Passiflora

ONLINE JOURNAL

ISSUE NO. 6 | JUNE 2015

sub sole sub umbra virens

THIS MONTH'S ISSUE ***Passiflora*** **cross-pollination. Bogotá Botanical Gardens. Peru native species loss.** ***Tacsonia*** **propagation.** ***Passiflora*** **'Scorpius' and more.**

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ISSUE 6 JUNE 2015 ISSN 2046-8180

Front Cover: *Passiflora* 'Byte' by Dr Roland Fischer 2012 © Myles Irvine

Inside Cover: *Passiflora* 'Panda' by Dr Roland Fischer 2012 © Myles Irvine

Back Cover: *Passiflora* 'Clear Sky' Dr Roland Fischer 2012 © Myles Irvine

We invite submissions from all *Passiflora* enthusiasts, from cartoons, garden tales, recipes and growing tips to articles about new species and hybrids and reports of wild collecting trips. Please contact the editor as above. Articles in any language are welcome but will be translated and published in English only for reasons of space.

We reserve the right to edit or refuse articles and ask contributors to note that we may be able to offer scientific peer review depending on the topic. Please note that contributors are not paid. Letters to the editor for publication are also welcome.

Note that new species should first be submitted to the appropriate scientific botanical journals so that the validity of the name is established, after which time we may carry an article about them. If you wish to formally register a hybrid, which is optional, you should apply to the Passiflora Cultivar Registrar who, if your application is accepted, will publish your hybrid in the Passiflora Society International Journal & Newsletter.

Publisher's name: Myles S. Irvine
Publisher's address:
18 Hampton Court Parade
East Molesey
Surrey
KT8 9HB
United Kingdom

Contents Issue 6

How to propagate *Tacsonia* species via air layering using sphagnum moss.

By Hikoku Nakagawa

Passiflora manicata © 2007 Anne Norman

Preparation ingredients

- NAA (Naphthylacetamide) based rooting solution
- Sphagnum moss
- Vinyl or hemp wire
- Knife or scissors
- Water
- Aluminium foil

Dissolve NAA-based rooting solution in water completely to create a 1000-1500 ppm solution of NAA. Alternatively, follow NAA's documentation on how to prepare rooting solutions. Saturate the sphagnum moss.

Find the best location on the host plant for the moss roll. A hard or semi-wooden stem is the best candidate.

Wrap the NAA-saturated sphagnum moss around the stem and secure with wire.

To prevent excessive moisture evaporation and respiration by the new roots, wrap with aluminum foil.

Rooting can usually be observed within six weeks. Gently cut the rooted stem from the host and plant in free-draining and moisture-retaining substrates such as a mix of perlite and peat-based soil. Place in a shaded area to gradually acclimatise. The following *Tacsonia* species have been successfully rooted using this technique.

- *P. manicata*
- *P. tripartita var. mollissima*
- *P. mathewsii*
- *P. parritae*
- *P. cumbalensis*
- *P. mixta*
- *P. antioquiensis*

It is quite possible that other less common *Tacsonia* species may be propagated with this technique, but they are difficult to find in Japan.

Passiflora cross-pollination

A photo essay by Emma Cattell & Myles Irvine

P. 'Silly Cow' © Myles Irvine

1. Ready to start.
Materials required:-
Two different *Passiflora* plants in flower.
Scissors.
Forceps.
Small paper price labels.
Staedtler Lumocolour permanent black medium marker pen.
Wedding favour organza bags 10cm x 15cm
A nice cup of tea.

2. Bud ready to open.

3. Slipping an organza bag over the bud to prevent the bees from pollinating it.

4. Taking fresh pollen from the donor flower.

5. Applying pollen with forceps to the stigmas of the recipient flower after removing the bag. It is replaced immediately after. Record both parents with a permanent marker pen on the paper price label.

6. It may be easier to cross-fertilise flowers if the pollen is applied before the flower opens.

7. Cutting off the tips of the petals and sepals to reveal the stigmas.

8. Applying pollen from the donor flower.

9. Plenty of pollen safely applied.

10. Record both parents with a permanent marker pen.

11. Immediately bag the flower.

12. Success! At this stage, remove the tag and transfer the parent information onto the fruit itself.

13. Fresh pollen can be stored. Air dry on paper in a sunny window for two days .

Passiflora 'Scorpius': a new hardy hybrid

by L.A. King

Passiflora 'Lunametista' (*P. caerulea* 'Constance Eliott' (♀) × *P. loefgrenii* 'Iporanga' (♂); **Figure 1**) was created by Maurizio Vecchia; it first flowered in 2005.

In 2009, I crossed *P.* 'Lunametista' with *P. caerulea*. Unusually, the pollen of *P.* 'Lunametista' proved to be fertile, and I was able to create viable offspring from both crossing directions. However, it was not until late summer 2012 that the hybrid *P.* 'Lunametista' × *P. caerulea* produced its first flowers. It has been named as *P.* 'Scorpius' (**Figure 2**). Meanwhile, the reciprocal cross (*P. caerulea* × *P.* 'Lunametista') has yet to flower.

There are now many hybrids based on crosses between *P. caerulea* and either of the two forms of *P. loefgrenii* (see Table 1). I have grown *P.* 'Lunametista', *P.* 'Lambiekins' and *P.* 'Betty Myles Young' for several years, but none has proven hardy enough to survive winters outside at my location. My objective in creating yet another hybrid with this parentage was therefore to produce a tougher plant.

14. Put in a labelled airtight container with silica gel desiccant. Keep in the fridge until needed. Allow to warm up before use and apply with a camel hair brush.

Figure 1 *P.* 'Lunametista' © L.A.King

Since summer 2010, *P.* 'Scorpius' has been grown in soil outdoors against a South-facing house wall. It has withstood two particularly cold winters with temperatures reaching -15ºC for short periods. In this respect, *P.* 'Scorpius' has shown itself to be as durable as *P. caerulea*, and noticeably hardier than any other hybrid that I have ever grown. This hardiness is perhaps not too surprising since 75% of the genome derives from *P. caerulea*. By contrast, the other hybrids shown in **Table 1** have a smaller contribution from *P. caerulea*. What is further surprising is that the deep colouration of the petals found in *P.* 'Lunametista' and *P.* 'Betty Myles Young' (Figure 3), for example, has not been 'diluted' out in *P.* 'Scorpius'. Apart from its hardiness, at first glance, *P.* 'Scorpius' looks much like P. 'Betty Myles Young'. Fortunately, *P.* 'Scorpius' can be distinguished from *P.* 'Betty Myles Young' and most of the other hybrids by its short peduncle (See **Table 2**) and a combination of floral and other vegetative features.

