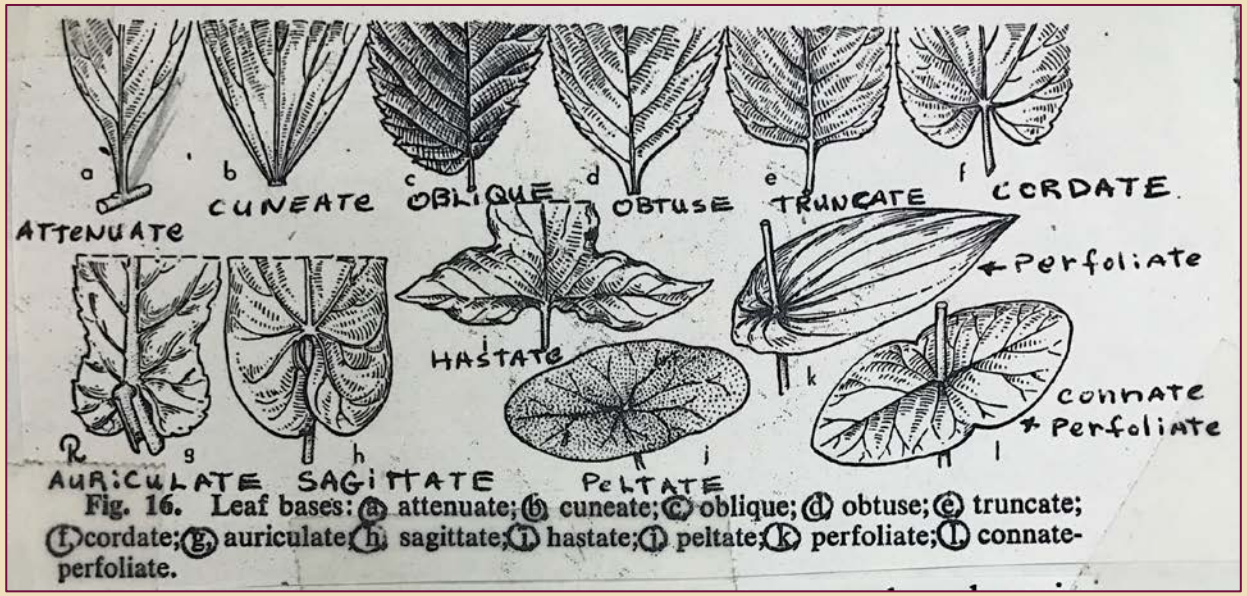


Fig. 16. Leaf bases: (a) attenuate; (b) cuneate; (c) oblique; (d) obtuse; (e) truncate; (f) cordate; (g) auriculate; (h) sagittate; (i) hastate; (j) peltate; (k) perfoliate; (l) connate-perfoliate.

