

FRIENDLY FOXES

WANDER AROUND MAYA RUINS OF YAXHA

GRAY FOX

UROCYON CINEREOARGENTEUS



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**PARQUE NACIONAL YAXHA,
NAKUM Y NARANJO (PNYNN)**

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FLAAR
MESOAMÉRICA

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We thank all the helpful and knowledgeable guides of IDAEH and CONAP 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.

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Camera: Canon T3i. Lens: Canon EF 300mm IS II USM. Settings: 1/60 sec; f/5.6; ISO 800.

TITLE PAGE PHOTOGRAPH:

Photo by: Erick Flores, FLAAR Mesoamerica, Sep. 5, 2018. Yaxha, Petén.

Camera: Canon 1D X Mark II. Lens: Canon EF 300mm IS II USM. Settings: 1/250 sec; f/5; ISO 400.

CONTENTS

Gray Fox is the mammal you will frequently see at Yaxha	1
Also entertaining to see the Gray Fox at Tikal National Park	2
Boa Constrictors love to swallow a Gray Fox whole!	3
But in fact, grey foxes are much more common in Parque Nacional Yaxha, Nakum y Naranjo	6
Gray Fox nibbles on <i>Anthurium crassinervium</i>	8
Name of <i>Urocyon cinereoargenteus</i> Fox in local languages	10
Name of <i>Urocyon cinereoargenteus</i> Fox in Mayan languages	10
Do foxes really live in trees?	11
Gray fox is commonly seen at zoos	14
Foxes in Mayan Art, Iconography, Cosmology	16
Foxes mentioned in the Popol Vuh, a Mayan mythical story	16
Foxes are mentioned in other Mayan tales	18
Fox and coyote are associated with each other even in relation to the gods	18
Gray Foxes as Pets	20
Our MayanToons Will Include Foxy Foxes	20
Concluding comments on foxes of PNYNN Guatemala	20
Bibliography on <i>Urocyon cinereoargenteus</i>	22
Dictionaries to find the Mayan Word for Gray Fox in several nearby languages	31
Web sites with information on <i>Urocyon cinereoargenteus</i>	32



Photo by: Erick Flores, FLAAR Mesoamerica, Sep. 5, 2018. Yaxha, Petén.

Camera: Canon 1D X Mark II. Lens: Canon EF 300mm IS II USM.
Settings: 1/400 sec; f/3.2; ISO 400.

GRAY FOX IS THE MAMMAL YOU WILL FREQUENTLY SEE AT YAXHA

Rather obviously, jaguars do not hike through the plazas and acropolis patios of Mayan ruins (at least not during the day). Spider monkeys and howler monkeys are the mammals you will see and hear most commonly at Yaxha. But the gray fox we have seen almost every day when we are walking through the ruins of Yaxha. However, outside the ruins, when we are hiking in remote areas, we never see foxes. Evidently the foxes like the cleared areas of the Yaxha park to walk through. Plus, in remote parts of the park there are so many trees and vines you can't see more than a few meters away, so you would not notice a fox.

It would be interesting to learn how often the camera traps in PNYNN capture photos of gray foxes. These camera traps are in pital (aguadas with *Aechmea magdalenae* plants growing around the aguadas). The animals most frequently seen walking through these pital aguada areas are pumas and jaguars. Peccary, deer and other mammals are also detected by the camera traps.

We (FLAAR Mesoamerica plus the IDAEH + CONAP teams from the park) spend most of our time exploring the remote areas looking for plants, tree species, arboreal insect nests and other flora, fauna, and ecosystems which have not been studied before. But when we are photographing bromeliads, parasitic vines, and other plants within the area of ruins of Yaxha, we see foxes every day during most months (May 5, 2021 was an exception: we saw agouti and coati but no foxes).

