

DAVIS EXPEDITION FUND

REPORT ON EXPEDITION / PROJECT

Expedition/Project Title:	Understanding the colonization of the Chocó biogeographic region: a case study using <i>Inga</i> (Leguminosae)
Travel Dates:	June – September 2021
Location:	Colombia
Group Members:	Kelly Tatiana Bocanegra González, Jefersson David Galvis, Fernando Fernández Méndez
Aims:	<p>The project proposes to understand the history of migration and diversification of the Chocó flora through a study of the genus <i>Inga</i> (Leguminosae)</p> <p>(1) Producing a wide phylogeny of the genus <i>Inga</i> in the Chocó region</p> <p>(2) Producing a population-level analysis of key <i>Inga</i> species (<i>I. thibaudiana</i>, <i>I. chocoensis</i> and <i>I. edulis</i>)</p>
Photography consent form attached: (please refer to your award letter)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Outcome (a minimum of 500 words):

Through this fieldwork we assessed the genus *Inga* for the first time in the central area of the Chocó and in the forests of Litoral del Pacífico and Cajambre municipalities, as well as in Bahía Málaga, the National Park Urámba and in the Bajo Calima (one of the most diverse regions of the world). The last assessment of *Inga* in the Chocó biogeographic region (1997) identified 35 species. Through this project, more than 60 have been identified, and we have collected more than 17 species from the region and 1 possible new species. This is an important advance in the that will allow us to interpret migratory routes from other regions (i.e., Andes, Amazonas, Central América) and its populational dynamics. It should be noted that knowledge of the genus in nearby regions (i.e. South Pacific in Colombia, North Ecuador) is lacking due to those areas being unexplored. It is expected that these areas are rich in the genus and key in the distribution routes from the Amazon and future expeditions should be focused on these areas.

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REPORT OF THE EXPEDITION IN THE CENTRAL REGION OF COLOMBIA



Figure 1. *Inga polita* Killip. Trail in Bahía Málaga.

Methodology

Sampling sites

This field work initially proposed sampling at four sites (Bahía Málaga, Bajo Calima, Cajambre and Anchicayá) in the Central Chocó Biogeographic region, in the Valle del Cauca department in Colombia (Figure 2). Given the presence of guerrilla groups in the area due to coca crops and the absence of the army, some localities were changed as well as dates of sampling. In the end, our expedition was carried out in six localities (National Park Urámba (coast perimeter), Bahía Málaga, Bajo Calima Tropical Center, Old Bajo Calima Tropical Center, Cajambre, and García-Gómez in the municipality of Litoral de San Juan) and was extended until early September. Five of those localities are in the department of Valle del Cauca and one in the South of Chocó department (Figure 3).

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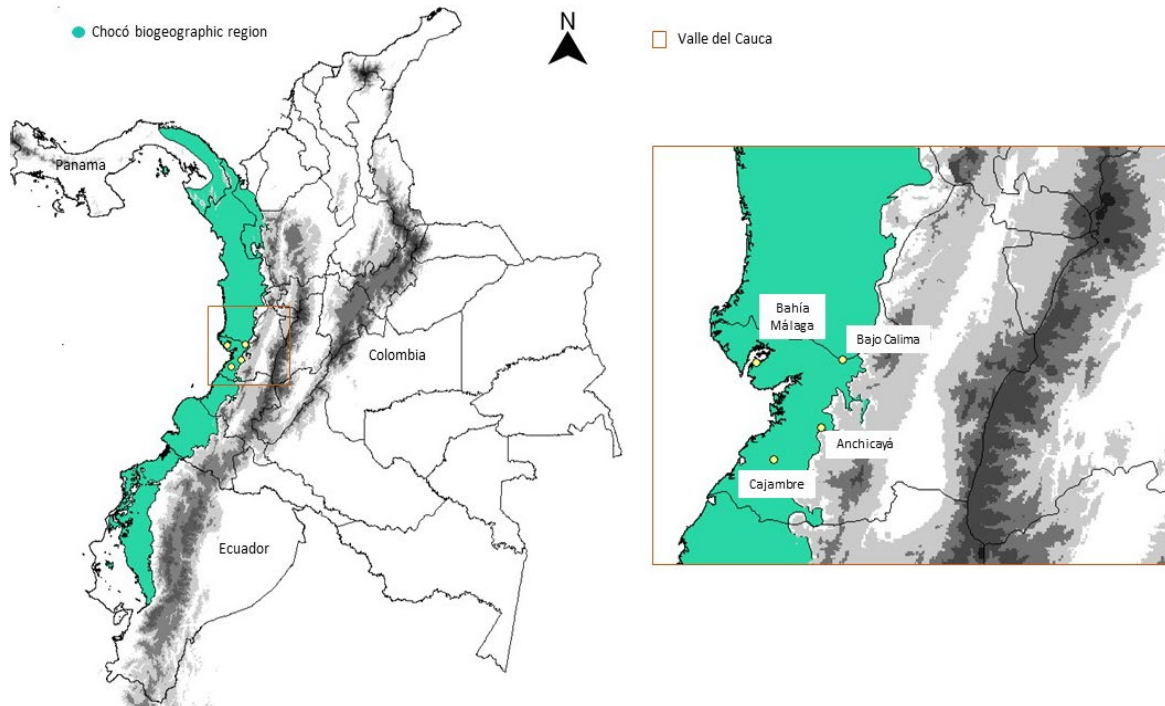