Table 1 Hybrids of *P. loefgrenii* and *P. caerulea*

Hybrid	Male parent	Female parent
P. 'Betty Myles Young'	*P. loefgrenii* 'Iporanga'	*P.* 'Clear Sky'
P. 'Blue Surprise'	*P. loefgrenii* 'Iporanga'	*P. caerulea*
P. 'Connor Cailean'	*P. caerulea*	*P. loefgrenii* 'Corupa'
P. 'Lambiekins'	*P. loefgrenii* 'Iporanga'	*P.* 'Emil Kugler'
P. 'Lunametista'	*P. loefgrenii* 'Iporanga'	*P. caerulea* 'Constance Eliott'
P. 'Scorpius'	*P. caerulea*	*P.* 'Lunametista'

Note: In addition, *P.* 'Purple Pendulum' is also believed to be a hybrid of *P. loefgrenii* and *P. caerulea*, but the form of *P. loefgrenii* used and the crossing direction have not been published

Table 2 Relationship between mean peduncle length of certain hybrids of *P. loefgrenii* and *P. caerulea* and the proportion of *P. caerulea* in the genome.

Hybrid	Peduncle length	% *P. caerulea*
P. loefgrenii	18	0
P. 'Blue Surprise'	10	50
P. 'Connor Cailean'	13	50
P. 'Lambiekins'	10	50
P. 'Lunametista'	18	50
P. 'Betty Myles Young'	16	58
P. 'Scorpius'	9	75
P. caerulea	4	100

Figure 2 *P.* 'Scorpius' © L.A.King

Figure 3 *P.* 'Betty Myles Young' © L.A.King

The José Celestino Mutis Botanical Garden in Bogotá

By Hernan Dario Bernal.

José Celestino Mutis
by R. Cristobal

The José Celestino Mutis Botanical Garden in Bogotá is a peaceful place. Tucked away from the bustle of the city, it is an excellent place to spend a day or just an afternoon taking advantage of the fresh air and birdsongs while exploring a collection of more than 18 thousand living plant specimens. The plants are both native and exotic, common and rare; some to the point of being in danger of extinction. It is the largest botanical garden in Colombia with a total area of 20 hectares. Located in the Bogotá savannah, at an altitude of 2600 meters, it is part of a complex of green areas within the city that also includes the Simón Bolivar and El Salitre parks.

Fig.1 *Statue of José Celestino Mutis at the entrance of the Bogotá Botanical Garden.*

Pioneers in America

The Bogotá Botanical Garden is named after the 18th century Spanish priest José Celestino Mutis, one of the first persons to systematically study the natural wonders of the Americas. In 1783 Mutis started collecting plant and animal specimens in the municipality of Mariquita, in the department of Tolima, sponsored by the Spanish crown. It was also from that location that one of the most ambitious scientific expeditions of the time was launched – the Royal Botanical Expedition. For 33 years, Mutis and his co-workers catalogued more than 20 thousand plants and 7 thousand animals and founded Colombia's first botanical garden. Mutis and his skilled team of naturalists and artists left us with hundreds of wonderful prints of catalogued species as well as detailed descriptions of the collected items and type specimens. Some of these species have not been collected since or have been rediscovered only recently.

Fig. 2 *Passiflora azeroana, named after the painter Lino José de Azero. This print was used as type specimen for the species. This species was rediscovered in the 1950s and collected again in the 1990s, near Bogotá.*

The symbol of the botanical garden is the flower of *Mutisia clematis*. First described by Linnaeus, and named in honor of Mutis, the plant is noteworthy in that it belongs to the only genus of the *Compositae* family that includes climbers. Today more than 50 species are described in the genus *Mutisia*.

Fig. 3 *A panel at the entrance of the garden depicting Mutisia clematis, the symbol of the Botanical Garden.*

Fig.4 *Mutisia clematis growing over a trellis in the garden.*

Despite the massive body of work by Mutis and his successors, it was not until 1955 that the Bogotá Botanical Garden was funded, through the joint work of Enrique Pérez Arbeláez, a priest, and Señora Teresa Arango de Bueno. Together they collected and organized a garden with native plants from Colombia. This seminal work later resulted in the book "Plantas Útiles de Colombia", for which Prof. Arbeláez gained national and international prominence. After his death the garden followed his original design for some time. Later, other personalities, scientists, and professional members of Colombian society formed a community that has helped the garden evolve to its present state.

A Walk Through the Garden

Depending on the season, it is possible to participate in many of the programs offered by the garden besides taking a walk to observe its many attractions. Among these organized events, there is the butterfly house, which is open to the public in January, visits at dawn to watch native and migratory birds that make a stop in the garden, and Eco-Yoga sessions that take place every Sunday.

Fig. 5 *Exposition of hummingbird sculptures in the rose garden; an event organized in cooperation with the Botanical Garden of Quito, Ecuador.*

During the week, groups of students of all levels learn about the plants and ecosystems in Colombia thanks to guided tours provided by the specialized staff of the garden. On weekends it is not uncommon to see visitors from abroad, who have travelled to marvel at the unique plants of Colombia and to visit the replicas of various Colombian ecosystems.

The garden maintains several biological collections; one of which is the palm collection with many species represented. Perhaps the most interesting, the Wax Palm of Quindío (*Ceroxylon quidiuense*), is the largest monocotyledon plant in the world and the national tree of Colombia.

Fig.6 P*athway to the conservatories surrounded by Wax Palm of Quindío (Ceroxylon quindiuense); the national tree of Colombia.*

Another important collection is that of orchids, many of which are reproduced in vitro in the laboratories of the botanical garden and can be seen inside the complex of conservatories open to the public.

Fig. 7 *Inside the orchid conservatory the beautiful "Flor de Mayo" (Cattleya trianae) stands unmatched. It is the national flower of Colombia.*

Both inside and outside the conservatories the garden contains detailed replicas of several Colombian ecosystems. Perhaps the most attractive of the conservatories is that of the tropical rain forest featuring a lake crowned with young *Victoria amazonica* water plants and populated by turtles and the occasional iguana; some of the many animals in the garden. The lake is surrounded by a narrow path almost overgrown with lush vegetation from the Colombian lowlands.

Fig. 8 *Inside the tropical rainforest conservatory.*

Outside the conservatories, one can enjoy the songs of the diverse wild birds that both inhabit and visit the gardens almost as it would have been when the Spanish trekked stone paths constructed through the cloud forests. One can also encounter scattered replicas of indigenous dwellings throughout the garden's installations.