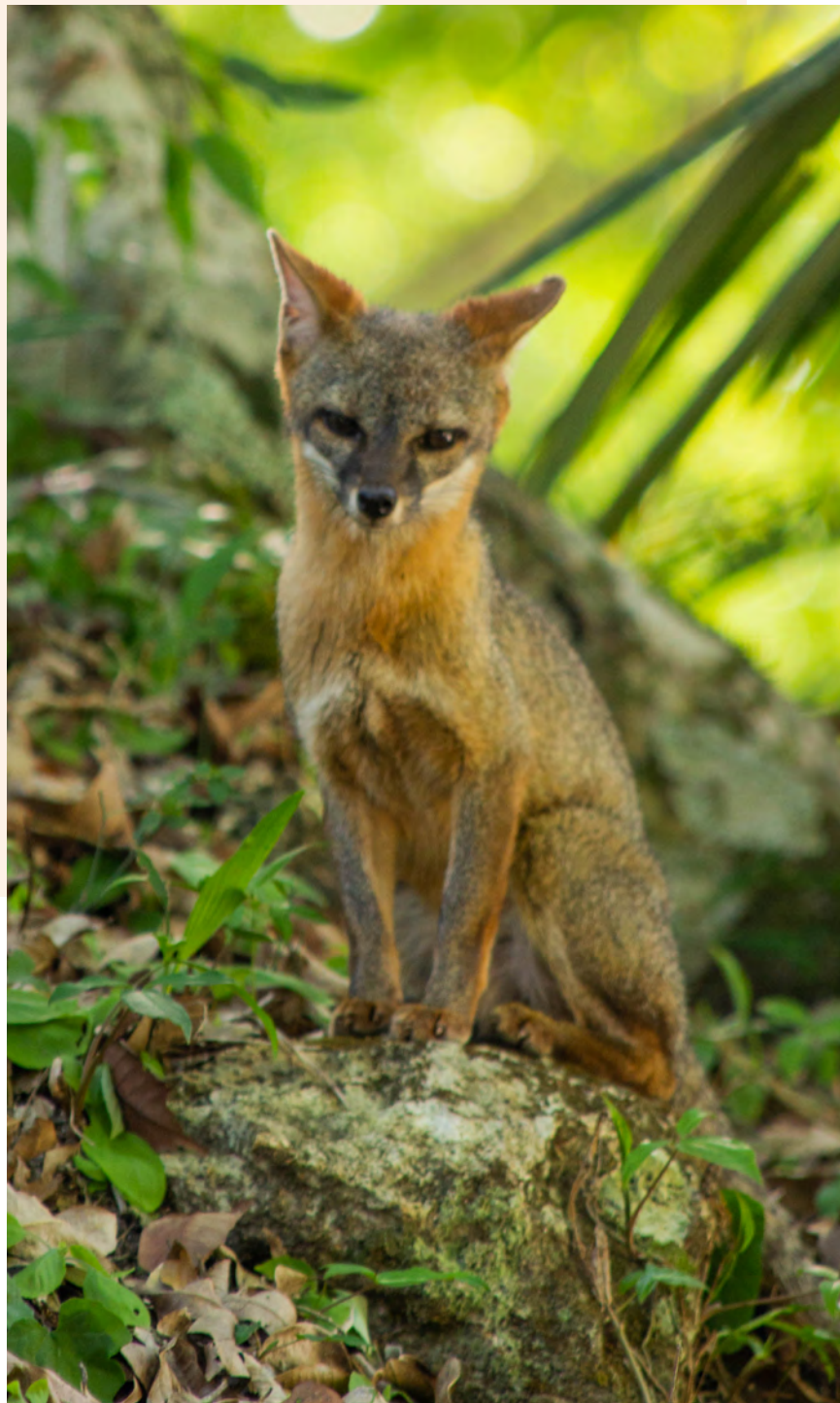


Photo by: David Arrivillaga, FLAAR Mesoamerica, Jul. 4, 2019. Yaxha, Petén.

Camera: Canon T3i. Lens: Canon EF 300mm IS II USM. Settings: 1/50 sec; f/5.6; ISO 800.

ALSO ENTERTAINING TO SEE THE **GRAY FOX** AT TIKAL NATIONAL PARK

There are more YouTube videos on foxes of the Parque Nacional Tikal than for foxes in any other area of Guatemala. The most impressive one is a Part I and Part III of a *Boa constrictor* ("mazacuata" is its common name in most places of the country) who captures a fox, and another fox comes to the aid of the dying fox. I did not find Part II of the snake and foxes, but Part I and III were enough to bring tears to my eyes.

When you visit Tikal, you can expect about a 50% chance of seeing grey foxes hiking freely across the Great Plaza or base of the North Acropolis. It helps if you stay several days at Tikal to be sure you see them.



Gray fox, *Urocyon cinereoargenteus*.

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica, Sep. 6, 2018. Yaxha, Plaza F, Petén.

Camera: Nikon D5. Lens: Nikon AF-S NIKKOR 600mm FL ED VR. Settings: 1/250 sec; f/11; ISO 16,000.

BOA CONSTRICTORS LOVE TO SWALLOW A **GRAY FOX** WHOLE!



At Yaxha we also experienced seeing a *Boa constrictor* swallowing a gray fox, whole, as the snake eased its way down into his hole in the ground (where this boa lived). By the time we got there, the boa was way down inside it's den (and the fox was mostly way down inside the snake).

Photo by: Nicholas Hellmtuh, FLAAR Mesoamerica, Sep. 6, 2018. Yaxha, Petén.

Camera: Nikon D810. Lens: Nikon AF-Micro-NIKKOR 200mm IF-ED Macro. Settings: 1/400 sec; f/10; ISO 5,120.

Other foxes were trying to rescue their dying friend, but their teeth are not powerful enough to impress a hungry boa constrictor. No fox tooth, fang, or claw can phase a giant boa. The exact same thing has been videoed happening at Tikal by tourists.

But don't worry, the boa constrictors here are nowhere near the size of anaconda snakes of Brazil. And boas get plenty of fresh fox meat so the boa constrictors at Yaxha do not look for tasty tourists.

So be careful you do not stick your head down any hole in the rain forest floor! It may be the lair of a boa constrictor.



Gray fox, *Urocyon cinereoargenteus*.

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica, Jan. 20, 2013. Yaxha, Petén.

Camera: Sony RX10 IV. Lens: Sony FE 28-60mm. Settings: 1/125 sec; f/4; ISO 100.



Gray fox hanging from the branches at Zoologico Nacional La Aurora.
Photo by: Nicholas Hellmuth, FLAAR Mesoamerica, Dec. 1, 2014. Aurora Zoo.

Camera: Canon 60D. Lens: Canon EF 24-105mm IS USM. Settings: 1/100 sec; f/13; ISO 640.

BUT IN FACT, **GRAY FOXES** ARE MUCH MORE COMMON IN PARQUE NACIONAL YAXHA, NAKUM AND NARANJO

Although most videos of foxes are at Tikal, in fact I saw more of the friendly furry foxes at Yaxha while documenting flowering plants hiking through the plazas. And if you stay overnight at the pleasant hotel Ecolodge El Sombrero (at entrance of the Parque Nacional Yaxha Nakum Naranjo) you may see foxes in the morning and early evening.

During 2018-2019, while having dinner in the Ecolodge El Sombrero dining room, we have often seen one or two foxes hiking through the room (one fox likes to climb the stairs and sleep on couch on the second floor). They are not asking for food; they just feel at home in the greater Yaxha area. Great place to take photos to impress your family and friends back home. This was during our field work at PNYNN during 2018-2019. Now (May 2021) we have a new five-year project with CONAP to document the flower and fauna of the park and neighboring areas of the Reserva Biosfera Maya.

This is one of my favorite places to stay in El Peten;
www.elsombreroecolodge.com/en-us
e-mail: ventaselsombrero@gmail.com,
telephone from outside Guatemala:
 +502 5460 2934,

Frankly it is remarkable how quickly the gray fox gets used to all the tourists at Tikal. Yaxha is more pristine, so you see a lot more foxes happily wandering around.



