



FLAAR
MESOAMÉRICA

WILD **Vanilla Orchid**

Vanilla insignis

NICHOLAS HELLMUTH
FLAAR (USA) & FLAAR MESOAMÉRICA (GUATEMALA)

WILD VANILLA ORCHID VINE FLOWERS FLOWERING IN SEASONALLY INUNDATED BAJO FORESTS



Part 1

May 2022

Parque Nacional Yaxha, Nakum and Naranjo (PNYNN)
Reserva de la Biósfera Maya (RBM)
Petén, Guatemala



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Arq. Jose Leonel Ziesse
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Biolg. Lorena Lobos (CONAP)

Initiation and coordination of the project of cooperation for 2021-2025

Licda. Merle Fernandez, CONAP
Marla Mercedes Bolvito Jerónimo, Unidad de Cooperación Nacional e Internacional de la Secretaría Ejecutiva de CONAP
Licda. Ana Luisa De León N., Directora de Educación para el Desarrollo Sostenible, CONAP
Lic. Apolinario Córdova, CONAP Petén
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all the helpful and knowledgeable guides of IDAEH CONAP at PNYNN who accompanied us each day. It is essential to have either an IDAEH and/or CONAP guardabosque or comparable when doing flora and fauna research in a national park.

Assistance for knowledge of plants and animals of PNYNN

Teco, Moises, Daniel Pérez Díaz, park ranger, PNYNN

We appreciate two donations during recent year to help cover the costs of FLAAR research projects specifically to assist and support the current FLAAR project of exploring remote areas to find and document flora and fauna in the Reserva de la Biosfera Maya (RBM), Peten, Guatemala.

This donation is from a family in Chicago in honor of the decades of botanical field work of botanist Dr John D. Dwyer, who worked in many areas of Mesoamerica, including in the Yaxha area in the 1970's while the site was being mapped by FLAAR.

This donation is also in recognition of the urgency and need for conservation of both wildlife and rare plants in the bio-diverse ecosystems of the Reserva de la Biosfera Maya (RBM) of Guatemala. Parque Nacional Yaxha, Nakum and Naranjo (PNYNN) and Parque Nacional Laguna del Tigre are the first two parts of the over 5 million acres of the RBM where we have initiated field work in 2021 and 2022.



CREDITS

The helpful individuals listed below are part of the FLAAR Mesoamérica research and field work team together with report preparation team.

Author

Nicholas Hellmuth

Photography assistant

Norma Estefany Cho Cu

Compilation of basic data from earlier botanists and ecologists

Nicholas Hellmuth

GPS documentation and route maps

Vivian Hurtado

Plant identification of this orchid (Genus species)

Fredy Archila

Design concepts for GPS route maps

Sergio Jerez

Bibliography team

Nicholas Hellmuth

Vivian Hurtado (for many years)

Maria Jose Toralla (starting in 2022)

Manager of design and layout

Andrea Sánchez Díaz

Layout of this english edition

Jaqueline González

Editors

Vivian Hurtado

Photographers

Nicholas Hellmuth

Edwin Solares

Norma Estefany Cho Cu

COVER PHOTOGRAPHY

Photograph by: Nicholas Hellmuth. FLAAR Mesoamerica.
May 11, 2022.

Camera: iPhone 13 Pro Max.

FLAAR was formed in 1969 to map Yaxha (and nearby Topoxte Island and Nakum). When the president of Guatemala visited Yaxha in the 1970's we mentioned that it was urgent to create a national park to protect both the Mayan heritage and also the original forests. We also spoke with the head of FYDEP to initiate protection of this area as a national park. A few months later the president of Guatemala asked me to accompany him to Tikal, so I had additional time to encourage him to declare Yaxha, Sacnab as a national park. The last day of our field work, I found a painted sign placed at the end of the road downhill that goes near the lake in those years, a sign by FYDEP reading Parque Nacional Laguna Yaxha Laguna Sacnab. It then took over 15 years to formalize the paperwork. Other NGO's and other individuals focused on conservation nudged the government to finish the paperwork plus these other entities intelligently added the Naranjo-Sa'al area to Yaxha and Nakum areas. I had not worked at Naranjo; only at Yaxha, Topoxte Island, and Nakum. I feel proud that FLAAR initiated what today is Parque Nacional Yaxha, Nakum and Naranjo.

Recently we were asked to return for flora, fauna, and biosphere field work from August 2018 to July 2019. This project found and documented with high-resolution photography enough plant, bird, and insect species, plus ecosystems, that as a result we were asked by CONAP to return for five years, 2021-2025 of coordination and cooperation with them, both in the Yaxha, Nakum and Naranjo national park plus all the rest of the Reserva de la Biosfera Maya (over 21,000 square kilometers which is over 5-million acres.

Contents

Chapter 1

- Introduction to wild Vanilla Orchid Vines of Guatemala _____ 2
- Why is “all vanilla from Veracruz, Mexico” if wild vanilla orchids are all over Guatemala? _____ 3
- My Personal Experience with *Vanilla insignis* _____ 6

Chapter 2: Botanical information

- Full Botanical Name _____ 8
- Here are synonyms for *Vanilla insignis* _____ 8
- Mayan names for *Vanilla* _____ 8
- Habit for *Vanilla insignis* _____ 8
- Is *Vanilla insignis* a vine? Or a bush? Or a Tree? _____ 9
- What other Vanilla orchid vine Names (now Synonyms) do we need to keep track of? _____ 9
- Botanical Descriptions of Vanilla Orchids of Guatemala _____ 10

Chapter 3: Where has *Vanilla insignis* been found?

- In what Ecosystem(s) can you find native *Vanilla insignis*? _____ 12
- What other Trees or Plants are often found in the same Habitat? _____ 13
- Is *Vanilla insignis* listed for Parque Nacional Tikal (PANAT)? _____ 17
- Where has *Vanilla insignis* been found in the Parque Nacional Yaxha Nakum y Naranjo (PNYNN)? _____ 17
- What species of *Vanilla insignis* trees did Cyrus Lundell find in Peten? _____ 22
- What Vanilla been found in the Peten by others? _____ 24



Contents

- *Vanilla insignis* in Belize? _____ 24
- In which States of Mexico is *Vanilla insignis* listed by Villaseñor? _____ 25
- Is *Vanilla insignis* from the Maya Highlands or from the Maya Lowlands (or both)? _____ 25
- *Vanilla insignis* in Chiapas _____ 26
- Chapter 4: Uses of Vanilla**
- Fragrance, for lots more than just flavoring Cacao Beverages _____ 28
- Was Vanilla mixed with Mayan Tobacco? _____ 28
- Was Vanilla mixed with Copal for Incense? _____ 28
- If Atole drink is flavored with vanilla, then surely the Classic Maya had it? _____ 28
- Practical uses of *Vanilla insignis* for the Lacandon Maya of Chiapas _____ 29
- Is there potential medicinal usage of *Vanilla insignis* by local people _____ 29
- Chapter 5**
- Concluding Discussion and Summary on *Vanilla insignis* _____ 31
- Additional Future Field Work would be helpful _____ 33
- Helpful additional Future Research:
Is there a Hieroglyph for Vanilla on Vases or Bowls? _____ 34
- Final Observation _____ 34



Contents

- Appendix A: Wild Vanilla Orchid Species of Mexico (and whether they are also wild in Guatemala) _____ 35
- Appendix B: More Notes on Presence of Wild Vanilla Orchid Vines in Guatemala _____ 37
- Appendix C: Mesoamerican Words for Vanilla _____ 43
- Nahuatl and Nahua _____ 44
- Mayan Languages: Highlands _____ 45
- Mayan Languages: Lowlands, Yucatec related Yucatec Maya, Lacandon Maya, Petén Itzá (Itza) Maya _____ 47
- Mayan Languages: More Lowlands, Chol, Cholti, Chorti related _____ 49
- Tabulated Initial Summary of research so far _____ 50
- References Cited and Suggested Reading on Vanilla in general And on *Vanilla insignis* _____ 52
- Helpful web sites for any and all plants _____ 65
- Web pages specifically on Vanilla _____ 66
- Videos on Vanilla _____ 66



Chapter 1



Photograph by: Edwin Solares. FLAAR Mesoamérica. Yaxha to Nakum, Petén. May 5, 2022. 10:11 am
Camera: Sony Alpha 1. Settings: 1/250 sec; f/14; ISO 1,600.

Introduction to wild Vanilla Orchid Vines of Guatemala

Vanilla is an orchid vine native to Mesoamerica. There are also other vanilla orchids native to other parts of the world but the fragrant ones are primarily in Mesoamerica. *Vanilla* orchids are a genus of plant family Orchidaceae that we all like to learn about because of the sweet essence it produces, which is used worldwide to flavor all kinds of foods. However, Vanilla is used to flavor a lot more than just chocolate.

Wild vanilla is probably heading to endangered lists because of all the destruction of forests of Guatemala for African palm oil plantations, cattle ranches, and slash-and-burn milpas. Also, it's cheaper to produce synthetic vanilla. That's why the study and conservation of wild vanilla is important for both students, biologists, and individuals interested in preservation and conservation.

There are many species of vanilla orchids native to the Maya Lowlands and the Maya Highlands of Mesoamerica listed in excellent reports by experienced orchid botanists: (Archila et al. 2018, Archila et al. 2019a and b; Soto and Dressler 2010; Karremans et al 2020). The goal of this FLAAR Report is to show the world that the Classic Maya also had the *insignis* species of *Vanilla* available in addition to the more common *Vanilla planifolia*. Obviously the Classic Maya could also have raised *Vanilla insignis* around their homes or had plantations.

An additional goal of our field work is to assist botanists and ethnobotanists in areas surrounding Petén to see what remarkable plants are in PNYNN and elsewhere in the RBM that are also available in their areas (Chiapas, Tabasco, Campeche, Quintana Roo, Belize). And for Belize we feel that more field work by capable botanists, ethnobotanists and students will find lots of *Vanilla insignis* in Belize. Yaxha is only a few dozen kilometers from Belize: I rather doubt these plants stop at the border!

99% of what is written on vanilla of Mesoamerica focuses on the Aztec feasts and modern plantations of the one species of *Vanilla planifolia* in Papantla, Veracruz, Mexico. And I bet that more than 80% of what is written about vanilla in popular sources features only *Vanilla planifolia*.

So why are the other species of vanilla of Tabasco, Campeche, Quintana Roo, Chiapas (Mexico) and Peten (Guatemala) totally ignored (except in scientific botanical articles about all vanilla orchid species)? I do not mean to ignore Yucatan, but there are more species in the aforementioned states that have more humidity.

Why are wild Mayan vanilla orchids of Petén, **Guatemala forgotten? Ignored? Missing?**

Wild vanilla orchid plants of Peten are noticeably totally missing from many monographs and peer-reviewed journal articles on vanilla of Mexico and Guatemala. The helpful and informative articles by vanilla orchid specialists list everything for Veracruz (no surprise) and Oaxaca, Chiapas; a bit for Campeche and Quintana Roo, basic species for Belize or Honduras, lots for Ixcán area of Quiche, Guatemala, only a few lonely species for Izabal, Guatemala, and not much for El Peten area (the entire northern section of Guatemala, the heartland of the Lowland Maya civilization).

Surely the rulers of Tikal, Uaxactun, Yaxha, Nakum, Naranjo-Sa'al and surrounding Classic Maya cities of Peten had access to vanilla?



Photograph by: Edwin Solares, FLAAR Mesoamérica. San José, La Gloria. May 5, 2022. 10:30 am.
Camera: Sony Alpha 1. Settings: 1/250 sec; f/14; ISO 1,600.

Why is “all vanilla from Veracruz, Mexico” if wild vanilla orchids are all over Guatemala?

I love Mexican vanilla. I have actually been several times to Papantla, Veracruz, the heartland of vanilla cultivation in Mexico. I have experienced vanilla vines growing in cacao orchards adjacent to the Mayan ruins of Comalcalco, Tabasco already in the 1970's. So vanilla is raised in lots more areas of Mexico besides just Papantla, Veracruz. But the Veracruz area is the single most publicized area for vanilla of Mesoamerica.

Thus, it is no surprise that effectively every web site on vanilla says “vanilla was domesticated in Veracruz by the Totonac people.” Then many authors add the following totally undocumented claim “the Totonacs spread vanilla cultivation throughout Mesoamerica...” Actually, the stone ballgame yokes, hachas, and palmas that are featured in ballgame scenes of El Tajin, Veracruz; yokes are then found throughout the Costa Sur of Guatemala (shown to me in the 1970's by Jorge Castillo, later the founder of the Museo Popol Vuh). Yokes are worn at Copan Ruinas by some players (their opponents often wear the leather and other materials across their chest; these are NOT yokes, though dozens of Mayanists inaccurately call anything around a ballplayer a yoke).

So, Veracruz did have major impact on the Maya: yokes came in along with Veracruz and Teotihuacan traders; ironic since yokes are not common at Teotihuacan itself. Palmas, outside of El Tajin and nearby, are primarily worn at very late Chichén Itzá.

Similar scenes (with yokes and hachas but not as many palmas) are on dozens of Tiquisate area cylindrical tripods that I studied for years in the 1970's-1990's (Escuintla area of Guatemala). But there are multiple species of wild vanilla vines in many parts of the Maya Lowlands and the Maya Highlands; so surely the original inhabitants were harvesting and processing the fragrant seed pods long before Veracruz influence arrived. Besides, the Olmecs were in Veracruz and western Tabasco. Surely, they had vanilla also. The Olmecs influenced the pre-Classic Maya as you can see on the faces of many of the elite in the San Bartolo murals, Peten. There were Olmec trade routes through the Costa Sur long before the Teotihuacanos and Veracruz cultures had trade there (the Costa Sur of Guatemala, inland from the Pacific Ocean, was a flat plain, so an easy area to have merchant trails to reach jade sources in Costa Rica).

Does the Veracruz focus on vanilla today mean that the Classic Maya had zero knowledge of vanilla before Olmec or later Totonac traders came hiking into their cities? There is wild vanilla IN EVERY LOWLAND PART OF GUATEMALA (and in much of the Highlands plus surely adjacent Chiapas, Campeche, Quintana Roo, and Belize).

So not one single solitary Maya person harvested vanilla until the Totonacs came from Veracruz? Huh? Fortunately, Archila et al. (2019 b) suggest that the Maya also knew how to process vanilla (page 104). Would help if archaeologists can document processed vanilla before the arrival of the Totonacs. Would also help to learn the Olmec role in vanilla processing (the Olmec sure were experts in making rubber; just Google Olmec, rubber balls).