Fig. 9 *A replica of a royal pathway (built by the Spanish as an early system of routes) inside a cloud forest environment.*

Fig. 10 *Passiflora tarminiana growing over a Maloka*.*

Fig. 11 *Passiflora bogotensis growing next to a Maloka.*

Passiflora in the Botanical Garden

As expected, the garden contains many species of *Passiflora*. It would be a shame if this was not the case as José Celestino Mutis, to whom the garden is dedicated, was enamored with the beauty of the genus and himself described several species such as *Passiflora parritae*, *Passiflora lehmannii*, *Passiflora azeroana* and *Passiflora mariquitensis*. All of these had been lost to science since the colonial period and were rediscovered only recently. During this time, they were only known from the exquisite prints produced by Mutis and his team.

Some species, originating in the Bogotá savanna, grow spontaneously inside the garden such as: *Passiflora bogotensis, Passiflora manicata, Passiflora tarminiana, Passiflora tripartita* var. *mollissima, Passiflora ligularis,* and *Passiflora edulis var edulis.* The latter four species are of commercial value both in Colombia and outside the country. The most common species of *Passiflora, Passiflora tripartita var. mollissima*, flowers and fruits all year in the gardens. It is common to find its hollow fruits on the ground, having been eaten by the birds that then disperse seeds throughout the garden.

Fig. 12 *Hollow fruit of Passiflora tripartita var. mollissima possibly eaten by birds.*

In Colombia *Passiflora tarminiana* is known as 'Curuba India', *Passiflora tripartita* var. *mollissima* as 'Curuba de Castilla' and its hybrids with *Passiflora mixta* and *Passiflora cumbalensis* simply as 'Curuba'. *Passiflora ligularis* is known as 'Granadilla' whereas *Passiflora edulis* var. *edulis* is known as 'Gulupa' or 'Curuba Morado'.

Fig.13 *Fruits of Passiflora edulis var. edulis grown in the food nurseries of the garden.*

The huge number of flowers in the garden year round attracts an enormous insect population of all kinds; amongst whom the bees and bumblebees are the major pollinating agents for flowering plants in the garden. Thanks to the labors of insects and birds one can even find fruits of other *Passiflora* species cultivated in a system of small food-garden plots. These areas are used to produce food plants for human consumption that are then used in urban agriculture programs implemented throughout Bogotá in neighborhoods with limited economic means.

Fig. 14 *Bombus sp. bee visiting flower of Passiflora ligularis.*

When the Tacsonia Go Wild

It is a well-known fact that *Tacsonia* species are difficult to cultivate and maintain in countries with more extreme climates. In some cases, it may be the soil. In others they grow weakly because of temperature and low humidity, whipped viciously by summer heat or winter cold. This makes it hard for plants grown abroad to develop the lush magnificence they achieve in their natural habitats, the high-altitude slopes of the Andes.* *

In the botanical garden, it is possible to see how magnificent *Tacsonia* can become. Colombia has more species of *Tacsonia* than any country in the world. This diversity is partially due to the local separation of the Andes into three high mountain ranges; each having produced different species. The isolation of species in distinct pockets of forest in these ranges promotes speciation over time. Bogotá, in particular, is in a privileged location for the cultivation of many *Tacsonia.* With the fertile soil of the savanna, the plants attain unimaginable sizes and have long life spans.

Fig. 15 *Passiflora tripartita var. mollissima growing over, and partially covering, the pathways in the cloud forest.*

The *Passiflora tripartita var. mollissima* depicted in Figure 15 is growing over trees more than 10 meters high in the region of the garden dedicated to the cloud forest. Apparently the plant is more than 30 years old; a fact that is attested by the huge stem base hidden in the forest shade. Several other *Tacsonia* species, some very rare, like *Passiflora parritae* and *Passiflora luzmarina,* have found a place in the garden to demonstrate their full splendour.

Fig. 16 *The main stem of the giant specimen of Passiflora tripartita var. mollissima.*

Fig. 17 *The last flowers of a massive display by Passiflora luzmarina.*

Fig. 18 *The many intertwined stems at the basis of a Passiflora luzmarina.*

For the delight of many, and thanks to Prof. Gustavo Morales, the garden also has two mature specimens of *Passiflora parritae*. Unfortunately, only one of the plants produces flowers; the other only beautiful and lush foliage so far.

Fig. 19 *A specimen of Passiflora parritae with massive foliar development.*

Fig. 20 *The lush development of the foliage in the Passiflora parritae is possibly due to a richness of nitrogen in the soil.*

Epilogue

The José Celestino Mutis Botanical Garden provides numerous services to the city of Bogotá, e.g. the programs for urban agriculture and forestation and also a space for the education and entertainment of the population. Further it fulfills an important scientific role for Colombia by cultivating, preserving, and documenting thousands of native plants; many of which are rare and in danger of extinction.

Editor's notes

*A Maloka is an indigenous design of house in Colombia and parts of Peru with the roof made of palm leaves or similar.

** *Tacsonia* can be very difficult to grow outside their native habitat, as most will suddenly die below -5° C and they also struggle in high temperatures with low humidity. In the wild, many grow in the "Páramos" between 1700-3000m in humid to semi-humid upper montane forest and forest edges. "Páramos" are zones of elevation found in the Andes of Colombia, Ecuador, Northern Peru & Venezuela. They have a very difficult and variable, though not extreme, climate; often ranging in one day from wet, cold, and windy to sunny and warm. *Tacsonia* therefore have root systems that are inadequate for coping with more extreme conditions which can rapidly cause them to wilt and die.