Fox having a snack on seed pod of plant in Ecolodge El Sombrero, Yaxha, Peten.

Photo by: Nicholas Hellmuth, FLAAR Mesoamerica, Aug. 24, 2018. Yaxha, Petén.

Camera: Nikon D5. Lens: Nikon AF-Micro-NIKKOR 200mm IF-ED Macro AF-S. Settings: 1/200 sec; f/6.3; ISO 8,000.



Photo by: Nicholas Hellmuth, FLAAR Mesoamerica, Oct. 14, 2018. Yaxha, Main Acropolis.

Camera: iPhone Xs.

During 2019, when I was hiking along one of the "streets" at Yaxha that I discovered and mapped in the 1970's, there was a fox standing on top of a palace on the north side of the street (the south side of the palace acropolis). Unfortunately, I had only my iPhone Xs camera with me, so could not get a close-up (telephoto photograph).

It was enjoyable to experience; the fox was hanging out watching me walk by. And I was watching the fox looking at me from the palace. They never attack; they are just curious.

GRAY FOX NIBBLES ON *ANTHURIUM CRASSINERVIUM*

Boris Llamas photographed what may be the first photo-documented proof that foxes of Peten, Guatemala eat the ripe fruits of *Anthurium crassinervium*. About 30 minutes after he captured this unexpected event I walked around a corner and witnessed a fox chewing off the ripe fruits on another *Anthurium crassinervium* spike (in front of the restaurant of hotel Ecolodge El Sombrero).

So now, the team of FLAAR Mesoamerica, together with Universidad de Valle student Boris Llamas, have another example of the potential of doing field work in Parque Nacional Yaxha, Nakum y Naranjo.



Photo by: Boris Llamas, FLAAR Mesoamerica, Jul. 2, 2019.
Ecolodge El Sombrero.

Camera: Nikon D810. Lens: Nikon 28-300mm VR.
Settings: 1/160 sec; f/8; ISO 640.



Photo by: Nicholas Hellmuth, FLAAR Mesoamerica, Dec. 1, 2014. Aurora Zoo.

Camera: Canon 60D. Lens: Canon EF 24-105mm IS USM.
Settings: 1/100 sec; f/13; ISO 640.

NAME OF *UROCYON CINEREOARGENTEUS* FOX IN LOCAL LANGUAGES

Several common names are used in Peten and nearby areas of Mesoamerica: gato (de) montés, zorra, or zorrillo, zorro gris. However obviously a fox is not a feline (so is not a true "cat" (gato).

NAME OF NAME OF *UROCYON CINEREOARGENTEUS* FOX IN MAYAN LANGUAGES

There are 21 or 22 Mayan languages of Guatemala, plus Xinca and Garifuna. Chorti Mayan language is also spoken in the Copan Ruinas area of Honduras. There are several additional Mayan languages in Mexico. We show here the words for fox in the languages closest to the Peten area.

IDIOMAS MAYAS	ZORRO GRIS
Peten Itza Maya	Ch'umak, ajch'umak (aj ch'umak)
Mopan Maya	ajch'umak (aj ch'umak)
Lacandon Maya	chmk, bayir pek (Baer and Baer)
Yucatec Maya	Chomac, Ch'omak
Kaqchiquel Maya	Xiwan
Q'eqchi' Maya	Yak
Pokomchi Maya	Yak
Chol Maya	Guash
Chorti Maya	Ch'ajch.

DO FOXES REALLY LIVE IN TREES?

Having been raised in the Ozark Mountain area of Missouri, I have seen foxes wandering around as a child. At age 19, I lived for 12 months in the Tikal National Park of northern El Peten area of Guatemala, where foxes wander around the North Acropolis during the day. The foxes at Tikal know that no one will bother them, so they walk around even when people are in the Great Plaza.

But I had no idea that these gray foxes live in trees. I only learned this when I visited the main zoo in Guatemala, La Aurora Zoo. The foxes were hanging out on branches, just like the margay and ocelots. Jaguars, pumas, and jaguarundis were on the ground (though especially jaguars can also climb trees when necessary).

Since I was not aware that foxes can live in trees, this is precisely one of the aspects that our Mayan cartoon series will feature: learning from the Mayan animals directly. While in their cage photographing them, I was literally eye to eye with the foxes, less than 2 meters from them. This is how I learn: up close and in-person.

I have read tons of books on the mammals of Mesoamerica, and I estimate that many clearly indicate that the gray fox can hang out and/or sleep in trees. But my library research was clearly not as effective as being two meters from the laid back foxes, literally hanging from the tree branches.



Photo by: Nicholas Hellmuth, FLAAR
Mesoamerica, Dec. 1, 2014, Aurora Zoo.

Camera: Canon 60D. Lens: Canon EF 24-105mm
IS USM. Settings: 1/100 sec; f/13; ISO 640.

GRAY FOX
U. CINEREOARGENTEUS



Photo by: David Arrivillaga, FLAAR Mesoamerica, Jul. 4, 2019. Yaxha, Peten.

Camera: Canon T3i. Lens: Canon EF 300mm IS II USM.
Settings: 1/100 sec; f/5.6; ISO 800.

We have prepared the comparative tabulation below to list which animals of the Maya areas are best known for utilizing trees.