I admire and respect the capability of the people and civilizations of Veracruz to have popularized vanilla literally around the world. But I would like to dedicate myself and my team to rescuing Maya knowledge of vanilla. This will be done in the following manner:

- Vanilla of Petén (we have found wild vanilla all over bajo forests of PNYNN and elsewhere)
- Vanilla of Alta Verapaz (we have found LOTS of wild vanilla in the cloud forests and nearby)
- Vanilla of Izabal (vanilla vines are very very common in flatlands and on hill slopes here).

The vanilla of Ixcán region (Quiché) is already well known; this research can be expanded to adjacent Huehuetenango.



Photograph by: Edwin Solares. FLAAR Mesoamérica. San José, La Gloria. May 5, 2022. 10:29 am.
Camera: Sony Alpha 1. Settings: 1/200 sec; f/9; ISO 2,000.

MY PERSONAL EXPERIENCE WITH *VANILLA INSIGNIS*

I first saw *Vanilla insignis* while photographing vanilla orchid flower sequence in the ethnobotanical garden of Fredy Archila several years ago in Coban, Alta Verapaz. Then when we were doing flora, fauna and ecosystem field work in Parque Nacional Yaxha, Nakum and Naranjo from August 2018 through July 2019 we found wild vanilla orchid vines in most bajo forests within the PNYNN park. But since we never saw any flowers, we had no reliable way to identify their species. Then during our field work in the east half of the Municipio de Livingston during February-March 2020 and October 2020 through December 2021 we found wild vanilla orchid vines in several areas. But you never see the flowers since they bloom only 3 hours during the morning of one single day.

Then Lucas Cuz, one of our plant scouts, told us a wild vanilla orchid vine was flowering on a high hill overlooking Amatique Bay, Izabal. So, I immediately drove 300+ kilometers, took a motor boat to the shore and hiked up the steep hills. Fortunately, there were enough buds that one was flowering that day.

I have also studied vanilla orchid vines in southwestern Peten and in Alta Verapaz (Chipemech to Cahabon). But as expected, you never see them flowering unless you learn in advance, from a local plant scout, when they will flower.



Photograph by: Edwin Solares. FLAAR Mesoamérica. San José, La Gloria. May 5, 2022. 10:29 am.
Camera: Sony Alpha 1. Settings: 1/200 sec; f/9; ISO 2,000.

Chapter 2

Botanical Information



Photograph by: Norma Estefany Cho Cu. FLAAR Mesoamérica. San José, La Gloria. May 7, 2021. 10:20 am.
Camera: iPhone 13 Pro Max.

Full Botanical Name

Vanilla insignis Ames is the accepted name.

Family name Orchidaceae.

Here are synonyms for *Vanilla insignis*

No synonyms for *Vanilla insignis*.

www.theplantlist.org/tpl/record/kew-211913

Mayan names for *Vanilla insignis*

Buk'luch' (Cook 2016: 289 and 301) for what is estimated to be *V. planifolia*. Sorting out the names for the different parts of vanilla (vine, leaves, flower, fruit pod, seeds, flavoring produced after processing) is worthy of a PhD dissertation. Plus, there are more than a dozen Mayan languages where vanilla grows wild plus all the languages of Veracruz where vanilla has been commercialized for many decades. I show more indigenous Mesoamerican terms for vanilla in Appendix C.

Habit for *Vanilla insignis*

Herb, epiphytic.

Photograph by: Norma Estefany Cho Cu.
FLAAR Mesoamérica. San José, La Gloria.
May 5, 2022. 10:20 am.
Camera: iPhone 13 Pro Max.



Is *Vanilla insignis* a vine?

Or a bush? Or a Tree?

These are vines; they obviously use trees to climb up to get sunlight, but we often find the vines hanging down from tree branches. Trees are constantly blown over during wind and rain storms so the vines on these trees often fall off. So, by no means are all wild vanilla vines of Peten stuck to tree trunks their entire life. In swamps of El Golfete part of Rio Dulce, Izabal, we have found the vanilla orchid vines growing along the ground (though I assume they are looking for a tree to climb up to find sunlight).

What other Vanilla orchid vine Names

(now Synonyms) do we need to keep track of?

In the 1930's Lundell used the name *Vanilla fragrans* (Salisb.) Ames. This is now a synonym of *Vanilla planifolia* Jacks. Ex Andrews. I would not be surprised if this species is indeed present in the areas of Peten where Lundell did field work in the 1930's onward. But I also would not be surprised if many collections of vanilla in those decades were automatically assumed to be *Vanilla fragrans* or in later decade assumed to be named *Vanilla planifolia*. If there are no flowers wide open in front of you, how can you really know what species you have? And most botanists have been very honest to remind the world that flattened dried vanilla orchid flowers are not always adequate for species identification.



Photograph by: Edwin Solares. FLAAR Mesoamérica. San José, La Gloria. May 5, 2022. 10:29 am.
Camera: Sony Alpha 1. Settings: 1/200 sec; f/9; ISO 2,000.

Botanical Descriptions of Vanilla Orchids of Guatemala

In 99% of the reports that I write on plants of Guatemala I prefer to use Standley and Steyermark, Standley and Williams, or their colleagues of the Chicago Natural History Museum (Field Museum of Natural History). Two reasons I prefer these:

- These dozen volumes, totaling thousands of pages, are ALL available on-line as PDF format
- They include ethnobotanical information for many of the plants

But for orchids the year 1952 *Fieldiana: Botany study of Orchids of Guatemala* is incomplete for Izabal, Alta Verapaz, and Peten. So not appropriate to feature.

The 2011 monograph by Cameron is surely helpful but does not cover Guatemala adequately; does not distinguish between different states of Mexico; and Yucatan needs to be defined since it has many meanings (and the south of the geographical term Yucatan Peninsula includes northern Guatemala!). I have additional annotations in the bibliography at the end of the present FLAAR Report.

Dix and Dix produced *Orchids of Guatemala* in year 2000. Two issues: first, it is not easily available in PDF format. I have over 13,000 PDFs of which more than 9,000 are on plants of Mesoamerica (rest are on zoology and on archaeology-iconography-epigraphy-architecture of the Classic Maya). I also have a substantial traditional library of hard-copy books but with all the flora and fauna I have to cover it is more realistic to undertake 90% of my research in my computer, using

PDFs. We have full-time staff who find and download everything: articles, theses, dissertations, and books, for each topic that I am writing on. In addition to not being in PDF format (at least not on-line), this book dates to over two decades ago. The more updated, recent monograph by Fredy Archila et al, and his many articles, are based on his life-long dedication to the orchids of Guatemala, plus he has the benefit of having tens of thousands of orchids preserved in his research facilities in Alta Verapaz.

I also recommend Soto and Dressler 2010, and Karremans et al. 2020. These two plus everything Fredy Archila and co-authors are the best sources of botanical descriptions of wild vanilla orchids of Guatemala.

I show lots of additional information on vanilla orchid vine species of Guatemala in the Appendices to this present FLAAR Report.

Chapter 3

Where has *Vanilla insignis* been found?



Photograph by: Norma Estefany Cho Cu.FLAAR Mesoamérica. San José, La Gloria. May 7, 2022. 10:20 am.
Camera: iPhone 13 Pro Max.

In what Ecosystem(s) can you find native *Vanilla insignis*?

We have seen wild vanilla orchid vines in most bajo forests along the road from Yaxha to Nakum. A few days before (also in May 2022) we found wild vanilla orchid vines along the roads in the Baren forest concession area east of Los Pescaditos (far west of Uaxactun). All of these vanilla orchids that we have found so far in Peten tend to be in bajo forests.

In Alta Verapaz, lots of the wild vanilla orchid vines (of potentially other species) are up on slopes of high hills.

In the Municipio de Livingston, Izabal, most of the wild vanilla orchid vines are near sea level, often growing from swamp levels. So each species of vanilla orchid has adapted to completely different elevation, rainfall pattern, etc. Peten has long months of zero rain and only a tad of morning mist. Alta Verapaz has more rain and more morning mist. Izabal has more rain than Peten. One would expect the soil and other aspects of the geology to be different also (though most of these areas are karst).

We have found vanilla orchids before in Parque Nacional Yaxha Nakum y Naranjo during august, 2018 and july, 2019. The vanilla vines have also been found and photographed in the natural reserve Tapon Creek, Livingstotn, Izabal.



Photograph by: Nicholas Hellmuth. FLAAR Mesoamérica. May 11, 2022.
Camera: iPhone 13 Pro Max.

What other Trees or Plants are **often found in the same Habitat?**

There are many different kinds of bajo vegetation. Best known are the tintal bajos, but in the far southeast portion of Parque Nacional Laguna del Tigre we have found many different kinds of bajo, most of which have no *Haematoxylum campechianum*, palo de tinto. To find and list every species of tree, bush, vine, shrub, and herb in each bajo is a helpful project but since we have over 21,000 square kilometers to study (the entire Reserva de la Biosfera Maya), we do not have funding to identify each tree. But the area filled with vanilla vines is easy to access: just drive from Yaxha towards Nakum, and once you get to each bajo, get out and hike, looking for the vanilla vines. Of course, we have also find wild vanilla orchid vines in other bajos in much more remote areas.

Please do not cut any vanilla orchid vine to take to your home garden. First, this is a national park. Second, these vines will wither and die in your garden. Vanilla orchid vine species flourish in their native habitat. But the temperature, soil, sun/shade of your home is not what these vines need. They will wither and die in your garden or greenhouse. If you want an orchid vine for your home, find a place that (legally) sells orchids and the vanilla vine is already rooted. Then it has perhaps a 50-50 chance of surviving in your home.



Although this vine is parallel to a young tree trunk, the vanilla vine is hanging from above (not pegged to the tree trunk).
Photo by Nicholas Hellmuth along the road from Yaxha to Nakum. May 11, 2022. 9:54 am. iPhone 13 Pro Max.



This is a typical seasonally inundated (and thus seasonally bone dry) bajo forest, one of several segments of bajo between Yaxha and Nakum. You can see that the upper part of the wild vanilla orchid vine is hanging down from far above; this vine is now crawling up the tree.

Photo by Nicholas Hellmuth along the road from Yaxha to Nakum. May 11, 2022. iPhone 13 Pro Max.

Ecology: From the level to ca. 900 m elevation. *Vanilla insignis* is probably the most common vanilla in Mexico (Soto Arenas, 2003), where it is widely distributed and forms large populations. It grows in dry and wet areas (1000 to 4000 mm of annual rainfall), but in the latter, is confined to savannas with especial edaphic conditions. It has been recorded only from calcareous substrates. In the Yucatan Peninsula it grows in the subdeciduous forests of *Bucida buceras*, *Brosimum alicastrum*, and *Manilkara sapota*, often with the understory dominated by the palm *Cryosophila argentea*; these areas have slow drainage during the rainy season, and are frequently associated to the flooded areas ("tintales") with *Haematoxylon campechianum*. In the much moister areas of Chiapas, it is found in savannas with *Coccoloba belizensis*, *Quercus oleoides*, and *Roupala borealis*. In Central Veracruz *V. insignis* grows in tropical deciduous forest or in warm oak forest.

Some specimens in Campeche and Chiapas seem to occupy areas up to 4,000 m², and undoubtedly they are the largest plants of any *Vanilla* of the area. Some of these specimens may prove to be the most massive orchidaceous specimens in the world, with weights of many tons. It flowers in April and May; fruits become ripe in March-April. The flowers are visited by male bees of *Eulaema polychroma*.

(Soto and Dressler 2010: 318).

We also found *Vanilla insignis* flowering in two parts of Peten in May. So, if you are a botanist, now you know what month to focus on. But keep in mind the flowering season varies year by year.

Vanilla insignis is very adaptable in different parts of Mesoamerica. But in Peten we tend to find at least 90% in bajo forests. Keep in mind that not all bajo forests have *Haematoxylon campechianum* all over the place.

Is *Vanilla insignis* listed for **Parque Nacional Tikal (PANAT)?**

The year 2003-2008 Plan Maestro of Parque Nacional Tikal has no list of plants within the park.

When you Google Plan Maestro, Tikal, those are the only two that turn up; nothing recent. There should be wild vanilla orchid vines all over bajos of PANAT just as we found to the west (La Pasadita/La Gloria areas) and to the east of Tikal (Yaxha road to Nakum).

If you have time to do even more research you will learn that yes, botanists have found wild vanilla orchid vines in the PANAT. We show this in the appendices to the present FLAAR Report.

Where has *Vanilla insignis* been found in the **Parque Nacional Yaxha Nakum y Naranjo (PNYNN)?**

So far, vanilla orchids are not listed for Yaxha (or if so, we have not yet found this publication) But many people who live near PNYNN are well aware of wild vanilla orchid vines in PNYNN:

- Gabriella Moretti
- Sebastian de la Hoz
- Juan Carlo de la Hoz
- Teco (Moises Daniel Perez Diaz)

And lots more local people. Once you know that a vanilla orchid vine looks like, you see them many places on both sides of the road between Yaxha and Nakum. Hiking through bajos to other areas of the park we have also found and photographed these vines (but, before May 2022, never saw a single flower).

This vine is very common. Yet the plant list by Dix and Dix seems not to mention any vanilla orchids for the park whatsoever. This is why we hike deep into the bajos, deep into the savannas, high across the hills, far from comfortable hotels; far from a road (though half the wild vanilla orchid vines are visible along the mud trail from Yaxha to Nakum). FLAAR initiated this 4WD road circa 1972 onwards since when there is no road then it is not easy for park rangers to protect the more remote areas. There was no national park at Yaxha or Nakum or nearby when FLAAR was organized in 1969 to initiate mapping Yaxha 1970-1974. So FLAAR encouraged FYDEP (the government organization in charge of Peten in the 1970's) and we spoke with the President of Guatemala when he visited Yaxha in those years, and we spoke with the US national parks service personnel that we were able to find when they were visiting Guatemala. So, we got the Lake Yaxha-Lake Sacnab area, with Nakum, declared a park in 1974. But it took about 19 years to get all the paperwork finished and other individuals and organizations intelligently added Naranjo (I had never visited Naranjo in those years).



I estimate this flower is wilting; not opening.

Photo by Nicholas Hellmuth along the road from Yaxha to Nakum. May 11, 2022. iPhone 13 Pro Max.



Three flowers have withered and totally fallen off. Two flowers bloomed in recent days and are withering (the one at bottom right is perhaps two or three days old; one at upper left is much more recent). Four or five buds. So all together about ten flowers from one inflorescence.

Photo by Nicholas Hellmuth along the road from Yaxha to Nakum. May 11, 2022. iPhone 13 Pro Max.