Figure 2. Initial sampling sites

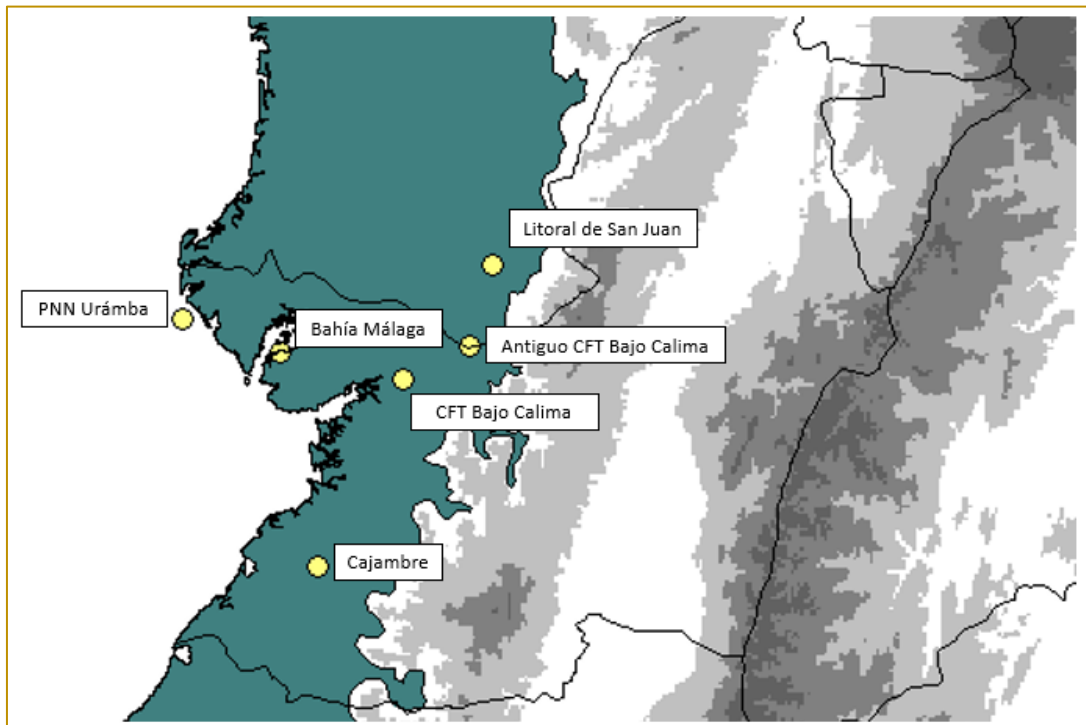


Figure 3. Sampled sites in the expedition

Sampling

The sampling took 6 to 9 days in each locality. In each one, trails were walked, and all individuals of *Inga* were registered and collected (Figure 4). At the same time,

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dasometric variables (DHB, Hight, Diameter of canopy, etc) were measured and each tree was georeferenced.

107 individuals of the genus *Inga* were registered across all localities (Table 1). 67 individuals were assigned to 17 species and 40 individuals are still without identification (Table 2). Also, 23 individuals of the species *I. chocoensis*, *I. edulis* and *I. thibaudiana* were collected for populational analysis (Table 3). Two silica gel samples were taken from all the individuals collected. One will remain in the collection of tissues of the Herbarium TOLI of the University of Tolima and others will be transported to the RBGE herbarium.



Figure 4. *Inga* individual registered (Trail in PNN Urámba)

Table 1. Individuals collected in each locality

Localities	Coordinates	Collected <i>Inga</i>
Antiguo CFT Universidad del Tolima	3.9115 -76.961587	14
Bahía Málaga/ PNN Urámba	4.0637 -77.5204	25
	3.98 -77.27	
Cajambre	3.44 -77.1745	17

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CFT Universidad del Tolima	3.9965 -76.791086	41
García Gómez	4.2007 -76.733653	10
Total		107

Table 2. *Inga* species identified to date

Identified species	N° Individuals
<i>Inga acreana</i> Harms.	1
<i>Inga auristellae</i> Harms.	3
<i>Inga capitata</i> Desv.	4
<i>Inga chocoensis</i> Killip ex T.S. Elias	4
<i>Inga cocleensis</i> Pittier.	6
<i>Inga edulis</i> Mart.	7
<i>Inga gracilior</i> Sprague.	2
<i>Inga laurina</i> (Sw.) Willd.	10
<i>Inga marginata</i> Willd.	1
<i>Inga multijuga</i> Benth.	1
<i>Inga oesterdiana</i> Benth.	1
<i>Inga pezizifera</i> Benth.	1
<i>Inga polita</i> Killip.	3
<i>Inga sertulifera</i> subsp. <i>leptopus</i> (Benth) T.D. Penn.	3
<i>Inga spectabilis</i> (Vahl) Willd.	5
<i>Inga tenuistipula</i> Ducke.	3
<i>Inga thibaudiana</i> subsp. <i>thibaudiana</i> DC.	12
Total	67

