



# Two new species in *Hippotis* (Rubiaceae) from Ecuador and Peru

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# Neotropics

Large plant and ecosystem diversity.

Hot and humid year-round.

Wet and dry seasons.



# Rubiaceae - 4th largest angiosperm family

World-wide distribution, but mostly in the humid tropics

All life forms, but mostly woody shrubs and trees

4-5% of the world's plant species, and 4-5% of Neotropical plant species



## General characters of the family:

- Opposite or whorled, simple, entire leaves; interpetiolar stipules
- Inflorescence basically cymose, various forms and positions
- Calyx and corolla gamosepalous, 4-5-merous
- Stamens alternate to lobes and fused to corolla
- Ovary inferior, 2-locular
- Fruit fleshy or dry, dehiscent or indehiscent; seeds few to many





# *Hippotis* Ruiz & Pav.



- The lineolate venation and veins with fibers on the leaves are characters that only a few Rubiaceae have.
- No one knows what is the function for this, but it helps distinguish this genus and related groups, even without flowers or fruits.



# *Hippotis* Ruiz & Pav.



- The calyx is also unusual: it is completely fused in bud, then breaks open when the corolla pushes through
- Often the calyx splits along one side and looks like an aroid inflorescences, so it this form is called spathaceous
- Found in only a few genera of Rubiaceae, and a distinctive character of *Hippotis*
- This character has not been studied in *Hippotis*, our study found some variation between species in the form of opening of the spathaceous calyx

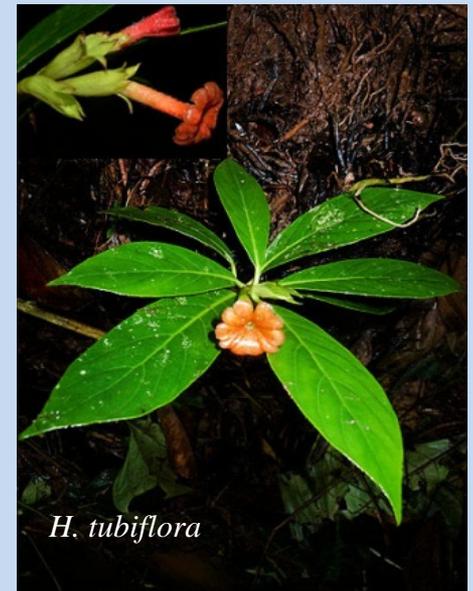
# *Hippotis* Ruiz & Pav.

- Trichomes on the abaxial surface of the leaves - their size, arrangement, density, etc. - were an important character to help separate species.
- These trichomes were used by previous authors to separate species, and this was confirmed by our study (that is, the trichomes are correlated with the flower and fruit characters).



# *Hippotis* Ruiz & Pav.

- Many species have red, tubular, rather large corollas, which represent the hummingbird pollination syndrome.
- Hummingbird pollination was suggested for *Hippotis* by other authors based on flower form, but now is confirmed for the first time in our study.
- We found a preserved hummingbird mite inside a flower of *H. triflora* Ruiz & Pav. on a herbarium specimen: these are transferred into flowers only by hummingbirds.



# *Hippotis* Ruiz & Pav.

- Other species in this genus have white funnellform corollas, which probably are not adapted for hummingbirds. This suggests that different species of *Hippotis* have different pollination syndromes.
- These *Hippotis* flowers are likely pollinated by hawkmoths (L. Lagomarsino, pers. comm.).



