Wasp Nests made of Mud

not Plant Material

San Jose Se Raxtul, Alta Verapaz

Yellow-Banded, Golden Winged
Polybia emaciata Wasps
and their Impressive Wasp Nests
of processed Mud

FLAAR Reports

FLAAR (USA)
and FLAAR Mesoamerica (Guatemala),

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CONTENTS

Introduction to Discovery of Wasp Nests potentially of *Polybia emaciata* in the mountains of Alta Verapaz, Guatemala, in March 2025 by Senaida Ba and Franklin Xol, FLAAR Mesoamerica with a helpful local guide. A local tuk-tuk can easily take a driver and two passengers (Franklin has years of experience driving tuk-tuk).

We are putting all honey wasps of golden colors in separate FLAAR Reports so that wasp entomologists can see them to provide genus and species names. *Polybia emaciata* do not make honey.

The wasp nests of these golden wasps of Aldea San Jose Se Raxtul, Municipio de Senahu, Departamento de Alta Verapaz are of a unique design—with an entry-exit TUNNEL—not merely an exit opening. And, the tunnel is not at the bottom, but on the side. Often in the middle but sometimes lower down.

Fig. 1.

Chapter 1

Aldea San Jose Se Raxtul, Wasp Nests made of Mud, photographed March 3, 2025

This heavy nest is hanging from a thin twig.

Fig. 2,
a and b

Fig. 3. Closeup from the previous photos, cropped and processed by Nicholas Hellmuth from photo by Byron Pacay, Raw mode from photo of Google Pixel 8 Pro.

March 3, 2025, Aldea San Jose Se Raxtul, Senahu, Alta Verapaz.

The photo team estimated these wasps were genus *Polybia* and species *emaciata*. Google Images also suggests *Polybia emaciata*, but they are always listed as primarily in South America. But the genus is correct because *Polybia emaciata* have nests very similar to those the team found in Aldea San Jose Se Raxtul, near Senahu, Alta Verapaz.

Portal de Biodiversidad de Guatemala gives no results for *Polybia emaciata*, so I searched for just the genus *Polybia*, and got, LOTS of *Polybia plebeja* de Saussure—but ZILCH for Alta Verapaz. Does this mean that the team of FLAAR Mesoamerica is the first to document *Polybia* wasps in Alta Verapaz?

And, none of the nests for *Polybia plebeja* de Saussure had the tubes sticking out—but all the nests of *Polybia emaciata* have the tube exit-entry structure.

This is another nest in the same area, Aldea San Jose Se Raxtul, Municipio de Senahu, Departamento de Alta Verapaz, but a different nest. Here the entry-exit tunnel tube is in the middle.

Here the entry exit tunnel is in the middle of the nest, so neither at the top nor at the bottom.

Fig. 4, a and b.

At the left is another nest in the same area, Aldea San Jose Se Raxtul, Senahu, Alta Verapaz, but a different nest. Here the entry-exit tunnel tube is much lower down.

At the right is the more usual position of this tube for nests made of mud.

Most wasp nests are made of plant materials (and thus are edible if it's a honey wasp nest). But this nest is made of mud—so not recommended to eat. At first we estimated that *Polybia emaciata* wasps could make honey but later we learned from the local Q'eqchi' Mayan people that these mud nests have no edible honey inside.

Fig. 5, a and b.

All these photos are by Byron Pacay with Pixel 8 Pro.

March 3, 2025, Aldea San Jose Se Raxtul, Senahu, Alta Verapaz.

This helpful close-up should allow a wasp entomologist to document what species this is.

I am always amazed that multiple wasps can exit at the same time, squeezing past each other, without fighting with each other.

With humans, trying to scramble past each other would create “road rage”.

Fig.7.

These are a species of wasp genus *Polybia*.

Their nests look like they are made out of mud—so different than paper wasp nests. When I checked on the Internet, I found that my observation was correct.

Studying wasps and wasp nests in Guatemala is excellent food for the brain and great physical therapy for brain health. At first. I thought the only wasp that made honey was the Mexican Honey Wasp, *Brachygastra mellifica*. Yes, we have found wasp nests of *Brachygastra mellifica* in other parts of Guatemala but our field trips taught us that there are LOTS of other species of wasps, native to Guatemala, that make honey. So I am looking for a species to name the Guatemalan Honey Wasp! Unfortunately, that title is not for *Polybia emaciata*.

