



**BGCI**

Global Botanic  
Garden Fund

**“Conserving an extinct species  
in the wild *Psychotria ilocana*  
Merr. (Rubiaceae)**

**A lone tree at the ex-situ  
collections of NUEBG,  
Philippines.”**



## Introduction:

*Psychotria ilocana*, a narrowly endemic species of the Rubiaceae family, faced the imminent threat of habitat destruction due to a massive land conversion project for the installation of wind turbine power generators and an extensive solar farm. This development encroached upon fragmented forests in coastal limestone and upland ultramafic areas, which are critical habitats for narrow endemic species in the region. These ecosystems have supported a unique and diverse flora, including species such as *Podocarpus* and *Cycas*, which boast primitive characteristics. Remarkably, these special floras have persisted in the area until today.

Regrettably, the significance of these vegetations was misunderstood by the local government, compounded by a lack of expertise in the province. Despite their ecological importance, these habitats were neglected until the Northwestern University Ecological Park & Botanical Garden (NUEBG) team dedicated 15 years to conducting an in-depth study on the floristic composition of these unique ecosystems. The outcome of the research unveiled numerous rare flora and the identification of species previously unknown to science.

Among the remarkable findings was the presence of *Psychotria ilocana* in these fragmented forests. However, the expedition team faced a challenge, as their discovery came at a late stage, with only a single specimen successfully rescued. Despite extensive exploration efforts and numerous attempts to locate additional plants within the adjacent vegetation, the team encountered difficulties, ultimately failing to find another specimen of this endangered species.



## Saving a lone tree at the NUEBG that is now extinct in the wild - *Psychotria ilocana* (Merr.) Merr.

*Psychotria ilocana* (Merr.) Merr. is a shrubby plant found in the lowland dry seasonal forests of Northwestern Luzon, Philippines. The digital herbarium at the Smithsonian Institution, featuring specimens with bar codes 02737774 (collected in Zambales, December 1907) and 02737773 (collected in Bangui, Ilocos Norte, February to March 1917), both gathered by Maximo Ramos of the Bureau of Forestry, serves as primary documentation.

These type localities were confirmed natural populations, as authenticated by Somer & Davis (2007) in their publication "The Genus *Psychotria* (Rubiaceae) in the Philippine Archipelago." However, the species faces the ominous prospect of potential extinction in the wild due to severe disturbances and widespread land conversions. The once-habitable areas have transformed into expansive agricultural farms and settlements, reflecting the burgeoning population over time. Originating from the slash-and-burn practices of local communities expanding their farmlands, the plant suffered neglect owing to its lack of utility for food or medicine.

Moreover, the confined lowland habitat has made it challenging to locate additional populations. The Northwestern University Ecological Park & Botanic Gardens' expedition team, active since 2007, has been unable to identify any other occurrences of *Psychotria ilocana*.

Given its critical status, the Northwestern University Ecological Park & Botanic Gardens (NUEBG) initiated a comprehensive ten-year expedition across the

entire northwest Luzon region to validate the extinction of this species. The objective was to explore adjacent mountain ranges that could potentially serve as refuges for *Psychotria ilocana*. Over the decade-long fieldwork, numerous narrow endemic species were documented, including *Syzygium ilocanum*, *Thunbergia ilocana*, and *Ardisia ilocana*. Unfortunately, *Psychotria ilocana* remained elusive, failing to be recorded despite the discovery and publication of numerous new species. Source: Philippine Journal of Science p. 173;

Recently, the team salvaged plant debris from a construction site designated for the development of solar farms and wind turbines. These salvaged specimens were then planted in the NUEBG conservatories. Surprisingly, a small tree from this collection bloomed, raising suspicions that it could be the elusive *Psychotria* species believed to be extinct in the wild, specifically, *Psychotria ilocana*. Through meticulous morphological assessments and an analysis of floral arrangements, the team confirmed the identification.

In January 2021, Suzanne Sharrock, Director of Global Programmes at the Botanic Gardens Conservation International (BGCI), alerted the NUEBG about a survey focusing on plant species presumed extinct but documented in collections according to the BGCI Plant Search database. The NUEBG promptly updated the BGCI index seminum.

In the summer of 2022, following the lifting of Covid-19 border restrictions, the NUEBG organized an expedition to investigate the construction site area where potential remaining trees could be located. Despite a week of intensive fieldwork, the team was disheartened to find no trace of the sought-after species. The region, characterized by ultramafic vegetation, was considered a potential habitat that may have been overlooked during previous explorations. While navigating the dense forest vegetation was challenging, the floristic data indicated that most *Psychotria* spp. did not typically thrive in this type of environment, with only a few individuals like *Psychotria luconensis*, a widespread species in the region, recorded. Despite the exhaustive efforts, the team once again failed to locate a single tree, emphasizing the elusive nature of their quest.