# Methods

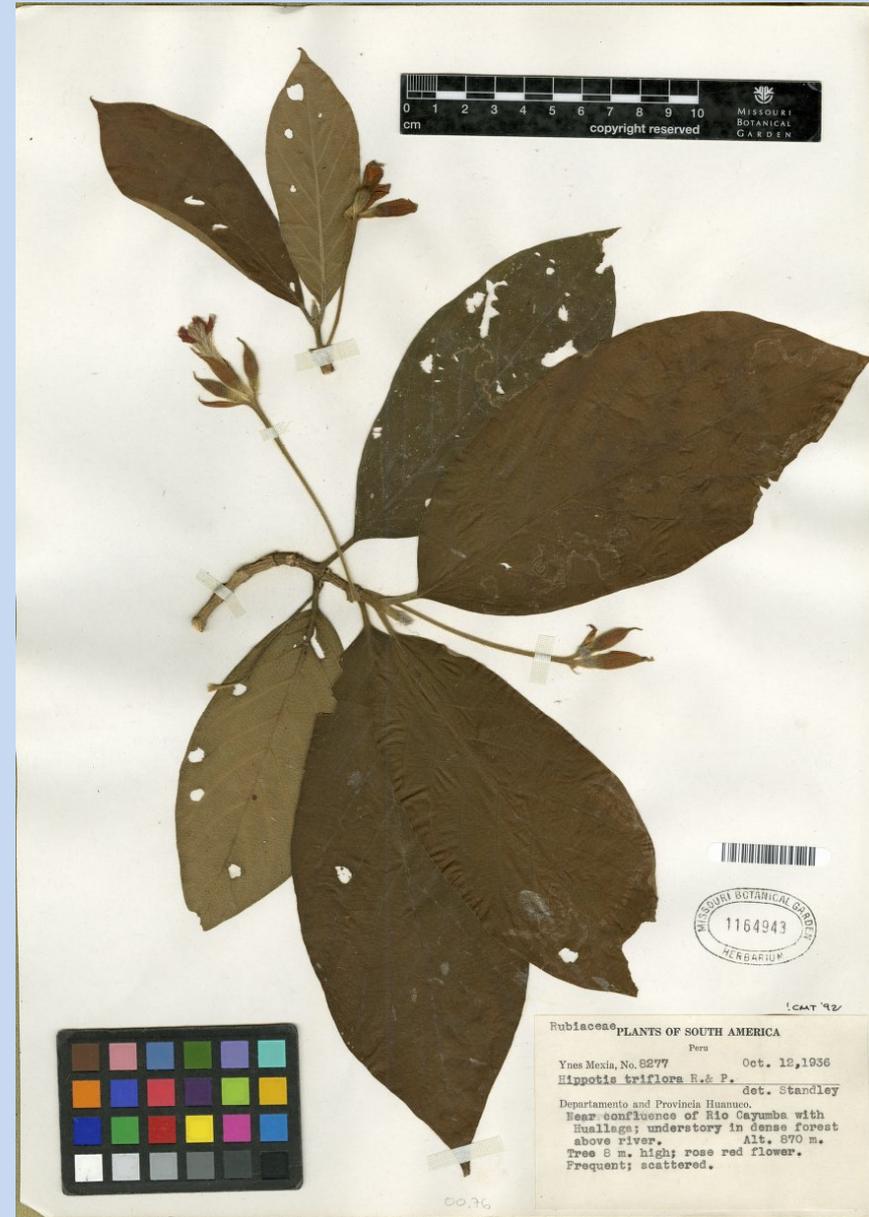
- We surveyed all the published species of *Hippotis* and compiled their characters, and studied all the specimens of this genus in the MO herbarium.
- Plants were studied as herbarium specimens, and their morphology analyzed. Species were separated based on morphological characters, and considered separate when they had two or more consistently distinct and correlated characters.
- Measurements were made on dried herbarium specimens, except dried flowers were revived by soaking with water and soap for a few minutes and then dissected.
- Published literature and type specimens were consulted to aid identifications.

# Results

- We found most known *Hippotis* species clearly distinguishable from each other, and morphologically well characterized.
- We found many *Hippotis* specimens that do not match any of the known species, and one species that was difficult to clearly separate or characterize: *Hippotis brevipes*.
- We studied 4 species in detail: *Hippotis triflora*, *H. brevipes*, and two other groups of specimens. These other specimens are similar to *H. brevipes* and *H. triflora*, and they have been identified as one of those species but do not match either of them.
- The identity of *H. triflora* is pretty clear, but in order to separate these other specimens, we had to figure out what is *H. brevipes* which was not clear.

# *Hippotis triflora* Ruiz & Pav.

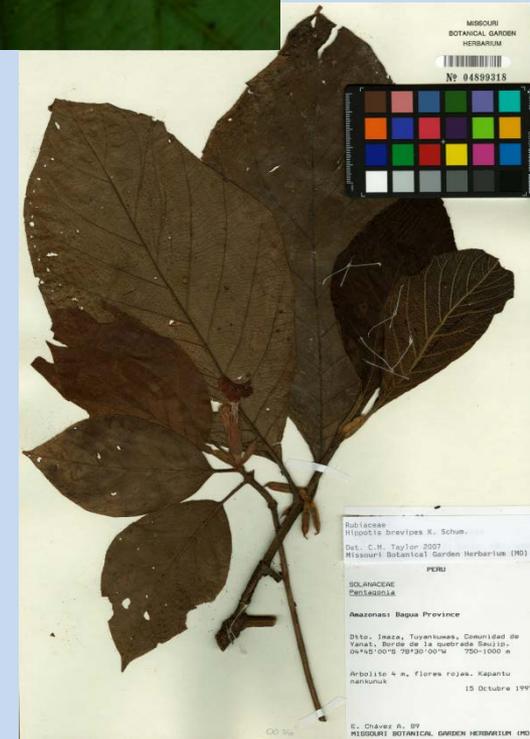
- This species grows in lowland wet forests in the western Amazon basin.
- It has been reported from both Peru and Ecuador, but we do not consider the specimens from Ecuador are the same species.