MAMMALS OF THE MAYAN AREAS OF MESOAMERICA WHICH INHABIT TREES			
Zoological name	Spanish name	English name	FLAAR cartoons of Mayan characters
<i>Alouatta palliata</i>	Mono aullador	Howler monkey	Link to cartoon version of howler monkey
<i>Ateles geoffroyi</i>	Mono araña	Spider monkey	Link to cartoon version
<i>Bassariscus sumichrasti</i>	Cacomistle	Mesoamerican relative of ring-tailed cat	Link to cartoon version
<i>Coendu mexicanas</i>	Puercoespín	Porcupine	Link to cartoon version of
<i>Didelphis marsupialis</i>	Zarigüeya, tacuazín	Opossum	Link to cartoon version of Opossum
<i>Potos flavus</i>	Micoleon (monkey lion)	Kinkajou	Link to cartoon version of Kinkajou
<i>Procyon lotor</i>	Mapache	Raccoon	Link to cartoon version of Raccoon
<i>Sciurus aureogaster</i>	Ardilla gris	Gray squirrel	Link to cartoon version of Gray squirrel
<i>Sciurus negligens</i>	Ardilla		Link to cartoon version
<i>Tamandua mexicana</i>	Oso hormiguero	Collared anteater	Link to cartoon version of Collared anteater
<i>Urocyon cinereoargenteus</i>	Gato (de) montés, zorra, zorrillo, zorro gris	Gray fox	Link to cartoon version of gray fox

We hope you can come visit Parque Nacional Yaxha, Nakum and Naranjo, and enjoy seeing and photographing the friendly gray foxes there.

GRAY FOX IS COMMONLY SEEN AT ZOOS

Usually the foxes are nervously pacing the cage, which is normally too small for them. But at the nice La Aurora Zoo (Guatemala City, near the airport) the foxes appear relaxed. Indeed the foxes were not even nervous when we entered inside their cage to do close-up photography.

I really enjoyed the opportunity to learn how the foxes literally "hang out" by hanging from the tree limbs.



Photo by: Nicholas Hellmuth, FLAAR Mesoamerica, Dec. 1, 2014. Aurora Zoo.
Camera: Canon 60D. Lens: Canon EF 24-105mm IS USM. Settings: 1/100 sec; f/13; ISO 640.

We appreciate the permission of all zoos in Guatemala and Mexico to allow us to enter the cages so we can get better photos of the animals. So this photograph is taken by Nicholas inside the cage at the La Aurora Zoo, near the airport in Guatemala City.

But at Yaxha, so far I see them only hiking around the plazas or the hotel Ecolodge El Sombrero. But this species of fox is known to be arboreal.



Photo by: Erick Flores, FLAAR Mesoamerica, Sep. 5, 2018. Yaxha, Petén.

Camera: Canon 1D X Mark II. Lens: Canon EF 300mm IS II USM. Settings: 1/640 sec; f/5; ISO 400.

FOXES IN MAYAN ART, ICONOGRAPHY, COSMOLOGY

If I were asked what animals are most frequently pictured in Classic Maya art I would tend to list:

- Felines (90% jaguars, rarely a puma),
- white-tailed deer,
- spider monkey,

For birds the most common are mostly (but not exclusively)

- water birds,
- hummingbird,
- scarlet macaw,
- occasional vultures.

This is a quick-list (without checking any of my multitude of researched published lists). Obviously armadillo, dogs, squirrels, rabbits and other animals also appear in Mayan art.

If someone asked me if I could cite a fox in a Maya scene (outside the Codices), I would be hard put to remember many scenes with a fox in a mural or painted on ceramic vase, bowl, or plate. They do occur, but not as frequently as jaguars, deer, and the spider monkey. Yet foxes wander around Tikal, Yaxha and most likely exist at most Maya ruins of Guatemala, Belize, Mexico, Honduras, and El Salvador. Plus, lots of Mayan folk tales include clever or devious foxes. But now, let's look at where you can find foxes in Mayan tales.

FOXES MENTIONED IN THE POPOL VUH, A MAYAN MYTHICAL STORY

Now it was all the animals,
both great and small, that had done it—
the puma and the jaguar,
the deer and the rabbit,
the fox and the coyote,
the peccary and the coati,
the small birds and the great birds.
These had done it. In a single night they did it.

Both the fox and coyote are cunning nocturnal animals that the Quichés associate with discovering and digging up hidden or secret things.
(Christenson translation, 2007 electronic version of 2003 publication)



Photo by: Nicholas Hellmuth, FLAAR Mesoamerica, Sep. 6, 2018. Yaxha, West Area.

Camera: Canon 1D X Mark II. Lens: Canon EF 300mm IS II USM.
Settings: 1/40 sec; f/5.6; ISO 16,000.

FOX AND COYOTE ARE ASSOCIATED WITH EACH OTHER EVEN IN RELATION TO THE GODS

But it was not clear where Balam Quitze, Balam Acab, Mahucutah, and Iqui Balam were. When they would see the nations passing by on the roads, they would cry out on the peaks of mountains. They would cry out with the call of the coyote and the call of the fox. They would make the call of the puma and the jaguar. And when the nations heard this there was great discussion about it:

"This is merely the cry of the coyote and of the fox," said the nations. "It is merely the puma and the jaguar," the nations said.

(Christenson 2003:221-222).

The coyote, *Canis latrans*, is not as visible as is the fox. I doubt there are coyotes in Peten, but coyotes could be found elsewhere in Guatemala. The Aztecs would have known the coyote.

FOXES ARE MENTIONED IN OTHER MAYAN TALES

The Xibaj(ob), a set of supernaturals often called 'devil(s)' or 'witch(es)', appear to include some of the supernaturals that are depicted on Classic Period ceramics. The chief witch, Xibaj himself, is a bald human-like figure (also called Tzimajol, 'Gourd Head', i.e., Skull); he commands a party of skeletons and personified animals, including talking owls and foxes. The story line most associated with this cast of characters is the Messenger tale, where witches visit the abandoned house in which two messengers have taken refuge for the night. Owls precede the caravan of witches, foxes follow and sniff out humans, the witches sit down to a meal of human corpse.

(Josserand 2003: 10)

In yet another tale, there is competition, but not a race, between the Rabbit and the Fox. Such Trickster stories are common in some Mayan languages (e.g., Chuj), but do not have a prominent place in Chol folklore.

(Josserand 2003: 12).



Photo by: Nicholas Hellmuth, FLAAR Mesoamerica, Dec. 1, 2014, Aurora Zoo.