**GRUMILEA ILOCANA** sp. nov.

Frutex glaber, erectus; foliis oblongo-obovatis ad obovatis, subcoriaceis, usque ad 9 cm longis, obtusis ad late obtusiusque acuminateis, basi cuneatis, nitidis, in siccitate pallide brunneis, nervis utrinque circiter 9, tenuibus, distinctis; stipulis oblongo-ovatis, obtusis, circiter 3 mm longis, caducis; infructescentiis 2.5 ad 5 cm longis, pedunculatis vel e basi ramosis; fructibus paucis, obovoideis, teretibus, in siccitate brunneis, circiter 7 mm longis; seminibus plano-convexis, laevis, albumine valde ruminato.

An erect glabrous shrub, the branches terete, brownish or grayish-brown, somewhat wrinkled, the branchlets compressed, brownish, smooth. Leaves subcoriaceous, smooth, oblong-obovate to obovate, 5 to 9 cm long, 2.5 to 4 cm wide, shining, brownish or pale brownish and of about the same color on both surfaces when dry, apex obtuse to shortly and broadly obtuse-acuminate, narrowed below to the cuneate base; lateral nerves about 9 on each side of the midrib, slender, distinct, obscurely anastomosing, the reticulations very lax, nearly obsolete; petioles 5 to 10 mm long; stipules caducous, oblong-ovate, obtuse, about 3 mm long. Panicles in fruit 2.5 to 5 cm long, peduncled or branched from the base. Fruits obovoid, about 7 mm long, smooth, terete, longitudinally and faintly ribbed, brown when dry. Seeds plano-convex, smooth, the albumen prominently and uniformly ruminated throughout.

Luzon, Ilocos Norte Province, Bangui, *Bar. Sci.* 27456 (type), 27459, 27444 Ramos, February, 1917, in thickets and forests at low altitudes. The alliance of this species is manifestly with *Grumilea leucosticta* (Cham.) F.-Vill., from which it is readily distinguished by its differently shaped, fewer-nerved leaves.



Following the conclusion of the decade long Northwesterniana Expedition, the NUEBG continued its research, supported by modest grants from foreign organizations. The BGCI ArbNet and the Global Genome Initiative (GGI) played a crucial role in bolstering the limited budget of the NUEBG conservation initiative. Notably, the NUEBG operates without government subsidies in the Philippines and relies primarily on minimal funding from Northwestern University through its annual departmental allocation under the Center for Biodiversity Conservation, Restoration Ecology, & Environmental Concerns (CBCREEC).



## The last of the *Psychotria ilocana*, a lone tree at the NUEBG given a new hope.

The NUEBG secured a small grant from BGCI to safeguard a species on the brink of extinction, and the successful implementation of the BGCI Wild Species Grant is underway in 2023. The team eagerly anticipates the next flowering cycle of this species, hoping to obtain viable seeds, given its historically low fruit-setting rate, potentially attributable to the absence of its natural pollinator.

During the dry summer in the Ilocos region, an extended drought significantly impacted flower development, resulting in only one branch producing a single mature fruit, ultimately yielding a non-viable seed upon examination. Due to its precarious status, a seed test was conducted following the MSB protocol to assess seed quality for banking. Following the reproductive stage, the team swiftly turned to asexual reproduction through marcotting, cutting and rooting the remaining branches.

A month later, as the Ilocos region transitioned into the wet season, heralding the re-greening of trees, the eagerly awaited moment arrived for the pruned branches to sprout new buds. Encouragingly, some of the cuttings exhibited the emergence of new leaves. The NUEBG conservation team promptly reported this achievement to the Northwestern University Board of Directors, signaling that the once extinct-in-the-wild species had successfully propagated a few plants. This development is significant as it offers hope for arresting the species' extinction. The NUEBG Director emphasized the importance of this species, named after the Ilocos province, *Psychotria ilocana*, as a natural heritage of the region.



*Propagated thru vegetative means, these cuttings are carefully selected to minimize the impact to the plant. They are meticulously treated with growth hormones to induce rootings. A few plants showed newly emerging shoots giving new hope to the species and build a new population for reintroduction.*



## Conservation program in place at the NUEBG.

As the conservation program took place at the botanic garden and has been running for several months, meetings are frequently being done to evaluate the procedures and if it fails, the condition to terminate immediately if the specimen is affecting the survivability of the only surviving species of *Psychotria ilocana*.

Also, two successful plants were produced from the 3 marcotted branches and is now undergoing hardening to be ready for transplanting.

The NUEBG conservation team made a final decision to maintain a near situ condition by creating a garden exclusive for the species. It will be part of the Plant Species with Extremely Small Population (PSESP-PhP) Philippine Project. This initiative is pioneered by the Kunming Institute of Botany (KIB) in Yunnan, China. The NUEBG director joined a fleet of plant conservation experts in Asia in 2023 to learn on the conservation effort made by the KIB and is now implemented to several endemic species including *Psychotria ilocana*.