Rubiaceae PLANTS OF SOUTH AMERICA  
Peru  
Ynes Mexia, No. 8277 Oct. 12, 1936  
*Hippotis triflora* R. & P. det. Standley  
Departamento and Provincia Huancayo.  
Near confluence of Rio Cayumba with  
Huallaga; understorey in dense forest  
above river. Alt. 870 m.  
Tree 8 m. high; rose red flower.  
Frequent; scattered.

# *Hippotis brevipes* Spruce ex K. Schum.

- Conclusion: this is a morphologically variable species that is common and widely distributed at 200-1500 m in the western Amazon basin from Ecuador to central Peru.
- It varies a lot in number and length of trichomes, peduncle length, corolla size, corolla color (pale pink to bright red) and leaf size.
- All the distinctive forms are linked by numerous intermediates, so they cannot be divided into smaller groups.
- This agrees with the conclusions of Andersson & Rova, but they only studied plants from Ecuador.



# The Other Specimens

- We studied both of the groups of specimens that we separated because they looked unusual, and compiled their characters.
- We knew these groups of specimens did not match *Hippotis triflora*. Then when *H. brevipes* was identified, these two groups of specimens clearly did not match that species either.
- We re-checked them, and confirmed that these *Hippotis* specimens do not match any of the known species so they are new to science.
- We also confirmed that the two groups are different from each other.
- We analyzed their morphology in more detail, wrote complete descriptions of each of these, and created new scientific names for them.

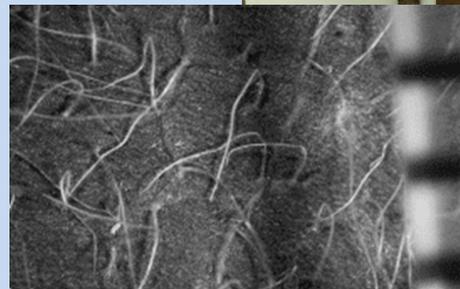
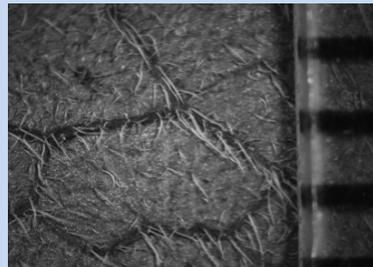
# *Hippotis hirsutissima* M. Calderón, sp. nov.

- Collected in wet forest in the western Amazon basin in San Martín Department, Peru at 350-650 m elevation
- Differs from *H. brevipes* and *H. triflora* by:
- Unlobed large calyx
- Longer trichomes (0.4-- 2.4 mm) on abaxial side of leaves
- The name refers to the long hirsute trichomes on the leaves and flowers, which are very different from these other species



*H. brevipes*

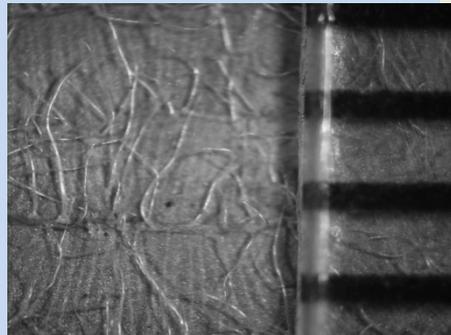
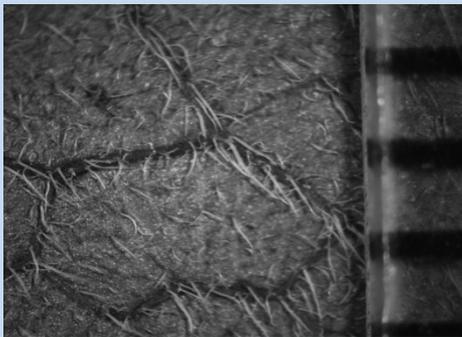
*H. triflora*



# *Hippotis brevistipula* M. Calderón, sp. nov.

- Collected in wet forest the western Amazon basin in central-northern Ecuador, at 900-1800m.
- Differs from *H. triflora* by:
- Shorter stipules (shortest in *Hippotis*)
- Longer trichomes (1.4--3.2 mm) on abaxial side of leaves
- Internally glabrous flowers.
- The name refers to the short stipules.