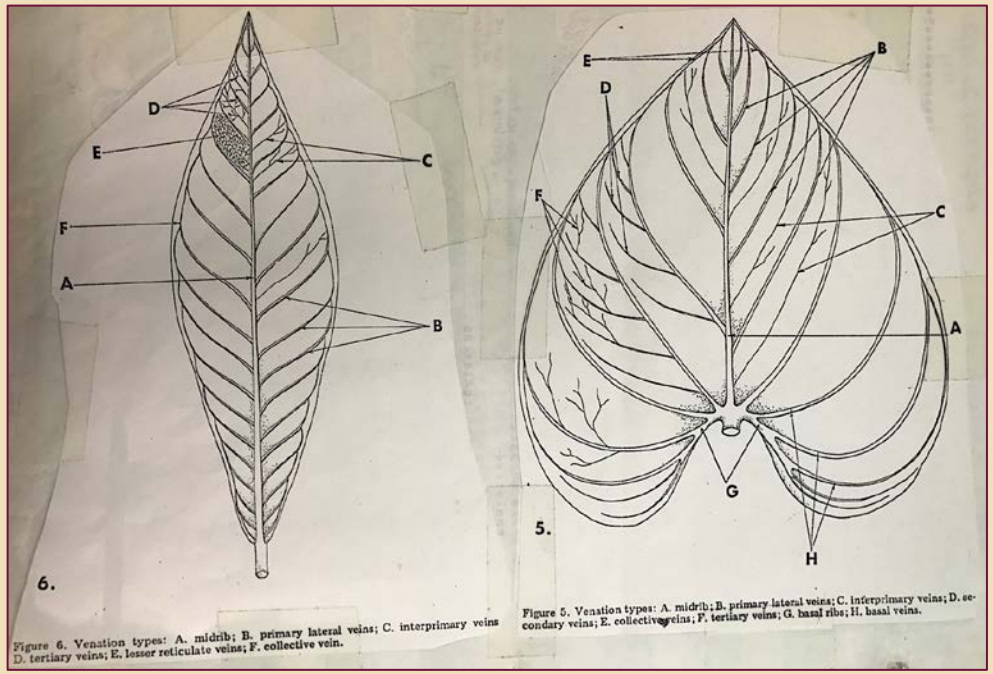
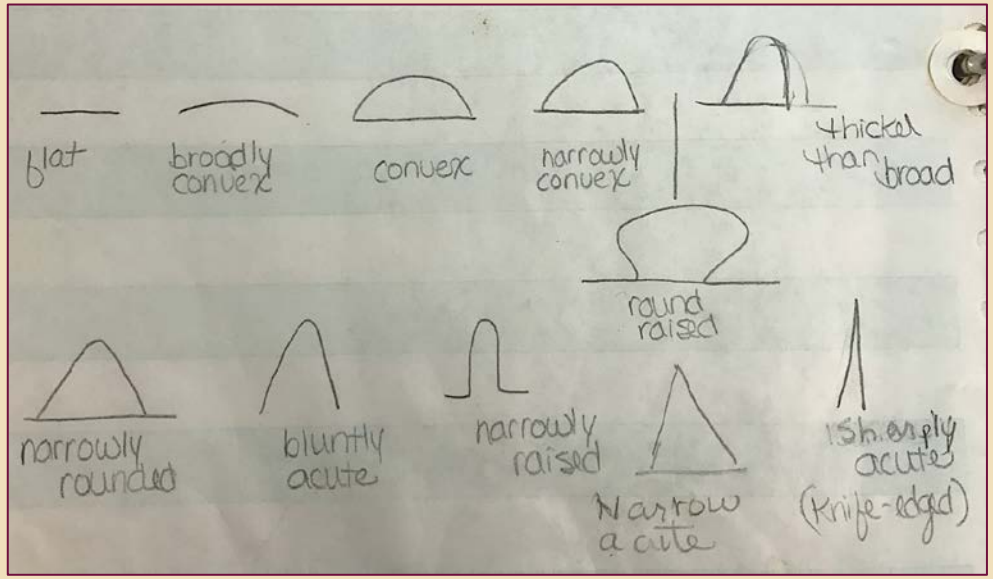


Figure 6. Venation types: A. midrib; B. primary lateral veins; C. interprimary veins D. tertiary veins; E. lesser reticulate veins; F. collective vein.

Figure 5. Venation types: A. midrib; B. primary lateral veins; C. interprimary veins; D. secondary veins; E. collective veins; F. tertiary veins; G. basal ribs; H. basal veins.



Dr. Thomas B. Croat

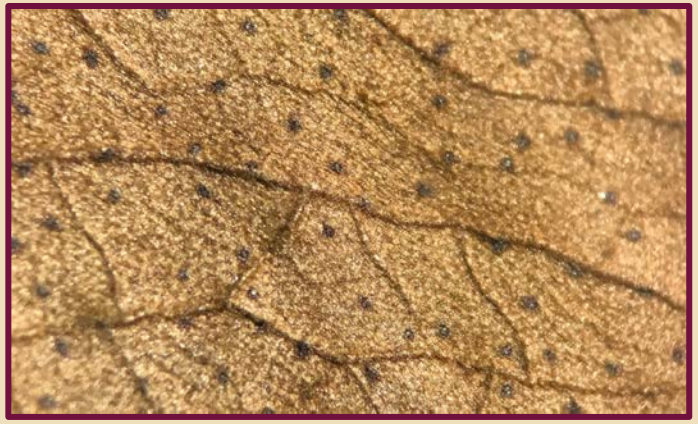
Example of a conserved morphological character within a species