Camera: Canon 60D. Lens: Canon EF 24-105mm IS USM. Settings: 1/100 sec; f/13; ISO 640.

GRAY FOXES AS PETS

It is not considered appropriate to capture wild foxes and keep them as pets. Another reason why keeping foxes as pets is not proper is because most die in captivity in a house or in your yard.

OUR MAYANTOONS WILL INCLUDE FOXY FOXES

Since foxes are already part of Mayan folklore, and since foxes (and coyotes in RoadRunner) are popular comic and animated film characters, our animated MayanToons video series will include a foxy fox.

CONCLUDING COMMENTS ON FOXES OF PNYNN GUATEMALA

You may see foxes in the Main Plaza or North Acropolis at Tikal. But in some months it is even easier to see lots of happy gray foxes at Parque Nacional Yaxha, Nakum and Naranjo. If you stay at hotel Ecolodge El Sombrero (before the entrance to the Yaxha area of Parque Nacional Yaxha, Nakum and Naranjo) you can see foxes almost every day. Frequently one fox will hike through the dining area of the restaurant of the hotel (not to get food; it lives on the other side and through the dining room is the quickest route for the fox to walk).

In one week at Yaxha (2018) I saw more foxes hiking around than I noticed elsewhere in Peten. Yet on May 4, 2021, we did not notice any foxes (but did see agouti and coati). If you wish to see, and photograph, the gray fox, we recommend visiting Parque Nacional Yaxha, Nakum and Naranjo (PNYNN). At Yaxha we also experienced seeing a *Boa constrictor* swallowing a fox. The other foxes were trying to attack the snake but the teeth and claws of a fox can't penetrate the scales of a *Boa constrictor*.

GRAY FOX

U. CINEREOARGENTEUS



Photo by: María Alejandra Gutiérrez, FLAAR Mesoamerica, Jul. 4, 2019. Yaxha, Petén.

Camera: Canon 1D X Mark II. Lens: Canon EF 300mm IS II USM. Settings: 1/40 sec; f/5.6; ISO 800.

BIBLIOGRAPHY ON *UROCYON CINEREOARGENTEUS*

Nicholas Hellmuth initiated this bibliography. This bibliography was expanded by Melany Soria, then updated by Stephanie Serrano and then by Linda Bac; next edition was by Marcella Sarti (all were university students who work at FLAAR Mesoamerica over the years, Guatemala City, Central America). Vivian Hurtado has now finished the bibliography (2021). Editing and annotations are primarily by Nicholas Hellmuth.

AGUILAR, María

2013 Dieta de la zorra gris: ¿es legítimo dispersor de las semillas que consume en Sierra de Quila Jalisco? Universidad de Guadalajara. 58 pages.

Available online:

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2008 Gray fox (*Urocyon cinereoaregentus*). Mammals of Mississippi. Vol. 9. Pages 1-7.

Available online:

www.cfr.msstate.edu/wildlife/mammals/pdf/grayfox.pdf

ALONZO, Waleska

2008 Evaluación del efecto anestésico y sedación de tres dosis de la combinación de tiletamina, zolazepam y xilacina vía intramuscular en zorra gris (*Urocyon cinereoargenteus*). USAC. Guatemala city. Pages 19-20.

Available online:

www.repositorio.usac.edu.gt/2470/1/Tesis%20Med%20Vet%20Waleska%20Guerra.pdf

ÁLVAREZ Del Toro, Miguel

1917 Chiapas y su biodiversidad. Tuxtlla Gutiérrez: Gobierno del Estado de Chiapas. 152 pages.

ÁLVAREZ Del Toro, Miguel

1952 Los Animales Silvestres de Chiapas. Ediciones del Gobierno del Estado, Tuxtla Gutiérrez, Chiapas, México. 251 pages.

This book suffers from typical nearly unusable photos of good scholars and cheap paper and cheap printing of most books in Mexico and Central America during the 1950's through 1970's. Several decades later Alvarez del Toro updated this book and divided it into different volumes, which are so much better (in coverage and quality) there is almost no comparison.

ÁLVAREZ Del Toro, Miguel

1991 Los mamíferos de Chiapas. Gobierno del Estado de Chiapas, Consejo Estatal de Fomento a la Investigación y Difusión de la Cultura, DIF-Chiapas, Instituto Chiapaneco de Cultura, 133 pages.

Alvarez del Toro focused on mammals of Chiapas, spiders of Chiapas, butterflies of Chiapas, and reptiles of Chiapas. Would be wonderful to have books of this nature on each kind of creature in Peten (probably over 80% of the creatures at Parque Nacional Yaxha Nakum Naranjo are elsewhere in Peten; and probably 97% of the creatures at Tikal are also at Yaxha (since the parks are next to each other). But Parque Nacional Yaxha Nakum Naranjo has two large lakes and the seasonal Rio Holmul (which is adjacent to Nakum and then Naranjo). So I estimate there are eco-systems in this park not at Tikal.

El Mirador is far to the northern border of Peten (with Campeche area of Mexico). This eco-system is more dry than central Peten.

ARANDA, Marcelo

2012 Manual para el rastreo de mamíferos silvestres de México. Comisión Nacional para el Conocimiento y Uso de la Biodiversidad (Conabio). 260 pages.

Available online:

<http://200.12.166.51/janium/Documentos/6800.pdf>

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1990 Hábitos alimenticios de la zorra gris *Urocyon cinereo-argenteus* (Carnivora:Canidae) en la región meridional de Baja California, México. *Rev. Biol. Trop.*, 38(2B):497-500, 1990

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2012 Diversidad de Mamíferos Silvestres del Astillero Municipal B'alam Juyu, Patzun, Chimaltenango. Programa de Experiencias Docentes con la Comunidad. Subprograma EDC-Biología. Informe Final de Investigación. Centro para la Investigación y Planificación del Desarrollo Maya. Escuela de Biología, Facultad de Ciencias Químicas y Farmacia. Universidad de San Carlos de Guatemala.