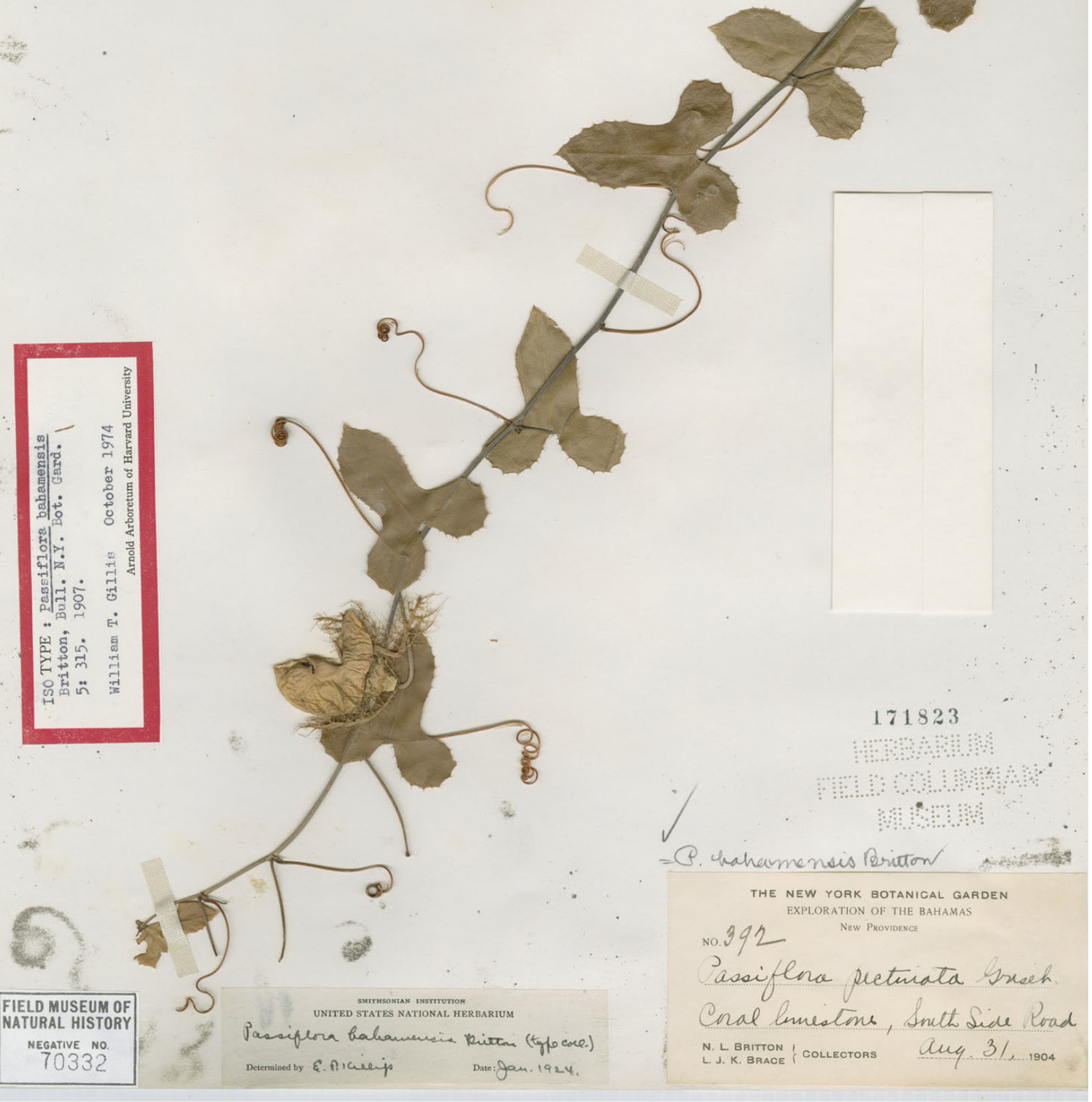
Some of the above information on the Páramos from Handbook of the Birds of the World vol.5, ed. by Hoyo, Elliott, and Sargatal, 1999.

Passiflora bogotensis images © Myles S Irvine

Untangling the Systematics of *Dysosmia*

by: Harlan T. Svoboda Ph.D. student Ohio University, USA

Passiflora foetida* var. unknown. Salem, India © *Venkat Venkataraju



Isotype of *P. bahamensis*. Photo courtesy of the Field Museum

Systematics plays a vital role in understanding the diversity and evolutionary history of all living things on our planet. Plant systematists, in particular, are tasked with inventorying approximately 422,000 plant species. As part of our attempts to catalog new and existing plants, we utilize taxonomy (the science of naming organisms) and a suite of techniques that help us determine how all of these plants are related to each other.

My research focuses on the systematics of section *Dysosmia* DC. which is currently in supersection *Stipulata* Feuillet & J. M. MacDougal in subgenus *Passiflora* (FEUILLET & MACDOUGAL, 2004). The name "*Dysosmia*" first appeared as a Section in *Passiflora* named by Augustin Pyramus de Candolle (1822). Since then, it has been revised nearly ten times by different botanists who each had different ideas on how to handle this unusual group of passionflowers. At one point *Dysosmia* was even considered its own genus by Max Roemer (1846)! Other notable treatments of the group also include Maxwell Masters' work (1872) and Ellsworth Paine Killip's monograph of the family in North America (KILLIP, 1938). The most recent revision of *Dysosmia*, which includes 21 species and a handful of varieties, came from John Vanderplank

An involucral bract of *P. campanulata*.

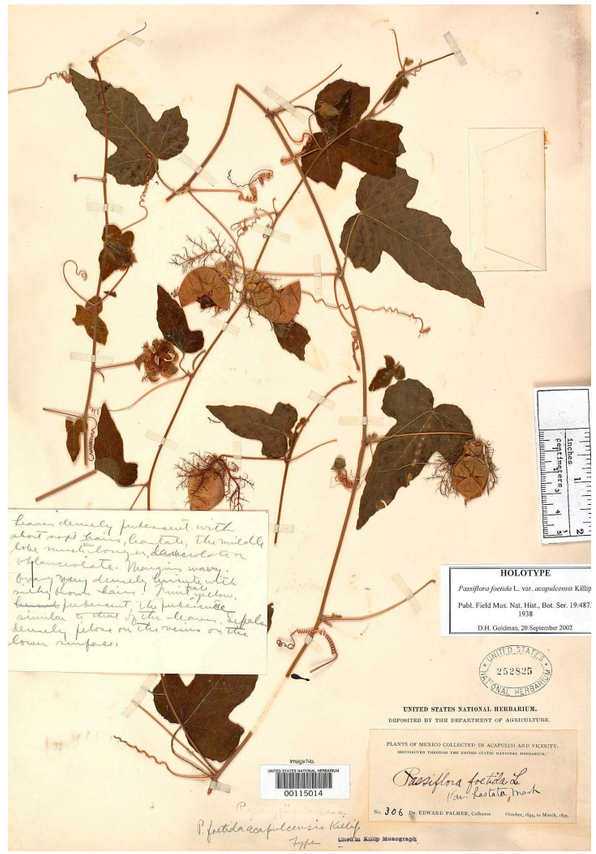
(2013) who has provided the most comprehensive look at this specific group to date.

Many of the *Dysosmia* species tend to be relatively distinctive in flower and/or leaf morphology. However, much of the confusion in understanding this group of plants—and why so many botanists have struggled to place it in the genus—comes from the species *Passiflora foetida* L. In fact, it is not really a clear "species" at all but rather what we call a "species complex." There have been nearly 50 named varieties that have fallen under "*P. foetida*" over the decades, many of which were Killip's doing. *Passiflora ciliata* Aiton is another example of a species complex that wreaks havoc on the taxonomy of this group. To summarize what nearly every botanist familiar with *Dysosmia* has said: *P. foetida* is an enormous mess! As many *Passiflora* breeders already know, *P. foetida* very readily hybridizes amongst the varieties as well as with other species. This is a nightmare when it comes to elucidating what should be considered its own species, what should be a variety (or subspecies), and what should be considered "normal" variation within a species.