*H. triflora*



# Future work

- Publication of this work.
- Description of additional species in the genus that were found in this review.

# Acknowledgments

- NSF grant (DBI-1559962)
- Charlotte M. Taylor
- Wendy Applequist, Monica Carlsen and Peter Hoch for managing this grant program
- Laura Lagomarsino for helpful advice
- Mike Blomberg for help with the images

Questions?

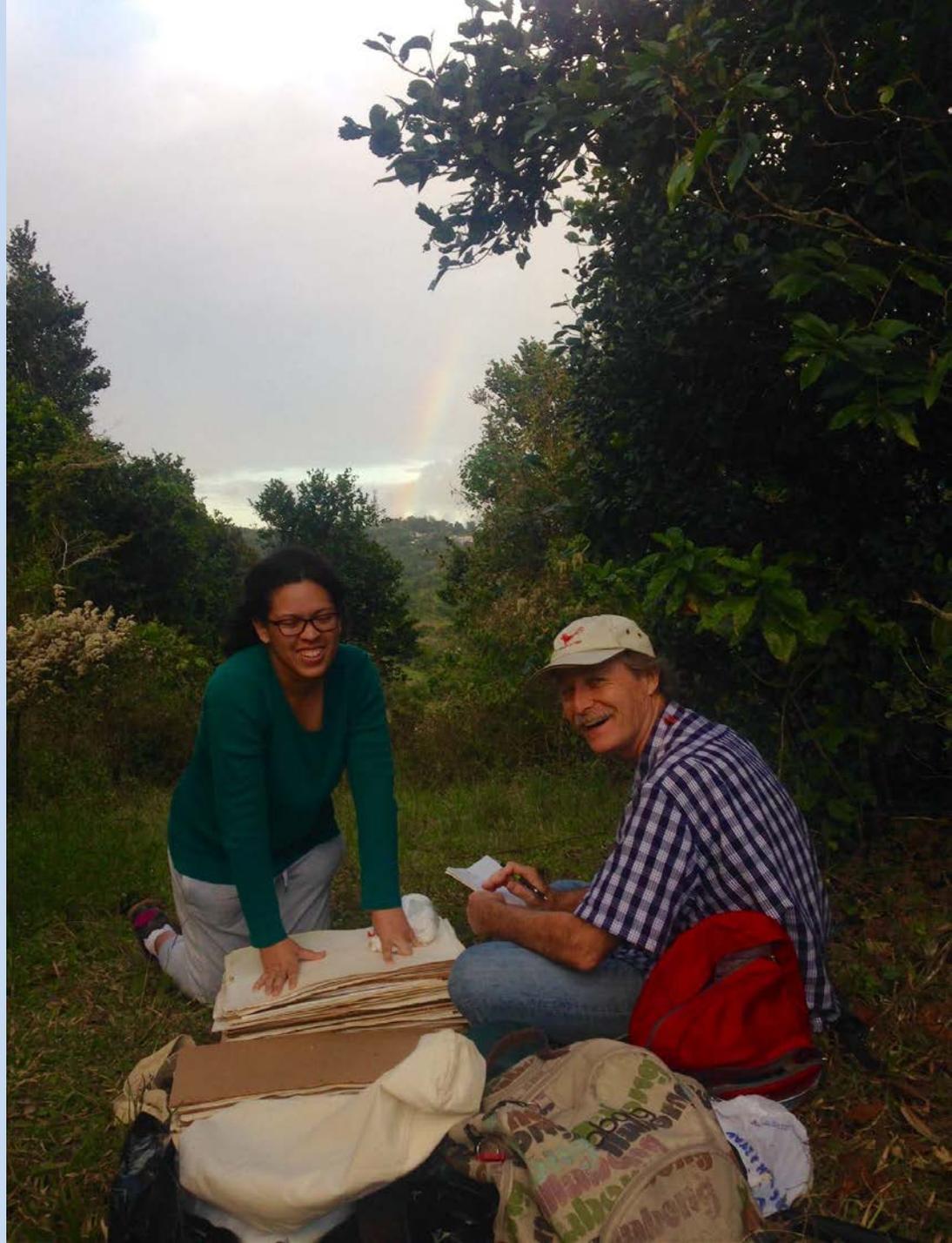


Photo credit: Montana Atwater