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2006 Travellers' Wildlife Guides Southern Mexico: The Cancun Region, Yucatan Peninsula, Oaxaca, Chiapas, and Tabasco. Interlink Pub Group Inc. 487 pages.

Available online:

<https://www.amazon.com/Travellers-Wildlife-Guides-Southern-Mexico/dp/1566566401>

BENSON, Elizabeth

1977 Birds and Beasts of Ancient Latin America. 162 pages.

Available online:

<https://www.amazon.com/Birds-Beasts-Ancient-Latin-America/dp/0813015189>

This is only a brief general introduction, not a full-scale coverage whatsoever. Elizabeth Benson is a well known and respected scholar but this book is not at close to the depth that a graduate student or scholar would need. What little it offers is more for South America and less for Mesoamerica, and more for a general reader who is a tad curious.

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2005 Biodiversidad del Estado de Tabasco. CONABIO, Instituto de Biología, UNAM. 373 pages.

Available online:

https://www.researchgate.net/publication/310327381_Mamiferos_del_estado_de_TabascoMexico_Mammals_of_Tabasco_Mexico

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2013 Maya exploitation of animal resources during the middle preclassic period: an archeozoological analysis from Pacbitun, Belize. Trent University. 253 pages.

Available online:

<http://digitalcollections.trentu.ca/objects/etd-186>

CEBALLOS, Gerardo and Gisselle OLIVA

2005 Los Mamíferos silvestres de México. Fondo de Cultura Económica, México D.F. 988 pages.

Sold online:

https://www.amazon.com/mam%C3%ADferos-silvestres-Ciencia-Tecnologia-Spanish/dp/9709000306/ref=sr_1_1?ie=UTF8&qid=1532131249&sr=8-1&keywords=Los+Mam%C3%ADferos+silvestres+de+M%C3%A9xico.+Fondo+de+Cultura+Econ%C3%B3mica&dpID=51wpTTq8wdL&preST=_SX218_BO1.204.203.200_QL40_&dpSrc=srch

Most photos in color. Good information. It is noticeable that no comparable book exists for Guatemala or El Salvador or Honduras nor Belize (at this size and full-color quality).

CEBALLOS, Gerardo

2009 Fauna Mexicana: Esplendor de la Naturaleza. Telmex. 153 pages.

Available online: <http://www.ecologia.unam.mx/laboratorios/eycfs/faunos/art/Gce/L3.pdf>

Photo album; not a book with technical information, but most of the photos are good.

CENDRERO, Luis

1972 Zoología hispanoamericana, Vertebrados. Editorial Porrúa, S.A. México, D.F. 1160 pages.

Sold online: <https://www.amazon.com.mx/Zoologia-Hispanoamericana-Vertebrados-portada-variar/dp/9684520018>

If you wish to have a complete library, you may want this, but otherwise, has no line drawings and photographs are of the variable original quality and low-tech printing quality which was the norm in Mexico and Central American publications for too long. Has only a handful of color (weak, as typical in those years).

CORONA, Eduardo

2014 Etnobiología, hacia una zooarqueología de los neotrópicos. Instituto Nacional de Antropología e Historia. Vol. 12, No. 2. 103 pages.

CUARON, Alfredo., MARTINEZ, Miguel., McFADDEN, Katherine., VALENZUELA, David and Matthew GOMPPER

2004 The Status of Dwarf Carnivores on Cozumel Island, Mexico. Biodiversity and Conservation 13:317-331, 2004.

Zoologist Alfredo Cuaron assisted us on trips down the Rio Usumacinta in 1970's-1980's as guide for local mammals.

ESCOBAR, Barbara

2013 Riqueza de mamíferos medianos y mayores en cafetales y bosques de tres reservas naturales privadas (san jerónimo miramar-quixayá, pampojilá- peña flor y santo tomás pachu) de la reserva de usos múltiples de la cuenca del lago de Atitlán. Universidad de San Carlos de Guatemala. Pages 22-24.

Available online:

www.repositorio.usac.edu.gt/793/

FARIAS, Veronica, FULLER, Todd, WAYNE, Robert and Raymond SAUVAJOT

2005 Survival and cause-specific mortality of gray foxes (*Urocyon cinereoargenteus*) in southern California. J. Zool. Lond. Vo. 266. Pages 249-254.

Available online:

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.502.105&rep=rep1&type=pdf>

FRITZELL, Erik and Kurt, HAROLDSON

1982 *Urocyon cinereoargenteus*. Mammalian Species. No. 189. Pages 1-8. The American Society of Mammalogists.

GARCIA del Valle

2015 Cultural significance of wild mammals in mayan and mestizo communities of the Lacandon Rainforest, Chiapas, México. Journal of Ethnobiology and Ethnomedicine 11:36. Pages 13.

GARDUNO, Alfonso

2010 Principales expresiones del culto totémico de la lluvia, la tierra y la guerra entre los antiguos habitantes de Teotihuacán. Instituto de Investigaciones Estéticas, UNAM. Arqueología.

GOTZ, Christopher

2014 Solamente Contextos Culturales? Evaluación del papel de la Tafonomía en la Zoo arqueología Maya de las Tierras Bajas del Norte de la Península de Yucatán, México. Revista de Etnobiología, Volumen 12, número 2. Facultad de Ciencias Antropológicas, Yucatán, México.

GUERRERO, Sergio, BADI, Mohammad, ZALAPA, Silvia, and Adriana FLORES

2002 Dieta y nicho de alimentación del coyote, zorra gris, mapache y jaguarundi en un bosque tropical caducifolio de la costa sur del estado de Jalisco, México. UANL. Guadalajara. Pages 119-137.

Available online:

www.scielo.org.mx/scielo.php?pid=S0065-17372002000200007&script=sci_abstract

HALL, E. Raymond and Keith R. KELSON

1959 The Mammals of North America. 2 vols. The Ronald Press Company, New York.

Vol. II goes from about page 547 to 1083, with an additional 79 pages of index. My research library of flora and fauna is missing Volume I.