Leaf Blade surface

Granular

Brown-Speckled

Short Pale-Lineate



Dark-Punctate

Pustular

Example of a conserved morphological character within a species

Spadix Attachment

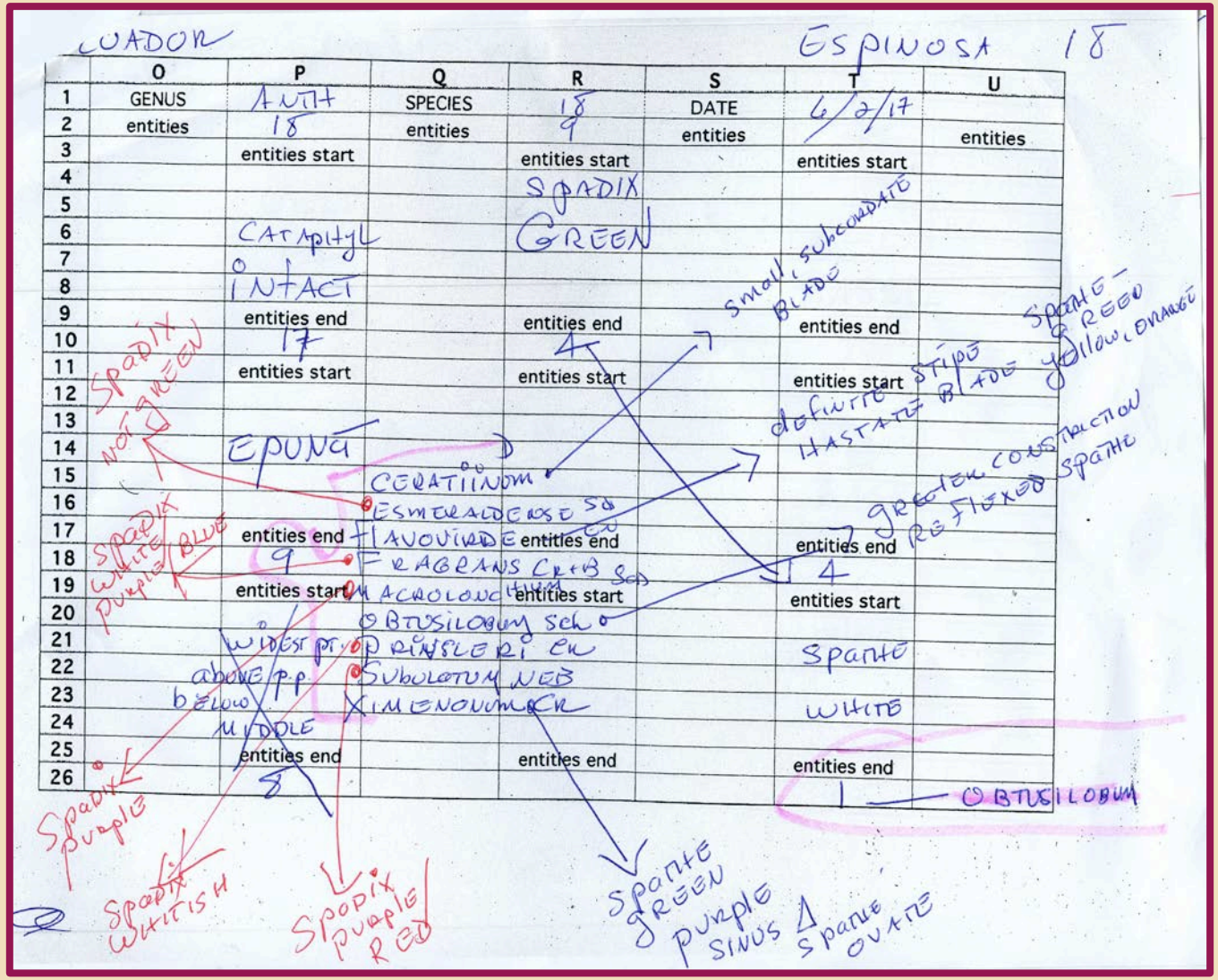
Sessile

Stipitate

Long-Stipitate

- Compare species with known species

Anthurium Lucid Key



- Multicotymous
- Assures that a given species is not already described
- Narrowed down to 5–10 species based on section
- Denote similarities and differences

Anthurium placerense Croat, **sp. nov.** Type: ECUADOR. Esmeraldas: Reserva Ecológica Cotocachi-Cayapas, Río Negro, El Placer, 00°51'N, 78°33'W, 700 m, 01 May 1998, *P. Espinosa 18* (Holotype, QCNE)

Terrestrial; **internodes** short, 1 cm diam.; **cataphylls** 15 cm, persisting intact, slender, drying densely short pale-lineate, granular, dark brown; **petioles** 34 cm long, 4 mm diam., subterete, granular; **geniculum** 1.5 cm long, 4 mm diam., drying darker than petiole; **blades** narrowly ovate, 32 cm long, 19.5 cm wide, 1.6 times longer than broad, broadest at point of petiole attachment, narrowly long-acuminate at apex (acumin 2.5 cm long), prominently lobed at base, cordate-sagittate, subcoriaceous, dark green above, drying moderately dark brown, semiglossy above, yellowish-brown and glossy below; **upper surface** densely granular. regularly, densely and conspicuously elongated short pale-lineate (these orientated in the same direction and parallel with the major veins); **lower surface** dark punctate, brownish speckled, obscurely granular, moderately inconspicuously short pale-lineate (these unusually elongate on upper surface); **anterior lobe** 25.3 cm long, convex; **posterior lobes** 9.8–10 cm long, 8 cm wide midway, rounded at apex, directed downward and weakly outward; **sinus** parabolic, 6.7 cm deep, 4.5 cm wide; **midrib** drying raised, concolorous, narrowly acute, concolorous above, narrowly rounded below; **primary lateral veins** 5–7 pairs, departing at a 55–60° angle, broadly convex, concolorous above, bluntly acute and darker below; **collective veins** arising from the 5th pair of basal veins, slightly loop-connected, 2–5 mm from margin; **basal veins** 5(6) pairs, 1st two pairs free to base, 3rd, 4th, and 5th pair fused to ca. 1.5 cm, concolorous; **posterior rib** short, naked, fused ca. 1.5–2 cm long. INFLORESCENCE erect, short-pedunculate; **peduncle** 7.7 cm long, 3 mm diam.; **spathe** white, 7.8 cm long, 2.3 cm wide, erect, thinly coriaceous, prominently aristate (arisa 2.1 cm long, 0.5 mm wide), drying dark reddish brown; **spadix** cylindroid, green, 4 cm long, 7 mm diam., drying dark reddish brown; **flowers** 6 visible per spiral, 1.6–2.0 mm long, 2.0–2.2 mm wide; **tepals** densely pustular, lateral tepals 0.8 mm wide, inner margin broadly round, sometimes bluntly pointed midway and with the lateral margins acutely pointed, outer margin triangular, 2-sided.