All previous botanists dealing with *Dysosmia* have relied almost solely on morphological differences to separate out species (or varieties) and provided very little, often cursory, guesses as to what the relationships might be between all of the plants. This is where I come in! My job as a plant systematist is to try and answer these questions with scientific rigor. In my research I will be utilizing several methods in the "systematics toolbox" to tease apart these difficult plants and provide evidence for how they might be related.

Like so many others who have focused on leaf variation, I, too, will spend time collecting information from the leaves. However, I will be taking it a step further by analyzing the data with robust statistical models. These analyses will help provide a new line of evidence to determine whether various aspects of the leaf (e.g. shape, lobing, hairiness, length, etc.) are good indicators of species/varietal boundaries.

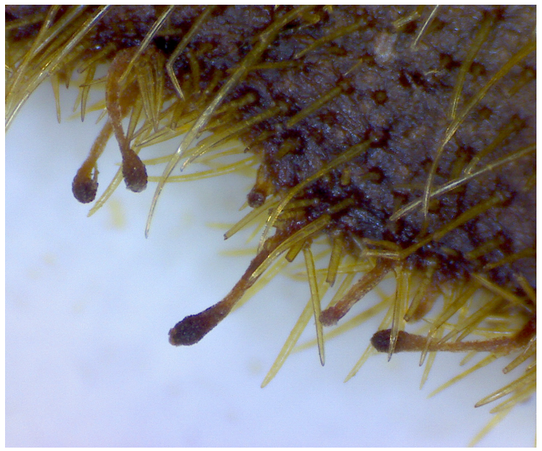
Not only will I be looking at the leaves, but also the smaller-scale features including stipules, involucral bracts, and glandular trichomes. In doing preliminary studies on these items I have already documented an immense amount of variation between the species/varieties of *Dysosmia*! For example, while the original descriptions of *P. lepidota* Mast. and *P. palmeri* Rose state that both species bear glands, they are completely different in structure. It turns out that the glands on *P. lepidota* are short, bulbous, and stalk-less whereas the glands of *P. palmeri* have a long stalk with a glandular head on top. This variation has not



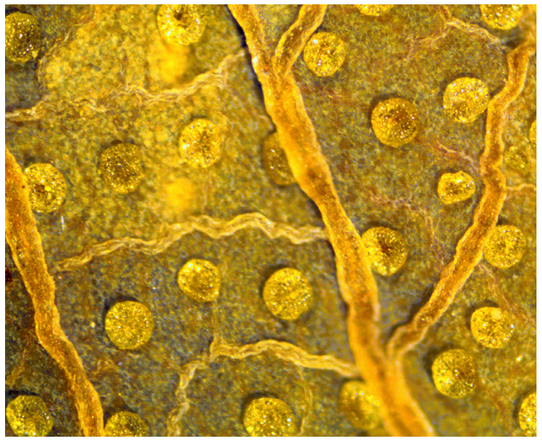
Holotype of *P. foetida* var. *acapulcensis*.
Photo courtesy of the United States National Herbarium

yet been thoroughly documented and is one of the first items on my research "to-do list."

The final, and perhaps most exciting, part of my research will be the first-ever molecular study specifically involving *Dysosmia*. DNA from every member of the group will be sequenced and analyzed to produce a phylogenetic tree, showing how all of the species/varieties are likely related to each other. Molecular data has so far only been applied to a few groups within *Passiflora*, some of which have used a specimen or two of *P. foetida*, but never with *Dysosmia* in its entirety.



Head-like (capitate) glands of a *P. clathrata* leaf.



Short, bulbous glands found on the leaves of *P. lepidota*.

Head-like (capitate) glands found on the leaves of *P. palmeri*.

A stipule of *P. foetida* var. *longipedunculata*.

With every systematic analysis that involves both morphological and molecular data, the hope is that both lines of evidence lead to the same conclusion. In other words, hopefully my hypotheses about species using just the morphological observations are also upheld by the molecular data. Being able to map specific, unique character traits (we call these "synapomorphies") to individual branches on the phylogenetic tree is ideal to help support or reject hypotheses about species relationships.

In the coming years I hope to make significant headway in this difficult group by providing an intensive and comprehensive reanalysis of *Dysosmia*. If you have any questions, comments, or advice please don't hesitate to contact me at hs923311@ohio.edu.

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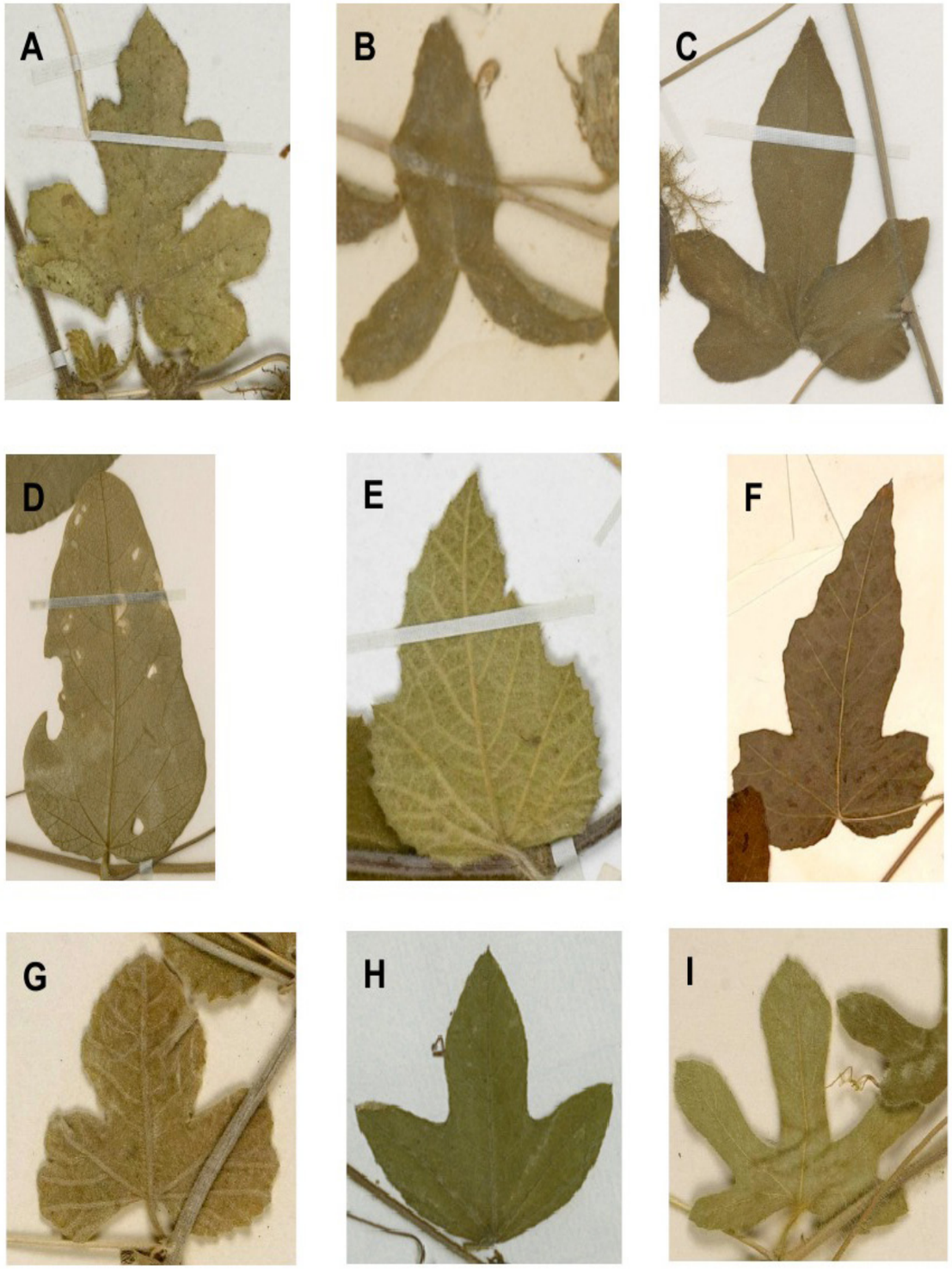
***P. foetida* var. unknown © Myles Irvine**