To learn that these wasps design, engineer and construct a nest out of "mud" is amazing. I am very curious to see inside, to see how the honey combs are constructed. We show a bit of that in the final chapter.

All these photos are by Byron Pacay with Pixel 8 Pro. FLAAR provides all its team with mobile photos that take excellent photos.

March 3, 2025, Aldea San Jose Se Raxtul, Senahu, Alta Verapaz.

Fig. 8.

Chapter 2

March 4, 2025, More Mud Nests
Aldea San Jose Se Raxtul, Municipio de Senahu,
Departamento de Alta Verapaz

When it pours rain the entry-exit tunnel has to protect the inside of the nest from getting soaked.

Fig. 9.

Lots of wasps have parallel yellow and brown colors, so you have to count how many bands are of each color and look at the patterns on other parts of the wasp's body.

Fig. 10, a and b.

Each genus of wasp makes the outside of their nest their own “logo” pattern. So you can often recognize the genus of the wasp by how they make their nests.

We have over a dozen reports on our websites that show different sizes, shapes, and surface patterns of wasp nests in Guatemala. Just Google wasp nest, Hellmuth, FLAAR and you can download all of these portfolios of photos of wasp nests.

Fig. 11.

It helps to have photos of each side and each angle of each wasp, so you can document which species you are studying. Plus it helps to have photos of high enough MB file size so that you can crop-and-enlarge individual wasps.

Here you can see that the antennae of this wasp are different shape than of other species.

Most wasps have their stinger inside their body, and they only extend their stinger when they are getting ready to attack. Since our team was not threatening the wasps, these wasps did not attack.

But every species is different.

If a nest is near a home, and no one in the house bothers them, these wasps do not attack people that come close to the nest.

Two wasps are trying to get out, but one wasp is pushing down to get in. It this happened at the door of an elevator, people would scream and some would “hit back.” We humans think wasps are monsters—but this species of wasp is not aggressive (at least not to each other).

If you Google where are houses made of mud? You get many countries around the world.

The other materials we use for human houses causes loss of forests, and chemical pollution manufacturing construction material.

The hard-working Maya people across Mesoamerica often made their houses out of mud! Google wattle and daub, Maya, Hellmuth and you will see a photograph and mention of this kind of house architecture.

Adobe bricks are used in only a few parts of Guatemala today. Best to use sun-dried bricks, since commercial bricks are fired. The Classic Maya of Comalcalco, Tabasco, Mexico, constructed their palaces out of fired bricks—since there was no limestone nearby.

I hope that LEED-certified architects around the world can include mud as wattle and daub, sun dried adobe and other natural products.

In other words, let's not exterminate wasps with carcinogenic chemical insecticides. Let's learn from wasps--including from "paper wasps" whose nests are like paper, and are edible. Yes, I was given a wasp nest to munch on by local Q'eqchi' Mayan people in Alta Verapaz. Wasp nests of honey-producing species are eaten in many parts of Mesoamerica for thousands of years.

I am not sure that LEED-certified architects can make houses of out "paper" and I doubt people will eat the walls of their own house—but we can learn from wasp chemical engineering and construction.

Chapter 3

Mud Wasp Nests photographed on March 19, 2025 at San Jose Se Raxtul, Senahu, Alta Verapaz, Guatemala

Since Senaida and Franklin live in Senahu, San Jose Se Raxtul is not that far away (two hours by tuk-tuk).

The following photos are by Franklin Xol.

The GPS map by Byron Pacay (on the last page of this report) shows the general area of Alta Verapaz where we found this and lots of other wasp nests.

This species of mud-wasp surely exists in lots of other parts of Guatemala and these nests deserve a MS thesis or PhD dissertation.

When lots of wasps need to get out of the nest, they literally rub against each other as they exit, but they do not fight each other.

Chapter 4

Returning to Aldea San Jose Se Raxtul, Alta Verapaz, July 24, 2025, for further study and photography of Wasp Nests made of Mud

In early July the owners of the house that had mud wasp nests in front of their home, telephoned Senaida Ha and said that they were expanding their home and that the area where the wasp nest was hanging from had to be removed. So they said that when they removed the nest, Senaida and Franklin could study the nest in more detail.

So we initiated a new field trip to San Jose Se Raxtul, Senahu, Alta Verapaz.

The following photos are by Franklin Xol.

Front and back of this wasp nest.

Even though this nest looks completely finished, the outside is filled with wasps. Are they “repairing” the outside? Are they adding new material after heavy rains washed off some of the mud?