## Habitat Protection and Restoration:

Identify and secure a near-situ habitat of for *Psychotria ilocana* to prevent further destruction or encroachment.

Collaborate with local communities, landowners, and relevant stakeholders to enforce protective measures and regulations. Restore degraded habitats and create buffer zones around the existing tree to enhance the chances of successful propagation.

## Seed Collection and Storage:

Develop a systematic and regular seed collection program from the existing tree to

ensure genetic diversity. Establish a seed bank or collaborate with existing seed banks to store collected seeds under optimal conditions for long-term viability. Develop protocols for germination and propagation from collected seeds to support the establishment of a viable population.

#### **Controlled Cultivation and Propagation:**

Use tissue culture and micropropagation techniques to rapidly propagate *Psychotria ilocana* from small tissue samples. Collaborate with botanic gardens, nurseries, and research institutions to cultivate and maintain a living collection of the species. Monitor and assess the genetic diversity and health of the propagated individuals to avoid inbreeding and increase chances of survival.

#### **Research and Monitoring:**

Conduct comprehensive research to identify the specific ecological requirements of *Psychotria ilocana*, including pollination and seed dispersal mechanisms. Establish a long-term monitoring program to track the survival, growth rates, and reproduction of the propagated individuals.

Use remote sensing technologies to monitor habitat conditions, including soil moisture levels, temperature, and light availability.

#### **Community Engagement and Awareness:**

Conduct outreach programs and educational campaigns to raise awareness among local communities, stakeholders, and the general public about the importance of conserving *Psychotria ilocana*.

Involve local communities in conservation efforts, providing them with training and opportunities for participation in the monitoring and protection of the species.

Collaborate with schools, universities, and environmental organizations to promote research, education, and citizen science initiatives focused on *Psychotria ilocana*.

#### **Reinforcement of Regulatory Measures:**

Work closely with government agencies, conservation organizations, and policymakers to establish and enforce regulations that protect *Psychotria ilocana* and its habitat. Advocate for the inclusion of *Psychotria ilocana* in the provincial and national conservation frameworks, such as the Philippine Biodiversity Conservation Strategy and Action Plan (PBCSAF).

By implementing this comprehensive program, we can ensure the effective propagation of *Psychotria ilocana* while minimizing the risk of extinction. The collaboration between various stakeholders, the involvement of local communities, and the integration of scientific research and monitoring are key to the success of this conservation program.



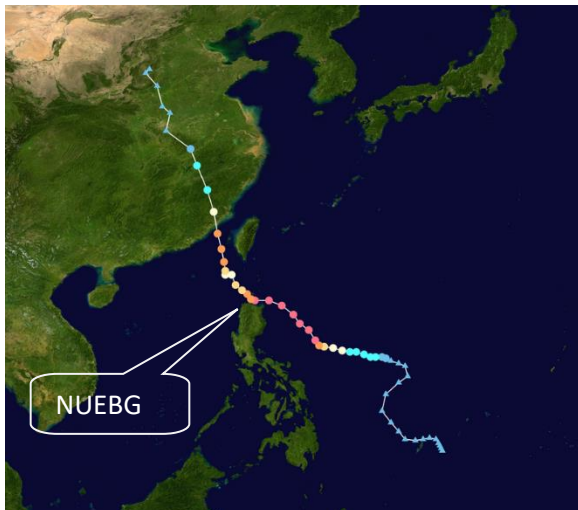
*Investigating areas as reintroduction areas but with factors to be addressed such as harsh climatic conditions of severe heat during summer and ultramafic vegetation which is affecting survival of the species.*

## Super typhoon is becoming frequent in the Northern Luzon and Taiwan.

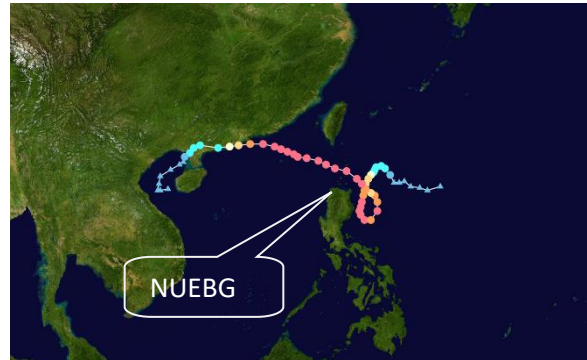
The strait between Taiwan and Northern Luzon acts as a major pathway for typhoons, and their frequency is on the rise. The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) records a minimum of 20 weather disturbances annually in this region. This unique climatic pattern highlights the urgent need for plant conservation efforts, given the adverse impact of climate change. Unlike fauna, which can be relocated to safer environments, plants in Northern Luzon are confined to their habitats, considered microecosystems.