By having a 3-meter high ladder it is easy to photograph the upper portion of the wild vanilla orchid vine to document that it is hanging down, it is not pegged to the trunk of a tree. That said, I estimate it had to climb up a tree in past years in order to be that high up to hang down. Or the tree it was on blew down but the vine fell off and survived.

Photo by Nicholas Hellmuth along the road from Yaxha to Nakum. May 11, 2022. iPhone 13 Pro Max.



Each of the photographers has their own style, so it is best that each individual dedicates their attention to photographing the rare find of a vanilla orchid vine with flowers (albeit wilted) and buds up and down over four meters. Here Vivi Hurtado is photographing the flowers.

What species of *Vanilla* did Cyrus Lundell find in Petén?

Vanilla fragrans (Salisb.) Ames. San Andres, Lundell 3236. A large fleshy vine; not common, although widely distributed through climax forest. (1937: 56).

For Central Peten Savanna Country (far from PNYNN and PNLT): (1937: 139). Probably in the bajos surrounding the savannas?

Vanilla fragrans (Salisb.) Ames. Vainilla. La Libertad, Aguilar 164. A large fleshy vine; collected in marginal forest. The pods are used for flavoring (1937: 165).

Today *Vanilla fragrans* is a synonym of *Vanilla planifolia*. Here are all the synonyms:

Epidendrum rubrum Lam.
Myrobroma fragrans Salisb. [Illegitimate]
Notylia planifolia (Jacks. ex Andrews) Conz.
Notylia sativa (Schiede) Conz.
Notylia sylvestris (Schiede) Conz. [Illegitimate]
Vanilla aromatica Willd. [Illegitimate]
Vanilla bampsiana Geerinck
Vanilla duckei Huber
Vanilla fragrans Ames [Illegitimate]
Vanilla rubra (Lam.) Urb.
Vanilla sativa Schiede
Vanilla sylvestris Schiede
Vanilla viridiflora Blume

Lundell mentions vanilla vines for several eco-systems (1937: 56, 139). He even found vanilla vines in the savanna area around La Libertad, Peten (ibid.: 165). Of course, not on the savanna itself, but on the trees on the rocky raised areas sprinkled throughout the Peten savannas. Unfortunately, over 70% of the savannas have been obliterated by modern construction, cattle ranches, commercial plantations, etc.

The first question is whether he ever saw a vanilla orchid flower? Since all the modern monographs by Soto and Archila were not available in the 1930's, probably Lundell simply used the estimated name *Vanilla fragrans*? This is trying to be polite since the decades of botanical field work of Lundell was impressive. Finding vanilla vines is easy (they are different in size, shape, and color from other vines and lianas, plus they often hang rather than climb a tree trunk). Everyone on the FLAAR Mesoamerica team can spot a vanilla vine even from the window of the 4x4 pickup. But if Lundell had no flowers available, his "identification" as *Vanilla fragrans* is an assumption; not a botanical identification (unless the leaf size, shape, and position is totally different than all other local vanilla vine species).

Collections of Vanilla species in Neotropical Flora are so paltry I can't believe it.

serv.biokic.asu.edu/neotrop/plantae/collections/list.php

We have found these vines almost every time we hiked through a bajo forest. And I estimate that most of what we have seen is *Vanilla insignis*. Yet the two records in Neotropical Flora are both claimed to be *Vanilla planifolia*. So why were NONE of the orchid flowers that we found in May (in PNYNN and less than 100 km to the west) NONE were *Vanilla planifolia*. The collections on Neotropical Flora were both from year 1993, before Soto, Dressler, Archila and others had provided more precise documentation of all the other species.

What Vanilla been found in the Petén by others?

Atran et al. 2004: 176 also use the name *Vanilla fragrans*, the synonym of *Vanilla planifolia*. *Vanilla fragrans* is the antiquated name used, surprisingly still in year 2004. I would estimate that *Vanilla insignis* is also present in the Petén Itzá areas but since you can't identify the species without the flower, and since it flowers only 3 hours one day a year, it is tough to identify the vine. Plus, I estimate that all earlier botanists named whatever wild vanilla vine *Vanilla fragrans* kind of copy-and-paste style.

Vanilla insignis in Belize?

Balick, Nee and Atha (2000) provide helpful list, but do not mention *Vanilla insignis*:

Vanilla hartii Rolfe — **Ref:** McLeish et al., 1995: 53, photo. 37; Catling & Catling, 1988: 90; Ames & Correll, 1985: 725. — **Habit:** Herb, epiphytic. — **Voucher:** *Gentle 4560* (Ames & Correll, 1985), 7673 LL (Catling & Catling, 1988).

Vanilla pfaviana Rchb. f. — **Ref:** McLeish et al., 1995: 53, photo. 38; Catling & Catling, 1988: 90; Ames & Correll, 1985: 55, 726, fig. 15. — **Nv:** vainilla, vanilla. — **Habit:** Herb, epiphytic. — **Voucher:** *Gentle 2894 K* (Ames & Correll, 1985; McLeish et al., 1995), 6152 (Ames & Correll, 1985), 6957 (Ames & Correll, 1985), 7023 (Ames & Correll, 1985), 7078 (Ames & Correll, 1985), 7108 (Ames & Correll, 1985).

Vanilla planifolia Jacks. — **Ref:** McLeish et al., 1995: 53, fig. 20, photo. 39; Catling & Catling, 1988: 90; Ames & Correll, 1985: 57, 726, fig. 16. — **Loc Use:** RITL. — **Reg Use:** SPC, MED. — **Nv:** vanilla. — **Habit:** Herb, epiphytic. — **Note:** *Vanilla pompona* Schiede, misapplied.

(Balick, Nee and Atha 2000: 171)

Notable that no use (neither edible nor medicinal) suggested for the first two species. And for *Vanilla planifolia* ritual, SPC and medicinal. SPC = spice, flavorings, preservatives. I would select flavoring for vanilla. For the Lacandon area of Chiapas you can add PRD, product, seeds for necklaces (Cook 2016: 34).

Soto and Dressler (2010: 287) consider *V. pfaviana* is a synonym of *V. inodora*. This species may not produce a fragrance that you can harvest?

In which States of Mexico is *Vanilla insignis* listed by Villaseñor?

Vanilla cribbiana Soto Arenas CHIS, OAX

Vanilla hartii Rolfe CHIS

Vanilla helleri A.D. Hawkes OAX

Vanilla inodora Schiede CHIS, COL, GRO, JAL, OAX, PUE, TAB, VER

Vanilla insignis Ames CAM, CHIS, OAX, PUE, QROO, TAB, VER, YUC

Vanilla odorata C. Presl. CAM, CHIS, OAX, QROO, TAB, VER

Vanilla phaeantha Rchb. f. QROO, YUC

Vanilla planifolia G. Jacks. CAM, CHIS, OAX, PUE, QRO, QROO, SLP, TAB, VER, YUC

Vanilla pompona Schiede CHIS, COL, GRO, JAL, MICH, NAY, OAX, VER

(Villaseñor 2016: 827)

- If *Vanilla insignis* is in Campeche (borders northern Peten, where vanilla has been found in El Mirador / Rio Azul).
- If *Vanilla insignis* is found in Tabasco (lowlands adjacent to western Peten)
- If *Vanilla insignis* is found in Yucatan state;
- If *Vanilla insignis* is found in Quintana Roo which borders on northern Belize

Surely more *Vanilla insignis* should be added to the list of vanilla species for Belize.

Is *Vanilla insignis* from the Maya Highlands or from the Maya Lowlands (or both)?

Vanilla insignis is a vanilla orchid species of the Maya Lowlands. Other species are in the Maya Highlands.

Vanilla insignis in Chiapas

Martinez, Ramos and Chiang provide a super-helpful list of five species for the Lacandona region of Chiapas, Mexico.

- *Vanilla insignis*
- *Vanilla inodora*
- *Vanilla odorata*
- *Vanilla planifolia*
- *Vanilla pompona*

(1994: 176).

Based on this list it would be helpful for botanists and ethnobotanists working in the Lacandon regions of Chiapas to tabulate which species are in which Lacandon areas. What ecosystem does each species prefer. And, when do they bloom.



Photograph by: Edwin Solares. FLAAR Mesoamérica. San José, La Gloria. May 5, 2022. 10:29 am.
Camera: Sony Alpha 1. Settings: 1/200 sec; f/9; ISO 2,000.

Chapter 4

Uses of Vanilla



Photograph by: Nicholas Hellmuth.FLAAR Mesoamérica. May 7, 2022.
Camera: iPhone 13 Pro Max.

Fragrance, for lots more than **just flavoring Cacao Beverages**

Even though I like chocolate ice cream, I also like vanilla ice cream. But vanilla extracts are used for more purposes than there is space to list here (since the current report is on which species are in which parts of the Maya Lowlands). Pure true vanilla extract is notably safer for you than chemically manufactured artificial vanilla.

After reading the health benefits of vanilla extract on-line, I would almost want to name it a super-food. I definitely will be looking to buy some and trying it out. Snag is finding true vanilla that is not adulterated.

Was Vanilla mixed **with Mayan Tobacco?**

The Maya put many of the same flavorings into their tobacco that they featured for their chocolate drink. Even today, many of the major international brands of cigarettes have cacao (cocoa) inside. Would be interesting to learn whether vanilla is also in cigarettes. And, no surprise, yes, vanilla is included in registered ingredients in some cigarettes by RJ Reynolds

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Was Vanilla mixed **with Copal for Incense?**

Several flavorings for Mayan incense were also flavorings used for edible foods. It would be great for a student to do a PhD dissertation on "Mayan vanilla: how many different ways it was used over a thousand years ago".

If Atole drink is flavored with vanilla, then **surely the Classic Maya had it?**

It is still debated whether the Classic Maya had tortillas (since they consumed their maize as atole and other liquid recipes and as "cornbread"). Assuming that atole is a drink for thousands of years, if vanilla was indeed a standard flavoring, then most likely the Maya were able to raise or harvest wild vanilla (before Totonac traders from Veracruz arrived).

Practical uses of *Vanilla insignis* for the Lacandon Maya of Chiapas

“Dried pieces of whole beans are strung in necklaces.” This is listed as *Vanilla planifolia* (Cook 2016: 34).

buk'luch' (äh) vanilla. Orchidaceae *Vanilla planifolia* Jacks. ex Andrews, syn. *Vanilla fragrans* Ames. A native of Mexico, vanilla is a vine that produces clusters of large, smooth, thick-skinned pods approximately 12.7 cm to 15.24 (5–6") long that contain numerous, miniscule black seeds resembling coarse dust. According to KM and KP, the resin in the pods severely irritates the eyes, so caution must be taken when picking and processing them. Dried pieces are tied onto necklaces, to add fragrance. Use: uuh 'necklaces'; Part: sool uwich 'shell of the bean'; Prep: Ahayk'intik uwich, pachil axet'ik uxot' 'You spread out the fruits in the sun to dry and then break them into small pieces. Thes: ak' (Fig. 5.18a, b). [Note: buclux. *Vanilla* sp. (Duran 1999); siislik', siisb'ik' [Itz.]. *Vanilla fragrans* (Atran et al. 2004); siis b'ik [Yuc]. *Vanilla fragrans* (in, Atran et al. 2004.) [Source : BM; KM; KP /

(Cook 2016:119).

Is there potential medicinal usage of *Vanilla insignis* by local people

Balick and Arvigo mention *Vanilla planifolia* as a love charm (Balick and Arvigo 2015: 151-152). Keep in mind that *Vanilla insignis* is not (yet) listed for Belize in monographs on plants of Belize. You find *Vanilla insignis* listed for Belize only in a few REA reports on specific areas and dating after the year 2000 of Balick, Nee and Atha.

Chapter 5



Photograph by: Norma Estefany Cho Cu.FLAAR Mesoamérica. San José, La Gloria. May 11, 2022. 10:29 am.
Camera: iPhone 13 Pro Max.

Concluding Discussion and Summary on *Vanilla insignis*

The goal of our May 2022 field trip between Yaxha and Nakum was to do aerial photographs of the two *Aechmea magdalenae* pital aguada areas and the separate and unrelated two corozera palm areas. One of these corozal habitats turns out to have unexpected number of tall botan palms (*Sabal* sp.). The northern corozera has fewer tall botan palms. But you need aerial photos to estimate and show the differences.

We have been doing botanical and ethnobotanical field work in the areas between Yaxha and Nakum since 2018 so are familiar with the quantity of wild vanilla orchid vines that are “visible everywhere” as you hike or drive through this area. But when Vivi Hurtado saw an over 4-meter high vine with buds and wilted flowers all up and down, we were amazed. And then Byron Pacay saw a full fresh wild vanilla orchid after he had gotten off the motorcycle to study a wild ocellated turkey (on a mud road with ruts so deep that even a 4x4 pickup truck will set stuck, you need a guide on a motorcycle to suggest which part of the road to avoid). In other words, we had no idea that mid-May 2022 was when wild vanilla orchid vines were in full flowering mode.

Before we unexpectedly found the two vines between Yaxha and Nakum, we had found another vanilla orchid vine flowering a few days before about 60 kilometers to the west. So, I decided to publish these photographs to assist botanists, ethnobotanists, students, botanical gardens and orchid societies around the world. Plus, I wish to remind ourselves that not all vanilla “identifications” of past decades are reliable. Our ID is based on Fredy Archila who knows vanilla orchids of Guatemala inside out.

I estimate that 25% to 50% of the “identifications” of a wild vanilla orchid vine in central Peten as *Vanilla fragrans* is a double error: first because that is a synonym of *Vanilla planifolia*. Second because I bet if there is no flower the botanist simply uses the most popular common name (*Vanilla fragrans* in antiquated naming or today *Vanilla planifolia* because that’s what is expected). It is also notable that most reports on Peten list only one single solitary vanilla orchid species (*V. fragrans/V. planifolia*). Yet we have found *Vanilla insignis* in both PNYNN and east of the road to Carmelita (east of Los Pescaditos). The true number of vanilla orchid vines in the Maya Lowlands is between three and up to five species:

- *Vanilla hartii* Rolfe, Belize, Chiapas
- *Vanilla inodora* Schiede, Chiapas, Tabasco
- *Vanilla insignis* Ames, Campeche, Chiapas, Quintana Roo, Tabasco, Yucatan, Peten, (not listed for Belize by Balick, Nee and Atha 2000).
- *Vanilla odorata* C. Presl., Campeche, Chiapas, Quintana Roo, Tabasco (so should for sure be in adjacent Peten).
- *Vanilla pfaviana* Rchb. f., Belize (not listed for Mexico by Villasenor). Soto and Dressler (2010: 287) consider *V. pfaviana* is a synonym of *V. inodora*.
- *Vanilla planifolia* Jacks., Campeche, Chiapas, Quintana Roo, Tabasco, Yucatan, Belize

If

- If *Vanilla insignis* is found in Quintana Roo which is adjacent to northern Belize;
- If *Vanilla insignis* is found in PNYNN which is less than 50 km from nearby Belize

Then surely *Vanilla insignis* is findable in Belize. Whew, finally I found *Vanilla insignis* listed for northern Belize (Holst et al. 2019: 14).