Species/Varieties:

P. arida (Mast. & Rose) Killip with one variety (*P. arida* var. *pentaschista* Killip), *P. arizonica* (Killip) D. H. Goldman, *P. bahamensis* Britton, *P. boticarioana* Cervi, P. *campanulata* Mast., *P. chrysophylla* Chodat, *P. ciliata* Aiton with three varieties (*P. ciliata* var. *hibiscifolia* (Lam.) Vanderplank, *P. ciliata* var. *orinocensis* (Killip) Vanderplank, and P. *ciliata* var. *santiagana* (Killip) Vanderplank), P. *clathrata* Mast., *P. foetida* L. with five varieties (*P. foetida* var. *acapulcensis* Killip, *P. foetida* var. *baraquiniana* (Lem.) Vanderplank, *P. foetida* var. *ellisonii* Vanderplank, P. *foetida* var. *nigelliflora* (Hook.) Mast., and P. *foetida* var. *oaxacana* Killip), *P. fruticosa* Killip, *P. hypoglauca* Harms, *P. lepidota* Rose, *P. palmeri* Rose, *P. pectinata* Griseb, *P. setulosa* Killip, *P. sublanceolata* (Killip) J. M. MacDougal, *P. urbaniana* Killip, *P. vellozii* Gardner, *P. vesicaria* L. with one variety (*P. vesicaria* var. *galapagensis* (Killip) Vanderplank), *P. vestita* Killip, and *P. villosa* Vell.

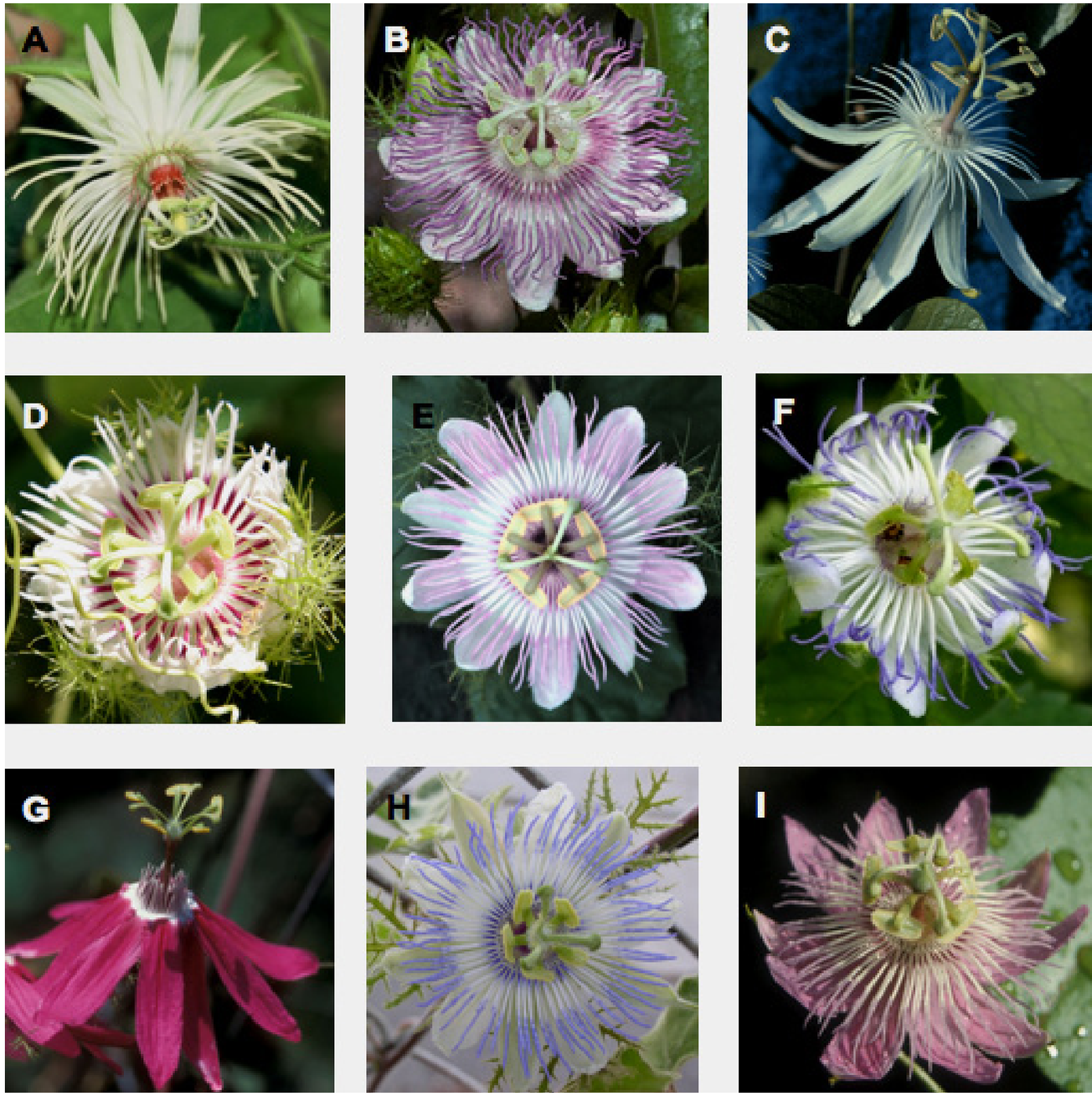
An involucral bract of *P. lepidota*

A stipule of *P. vellozii*.



