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.
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

Primary Lateral Veins
Collective Veins
Basal Veins
Lobes
Sinus
Midrib
Apex
Petiole

Anthurium durangoense Croat
Textbook guidance

Dr. Thomas B. Croat
Example of a conserved morphological character within a species

Leaf Blade surface

Granular

Short Pale-Lineate

Dark-Punctate

Brown-Speckled

Pustular
Example of a conserved morphological character within a species

Spadix Attachment

Sessile

Stipitate

Long-Stipitate
- Compare species with known species

**Anthurium Lucid Key**

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

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

**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., suberect, 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 (arista 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.
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. aulesiorum 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. bellajungense Croat
      5b. Not short pale-lineate, may be pustular or granular.
         7a. Blade 1.4-1.7 times longer than broad
             ......................................................... A. nigropunctatum Croat & Rodriguez
         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. zulcastorum Croat

1b. Leaf blades not conspicuously dark-punctate or obscurely dark-punctate.
   10a. Leaf blade obscurely dark-punctate
      11a. Spathe cuneate oblong-elliptic, cylindroid, 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 durangoense Croat
Anthurium litense Croat
Anthurium pallidiscum Croat
Anthurium huntingtonianum 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. pallidiscum Croat
- A. placerense Croat
- A. reticultepalam Croat
- A. ricardoi Croat
- A. rosmalenii Croat
- A. schwerdtfegeri Croat
- A. whitehilliae Croat
- A. zulcasteorum Croat
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- Dr. Monica Carlsen, coordinator
- Dr. Peter Hoch, coordinator
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Questions?