Northern Belize here is considered to be the three northern political districts, Belize, Orange Walk, and Corozal, and the northern Cayo lowlands (< 200 m elevation; basically, north of the Western Highway). The region is markedly dryer than the humid, mountainous south, which strongly influences its epiphyte composition. In the north, drought-tolerant epiphytes abound, especially cacti, bromeliads, and orchids. Not so much in terms of species numbers, but of numbers of individuals. (ibid.: 16).

Additional Future Field Work **would be helpful**

Book after book, monograph after monograph, article after article mentions primarily *Vanilla planifolia*. Our goal is to put *Vanilla insignis* on the map. This wild vanilla orchid vine is very common in many areas of Peten and surrounding parts of Mesoamerica. But if no one hikes into the bajos to find and photograph it, *Vanilla insignis* will continue to be lost. Fortunately, the orchidologists Soto and Dressler have a description of *Vanilla insignis* that is better than anything else I have read, and, more important, already in year 2009 they realize this vanilla is in Belize:

Distribution: The Caribbean watershed of N Central America, in Honduras, Belize, Guatemala, and Mexico (Yucatán, Quintana Roo, Campeche, Chiapas, Tabasco, Oaxaca, and Veracruz; perhaps also in Puebla).

(Soto and Dressler 2010: 318).

So now would help if an orchid enthusiast or orchid society or botanical garden could provide support so our Mayan plant scouts can find:

- *Vanilla hartii* Rolfe
- *Vanilla inodora* Schiede
- *Vanilla odorata* C. Presl.
- *Vanilla planifolia* Jacks.

Teco (Moisés Pérez Díaz) is a park ranger at PNYNN for about two decades. He said he worked for four years trying to find the orchid vines in flowering stage (since he knows these orchids need flowers to be identified as to species). He knows the Peten inside out. He knows where the orchid vines are as do many people from this area. But the chance of being in front of a vine during the 3 hours that it flowers is definitely more than “one in a million.” But with adequate funding, the team of plant scouts could check each vine every month to see when it is starting to bud. Then check each week when the buds are growing thicker. They every MORNING which the buds are ready to bloom. With an iPhone 13 Pro Max you can accomplish outstanding photos, including macro of details of the flowers. So, we would like to provide the plant scouts with this cell phone (that way they can send the photos; plus, they can alert us one week in advance so our team can drive the 1,120 kilometers round trip to experience and photograph these flowers). Plus they need gasoline for their motorcycles and expenses for the wear-and-tear to any vehicle that tries to travel on these unrepaired, unleveled, and often intransitable “roads”.

Helpful additional Future Research: Is there a Hieroglyph for Vanilla on Vases or Bowls?

Every several years epigraphers are able to read more of the hieroglyphs on Classic Maya ceramic vases and bowls and plates. The vases and bowls often clearly mention cacao. Often, they mention ingredients or kinds of cacao beverages (cacao mixed with maize, as one). The word itsimte' (many different spellings) has been estimated to be various concepts; some epigraphers suggest deities; others suggest plants; but I bet it refers to *Clerodendrum linguistrinum*, a plant we have found along the shores of tributaries of Rio San Pedro and Arroyo Petexbatun (both in different parts of Peten). You should also be able to find it along other rivers. Itsimte' is a flavoring.

Final Observation

Neotropical Flora database is one of the best in the world. This is a digital database of all the leading botanical gardens in the world, New York Botanical Garden, KEW, MOBOT and lots more. I have been to all three (obviously to MOBOT since the Hellmuth family live in St Louis for generations). But when I searched ALL COLLECTIONS, for where *Vanilla insignis* had been collected, I found only one lonely collection by Ames. The lack of date and local of where in Guatemala was not the issue. The reality is that the great botanists of the current and last century have collected not many specimens.

I can sympathize with them since in 50+ years, over half a century, the first wild vanilla orchids that we found in the Peten were during May 2022. So, in one single month the team of FLAAR (USA) and FLAAR Mesoamérica (Guatemala) found two different wild vanilla orchid vines IN FULL FLOWER. And our photos show the flower from all sides; not flattened in a drawer. Plus, we document in what part of Peten so botanists can return there in a future year and find even more.

Plus we have found hundreds of wild vanilla orchid vines in Izabal and in Alta Verapaz. I also estimate that Fredy Archila has documented even more.

Appendix A

Wild Vanilla Orchid Species of Mexico (and whether they are also wild in Guatemala)

I put in bold the orchid species listed by Villaseñor 2016: 827 for where vanilla orchids are found in Mexico.

Oaxaca has more vanilla orchid species than the Olmec homeland of Veracruz and Tabasco. Chiapas also has more vanilla orchid species than Veracruz.

Neotropical Flora database has no returns for *Vanilla costaricensis*. For *Vanilla calyculata* has one specimen for Honduras. *Vanilla dressleri* and *Vanilla trigonocarpa* are listed for Colombia, Panama and Costa Rica so not really a Mesoamerican vanilla. *Vanilla sarapiquensis* is listed just for Costa Rica.

Each botanist lists different areas for different species. So if you were doing a MA thesis on wild vanilla orchid vine species of Mesoamerica you could improve this tabulation. But here is a start.

	Yucatan, Campeche, Quintana Roo	Chiapas	Oaxaca	Tabasco	Veracruz	Guatemala	Belize	Honduras
<i>Vanilla calyculata</i>								Honduras
<i>Vanilla cribbiana</i>		Chiapas	Oaxaca			Guatemala, Ixcan & elsewhere	Belize	Honduras
<i>Vanilla hartii</i>		Chiapas				Guatemala, Ixcan	Belize	
<i>Vanilla helleri</i>			Oaxaca					
<i>Vanilla inodorata</i>	Yucatán Peninsula	Chiapas	Oaxaca	Tabasco	Veracruz	Guatemala, Ixcan	Belize	
<i>Vanilla insignis</i>	Yucatán Peninsula		Oaxaca	Tabasco	Veracruz	Guatemala, Ixcan		
<i>Vanilla martinezii</i>						Guatemala, Ixcan		
<i>Vanilla odorata</i>	Yucatán Peninsula	Chiapas	Oaxaca		Veracruz		Belize	
<i>Vanilla phaeantha</i>	Yucatán Peninsula							
<i>Vanilla planifolia</i>	Yucatán Peninsula	Chiapas	Oaxaca	Tabasco	Veracruz	Guatemala, Ixcan & elsewhere	Belize	Honduras
<i>Vanilla pompona</i>	Yucatán Peninsula	Chiapas	Oaxaca		Veracruz			

The main areas of wild vanilla in Mexico are Veracruz, Oaxaca, and Chiapas. But wild vanilla is also found occasionally in Tabasco, Campeche, Quintana Roo, and elsewhere.

Although almost every web page in the world focuses on *Vanilla planifolia* as the commercial crop of Mexico, in fact *Vanilla pompona* is also grown to eat (Cameron 2011: 46). The third species which is occasionally grown commercially is *Vanilla odorata* (Soto 2003).

Oaxaca info is from Soto and Salazar (2004: 295).

Vanilla sativa and *Vanilla sylvestris* are from (Ossenbach 2009: 26).



Photograph by: Norma Estefany Cho Cu, FLAAR Mesoamérica. May 11, 2022.
Camera: iPhone 13 Pro Max.

Appendix B

More Notes on Presence of Wild Vanilla Orchid Vines in Guatemala

(Mis)spelling and punctuation is what is in the PDF on-line of Soto and Dressler 2010: 335). I do not know whether these are errors of scanning software or were in the original publication.

Vanilla cribbiana is found in the following parts of Guatemala:

GUATEMALA: PETEN: Fleshy epiphytic vine. Canchacán, in high rain forest of southeastern Petén. July 14 1959. C.L. Lundell 16457 *LL (x2, buds)! MO(3832548)! "Vianilla", vine, fruits black, fragrant, Dolores, in low forest of pinal about 800 m south of the village on the Machaquila Road, May 18, 1961, E. Contreras 2333 MEXU (511605)! NY! LL (fruit)! LL (buds)! "Vainilla" Fleshy vine, fruit green; Dolores, on Río Mopan trail, in high forest, October 17, 1961, E. Contreras 3063 LL (fruit)! BELIZE: STANN CREEK: "vainilla". Vine; fls., yellow. In high ridge on hill top. Middlesex, 2 July 1939. P.H. Gentle 2894 *AMES (58082)! K! LL! NY! TOLEDO: Jimmy cut, Alt. 40 m, vive, hanging from tree, no flowering or fruiting, stiff, thick leaves, 1973, C. Whitefoord 1816 BM! HONDURAS: ATLANTIDA: Near Tela. Guaymas. Clambering over tree. March 17, 1923 O. Ames II 211AMES (36945, fruit)!

(Soto and Dressler 2010: 302-303).

Vanilla hartii is found in the following parts of Guatemala:

GUATEMALA:

IZABAL: Leaves subcoriaceous, dark dull green above, slightly paler dull green below. Stem terete, dull green. Petals and sepals pale greenish-white. Lip white. Leaves somewhat narrower than in typical *V. fragrans*. Swamps of Salomón Creek, 1/2-1 mi. south of Bananera, alt. 50 m. April 6, 1940. J.A. Steyermark 38944 *F (1043051)! [cf.] Quebradas, 19-22, May 1919, H. Pittier 8589A NY (sterile)! *US (1013493; sterile)!

(Soto and Dressler 2010: 308).

Vanilla inodora is found in the following parts of Guatemala:

Vanilla inodora is found in more areas of Guatemala than other species:

GUATEMALA: IZABAL: [cf., sterile] wet forest, "Vainilla". Creeping on tree trunk. Near Entre Ríos, alt. about 18 m., April 30, 1939, P.C. Standley 72709 F (991636)! ESCUINTLA: [cf., sterile] El Zapote, in jungle, on tree of Ficus, April 9, 1937, W.C. Muescher 12480 F (905455)! SAN MARCOS: [sterile] "vainilla", climbing, leaves fleshy coriaceous, rich green above, practically same color but slightly paler beneath, above Finca El Porvenir on "Todos Santos Chiquitos", lower south facing slopes of Volcán Tajumulco, alt. 1300-1500 m, March 7, 1940, J.A. Steyermark 37076 F (1041850)! HUEHUETENANGO: [cf.] Epiphyte, alt., At 3000 ft. alt. Cerro Chiblac, between San Rafael and Ixcán, Sierra de los Cuchumatanes, July 22, 1942, J.A. Steyermark 49171 *AMES (63277, sterile)! F(1495682)! SUCHITEPEQUEZ: [cf., sterile] Epiphyte on tree on bark, leaves fleshy subcoriaceous, dull dark green above, dull green beneath, stem pale green, in cafetal on opposite side of Finca, southern lower slopes of Volcán Zunil, vicinity of Finca Las Nubes, along Quebrada Chita, east of Pueblo Nuevo, alt. 500-800 m, Feb 2, 1940, J.A. Steyermark 35412 F (1041244)! BAJA VERAPAZ: Wald in Paujal, 1000 met April 1907, Bl. grün, Lippe weiss, H. von Türckheim II 1764 *US (825825)!

(Soto and Dressler 2010: 315).

Vanilla insignis is found in the following parts of Guatemala:

GUATEMALA: IZABAL: [sterile] climbing on dry pine slope; leaves coriaceous, dull green above, paler dull green beneath, stems dull olive-green, warty rugulose, with a sulcation on each side, between Milla 42.5 and ridge, 6 miles from Izabal, Montaña del Mico, 65-800 m altitude, April 1, 1949 J.A. Steyermark 38539 F (1043863)! [cf., fruit] A 8 km al NO de El Estor, 210 m s.n.m., hierba trepadora con fruto, sabana, 30 agosto 1988, E. Martínez 23348 & D. Stevens MEXU (480867)! MO (3656561)! Punta Palma, Sto. Tomás, 100 m de la entrada de la playa por el lado norte, 3 ó 4 plantas en la playa, 22 febrero 1998, M. Dix sub M. Soto 8611 AMO! ALTA VERAPAZ: [cf., sterile] Climbing, stems terete, deep green, savanna north of Concepción, 3-5 miles southeast of Finca Yalpemech, near Alta Verapaz- Petén boundary line, alt. 100-110 m, March 23, 1942, J.A. Steyermark 45233 *AMES (sterile, 63988)! F (1195510)! BAJA VERAPAZ: [cf.] Jocoló, climbing up trees, wild species of Vanilla, fruits said to be short, used as flavoring, 100 ft, Jan 30 1921, H. Johnson 1178 AMES (22753, sterile, perhaps *V. cribbiana*)! PETEN: "Vainilla", fleshy vine, Tikal National Park, Bajo de Santa Fé, salida de Arroyo Corriental, in tintal on Aguada Términos road, March-June, 1959, C.L. Lundell 15940 *LL (fruit)! same data C.L. Lundell 15818 *LL (fruit)! BELIZE: COROZAL: Maskall, Dec. 1933, P. Gentle 1063 *AMES (40496, sterile)! NY (fruit)! TOLEDO: "Vianilla", vine, in cohune ridge, Cañada Hill- Alta Vista Road, November 2, 1953, P.H. Gentle 8054 *LL (fruit)!

(Soto and Dressler 2010: 320).

Vanilla martinezii is found in the following parts of Guatemala:

TYPE: GUATEMALA: IZABAL: Mpio. Livingston, El Golfete, a 20.4 km al NE de Río Dulce por lancha camino a Calix, bejuco herbáceo, flor verde con amarillo y labelo blanco; selva mediana perennifolia 'swampo', 15°47'06"N, 88°51'42"W; E. Martínez S. 36410 y D. Alvarez, holo. MEXU!, iso. AMO! BIGUA! MO!