Species description

- Species name
- Type data (collection details)
- Morphological descriptions (taxonomic treatment)
- Life zone information
- Diagnoses (most distinguishable characters)
- Discussion of comparable species
- Exsiccatae

- Generated a dichotomous key for future studies

1a. Leaf blades conspicuously medium to dark-punctate.

2a. Collective veins arising from one of the primary lateral veins or from the first or second pair of basal veins.

3a. Blades drying grayish green to greenish, not brown; basal veins prominently coalesced, the posterior rib well developed, to 10 cm long.

4a. Collective veins arising from 1st–2nd pair of primary lateral veins ……..….*A. rosmalenii* Croat

4b. Collective veins arising from 1st–2nd pair of basal veins ……..….*A. aulestiorum* Croat

3b. Blades drying mostly brown, yellowish brown to red brown; basal veins mostly free to the base, the posterior ribs absent or very short; collective veins arising from the 1st or 2nd pair of basal veins.

5a. Short pale-lineate on either side, even minutely or sparsely.

6a. Petiole length more than 75 cm……..….*A.* sp. #1

6b. Petiole length greater than 75 cm …….*A. bellajunglense* Croat

5b. Not short pale-lineate, may be pustular or granular.

7a. Blade 1.4–1.7 times longer than broad ……..……*A. nigropunctatum* Croat & Rodríguez

7b. Blade >2 times longer than broad…….....*A.* sp. #2

2b. Collective veins arising from the base or from one of the uppermost basal veins. Basal veins prominently fused into a posterior rib.

8a. Blades drying yellow-green to gray-green……..…..*A. pallescens* Croat

8b. Blades drying brown to dark-brown or gray-brown

9a. Leaf blades with posterior ribs less than 4.5 cm long; spadix less than 12 cm long; 17.5 km NW of Lita bridge, 803 m……..*A. litense* Croat

9b. Leaf blades with the posterior rib less than 4.5 cm long; inflorescence with spadix stubby, white, broadly cylindroid and reddish in fruit ……..……..……...*A. zulcasteorum* Croat

1b. Leaf blades not conspicuously dark-punctate or obscurely dark-punctate.

10a. Leaf blade obscurely dark-punctate

11a. Spathe cucullate oblong-elliptic, cylindriod, 19.5 cm long, rounded at apex

Results

24 species total were described in our flora and key for *Anthurium* sect. *Calomystrium* of the Lita-San Lorenzo region:

- 3 published species, found in Ecuador and Colombia
- 18 new species are fertile, given species epithet
- 3 new species are sterile, unique enough to be set aside as their own species, represented by a number

Holotype Specimens determined and scanned

Anthurium bellajunglense Croat

Anthurium dunivantianum Croat

Anthurium whitehilliae Croat

Anthurium huntingtonianum Croat

Anthurium durangoense Croat

Anthurium litense Croat

Anthurium pallidisiccum Croat

18 Species New to Science

- *A. aulestiroum* Croat
- *A. balsarenoense* Croat
- *A. bellajunglense* Croat
- *A. dunivantianum* Croat
- *A. durangoense* Croat
- *A. huntingtonianum* Croat
- *A. kennedyae* Croat
- *A. litense* Croat
- *A. lorguelpeorum* Croat
- *A. pallescens* Croat
- *A. pallidisiccum* Croat
- *A. placerense* Croat
- *A. reticultepalum* Croat
- *A. ricardoi* Croat
- *A. rosmalenii* Croat
- *A. schwerdtfegeri* Croat
- *A. whitehilliae* Croat
- *A. zulcasteorum* Croat

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Thank you!

Questions?