Lots of people use fire to get rid of paper wasps. Other people use insecticide. But hundreds of homes in rural areas have wasp nests that the local people do not destroy—because most wasps do not sting people that they recognize as not wanting to harm them.

Obviously you don't use fire on a nest made of mud. And we do not use insecticide on wasps. They buzz around our FLAAR Ethnobotanical Research Garden as do lots of miniature stingless bees.

Since the home where this wasp nest is nearby needed to expand their house, there was no more space for the wasp nest, so they gently pruned the twig and moved the nest to where we could study it.

Notice that the man's fingers are very near the wasps but not one of them is stinging him.

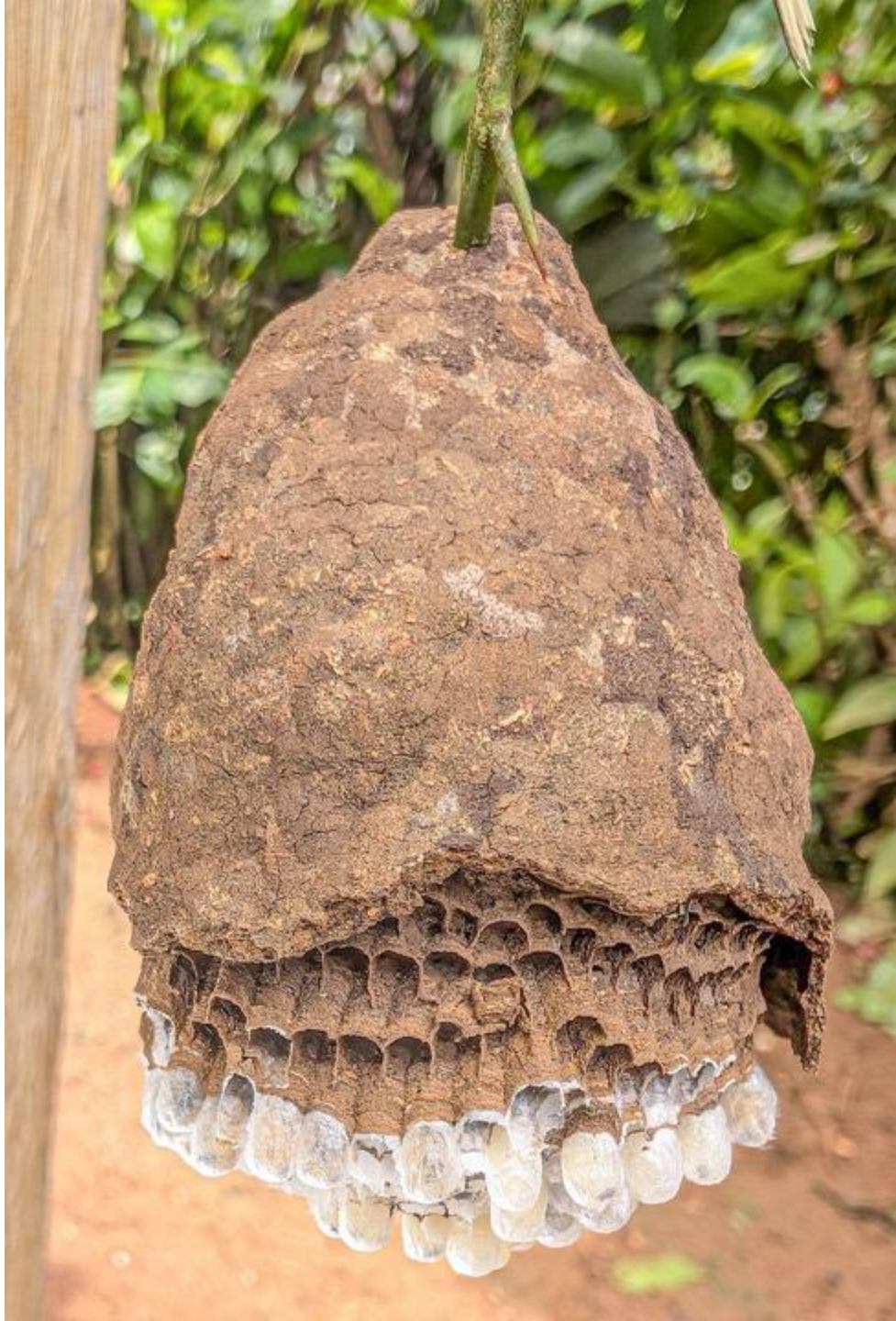
I estimate that these wasps are hard at work adding more mud to the outside of their nest.