Distribution: Known only from eastern Guatemala, but Also, to be expected from adjacent wet areas of Belize and Honduras. It may also be native to Mexico. DNA from a sterile specimen of a membranaceous *Vanilla* collected in Crucero Corozal, in the Selva Lacandona, Chiapas, Mexico, A. Ibarra P. 2222?, was sequenced (ITS, matK), and it shows a strong relationship to *V. martinezii*, yet it seems different from the sympatric *V. inodora*; we suppose that it belongs to *V. martinezii*, although its sequences are somewhat divergent from the Guatemalan material. This locality is known to have populations of very thermophilous plants, that are very rare in other rain forest areas of Mexico (e.g. *Lacandonia schismatica*, *Chysis limminghei*, *Warrea costaricensis*, *Ligeophila clavigera*, *Specklinia haberi*, *Maxillaria alba*); furthermore, the substrates in this area is, partially flooded and with peat-like soils. Ecology: In lowland, wet, swampy areas of high rainfall. Locally abundant. Flowering in February and July. As far as we know, this vine grows only on islets in the delta of the Polochic River into Lake Izabal and similar habitats near the coast in the area known as Golfete; its habitat could be very specific, since these islets have an unusual peat-like soil. In the only flower that we have examined, the midlobe of the stigma is perpendicular to the column body, and the anther is also protruding. The fruit set in *Vanilla martinezii* is very high (up to 53% in a clone) which suggests that it could be self-pollinated.

(Soto and Dressler 2010: 320, 322).

Other records: GUATEMALA: IZABAL: Creek Lagarto, Ensenada de los Lagartos, El Estor, 2 m s.n.m., bejuco, flor blanca, selva mediana perennifolia inundable, 16 julio 1988, E. Martínez 22790, P. Tenorio, H. Droege & M. Díaz MEXU (480869)! Lago Izabal, desembocadura del Río Polochic, Creek Lagarto, al SW de El Estor, selva mediana inundable con *Pachira aquatica*, sobre suelos con mucha materia orgánica (peat), con *Epidendrum stamfordianum*, *E. flexuosum*, *E. cardiochilum*, *E. raniferum*, *Oncidium sphacelatum*, *O. luridum*, *Pleurothallis marginata*, *P. sertularioides*, *Maxillaria crassifolia*, *M. elatior*, *Gongora* aff. *quinquinervis*, *Coryanthes picturata*, *Myrmecophylla brysiana*, *Sobralia decora*; cerca del nivel del mar, ca. 15°28'N, 89°23'W; común, hasta de 10 m de alto; 24 febrero 1998, M. Soto 8601a AMO! mismos datos, 23 cápsulas de 43 flores, M. Soto 8602a AMO!

(Soto and Dressler 2010: 320, 322).

Vanilla is very common in many areas of the Departamento of Izabal. But in gardens, has often been brought in; though often in gardens is simply brought from a kilometer or so away (so is native to that region).

Vanilla odorata is found in the following parts of Guatemala:

GUATEMALA: IZABAL: [cf., sterile] Twining vine; leaves deep green, succulent; fruit green, thick and succulent, twisted, exuding clear thick liquid when crushed; faint vanilla odor. Quebradas, 19-22 May 1919, H. Pittier 8589A NY! US (1013492); ALTA VERAPAZ: "Vainillita" Chirujija Oxec.; near the Finca Sepacuité, April 23, 1902, O.F. Cook & R.F. Griggs 735 *US (408445)! PETEN: "Vainilla". Fleshy vine, Tikal National Park, Tikal, in botanal north of hotel, January 20, 1961 E. Contreras 1841 *LL (fruit)! La Libertad and vicinity, Aug.-Nov. 1933, M. Aguilar H. 164 *AMES (40519; steril)!

(Soto and Dressler 2010: 326).

Since we found hundreds of wild vanilla orchid vines throughout bajo areas of PNYNN in 2018-2019 and 2021-2022 surely vanilla should be at Tikal. However notable that Soto and Dressler identify the Tikal vine as *Vanilla odorata* whereas Fredy Archila identified the two flowers we found nearby (outside PANAT but not far away) as *Vanilla insignis*. If all Soto and Dressler had was "a fleshy vine" maybe it was not identified on the basis of a flower?

Vanilla planifolia is found in the following parts of Guatemala:

Although *Vanilla planifolia* is the primary commercialized plantation species of vanilla (especially around Papantla, Veracruz, Mexico), in fact it grows wild in many places of Mesoamerica.

BAJA VERAPAZ:

...Rio Polochic, near Tucuru... ALTA VERAPAZ: Flowers pale greenish; lip slightly finely fringed with slight crests down middle. Vicinity of Finca Yalpemech, near Alta Verapaz-Petén boundary line, alt. 100-120 m. March 24, 1942, J.A. Steyermark 45286 *AMES (62981)! *F (1195546)! PETEN: "Vianilla", vine, flowers green; Dolores, in low forest about 2 km. 100 m south of village, May 3, 1961; E. Contreras 2239 *LL! IZABAL: Large herbaceous vine, wet thicket, frequent, vicinity of Puerto Barrios, at sea level, June 2-6, 1922, P.C. Standley 25064 *AMES (22674, fruit)!

(Soto and Dressler 2010: 335).

This short publication is essential to see where each species has been found in Mexico and Guatemala.

Appendix B

Mesoamerican Words for Vanilla Nicholas Hellmuth and Elena Bout

In 2018 Elena Bout and Hellmuth initiated this list of words in Mesoamerican languages for Vanilla. Needs more work but it helps to go further when we share what we have already found.

1660s, "pod of the vanilla plant," from Spanish vainilla "vanilla plant," literally "little pod," diminutive of vaina "sheath," from Latin vagina "sheath of an ear of grain, hull of a plant". So called from the shape of the pods. European discovery 1521 by Hernando Cortes' soldiers on reconnaissance in southeastern Mexico. Meaning "flavoring extracted from the vanilla bean" is attested by 1728. Meaning "conventional, of ordinary sexual preferences" is 1970s, from notion of whiteness and the common choice of vanilla ice cream. (Online etymology dictionary)

When searching for translations you have to be careful whether you are getting the word for

- Vanilla flower
- Vanilla plant (vine)
- Vanilla, the edible pod (this is the translation I am most interested in, but all three are needed (flower, vine, and edible part(s))).

The challenge is that in some languages we are told that "the same word is for all three." However, this I doubt since in English we have three sets of words, and in Q'eqchi' and other languages they include the word "che'" in various regionally preferred spelling variations. Che' means tree.

There are several really good ethnobotanical studies which tackle the Mayan thought concepts for flower vs vine vs seed pod. That may be needed for all Mayan languages where vanilla orchids are a noticeable part of the landscape: wild or in cacao-achiote orchards.

Nahuatl and Nahua

Although most translations of Vanilla orchids focus on Nahuatl, there was surely also other species of wild vanilla in Central America where Nahua was spoken. So, all these languages are needed.

- caxixanath, the recondite flower
- tlilxochitl, the black flower

Essential is to know whether “the black flower” really means “the black pod from a (remarkable) flower.” I say this because many Mayan languages use the word smoke or even black smoke to name the vanilla.

I do not know of many vanilla flowers which are themselves black. What is “black” is the dried vanilla for flavoring. And this raises the question of whether any Mesoamerican group every used “smoke producing heat” to cure the pods (which may be a reason to get the word “smoke” into the name of the plant (keeping in mind that the name of the seed pod may have been the source of the name of the overall plant.

Another option is based on colonial period Aztec renderings of a vanilla plant; it shows four groups of what are probably the bean pods. But since they are each a three-some, they do look like four black flowers, each with three black petals.

But to document this concept, I would need to see the green vanilla pods turn black while still physically attached to the plant.

The “black petaled vanilla pod-flower” is in Gomez 2008: *Vanilla planifolia*, the First Mesoamerican Orchid illustrated and Notes on the de la Cruz-Badiana Codex. Lankesteriana, Vol. VIII, No. 1, pp. 81-88.

Mayan Languages: **Highlands**

Tz'utujil Mayan dictionary does not have the plant name vainilla (Perez and Hernandez 2001), CHOLSAMAJ.

Che'sib'ik, la vainilla es olorosa, sununk li che'sib'ik, (Academia de Lenguas Mayas de Guatemala n.d. : 399). Che' is the common word for tree in many Mayan languages. Many plant names in Q'eqchi' include the word ik' (ibid.: 84). Sib' is humo, tizne (ibid: 162). Ik with no accent is the word for chile in many Mayan languages.

“tree smoke chile” which raises the question of whether the humo is the wood or the chile. You do “cook” the vanilla pod in very hot water to stop the chemicals from continuing to function as if the pod were still on the tree; you want the vanilla chemicals to turn into vanilla flavor.

If you look at the words for ahumado, you get many Mayan languages with sub'... and even more interestingly: k'isik' (Sakapulteko) and ksib'rik (Sipakapense). Plus, Sib for most of the other languages (Vocabulario comparativo 2003: 280-281).

So “smoked” or “smoke” should be studied to find out how it relates to vanilla? Does the brown color suggest to the Mayan viewers that it has been smoked? Or do they smoke the vanilla to cure it?

The chile aspect is interesting since chile chocolate is a major flavoring for cacao drinks of the Mayan people for centuries: chile chocolate, vanilla, and cacao, plus achiote. There are actually over 50 medicinal plants you can add, using the cacao as a vehicle to ingest the added plant chemicals. But our current study is focused on vanilla.

There is a lot to learn, especially why Yucatec Maya is not closer to Peten or to Lacandon (though I estimate the word in the Yucatec dictionary is not the vanilla plant but something for weaving).

In the K'ekchi' dictionary by Guillermo Sedat (1955: 79).

- ic is chile
- ik is carga (a load you carry)
- ik' is wind, air

Flor de Vanilla - Ratzum che'sib'ik

Vanilla - Che'sib'ik Ru

Frutos de Vanilla - che'sib'ik (all Q'eqchi)

sib'-smoke, Q'eqchi

Sib'- black smoke, Kaqchikel (Macario et al. 2001: 318)

Sib'-smoke Tz'utujil (Mendoza 2001: 641)

Sib'-smoke, K'iche' (Tum et al. 2005: 360) in Diccionario K'iche'

Ik - chile, K'iche'; iq' - wind (Christenson 2003)

sib (adj) smoky-colored; Kiche (Christenson: 110)

Jakalteco: si' (n) firewood

siq (v) to smell something; to sniff; to kiss

si' lena; sik cosa fria sik' tabaco (all with smoke, burning) tzeb' - labrar (madera) (Montejo 2008)

buk: perfumar, sahumar (45) che: cualquiera madera, palo, leño, trozo, garrote, árbol en género (Feldman 1998: 59) Pokom Maya



Photograph by: Edwin Solares. FLAAR Mesoamérica. San José, La Gloria. May 5, 2022. 10:29 am.
Camera: Sony Alpha 1. Settings: 1/200 sec; f/9; ISO 2,000.

Mayan Languages: Lowlands, Yucatec related

Yucatec Maya, Lacandon Maya, Petén Itzá (Itza) Maya

Buk'luch' (Cook 2016: 119, photos on page 121). Totally different than Maya of Peten Itza; totally different from Q'eqchi'. Q'eqchi' and Peten Itza Maya are essentially the same. I would need to learn the word for humo (smoke) in Lacandon Maya. We also need to look in all other dictionaries of Lacandon Maya.

/buclux Lacandon

Buuk – smoke, Lacandon (Dienhart 1989 V.3: 584)

Looch (spelling)– crooked, warped (Bruce 1979: 187)

A French-Lacandon Maya dictionary has burutx for vanilla (Perez 2003: xlvi). He says buuts' is smoke smell or perfume (as in pom incense being burned). But I can't make any sense out of the spelling burutx; and I can't find rutz anywhere).

PEREZ, Patrick

2003 Lexique Lacandon (Maya) Francais/Espagnol. Ministère De La Culture et Centre National De La Recherche Scientifique Map, Unite Mixte de Recherche 694.

But ruutz is *Crescentia alata* or *Crescentia cujete* (ibid.: cix), which now puts "smoky jicara" or "smoky morro" in line with other languages. Bowls made from dried *Crescentia containers* were the #1 drinking container for cacao for thousands of years, and still are today.

Mayan glyph for smoke was b'utz, logogram (according to Montgomery dictionary), recalling the Lacandon bu.

Buts' is a smoke also on Chol. It appears to be two versions so far: with 'smoke' (che'sib'ik and bukluh) and with 'cold' (siisb'ik'), both with second part meaning crooked/warped. What is interesting in one language they have coexisting words for smoke (buts) and cold (sis) in Chol or buk (smoke) and sis (cold) in Yucatec (Siisb'ik vanilla), so can it be that they had second word for vanilla with "smoke" significance along with the "cold" one for different parts of vanilla? sis –cold Chol (Dienhart 1989 V.1: 133)

Lacandon Maya is the Chiapas area version of what was in previous centuries from Yucatec Maya. The Lacandones moved to Chiapas after the Spanish conquest removed the original Cholti-Lacandon speakers. The Yucatec Maya (from Chichen Itza) moved to Lake Peten (Itza) during the late Postclassic (before the Spanish conquest).

Turns out the reason they put T'isil for vanilla is because in Spanish of past centuries (and Maya of past centuries), T'isil was a part of a weaving system (part of a loom-like weaving setup): *entre costureras, el menudo y sutil deshilado que se hace a la orilla de la tela, junto a los dobladillos. U chi' nok'* is another world (for the weaving aspect).

This raises the question of whether "vanilla" comes from "vaina" (vine) or weaving stick (will have to look up the technical jargon).

I am not surprised that a Yucatec Maya dictionary lacks the word for edible vanilla under the word *vainilla*. We now need to look for all the Yucatec Maya words for smoked chile!

Siisiik', siisb'ik', Itza, Peten (Atran, Lois, Ucan 2004: 176)

(Siis-cold, sib'-emanate; b'ik – serpentine, crooked; ik'-adj., word complement/ wind, air)

Siisb'ik in Yucatec

Where *siis*-cold Yucatec (Dienhart 1989 V.1: 132)

Bik –twisted (Bolles 2001)

Buk – smoke, Yucatec, Itza, Chorti, Chol (Dienhart 1989 V.3: 584)

www.famsi.org/reports/96072/b/bi_bik.htm

Mayan Languages: More Lowlands, **Chol, Cholti, Chorti related**

Chizibic – vanilla in Cho'tlí' (Feldman)

www.famsi.org/mayawriting/dictionary/feldman/cholti_dictionary.html

(butz – smell; siz- frio, che-madera) (Cholti Boot 2004)

insis – cold, Ch'orti (Hull 2005: 43); b'i' – stretch out (11); ch'i'-grow Ch'orti (30)

The full name of vanilla in Ch'orti is not clear, but seems to be similar to Cho'tli, having the significance of “cold” and “stretched/twisted” (substance, smell??)