*Psychotria ilocana*, for instance, flourishes in Ultramafic vegetation covering an area of less than 100 hectares. Unfortunately, it has been declared extinct in its original location (Bangui Ilocos Norte) and extirpated from its latest collection site due to the construction of solar power facilities in Burgos Ilocos Norte.

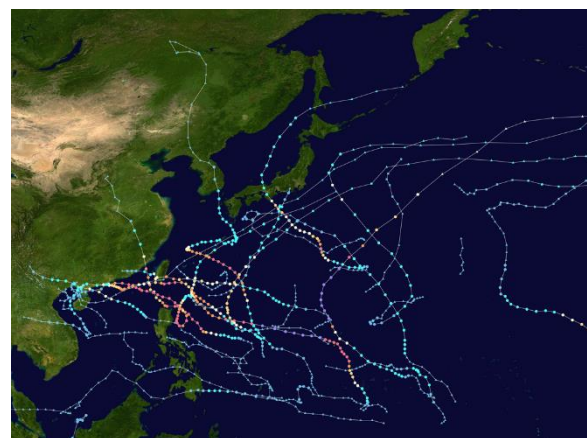
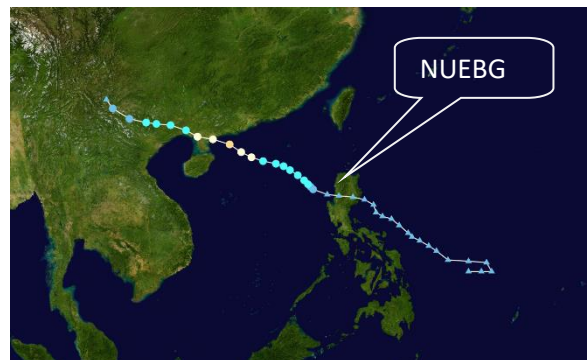
Additionally, there was a formidable, deadly tropical cyclone that struck, setting records as the costliest typhoon to hit Philippines, Taiwan and China. With a total cost of \$15.7 billion (2023 USD, it stands as the second-costliest typhoon on record and holds the record as the costliest in Chinese history.



Typhoon Saola, known in the Philippines as Super Typhoon Goring, was a powerful and erratic tropical cyclone that affected the Philippines, southern Taiwan, Hong Kong, Macau and South China. It left a damages to about \$545 million (2023 USD)



Severe Tropical Storm Talim, known in the Philippines as Tropical Storm Dodong, was a compact tropical cyclone that affected the Philippines, China, and Vietnam.



## **The NUEBG seeks for help, but to no avail.**

In the wake of the recent super typhoon of 2023, the garden has endured substantial damage, with a profound impact on both its facilities and landscapes. The challenges in restoring the Garden are formidable, and the NUEBG community finds itself in a precarious situation, desperately in need of support.

The NUEBG has reached out to numerous international garden organizations, seeking any assistance that could aid in the recovery process. The garden needed potting materials, screen house roofing, as well as chemicals used to hasten growth and recovery. Regrettably, despite its sincere efforts, the desired help to address the aftermath and restore the garden has not been forthcoming.

The garden, devoid of government financial support, has depleted its last remaining resources. To reclaim the lost specimens, the garden aims to either recollect them from the wild or acquire identical specimens from other botanical gardens. In this pivotal moment, the garden maintains optimism that, through collective efforts, it can overcome this challenging period and restore the NUEBG to its former splendor. Any support during this critical phase is instrumental in rejuvenating the garden and preserving its valuable collection.

## **Acknowledgement**

The success of our expedition and the subsequent mass propagation efforts for *Psychotria ilocana*, a critically endangered species endemic to the Philippines, would not have been possible without the invaluable support of the Botanic Gardens Conservation International (BGCI) Wild Species Grant 2022. We extend our heartfelt gratitude to BGCI for their generous funding, which played a pivotal role in financing the comprehensive exploration and conservation initiatives aimed at preserving this rare and at-risk species.

The financial support provided by BGCI has not only facilitated the in-depth study of the floristic composition of the unique ecosystems supporting *Psychotria ilocana* but has also empowered us to undertake crucial mass propagation endeavors. These efforts are essential for ensuring the survival and sustained growth of this critically endangered species.

We express our sincere appreciation to BGCI for their commitment to the conservation of biodiversity and their recognition of the importance of safeguarding endemic and endangered species like *Psychotria ilocana*. This collaboration exemplifies the positive impact that partnerships between organizations and conservation initiatives can have on preserving the rich and fragile ecosystems that contribute to the global biodiversity landscape.

**Michael Agbayani Calaramo**

*Director*

Northwestern University Laoag City Philippines.  
Center for Biodiversity Conservation,  
Restoration Ecology, & Environmental Concerns  
CBCREEC.