Here you can see that the outside has lots of patches of recently added mud (you can see the many different colors).

To see the inside of the nest the local people opened up the bottom. You can see lots of larvae (their white cocoons are very visible).

Most wasp nests have eggs not yet hatched in many cells and larvae in other cells. So the wasps don't all hatch at once—some finish their metamorphosis each day so the hive does not get overpopulated in one day.

These wasps rarely attack. But once they realize that their nest has been detached, they fly away (to find another place to start a new nest).



Each different genus of wasps build their nest interior and exterior slightly differently.

Deep down inside you can see eggs in various phases of metamorphosis, hatching from egg into larva into pupa and then emerging as an adult.

The larger white areas rising out of many cells are the pupae, who have each formed their cocoon.

In the next page we see larvae already developed into pupae into adult wasps ready to rise out of the cocoon and rise out of the cell to fly into adulthood.

The helpful photo by Franklin Xol allows you to notice that many of the hexagons are “disoriented”. Some are larger than adjacent ones, and others have sides that are not of equal size.

Wonderful view of several wasp pupae already with their full colors and ready to emerge. But others still have a bit more to mature before they rise up to fly out.

Many different cultures, especially in rural areas, routinely eat wasp larvae of some species. But since *Polybia emaciata* do not make honey, and since their nest is of mud—and not a paper nest—additional research is needed to learn from local Q'eqchi' people which species they eat, and which they do not eat.

We greatly appreciate the assistance of local people throughout Guatemala for our research on wasp nest size, shape, and exterior pattern.

If you are a student with aspiration and inspiration to accomplish advances in studies of mud-made nests of wasps, be sure you go with local Q'eqchi' Maya guides.

The area where we did field work was 2 hours in TukTuk (Franklin is experienced driver of Tuk-Tuks for many years). You can get to Senahu by bus and there are many hotels there to overnight. We eat all our meals on the 2nd floor restaurant overlooking the town plaza of Senahu.

Recommended Reading on Wasps of Guatemala

There are hundreds of articles on *Polybia* wasps all over Latin America, but our focus is on Guatemala, so we show the following helpful chapter.