Chol: sib'ik n, gunpowder; pólvora

sib'ik, n. gunpowder; pólvora. Becerra 1935:271 <Sibik> Chol

sik' vtr, smell something; olerlo

sis –cold Chol (Dienhart 1989 V.1: 133)

buts- smoke in Chol (Becerra 1937: 22)



Photograph by: Nicholas Hellmuth.FLAAR Mesoamérica. Yaxha to Nakum. May 11, 2022.
Camera: iPhone 13 Pro Max.

Tabulated Initial Summary of research so far

Language	Word for vanilla	Meaning
Yucatec	Siisb'ik	siis-cold; bik –twisted
Lacandon	Buk'luch', buclux, burutz(x)	buuk-smoke
Itza	Siisiik', siisb'ik'	siis-cold, sib'-emanate; b'ik – serpentine, crooked
Mopan		
Cho'ti'	Chizibic	butz – smell; siz- frio; che-madera
Chol		sib'ik –gunpowder; sik' – smell something; b'uk'-swallow; b'uk'utzu'-smoke; chi'-sweet
Chorti		insis – cold, Ch'orti; b'i' – stretch out; ch'i'-grow
Chuj		
Tzeltal		
Tzotzil		
Q'eqchi	Che'sib'ik	che-madera;
Quiche		sib – smoky-colored; sib'-smoke; ik – chile, iq'- wind
Cakchiquel	Tz'eb'ki'	ki'-sweet; Sib' - black smoke
Tz'utujil		sib'-smoke
Jakalteco		si'-firewood;siq-to smell something; to sniff; si' -lena; sik -cosa fria; sik'-tabaco; tzeb' – madera
Pokomchi		buk-perfumar, sahumar; che-cualquiera madera, palo, leño, trozo, garrote, árbol en género
Nahuatl (Aztec)	tlilxochitl	the black flower
Mixean		
Zoquean		
Mixtec Zapotec		
Totonac		
Xinca	(non-Mayan language of Guatemala)	

This Appendix C should be continued as an MA thesis to get even more languages of Mesoamerica. The following are obviously missing, plus the Olmec language(s).

So all the following languages need to be studied:

- Languages of Veracruz
- Languages of Tabasco
- Languages of Guerrero (many Olmec outposts here)

We have not yet delved into Mixtec, Zapotec, and languages of Oaxaca. But here is one note:

- ita ko'yo: orquídea (CAB)154
- ita nchaka: orquídea
- ndiva: guaje, vainas (CTZ)

Lots more dictionary publications (for all languages) need to be added. Also need to look at ethnobotanical reports on each linguistic area that includes mention of vanilla. The monograph by Cook on the Lacandon Maya is an example. Since there is a lot of wild vanilla in Oaxaca, Mexico, all these languages need to be checked, and Mixe-Zoque of the early Olmec related "pre-Maya" peoples.

Once the words for vanilla (plant, flower, beans and the product of flavoring) of ALL the languages are tabulated, then epigraphers can hopefully find a hieroglyph for vanilla when cacao or other aspects are discussed on Classic Maya vases, bowls or plates.

References Cited and Suggested and Reading on *Vanilla in general and on Vanilla insignis*

Most useful document for this report:

There is not yet any monograph on *Vanilla insignis* that we have yet found. These vines certainly deserve more attention in Guatemala and adjacent countries.

Most helpful article on vanilla orchids:

Articles by Fredy Archila are essential.

Soto Arenas and Dressler 2010 is very helpful (for technical botanical aspects of differentiation of species of vanilla orchids in Mexico and Central America).

AGVIK, E. X.

2011 Enraizamiento y aclimatación de plántulas de *Vanilla planifolia* Andrews, provenientes de cultivo de tejidos con fines de conservación. Thesis, Universidad de San Carlos de Guatemala. 69 pages.

Available online: http://biblioteca.usac.edu.gt/tesis/06/06_3097.pdf

ALIPHAT, M. M.

2009 Huertos y cacaotales mayas: un análisis agroecosistémico. En XXII Simposio de Investigaciones Arqueológicas en Guatemala. Pages 267-275.

Available online:

www.asociaciontikal.com/v2/wp-content/uploads/2017/01/021_-_Aliphat.08.pdf

AMES, Oakes

1934 An Addition to the Genus *Vanilla*. *Botanical Museum Leaflets*, Harvard University, Vol. 2, No. 8. Pages 101-102.

AMES, Oakes and Donovan Stewart CORRELL

1952 Orchids of Guatemala. Fieldiana: Botany Vol. 26, No. 1, Chicago Natural History Museum.

The authors state that because it is not realistic to press a vanilla flower (due to its 3-dimensional shape) that most botanical specimens are not adequate to identify which species is the correct name. They suggest preserving the flowers in alcohol. Nonetheless they do devote several pages to vanilla orchids: pp. 54-60. And, as he suggests, *Vanilla pfaviana* turns out to be same as *Vanilla inodora*.

Zilch mentioned for anywhere in what is today the RBM area of Peten.

Available online:

a600200.us.archive.org/8/items/orchidsofguatemala261ames/orchidsofguatemala261ames.pdf

ARAYA, C., CORDERO, R., PANIAGUA, A. and J. B. AZOFEIFA

2013 Promoviendo la investigación, la extensión y la producción de vainilla en Mesoamérica. I Seminario Internacional de Vainilla. 198 pages.

Primarily on *Vanilla planifolia* of Veracruz, Mexico. But does have one chapter on three vanilla species of the center of Chiapas. As typical of almost all helpful monographs or articles on vanilla, is primarily on the commercial species and does not discuss vanilla of Guatemala or elsewhere in Mesoamerica.

Available online:

[www.gob.mx/cms/uploads/attachment/file/168849/I Seminario Internacional de Vainilla.pdf](http://www.gob.mx/cms/uploads/attachment/file/168849/I_Seminario_Internacional_de_Vainilla.pdf)

ARCHILA, Fredy

1999 Hallazgos importantes en Vanilla/Orchidaceae de Jussieu, para Guatemala. *Revista Guatemalensis* 2(3): 47.

ARCHILA, Fredy

2014 Listado de orquídeas de Guatemala. *Revista Guatemalensis* 17(2): 32-71.

ARCHILA, Fredy and G. CHIRON

2012 Addition à la flore du Guatemala: *Vanilla esquipulensis* (Orchidaceae), espèce des forêts xérophytes. *Richardiana* 13: 3- 12.

ARCHILA Fredy and G. LANCERIO

2010 El batido o Kakao, la bebida de los dioses. *Revista Guatemalensis* 13(1): 1-14.

ARCHILA Fredy, SZLACHETKO, D., CHIRON, Guy, LIPÍŃSKA, M., BERTOLINI, V. and K. MYSTKOWSKA

2018 Orchid Genera and Species in Guatemala. Koeltz Botanical Books. Germany. 724 pages.

We do not yet have this publications; but I estimate this is the best botanical monograph on orchids specifically of Guatemala.

ARCHILA Morales, Fredy, MENCHACA, Rebeca and Guy R. CHIRON

2019 Notes on Mesoamerican orchids. I: Vanilla, with a new species. RICHARDIANA, Jardin Botanique de Guyane. Vol. 3, pp. 71-79.

Available online on several websites:

www.uv.mx/citro/files/2019/05/Publication-Jardin-botanique-de-Guyane-30-Vanilla-rebecae.pdf

ARCHILA Morales, Fredy, MENCHACA, Rebeca and Guy R. CHIRON

2019 Notes on Mesoamerican orchids. II: millenary use in the Q'eqchi communities of the lowlands, with a new Vanilla species. RICHARDIANA, Jardin Botanique de Guyane. Vol. 3, pp. 100-108.

www.richardiana.jardinbotaniquedeguyane.com/wp-content/uploads/2019/10/Publication-Jardin-botanique-de-Guyane-33-Vanilla-cochlearilabia.pdf

ATRAN, Scott, LOIS, Mimena and Edilberto UCAN Ek'

2004 Plants of the Peten Itza' Maya. Museum of Anthropology, Memoirs, Number 38, University of Michigan. 248 pages.

Very helpful and nice collaboration with local Itza' Maya people. But would help in the future to have a single index that has all Latin, Spanish, and English plant names so that you can find plants more easily. Suzanne Cook's Lacandon ethnobotany index is significantly easier to use.

Not available as a download. To help the world learn about the Itza Maya culture and ethnobotany, would be a courtesy of the author and publisher to make as an open searchable PDF as a helpful download.

BALICK, Michael J., NEE, Michael H. and Daniel E. ATHA

2000 Checklist of the Vascular Plants of Belize: With Common Names and Uses. *Memoirs of the New York Botanical Garden* Vol. 85. 246 pages.

BALICK, Michael J. and Rosita ARVIGO

2015 *Messages from the Gods: A Guide to the Useful Plants of Belize*. The New York Botanical Garden, Oxford University Press.

BELLO-Bello, J. J., GARCÍA-García, G. G. and L. IGLESIAS-Andreu

2015 Conservación de vainilla (*Vanilla planifolia* Jacks.) bajo condiciones de lento crecimiento in vitro. *Rev. Fitotec. Mex.* Vol. 38, No. 2. Pages 165-171.

Available online: www.revistafitotecniamexicana.org/documentos/38-2/6a.pdf

BESTELMEYER, Brandon T. and Leeanne E. ALONSO (editors)

2000 A Biological Assessment of Laguna del Tigre National Park, Petén, Guatemala. *RAP Bulletin of Biological Assessment* 16, Conservation International, Washington, DC. 221 pages.

BORY, Séverine, GRISONI, Michel, DUVAL, Marie and Pascale BESSE

2008 Biodiversity and preservation of vanilla: present state of knowledge. *Genet Resour Crop Evol.* No. 55 Pages 551–571.

Available online:

www.academia.edu/4284775/Biodiversity_and_preservation_of_vanilla_present_state_of_knowledge

Very helpful but already 10 years old. Does not discuss the reality of *Vanilla mexicana*, but otherwise does have information on the main topic: *Vanilla planifolia*. Lacks knowledge of Guatemala, Belize, El Salvador, and Honduras: an issue with almost all discussions of vanilla origins: everything is focused on Papantla... (no surprise since it is a world center for vanilla production today). But there were millions of Mayan people and many edible species of vanilla orchids in Guatemala and surely also in Belize and other adjacent countries (more than just Costa Rica). Plus, there are lots of wild orchid species in Tabasco, Chiapas, Quintana Roo, and Campeche.

CAMERON, Ken

2011 Vanilla Orchids. Timber Press. 212 pages.

This is widely considered one of the best general monographs on vanilla of the world for its year (2011). But, much to my surprise, it turns out that it is very similar to all the equally great books on heliconia of the world: their authors are not focused on Guatemala or Belize. The list on pages 194-195 would unlikely be accepted by any geography professor at any university in the Americas: NORTH AMERICA is correct to include Veracruz, but not Tabasco, Yucatan Peninsula or Chiapas (Oaxaca is in the middle of the end of North America).

And his "South America" totally ignores the reality of Central America. Thus, his list of orchids of "Mexico and Central America" is splattered between two incomplete concepts: North America and South America.

Cameron knows more about vanilla orchids than I by far. But since I have lived and worked in southern Mexico, Guatemala, Belize, Honduras, and El Salvador for over half a century, I am familiar with the political geography (and the eco-systems) of this part of the world. Plus, I was already in Papantla, Veracruz, Mexico over 40 years ago. And, being a gringo by birth, I am aware of the total misunderstanding by most US citizens of what is "America", what is "North America" what is "Mexico" and what is Central America as well as what is Mesoamerica which is a missing classification as well.

I bet the list of "all currently recognized Vanilla Species arranged by native distribution" (pp. 192ff) is missing at least one and potentially two Mesoamerican species. Plus, I do not list *Vanilla mexicana* despite it being listed by Cameron for "Mexico to tropical America" (Cameron 2011: 194). Soto and Dressler 2010 do NOT include *Vanilla mexicana* in the 15 species for Mexico, though they do mention *Vanilla mexicana* repeatedly in their discussions. I would want to see a peer-reviewed journal article 100% focused on *Vanilla mexicana* so that I can understand why it is discussed yet NEVER in a "list of species wild in Mexico" by Soto. It is in his charts, his analyses, and his descriptions, yet not in the "list of 15 wild species".

So Cameron including *Vanilla mexicana* is no surprise, and perhaps it really is an actual Mexican species and not a misnomer or a synonym. Ironically even Cameron himself recognizes that *Vanilla mexicana* is not necessarily a reliable name (2011: 41). This makes it all the more curious why *Vanilla mexicana* is in the list of vanilla species without any warning.

CASTILLO-Martínez, R., and E. M. ENGLEMAN

1993 Caracterización de dos tipos de *Vanilla planifolia*. Acta Botánica Mexicana. No. 25. Pages 49-59.

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CONAP - DGPCN/MICUDE

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Helpful web sites for any and all plants

There are several web sites that are helpful even though not of a university or botanical garden or government institute.

However most popular web sites are copy-and-paste (a polite way of saying that their authors do not work out in the field, or even in a botanical garden). Many of these web sites are click bait (they make money when you buy stuff in the advertisements that are all along the sides and in wide banners also. So we prefer to focus on web sites that have reliable information.

<https://serv.biokic.asu.edu/neotrop/plantae/>

Neotropical Flora data base. To start your search click on this page:

<https://serv.biokic.asu.edu/neotrop/plantae/collections/harvestparams.php>

<http://legacy.tropicos.org/NameSearch.aspx?projectid=3>

This is the main SEARCH page.

<https://plantidtools.fieldmuseum.org/pt/rrc/5582>

SEARCH page, but only for collection of the Field Museum herbarium, Chicago.

<https://fieldguides.fieldmuseum.org/guides?category=37>

These field guides are very helpful. Put in the Country (Guatemala) and you get eight photo albums.

<http://enciclovida.mx>

CONABIO. The video they show on their home page shows a wide range of flowers pollinators, a snake and animals. The videos of the insects are great.

www.kew.org/science/tropamerica/imagetdatabase/index.html

Kew gardens in the UK is one of several botanical gardens that I have visited (also New York Botanical Gardens and Missouri Botanical Gardens (MOBOT), in St Louis. Also the botanical garden in Singapore and El Jardín Botánico, the open forest botanical garden in Guatemala City).

www.ThePlantList.org

This is the most reliable botanical web site to find synonyms. In the recent year, only one plant had more synonyms on another botanical web site.