Table 3. Number of *Inga* species for populational analysis

Species	Total individuals
<i>Inga chocoensis</i> Killip ex T.S. Elias	4
<i>Inga edulis</i> Mart.	7
<i>Inga thibaudiana</i> subsp. <i>thibaudiana</i> DC.	12

Herbarium activities

The collected material was processed in the herbarium TOLI of the University of Tolima. There it was dried and montaged and was included in this collection (Figure 5, 6, 7). Also, this material was digitized for future assessments and stereoscope images were taken for most of the specimens. All silica gel material was processed as well and packaged for its transportation to RBGE in the UK.

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Once in the UK silica samples will be processed in the molecular laboratory of the RBGE for DNA extraction. Subsequently, the material will be sequenced to build the phylogeny of the genus.



Figure 5. Drying *Inga* collection in the herbarium TOLI



Figure 6. Assembly of *Inga* collections in the herbarium TOLI

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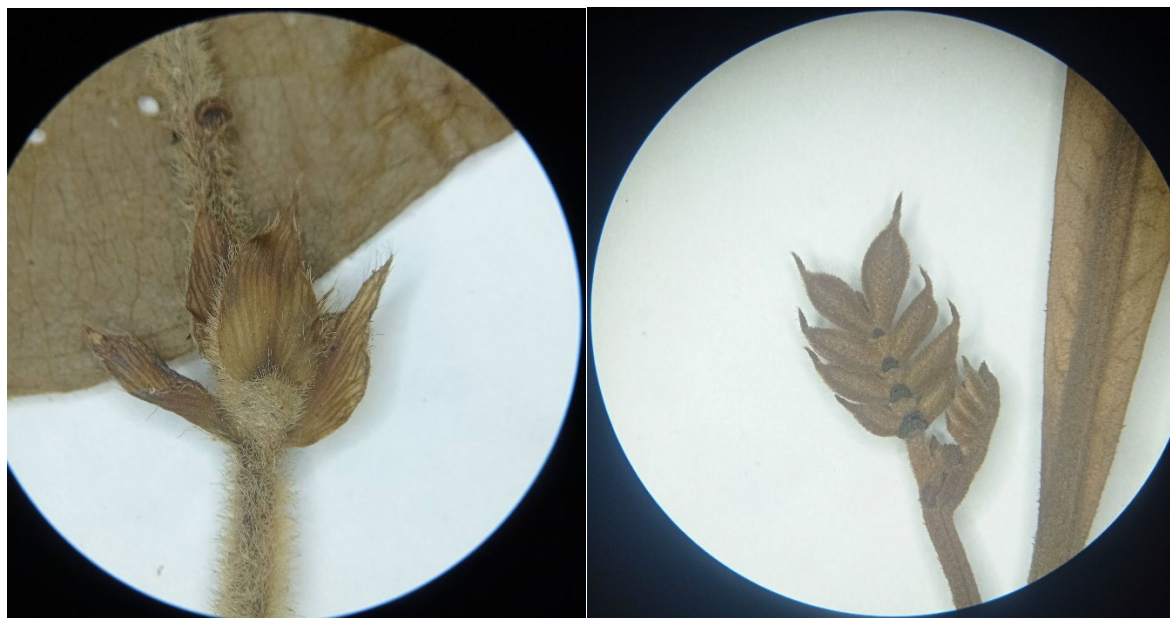


Figure 7. *Inga* collection stereoscope record

A possible new species

The individuals IG-BC-25; IG-BC-59 were collected in the locality of Bajo Calima and correspond to the same species. Although, in the identification process have been participated the Dr. Terrance Pennington, Dr. Kyle Dexter (experts in the genus *Inga*) we are still without identified them. These specimens have common traits of species like *I. chocoensis* and *I. goldmanii* but with marked differences (Figure 8). Hopefully, molecular analysis will clarify the identity of this species.

The montage and the herbarium record was done in the Jardín Botánico de Bogotá. This original record is being sending to herbarium of the RBGE and a copy remains in the Herbarium TOLI.

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Figure 8. A possible new species

Conclusions

- *Inga* is a very abundant genus in the selected localities, and it is necessary to expand research in nearby key areas.
- El Chocó biogeographic region could contain higher diversity in the genus than other regions such as Atlantic Forest and even the Amazon.
- *Inga thibaudiana* is the most common species in the assessed localities.
- Future expeditions should be focused on the South of the Chocó region, especially, in south Colombia (Cauca and Nariño) and North of Ecuador (Esmeraldas).