HAMBLIN, N. L.

1984 Animal Use by the Cozumel Maya. University of Arizona Press. 206 pages.

Sold online: <https://www.amazon.com/Animal-Cozumel-Maya-Nancy-Hamblin/dp/0816508240>

HELLMUTH, Nicholas

2013 Maya Ethnozooology Complete Inventory: Mammals, Birds, Insects, Reptiles, Seashells, Fish & Amphibians that appear in Classic Maya Art: Murals, Pottery, Effigies, Guatemala, Mexico, Belize, Honduras. FLAAR Reports.

Illustrated with high-res digital photographs (a polite way of saying these are not old 35mm color slides scanned into pseudo-digital images). Although we hope that any epigrapher or iconographer or zoologist could find a few additional species that are not in this opus, what is present is more than in all the other books on animals of Classic Maya art.

No cost to download.

HERNÁNDEZ, Norma, PINEDA, Raúl, GUERRERO, María, CANTÓ, Germinal, WALLACE, Robert, MORENO, Marco, MOSQUEDA, Juan, ZAMORA, Salvador and Brenda CAMACHO

2016 Gray fox (*Urocyon cinereoargenteus*) parasite diversity in central Mexico. *International Journal for Parasitology: Parasites and Wildlife*. Vol. 5. Pages 207-210.

Available online:

<https://core.ac.uk/download/pdf/82099893.pdf>

HERRERA, David y Christopher MARKUS

2013 La Alimentación de los Antiguos Mayas de la Península de Yucatán: consideraciones sobre la Identidad y la Cuisine en la Época Prehispánica. Facultad de Ciencias Antropológicas, Universidad Autónoma de Yucatán.

HORWICH, Robert H. and Jonathan LYON

1990 A Belizean Rain Forest. The Community Baboon Sanctuary. Orang-utan Press. 420 pages.

Sold online: <https://www.amazon.com/Belizean-Rain-Forest-Community-Sanctuary/dp/0963798200>

JANSON, Thor

2001 Maya Nature: An Introduction to the Ecosystems, Plants and Animals of the Mayan World. Vista Pubns. 128 pages.

Sold online: <https://www.amazon.com/Maya-Nature-Introduction-Ecosystems-Animals/dp/0962622184>

JOSSERAND, J. Kathryn

2003 Story Cycles in Chol (Mayan) Mythology: Contextualizing Classic Iconography. With Nicholas A. Hopkins, Ausencio Cruz Guzmán, Ashley Kistler, and Kayla Price

<http://www.famsi.org/reports/01085/01085Josserand01.pdf>

JUAREZ, Antonio., IZAS, Manuel y Michelle BUSTAMENTE

2011 Felinos del Biotopo del Quetzal, desarrollo de un protocolo de muestreo no invasivo. Coordinación General de Programas. Dirección General de Investigación. Universidad de San Carlos de Guatemala.

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2007 Guía Ilustrada de Pelos para la Identificación de Mamíferos Medianos y Mayores de Guatemala. Dirección General de Investigación (DIGI), Universidad de San Carlos de Guatemala. Instituto de Investigaciones Químicas y Biológicas (IIQB), Facultad de Ciencias Químicas y Farmacia, Universidad de San Carlos de Guatemala.

LARA, Estuardo, CASO, Laura and Mario ALIPHAT

2012 El sistema milpa roza, tumba y quema de los Maya Itzá de San Andrés y San José, Petén Guatemala. Ra Ximhai. Vol. 8, No. 2. Pages 71-92.

Available online: www.redalyc.org/pdf/461/46123333007.pdf

LEOPOLD, Starker

1972 Wildlife of Mexico: The Game Birds and Mammals. University of California Press. 568 pages.

Sold online: <https://www.amazon.com/Wildlife-Mexico-game-birds-mammals/dp/B0007HWCTI>

Hardly any photographs, and those few which are present are mediocre quality. But the line drawings are excellent and reproduced at a healthy size. The same book is available in Spanish, 1977.

LORENZO, Consuelo, ESPINOZA, Eduardo and Jorge ORTEGA

2008 Avances en el estudio de los mamíferos de México II. Asociación Mexicana de Mastozoología, A. C. 726 pages.

Available online:
www.researchgate.net/profile/Jorge_Ortega8/publication/320191321_Avance_en_el_Estudio_de_los_Mamiferos_de_Mexico_II/links/59d3f294a6fdcc181ad94b09/Avance-en-el-Estudio-de-los-Mamiferos-de-Mexico-II.pdf

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2009 Depredadores de murciélagos en la cueva de los laguitos, Chiapas, México. Revista Mexicana de Mastozoología. Vol. 13. Pages 82-91.

Available online:
www.revmexmastozoologia.unam.mx/ojs/index.php/rmm/article/view/37

MONROY, Rafael., PINO, José., LOZANO, Marco and Alejandro GARCIA

2011 Estudio etnomastozoológico en el Corredor Biológico Chichinautzin (COBIO), Morelos, México. Etnomastozoología en COBIO, México.

MONTIEL, Griselda, FUENTES, Helxine and Margarita VARGAS

2007 Primer registro de Ixodes cookei (Acari: Ixodidae) para México. Revista Mexicana de Biodiversidad. Vol. 78. Pages 205-206.

Available online:
www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1870-34532007000100020

REID, Fiona

2009 A field guide to the mammals of Central America and Southeast Mexico. Oxford University Press. 2nd edition. 384 pages.

Available online:

www.amazon.com/Mammals-Central-America-Southeast-Mexico/dp/0195343239

SCHLESINGER, Victoria

2002 Animals and Plants of the ancient maya: a guide. University of Texas Press. 1st Edition. 373 pages.

Useful for high school students and first year in college, but for serious research on flora, fauna, and iconography of the Classic Maya a more complete work is needed.