Web pages specifically on *Vanilla*

There are probably “thousands” of web pages on Vanilla. We list a sample:

www.asocoa.com/vanilla-planifolia/

Information and photo.

www.edenproject.com/learn/for-everyone/plant-profiles/vanilla

Facts about vanilla.

www.eol.org/pages/1127948/overview

Photos and information.

www.floresyplantas.net/vanilla-planifolia/

Information and photos.

www.goorchids.northamericanorchidcenter.org/species/vanilla/planifolia/

Information and photos.

Most incomplete list I have yet found. Is incomplete as to what countries each plant is native to and is missing too many species. Equally incomplete is the web site page on vanilla:

www.ecured.cu/Anexo:Especies de Vanilla

www.iucnredlist.org/details/105879483/0

One page but nonetheless helpful info. Not a single photo.

Videos on *Vanilla*

There are hundreds of videos on vanilla but the only one that we found when we Googled “*Vanilla insignis*” is this one:

https://m.facebook.com/watch/?v=792013621462153&_rdr

48:47, so a rather long video. Focused obviously on commercial production (so not wild species).

Homemade video (from cell phone without stabilizer) but nonetheless has information on commercial production of vanilla in Mexico. At 17:38 mentions *Vanilla insignis*.

www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=e935

Information.

orchidrepublic.com/blogs/about-orchids/vanilla-orchids

Abundant information; includes photographs. Lists 110 vanilla orchid species.

www.phytoimages.siu.edu/taxpage/0/genus/Vanilla.html

Has photos of about five or so species, and not specifically or Mesoamerica.

powo.science.kew.org/taxon/urn:lsid:ipni.org:names:262578-2

Information and illustration.

www.sciencedaily.com/releases/2008/08/080821164558.htm

Based on successful vanilla orchid project of Pesach Lubinsky. Seung-Chul Kim, an assistant professor of systematics in the Department of Botany and Plant Sciences and a coauthor on the research paper, served as an advisor to Lubinsky on the project.



From left to right:

Emanuel (experienced drone pilot); Norma (many years as photo assistant now has advanced to being one of the photographers); Nicholas is up on the ladder obviously was happy that Vivi found the orchid vine; Maria Isabela, videos, project fund raising via social media; Sergio, GPS MAP specialist to document where in the PNYNN, RBM each photo is taken; Teco has assisted us now four years when he has time off from being a park ranger; Edwin is lead photographer; Vivian is project manager and organizer and also does photography; Byron sorts, organizes, packs the camping and photography equipment at each base camp and is an experienced driver and mechanic. He handles the portable power generator and oversees setting up the tents when we camp (where no hotel is anywhere near).



WILD

Vanilla Orchid Vine Flowers



FLAAR
MESOAMÉRICA

Part 2

May 2022

East of Los Pescaditos (West of Uaxactun)
Reserva de la Biósfera Maya (RBM)
Petén, Guatemala

NICHOLAS HELLMUTH
FLAAR (USA) & FLAAR MESOAMÉRICA (GUATEMALA)



APPRECIATION FOR FACILITATING THE RESEARCH PROJECTS

Initiation and coordination of the project of cooperation for 2021-2025

Licda. Merle Fernandez, CONAP
Marla Mercedes Bolvito Jerónimo, Unidad de Cooperación Nacional e Internacional de la Secretaría Ejecutiva de CONAP
Licda. Ana Luisa De León N., Directora de Educación para el Desarrollo Sostenible, CONAP
Lic. Apolinario Córdova, CONAP Petén
Ing. Jorge Mario Vazquez (CONAP, Santa Elena, Petén)

Guide and assistance for knowledge of plants and animals, may, 2022

Teco, Moises Daniel Perez Diaz

Guides and equipment porters from La Pasadita during may, 2022

Franklin Pérez Méndez
José Luis Martínez Lemus
Elías Xol Coy
Arnulfo Ismael Pérez

Cook from La Pasadita, May 2022

María Candelaria Xol

Hospitality at Zona de Uso Multiple RBM, Los Pescaditos base camp

Mynor López Barrientos,
CONAP Forest Ranger
Abel Castro, Infantry Lieutenant

Essential storage space of camping equipment between field trips in Los Pescaditos areas of the RBM

Mynor López Barrientos,
CONAP Forest Ranger, CONAP

Essential storage space of camping equipment between field trips in western areas of the RBM

Ing. Sergio Balam, San Benito, Petén

Essential storage space of field work equipment between field trips in PNYNN areas of the RBM

Gabriella Moretti, Ecolodge El Sombrero, before entrance to Yaxha area of PNYNN, Petén.

Drivers of rented 4WD pickup truck (after 4X4 VW Amarok was not able to continue)

Edin Recinos Orellana
Rubencin Recinos Orellana

Assistance during the car accident on the fieldtrip

Sergio Armando Martínez

FLAAR was formed in 1969 to map Yaxha (and nearby Topoxte Island and Nakum). When the president of Guatemala visited Yaxha in the 1970's we mentioned that it was urgent to create a national park to protect both the Mayan heritage and also the original forests. We also spoke with the head of FYDEP to initiate protection of this area as a national park. A few months later the president of Guatemala asked me to accompany him to Tikal, so I had additional time to encourage him to declare Yaxha, Sacnab as a national park. The last day of our field work, I found a painted sign placed at the end of the road downhill that goes near the lake in those years, a sign by FYDEP reading Parque Nacional Laguna Yaxha Laguna Sacnab. It then took over 15 years to formalize the paperwork. Other NGO's and other individuals focused on conservation nudged the government to finish the paperwork plus these other entities intelligently added the Naranjo-Sa'al area to Yaxha and Nakum areas. I had not worked at Naranjo; only at Yaxha, Topoxte Island, and Nakum. I feel proud that FLAAR initiated what today is Parque Nacional Yaxha, Nakum and Naranjo.

Recently we were asked to return for flora, fauna, and biosphere field work from August 2018 to July 2019. This project found and documented with high-resolution photography enough plant, bird, and insect species, plus ecosystems, that as a result we were asked by CONAP to return for five years, 2021-2025 of coordination and cooperation with them, both in the Yaxha, Nakum and Naranjo national park plus all the rest of the Reserva de la Biosfera Maya (over 21,000 square kilometers which is over 5-million acres.



CREDITS

The helpful individuals listed below are part of the FLAAR Mesoamérica research and field work team together with report preparation team.

Author

Nicholas Hellmuth

Photography assistant

Norma Estefany Cho Cu

Compilation of basic data from earlier botanists and ecologists

Nicholas Hellmuth

GPS documentation and route maps

Vivian Hurtado

Plant identification of this orchid (Genus species)

Nicholas Hellmuth

Design concepts for GPS route maps

Sergio Jerez

Bibliography team

Nicholas Hellmuth

Manager of design and layout

Andrea Sánchez Díaz

Vivian Hurtado (for many years)

Maria Jose Toralla (starting in 2022)

Layout of this english edition

Jaqueline González

Editors

Vivian Hurtado

COVER PHOTOGRAPHY

Photograph by: Edwin Solares. FLAAR Mesoamerica, May 5, 2022.

Camera: Sony Alpha A7C. Settings: 1/250 sec; f/3,5; ISO 2,000.

Photographers

Nicholas Hellmuth

Edwin Solares

Norma Estefany Cho Cu

FLAAR was formed in 1969 to map Yaxha (and nearby Topoxte Island and Nakum). When the president of Guatemala visited Yaxha in the 1970's we mentioned that it was urgent to create a national park to protect both the Mayan heritage and also the original forests. We also spoke with the head of FYDEP to initiate protection of this area as a national park. A few months later the president of Guatemala asked me to accompany him to Tikal, so I had additional time to encourage him to declare Yaxha, Sacnab as a national park. The last day of our field work, I found a painted sign placed at the end of the road downhill that goes near the lake in those years, a sign by FYDEP reading Parque Nacional Laguna Yaxha Laguna Sacnab. It then took over 15 years to formalize the paperwork. Other NGO's and other individuals focused on conservation nudged the government to finish the paperwork plus these other entities intelligently added the Naranjo-Sa'al area to Yaxha and Nakum areas. I had not worked at Naranjo; only at Yaxha, Topoxte Island, and Nakum. I feel proud that FLAAR initiated what today is Parque Nacional Yaxha, Nakum and Naranjo.

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Contents

- Introduction to 1-chance in a million to see a wild vanilla orchid vine flowering _____ 1
- Close-up, Side View of this wild Vanilla Orchid Flower of Peten, Guatemala _____ 3
- Close-up, Front View _____ 4
- Close-up, Diagonal View of this wild Vanilla Orchid Flower of Peten, Guatemala _____ 5
- Black Insect wandering around the petals and sepals _____ 6
- View of the wild Orchid Flower from the Back _____ 8
- View of the wild Orchid Flower from Straight Above _____ 9
- Bibliography, List of Suggested Reading on Orchids of Guatemala _____ 10



Introduction to 1-chance in a million to see a wild vanilla orchid vine flowering

While stopped on a mud road in a remote part of the Reserva de la Biósfera Maya (RBM), one of the team saw a wild vanilla vine with a full flower. It was 10:30 am, so the flower sepals were already beginning to close. Wild vanilla orchid vine flowers stay open only a few hours in the morning, one day a year. But since there are an average of 10 flowers per inflorescence, and lots of inflorescences on a single vine, you have a tad more opportunity.

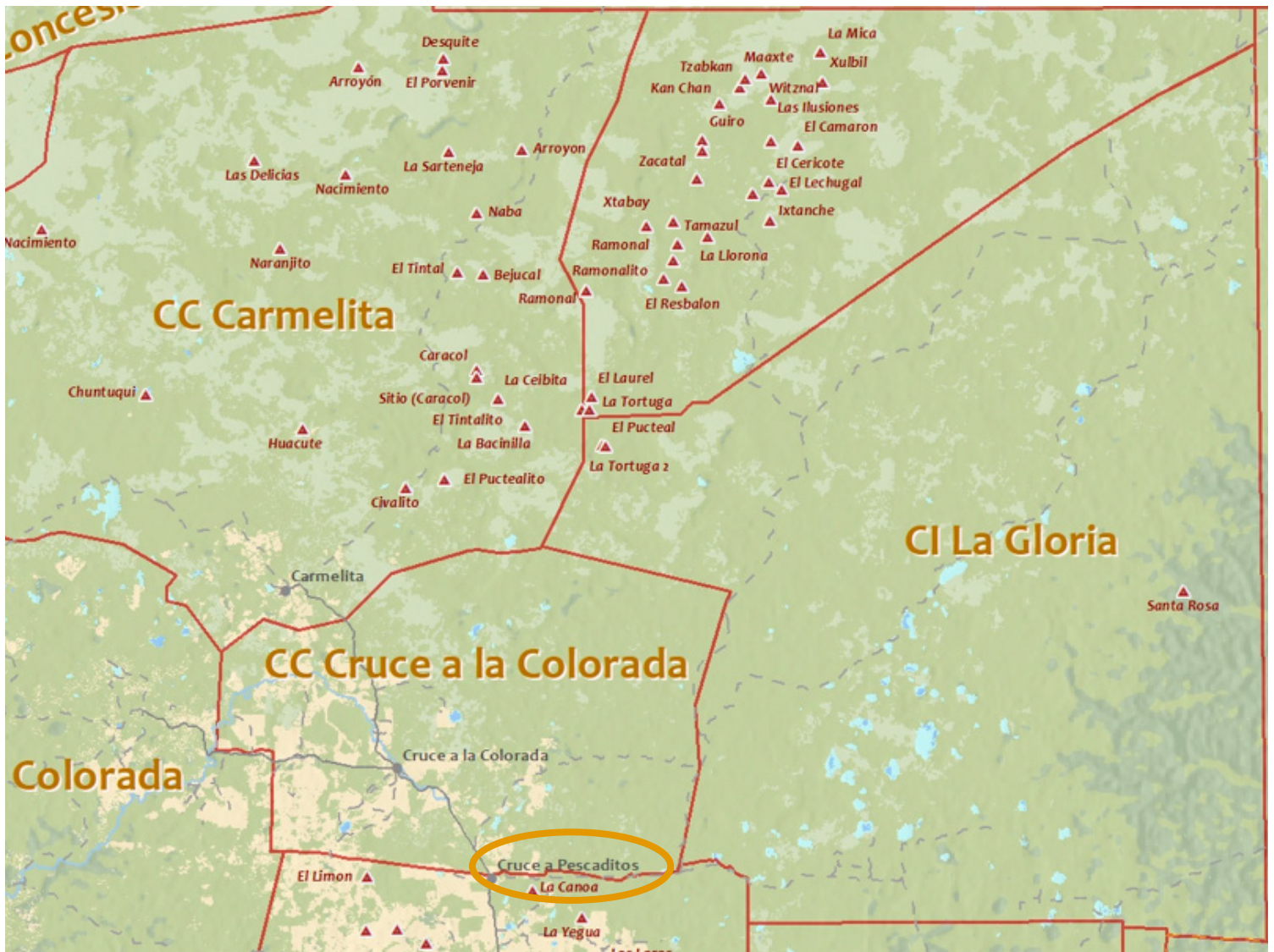
The other eight flowers on this part of the vine had bloomed the previous week and had dropped off completely.

In 50 years exploring rain forests of Mesoamerica, this is the first time I have chanced to be in front of a wild vanilla orchid vine of Petén when it flowered. A previous year we had driven 300 kilometers, taken a long boat ride, then climbed a steep hill overlooking the Amatique Bay of the Caribbean area of eastern Izabal, Guatemala. All that effort because one of our helpful plant scouts, Lucas Cuz, had told us he had seen a wild orchid vine flowering and it still had buds. So, within a few hours we rushed off to reach this vanilla orchid vine to document its flowers. This is the initiative, energy, and photographic

capability that the local conservation and flora/fauna/ecosystem preservation institutes appreciate.