A sampling of the leaf variation within sect. *Dysosmia*.

A. *P. arizonica*; B. *P. ciliata* var. *hastata*; C. *P. foetida* var. *subpalmata*; D. *P. urbaniana*; E. *P. sublanceolata*; F. *P. foetida* var. *acapulcensis*; G. *P. arida*; H. *P. campanulata*; I. *P. foetida* var. *santiagana*.



A sampling of the flower variation within sect. *Dysosmia*.

A. *P. vellozii* (photo: passiflorae.fr); B. *P. bahamensis* (photo: D. Goldman); C. *P. pectinata* (photo: J. M. MacDougal); D. *P. foetida* var. unknown (photo: R. Boender); E. *P. foetida* var. *lanuginosa*; F. *P. foetida* var. *gossypifolia*; G. *P. sublanceolata* (photo: R. Boender); H. *P. arida* (photo: J. Ochoa); I. *P. urbaniana* (photo: R. Boender).

Peru : Native species that are lost day by day.

By Boris Esquerre-Ibañez
Universidad Nacional Pedro Ruiz Gallo, Lambayeque, Perú
Asociación Lambayecana de Botánicos (ASLAB), Chiclayo, Perú

Fragmented cloud forest due to shifting cultivation, the habitat of *Passiflora tripartita* and *Passiflora viridescens*. Cajamarca Department.

Illegal logging in primary forest, habitat of *Decalobas* and *Tacsonias*

Some go unnoticed on the side of roads, others are observable from afar by the magnificence of their flowers. These are the passion flowers of Peru, a country in western South America. There are about 100 endemic *Passiflora* species and probably more to be discovered. Peru boasts a rich heritage of biodiversity with a variety of climates thanks to the presence of the Andes Mountain Range that crosses the country from north to south. The *Passiflora* of Peru are well distributed, from the coastline, near sea level, to the highest mountain zones of the Andes, called "punas" and "paramos", as well as in the almost impenetrable lowland rainforests of the Amazon.

Cerros de Amotape National Park, habitat of *Passiflora tenella*, now threatened by the Peruvian government due to a binational irrigation project with Ecuador. Tumbes Department.

Dangerous oil spill in the Pacaya-Samiria National Reserve in the Peruvian Amazon, the habitat of species such as *Passiflora spinosa* and *P. serratodigitata*. Loreto Department.

From my own observations, the *Tacsonia* species (Subgenus: *Passiflora*; Supersection: *Tacsonia*) are mostly isolated in the highlands of the Andes; at intermediate and high altitude forests the *Decaloba* species (Subgenus: *Decaloba*)

Peruvian Armed Forces destroying chemicals in a clandestine cocaine laboratory in the amazonian lowlands. Huánuco Department.

Páramo totally destroyed, the habitat of species such as *Passiflora gracilens, P. mathewsii* and *P. sanchezii,* now an active open pit mine. Cajamarca Department.

Passiflora punctata behaves as a species well adapted to human intervention in its natural habitat. Lambayeque Department.

are found, particularly more diverse in the permanently wet areas where ferns and orchids grow. In the region of the Amazonian lowlands, we find the tree passion flowers (Subgenus: *Astrophea*) and other groups of subgenus *Passiflora*. Finally, a small group of species is present in arid and semi-arid regions of the warm coastal strip, e.g., *P. foetida*, *P. suberosa*, *P. punctata*, and, on the "lomas" formations, species such as *P. suberosa* and *P. peduncularis*.

Every year I am surprised to see new *Passiflora* hybrids with flowers of enviable beauty. At the same time, however, I am worried about the lack of importance given to the cultivation of native species. Many do not receive special attention by the horticulturists or the general public, because they don't have an attractive flower or edible fruits.

For me, all species should be considered equal – beautiful or not, edible or not. Their significance should be due to the fact that they are the native flora of a territory. Yet, it is these native species that are the most vulnerable to extintion, due to destructive human intervention in the environment, namely urban growth, illegal logging, shifting cultivation, and open-pit mining.

Currently, in Peru, human presence in areas with biodiversity is always a serious threat to conservation efforts. I refer here to human groups settled, called in Spanish "colonos", not the native groups of people in the wild. People have lived in these areas for millennia, e.g., the Incas in the Andean/Amazonian regions of southern Peru, or the Lambayeques in the dry forests of northern Peru, but these ancient civilizations maintained a relatively balanced relationship with the natural environment. It was after the Spanish invasion that these areas, rich in plant and animal diversity, began experiencing high-impact human activity.

While the creation of protected conservation areas has helped in some cases, unprotected areas continue to suffer the effects of deforestation every day as is the case, unfortunately, with some protected areas due to inadequate patrolling of the territory. Who knows how many species are being lost? Perhaps some species will never be known because they are already extinct.

I have personally perceived some major threats to three groups of passion flowers here in Peru, and they are the ones I share here. I'm not sure, but I suspect the same situation is happening in neighboring countries such as Colombia, Ecuador and Brazil.

Tacsonia threatened in the Andes

The *Tacsonia* species develop on the level of mountain forests. The main threats destroying their environment are illegal logging by industry or by the people of the area and the total destruction of vegetation by open-pit mining. Foundations, protection societies and conservation groups have always fought to curb these activities, especially in sectors with high biodiversity and primary forests, but sometimes the government itself becomes the enemy. One might be inclined to give up, but I guess there is always hope. Some *Tacsonia* species, for example, have developed tolerance to human intervention in their habitat.

Decaloba endangered in the unprotected mountain forests

In the mountain forests, the threat is large-scale shifting cultivation and the ecological crime of open-pit mining. Shifting cultivation is the use and disuse of land to cultivate edible plant species. This agricultural practice requires many acres of forest to be "cleaned." Swathes are evaluated, trees are cut down, and the surrounding vegetation burned. As time passes and the land ceases to be fertile, people look towards the neighboring mountain for more land on which to work. They then migrate from "their land" to another forest, cutting it again, and so continuing the cycle of destruction. After several years, all that is left is a deserted mountain with the scars of human intervention. Even if some isolated patches of forest are "saved", the mountain will take many years to return to its former glory, if it ever does.