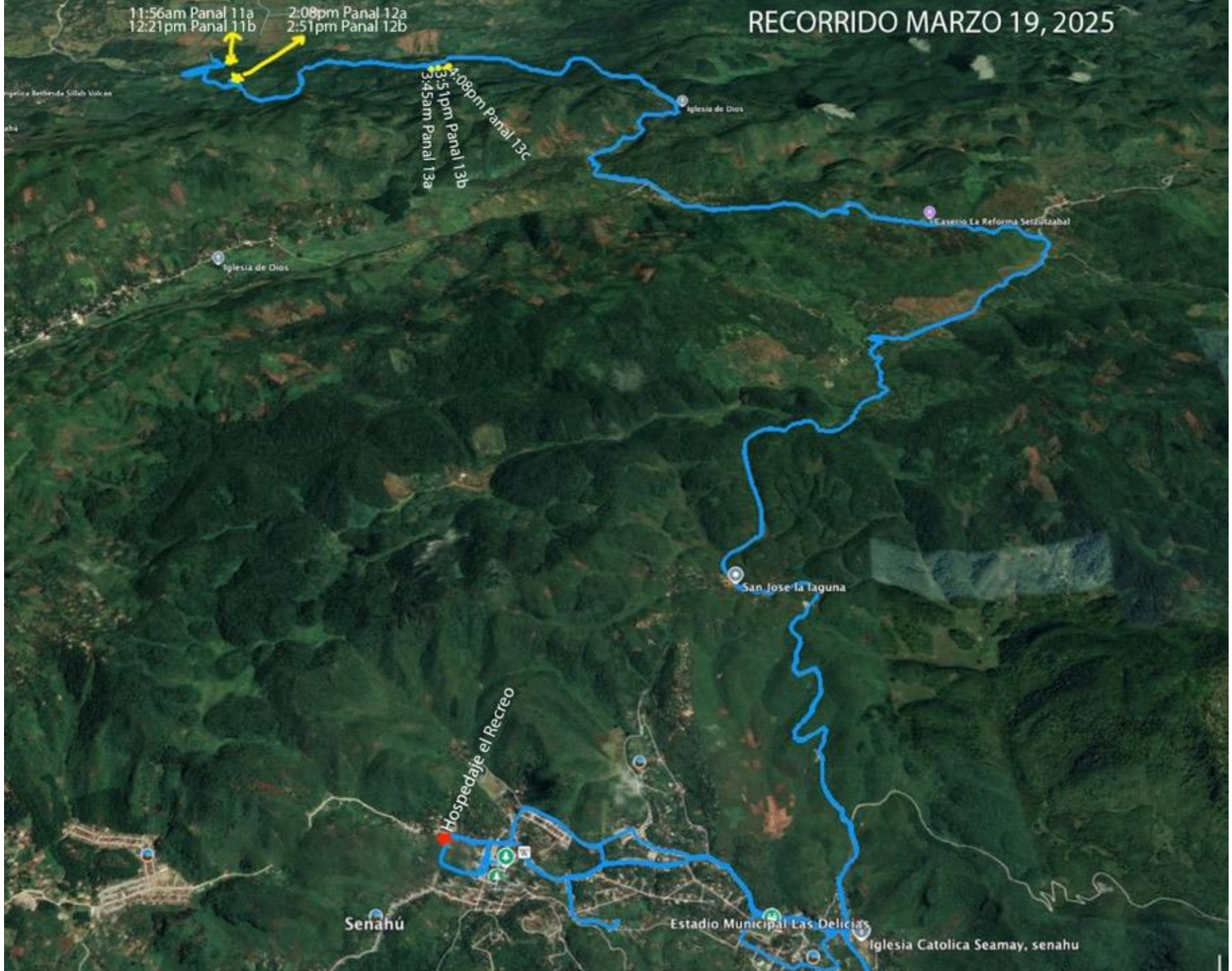
CARPENTER, James Michael, GARCETE Battett, Bolivar Rafael and **Joseph Aledander FREIRE**
2012 Las Vespidae (Hymenoptera: Vespoidea) de Guatemala. Chapter, pages 269-279 in Biodiversidad de Guatemala, Volumen 2, Universidad del Valle de Guatemala. Available as helpful download from ResearchGate and elsewhere.

Carpenter, Garcete, and Freire list the *Polybia emaciata* species in their helpful chapter on wasps of Guatemala, but I have not yet found other specific discussions of *Polybia emaciata* for Guatemala. Yet I have not yet found another *Polybia* wasp species that are well documented for Guatemala that have a nest of mud with a tubular entry-exit tube. Plus, the nests found by the team were obviously made with mud. This entomological discovery was courtesy of the local guides assisting the FLAAR Mesoamerica team of Senaida, Franklin (who live in Senahu so know local people and local areas) and Byron (the photographer) on March 3, 2025.

Although I am obviously not an entomologist, I estimate that the several nests documented by the FLAAR Mesoamerica team are all of *Polybia emaciata*. However if a wasp entomologist can correct me, I will accept their years of experience.

Below is the list of species of wasp genus *Polybia* from the end of the chapter by Carpenter, Garcete and Freire (Appendix 1). The notes are by Hellmuth:

Polybia diguetana du Buysson 1905 Their nests do not have tubular entry/exit shape.
Polybia emaciata Lucas 1879, No mention of location on biodiversidad.gt, so no photos on that web page, but has lots for South America.
Polybia flavitincta Fox 1898, shows *Polybia mediamericana* Chimaltenango, no photos
Polybia occidentalis nigratella du Buysson 1905, Peten, Escuintla, Santa Rosa, Jutiapa
Polybia raui raui Bequaert 1933, no tube on their nests, no results from biodiversidad.gt
Polybia rejecta (Fabricius 1798), Peten, Izabal, Guatemala, but no tube on their nests
Polybia simillima Smith 1862, no results from biodiversidad.gt, no tube on their nests
Polybia tinctipennis tinctipennis Fox 1898, no results from biodiversidad.gt.


RECORRIDO MARZO 19, 2025
11:56am Panal 11a
12:21pm Panal 11b
2:08pm Panal 12a
2:51pm Panal 12b
3:45am Panal 13a
3:51pm Panal 13b
4:08pm Panal 13c
Iglesia de Dios
Iglesia de Dios
Caserio La Reforma Setzuzabal
San Jose la laguna
Hospedaje el Recreo
Senahú
Estadio Municipal Las Delicias
Iglesia Catolica Seamay, senahu