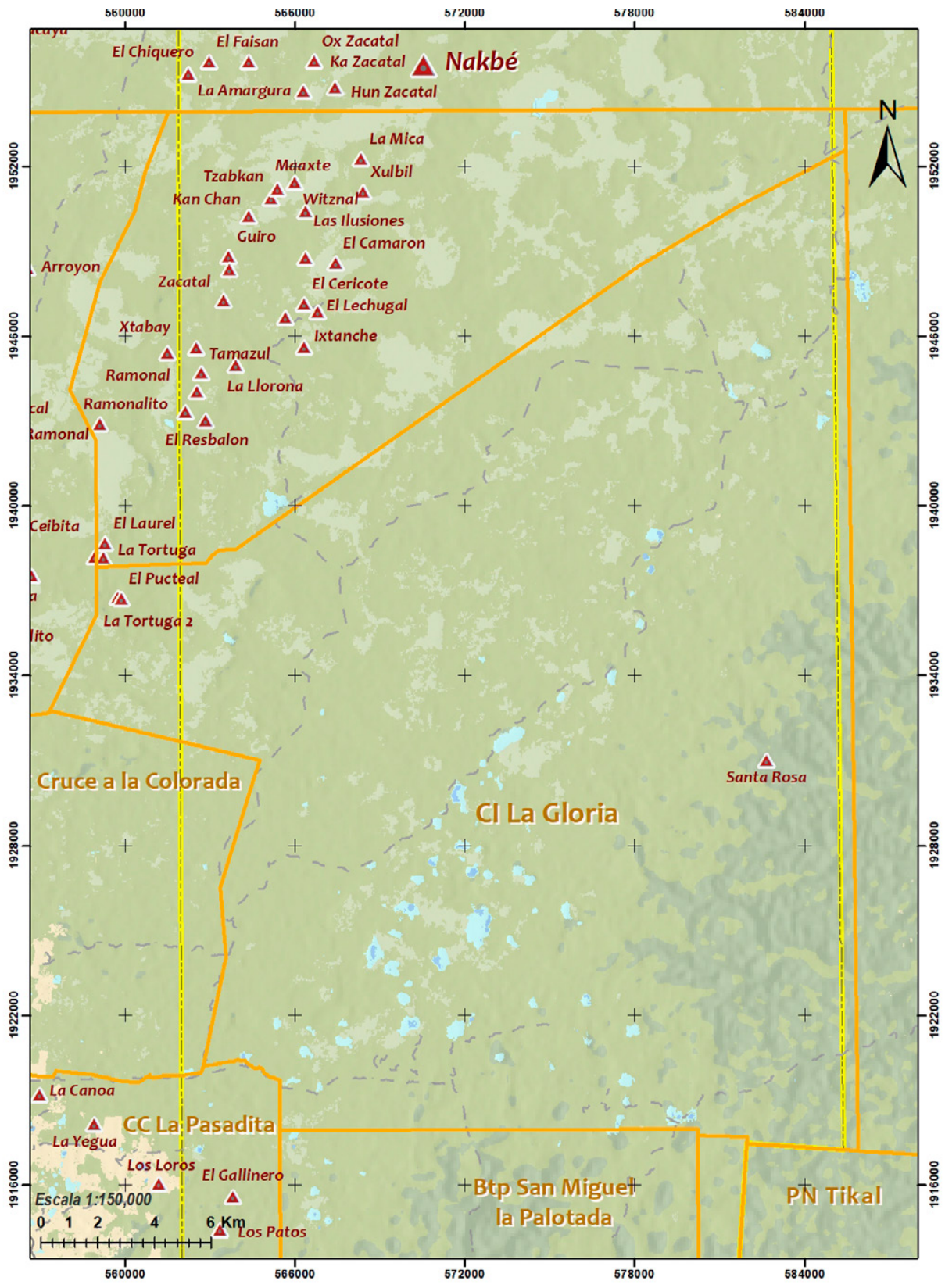
Once we were back to an area where we had phone signal, we send images to the leading Guatemalan orchidologist, Fredy Archila. He kindly identified the flower in Petén as *Vanilla insignis*.

About three days later, while less than 80 kilometers to the east, we found two more wild *Vanilla insignis* orchid vines with flowers in Parque Nacional Yaxha, Nakum and Naranjo (PNYNN). Our separate FLAAR Report on the orchid flowers of PNYNN has all the information on wild vanilla of Peten, Chiapas, Campeche, Quintana Roo and Belize. Plus has a bibliography. The present FLAAR Report is to make photographs of the *Vanilla insignis* of the Los Pescaditos area of the Municipio de San Jose, Petén, Guatemala, available to botanists, ethnobotanists, botanical gardens, and orchid societies, plus to the general public.



RBM Base Map.
 Map elaborated by CEMEC (Centro de Monitoreo y Evaluación de CONAP)

By reviewing a complete map of the RBM, we were able to locate the camp “Los Pescaditos” and that it was actually outside the limits of the concession and the municipality of San José



La Gloria forest concession
 Map elaborated by CEMEC (Centro de Monitoreo y Evaluación de CONAP)

This map shows La Gloria forest concession and the limits of Municipio of San José, Petén (in yellow). You can also see little points in light blue that refer to wetlands in the area. We concentrate on these points to carry out our expedition in May in some of them. But the camping area "Los Pescaditos", where we settled is located a few meters from the concession and the limits with the municipality of San José. Since the Municipality of San José is very small and is occupied mainly by La Gloria, it was difficult at first to determine if our camp belonged to San Andrés or San José.

Close-up, Side View of this wild
Vanilla Orchid Flower of Petén, Guatemala



Photograph by: Nicholas Hellmuth. FLAAR Mesoamérica. Yaxha to Nakum. May 7, 2022.
Camera: iPhone 13 Pro Max

Close-up,
Front View



These are views best seen out in the wold, with a high-resolution digital camera.

Photograph by: Nicholas Hellmuth, FLAAR Mesoamérica. Municipio de San Jose, RBM, Petén. May 7, 2022.
Camera: iPhone 13 Pro Max

Close-up, Diagonal View of this wild
Vanilla Orchid Flower of Petén, Guatemala



Notice how healthy the flower and vine appear. Municipio de San José, Reserva de la Biosfera Maya, Departamento Petén, Guatemala, Central América.

Photograph by: Nicholas Hellmuth, FLAAR Mesoamérica. Municipio de San Jose, RBM, Petén. May 7, 2022.
Camera: iPhone 13 Pro Max

Black Insect wandering around the petals and sepals



We estimate that most flowers attract varies species of insects and that many end up helping pollination.

Photograph by: Nicholas Hellmuth, FLAAR Mesoamérica. Municipio de San Jose, RBM, Petén. May 7, 2022.
Camera: iPhone 13 Pro Max.



Would help to return to Municipio de San Jose in May 2023 and take macro photographs of this insect so we can identify it

Photograph by: Nicholas Hellmuth, FLAAR Mesoamérica. Municipio de San Jose, RBM, Petén. May 7, 2022.
Camera: iPhone 13 Pro Max.

View of the wild Orchid Flower from the Back



It helps to see everything from front, side, back and from above.

Photograph by: Nicholas Hellmuth, FLAAR Mesoamérica. Municipio de San Jose, RBM, Petén. May 7, 2022.
Camera: iPhone 13 Pro Max.

View of the wild Orchid Flower from Straight Above



You can see that at least seven other flowers have bloomed the previous days and have wilted and fallen off. This is the last flower of this inflorescence to bloom (no more buds). All the more realization of total pure luck to have seen this flower.

Here the insect is inside. Photo by Nicholas Hellmuth. Municipio de San Jose, RBM, Petén. May 7, 2022.

Bibliography, List of Suggested Reading **on Orchids of Guatemala**

Our list of suggested reading on wild orchids of Guatemala is in the Part I of this FLAAR Report on the wild vanilla orchid flower we saw between Yaxha and Nakum (PNYNN) a few days after we saw the vanilla orchid flower near Los Pescaditos, RBM, Peten.

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To publish photographs

Hellmuth's photographs have been published by National Geographic, by Hasselblad Magazine, and used as front covers on books on Mayan topics around the world. His photos of cacao (cocoa) are in books on chocolate of the Maya and Aztec both by Dr Michael Coe (all three of editions) and another book on chocolate by Japanese specialist in Mayan languages and culture, Dr Yasugi. We naturally appreciate a contribution to help cover the costs our office expenses for all the cataloging, processing, and organization of the photos and the field trip data.

For your social media

You can post any of the FLAAR Mesoamerica PDFs about the Municipio of Livingston on your Social Media sites; you can send any of these PDFs to your friends and colleagues and family: no cost, no permission needed.

We hope to attract the attention of professors, botanical garden clubs, orchid and bromeliad societies, students, tourists, experts, explorers, photographers and nature lovers who want to get closer, to marvel at the species of flowering plants, mushrooms and lichen that FLAAR Mesoamerica finds during each field trip each month.

BACKCOVER PHOTOGRAPH

Photograph by: Nicholas Hellmuth.
FLAAR Mesoamerica, May. 11, 2022.
Camera: iPhone 13 Pro Max.

ACKNOWLEDGEMENTS TO FLAAR MESOAMÉRICA

Flor de María Setina is the office manager, overseeing all the diverse projects around the world. We also utilize the inkjet prints to produce educational banners to donate to schools.

Vivian Hurtado is the actual project manager for FLAAR's divisions: Flora & Fauna and MayanToons. She is also environmental engineer and passionate researcher

Victor Mendoza environmental engineer, is in charge of the photographic database of FLAAR Mesoamerica and its taxonomic identification. He also supports as a research assistant.

Sergio Jerez He is involved with plant identification, bibliographic research and map design for the trails explored on each expedition.

Andrea de la Paz designer who helps prepare the master-plan for aspects of our publications. She is our editorial art director.

Senaída Ba has been our photography assistant for several years. Now, she puts together PowerPoint presentations for students and teachers to learn about several subjects like Flora, Fauna and Mayan Iconography.

Jaqueline González designer who puts together the text and photographs to create the actual report.

Roxana Leal major in Communication who manages all our social media and digital community. She's sometimes part of our fieldwork trips, since she has a special interest for adventure and Guatemala's diverse nature.

María Alejandra Gutiérrez is an experienced photographer who now prepares all the Photography Catalogs for the project we're currently working on the RBM. She also contributed to the coordination of several trips we made during our Livingston, Izabal research project.

David Arrivillaga is an experienced photographer able to handle both Nikon and the newest Sony digital cameras. Work during and after a field trip also includes sorting, naming, and processing.

Juan Carlos Hernández takes the material that we write and places it into the pertinent modern Internet software to produce our web pages.

Paulo Núñez is a webmaster, overlooking the multitude of web sites. Internet SEO changes every year, so we work together to evolve the format of our web sites.

Rosa Sequén is also an illustrator for MayanToons and also helps prepare illustrations for Social Media posts and for animated videos.

Laura Morales is preparing animated videos in MayanToons style since animated videos are the best way to help school children how to protect the fragile ecosystems and endangered species

Heidy Alejandra Galindo Setina joined our design team in August 2020. She likes photography, drawing, painting, and design.

Paula García is part of our MayanToons Animation team. Her job brings our favorite jungle, wetland and savanna characters to life.

María José Rabanales she is part of the team for editing photographic reports and educational material of Flora and Fauna since September 2020. She works together with others of the team to prepare the finished pdf editions of the material of the Yaxha, Nakum and Naranjo Project.

Alejandra Valenzuela biology student is now part of Flora y Fauna's photographic report and educational material editing team since September 2020.

Alexander Gudiel designer who join the editorial design team on December 2020. He will combine the text, pictures and maps into the FLAAR Mesoamerica editorial criteria.

Cristina Ríos designer student who join the editorial design team on December 2020. He will combine the text, pictures and maps into the FLAAR Mesoamerica editorial criteria.

Byron Pacay handles GPS mapping of where we hike or go in the lancha (boat) each field trip day. He also lists where we stop to take photos and what each one of us is photographing and then has that tabulation ready each night.

Edwin Solares environmental engineering. He is a photographer and videographer during our expeditions and later edits this content to be able to use it in the materials we generate.

Belén Chacón her job includes organizing and tabulating data on useful and edible flora, which is listed in FLAAR's bibliography and many other references, in order to keep a complete list of plant species that are useful, along with updated taxonomical information.

Diana Sandoval her work consists of the recompilation of scientific information, which later is transformed into the FLAAR reports that are published on our websites.

María José Toralla she gathers information and bibliographies that are added to our Flora & Fauna electronic library and also make part of the information found in research, reports and websites.


Valeria Áviles is an illustrator for MayanToons, the division in charge of educational materials for schools, especially the Q'eqchi' Mayan schools in Alta Verapaz, Q'eqchi' and Petén Itzá Maya in Petén, and the Q'eqchi' Mayan and Garifuna schools in the municipality of Livingston, Izabal.

Niza Franco is part of our MayanToons Animation team. Her job brings our favorite jungle, wetland and savanna characters to life.

Josefina Sequén is illustrator for MayanToons and also helps prepare illustrations for Social Media posts and for animated videos.

Isabel Rodríguez Paiz is in charge of the fundraising. She is experienced in networking, social media, and organizing meetings to experience what FLAAR does out in the remote rain forest ecosystems

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-  Ruta
-  Aeropuertos
- Terracería
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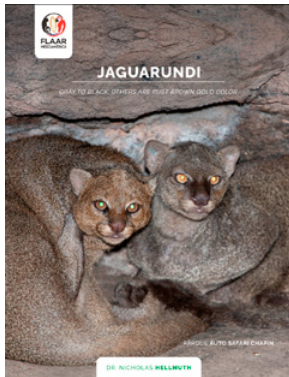


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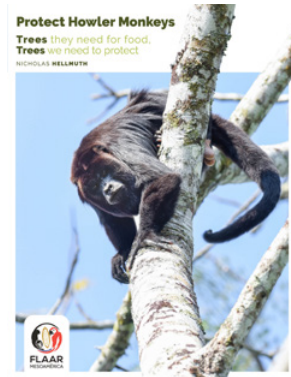
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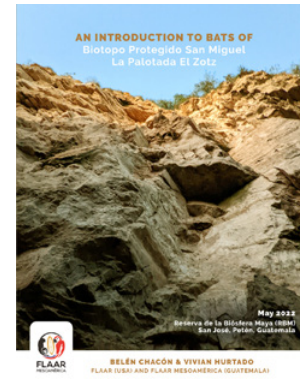
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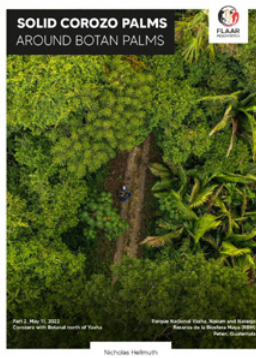
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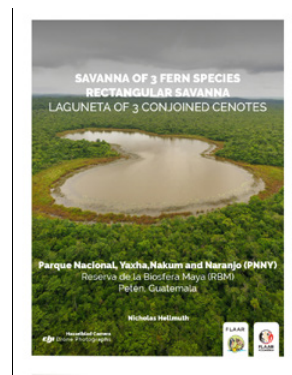
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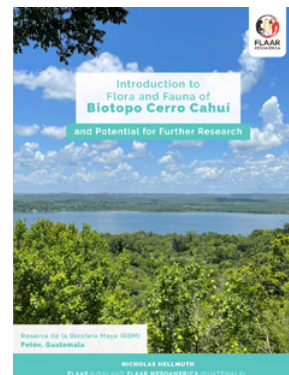
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