Second, is open-pit mining, which basically destroys forests (when mining is located in the forests), but with the difference that the forests are lost forever. Here, absolutely every living thing is destroyed and the mountain becomes as deserted as a lunar landscape. These are major ecological disasters under the aegis of national and multinational companies, with the indifference or sometimes sponsorship of the government.

Vulnerable *Astrophea* in the Amazon rainforest

In the dense Amazonian rainforest of eastern Peru, where unfortunately there is little government control, illegal logging is one of the major causes of habitat loss. Endangered species in this geographic range include, from highlands to lowlands, P. *frutescens*, *P. putumayensis*, *P. cauliflora*, *P. spinosa* and *P. pyrrhantha*.

Other industrial damage is due to the activity of oil and gas companies. In particular, oil extraction, seriously damages the Amazon basin by contaminating water sources and forests (through pipelines), affecting the ecosystems and generating social conflicts between the native people of the Amazon, the companies and the government.

Narcotraffic also causes harm at this level because it "clears" areas of primary forest to grow species like *Erythroxylon* (*E. coca*). These mafias, hidden in the deep Peruvian Amazonian forests, are destroying hectares of pristine forest and polluting the available water sources, to build roads and illegal chemical laboratories for the preparation and purification of the alkaloid - cocaine base paste. Unfortunately, these areas are very isolated for government control to be effective, and often local people work with the drug dealers because they earn more than working in a legal activity; sometimes they do it because they live terrified by the drug dealers. An example of one such region is the jungle of the Valley of the Apurimac and

***Passiflora gracilens* in Bolivia © 2004 Christian Bravard**

Ene rivers, in southern Peru, until now a haven of high biodiversity; with hundreds of new species waiting to be discovered.

Conservation

Having considered these problems, it is important to promote actions to save the wild passion flowers of Peru.

Every day that passes many habitats are destroyed, and with them many species of *Passiflora* that also are food for mammals, birds, reptiles, and insects, many of which may also be lost. It is nice to see the species in photos, buy seeds, grow and hybridize them, but it is also good to think about native species, those living in the wild. I personally prefer to cultivate and promote native species; It is my initiative to keep native species safe. Thankfully, some species are safe in the state-protected areas and private conservation areas. I believe it is a good option to preserve the species in collections, but it is much better still to keep them in their own habitat, thereby not breaking their relationships with other living things and their natural environment.

"The Slaughter of Bagua" - In June 2009 natives from the Amazon region revolted against the Peruvian government, due to a law that would favor large multinationals and mining companies to use their territories in the jungle. The violence resulted in 33 deaths.

***Passiflora sagasteguii*, a vulnerable species living in areas of shifting cultivation around the Andes from northwest Peru, needs to be protected. Lambayeque Department.**

The author looking for ripe fruits and cuttings for propagation of *Passiflora viridescens* by the road side. Amazonas Department.

Baked Sea Bream with passion fruit sauce. (serves 4)

Daurade au four, sauce au fruit de la passion. (pour 4 personnes)

By Sébastien Larique

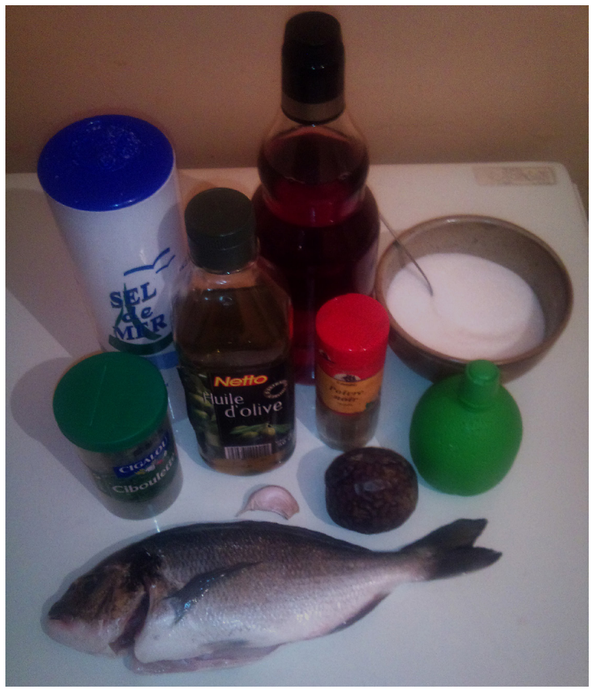
4 sea bream fillets or any firm white fish such as snapper, trout, bass or tilapia.

- 3 passion fruit
- 75 ml (1/3 cup) of passion fruit vinegar
- 50 grams (1/4 cup) of sugar
- 1 lime
- 2 cloves of garlic
- 4 tablespoons of oil oilive
- 2 sprigs of cilantro (coriander leaves)
- A few chives
- Salt and pepper

Cut the passion fruit in half and extract the pulp. Bring vinegar, passion fruit pulp and sugar to boil in a saucepan and reduce for 5 minutes. Preheat oven to 180° C, 350° F, Gasmark 5. Cut the lime into thin slices. Peel the garlic and cut into strips. Salt and pepper the fish, garnish with the garlic and lime. Drizzle with olive oil and bake for 20 minutes in the oven.

Sprinkle chopped chives and coriander over the fish.

Serve with passion fruit sauce.



4 daurades écaillées et vidées

- 3 fruits de la passion
- 75 ml de vinaigre de fruit de la passion
- 50 grammes de sucre
- 1 citron vert
- 2 gousses d'ail
- 4 cuillères à soupe d'huile d'oilive
- 2 brins de coriandre
- Quelques brins de ciboulette
- Sel et Poivre

Coupez les fruits de la passion en deux et récupérez la pulpe. Portez le vinaigre de fruit de la passion, la pulpe et le sucre à ébullition dans une casserole puis réduire pendant 5 minutes. Salez et poivrez. Réservez. Préchauffez le four thermostat 6 - 180° C, 350° F, Gasmark 5. Coupez le citron vert en tranches fines. Epluchez l'ail et coupez les en lamelles. Salez et poivrez les daurades, garnissez les d'ail et de citron vert. Arrosez d'huile d'olive et faites

cuire 20 minutes au four. Hachez la ciboulette, la coriandre et parsemez sur les poissons.

Servez avec la sauce au fruit de la passion.

Sébastien Larique, 34 years old, has been living in Epernay (Champagne-Ardennes) for 7 years with his partner and two daughters age 12 and 13, and is an enthusiast collector of the genus *Passiflora* since year 2008. Curator of a collection of 176 species and hybrids of *Passiflora*. Works as gardener and landscape gardener in the four star hotel 'La Briqueterie' set on 2.5 hectares at Vinay in the vicinity of Epernay.