Available online:

www.amazon.com/Animals-Plants-Ancient-Maya-Guide/dp/0292777604

SEGOVIA, Augusto, CHABLE, Juan, DELFIN, Hugo, SOSA, Javier and Silvia HERNANDEZ

2013 Aprovechamiento de la fauna silvestre por comunidades mayas. Biodiversidad y desarrollo en Yucatan. Pages 385-387.

Available online:

www.cicy.mx/Documentos/CICY/Sitios/Biodiversidad/pdfs/Cap7/20%20Aprovechamiento%20de%20la%20fauna.pdf

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2011 Animales Medicinales y agoreros entre Tzotziles y Tojolabales. Estudios Mesoamericanos. Nueva época, 11, Julio-diciembre 2011. Pages 29-42.

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www.iifilologicas.unam.mx/estmesoam/uploads/Vol%C3%BAmenes/Volumen%2011/animales-medicinales%20-y-agoreros.pdf

SERRANO, Rafael, GUERRERO, Fernando and Rafael SERRANO

2011 Animales Medicinales y agoreros entre Tzotziles y Tojolabales. Estudios Mesoamericanos. Nueva época, 11, Julio-diciembre 2011.

STARKER, Leopold

2008 Wildlife in Mexico, the game birds and mammals. University of California Press. London. Pages 559.

Available online:

<https://archive.org/details/wildlifeofmexicooleop>

THORNTON, Erin

2011 Animal resources in ancient maya economy and exchange: zooarchaeological and isotopic perspectives. University of Florida. Florida. 244 pages.

Available online:

<http://ufdc.ufl.edu/UFE0042707/00001>

VILLALOBOS, Alejandra, BUENROSTRO, Alejandra and Guillermo SÁNCHEZ

2014 Dieta de la zorra gris *Urocyon cinereoargenteus* y su contribución a la dispersión de semillas en la costa de Oaxaca, México. THERYA. Vol. 5, No. 1. Pages 355-363.

Available online:

www.scielo.org.mx/pdf/therya/v5n1/v5n1a19.pdf

DICTIONARIES TO FIND THE MAYAN WORD FOR GRAY FOX IN SEVERAL NEARBY LANGUAGES

We have Pokomchi, Kaqchiquel, and Q'eqchi' Mayan speakers in-house at FLAAR Mesoamerica, so for those languages we get the translations directly from them. For the other languages, most is on-line or in standard dictionaries. Here is one example.

BAER, Phillip and **Mary BAER**

2018 Diccionario Maya Lacandon. Vocabularios indigenas Num. 51. Summer Institute of Linguistics, SIL, México.

Download: www.sil.org/system/files/rapdata/22/21/39/2221392296488691456377120169358150349/lac_Dic_gram_1b_b_w.pdf

VIDEOS ON THE GRAY FOX, ESPECIALLY AT TIKAL, PETEN

https://www.youtube.com/watch?v=xbn_zRUXqiQ

The most perfect focus and color I have seen in a video. This excellent video is by CAYAYA BIRDING.

<https://de-de.facebook.com/BrummiesAdventures/videos/gray-fox/2055213411188617/>

Only 2 seconds; Tikal, Temple I.

<https://www.youtube.com/watch?v=8MCMn7zy-u8>

Grey Fox fighting Boa Constrictor at Tikal, Guatemala Part 3

<https://www.youtube.com/watch?v=3Ac2AQRNQwE>

Grey Fox fighting a Boa Constrictor in Tikal Part 1

WEB SITES WITH INFORMATION ON *UROCYON CINEREOARGENTEUS*

www.acguanacaste.ac.cr/paginas-de-especies/mamiferos/657-canidae/4277-urocyon-cinereoargenteus-canidae
Information.

http://animaldiversity.org/accounts/Urocyon_cinereoargenteus/
Hard to tell which web site is borrowing from which other, but at least this page has abundant information and several photos.

www.arkive.org/grey-fox/urocyon-cinereoargenteus/
Photos.

www.backyardnature.net/n/a/gray-fox.htm
Jim Conrad was a lecturer on plants and animals over 25 years ago during FLAAR lecture-tours to the Maya area. He has had his own Naturalist Newsletter for several years.

www.bucknell.edu/msw3/browse.asp?id=14000841
Sub-species

www.inaturalist.org/taxa/42076-Urocyon-cinereoargenteus
Lots of information; good bibliography (but the one of Smith.edu is multiple times longer). But the inaturalist site has many photographs.

www.iucnredlist.org/details/22780/0
Status conservation.

<http://maps.iucnredlist.org/map.html?id=22780>
Map of distribution range.

www.nhptv.org/natureworks/grayfox.htm
Information.

www.petencito.usac.edu.gt/florayfauna.php?c=26
Synthesized information.

www.science.smith.edu/msi/pdf/i0076-3519-189-01-0001.pdf
By Erik Fritzell and Kurt J. Haroldson, 1982. Has exhaustive bibliography (albeit only up to 1982). Discusses each aspect of life, but no photographs.

www.sibr.com/mammals/M149.html
Information.

www.uwsp.edu/biology/VertebrateCollection/Pages/Vertebrates/Mammals%20of%20Wisconsin/Urocyon%20cinereoargenteus/Urocyon%20cinereoargenteus.aspx
Information.

The following citation can be put in your preferred style, but here is the pertinent information:

HELLMUTH, N.

2021 Friendly Foxes, Wander around Maya Ruins of Yaxha, Parque Nacional Yaxha, Nakum and Naranjo, Gray Fox, *Urocyon cinereoargenteus*. FLAAR (USA) and FLAAR Mesoamerica (Guatemala).

ECOLOGDE EL SOMBRERO

I thank Gabriella Moretti, owner of Ecolodge El Sombrero, for providing hotel room and meals while we have been doing field work at Parque Nacional Yaxha, Nakum and Naranjo. We also appreciate the hospitality of her sons Sebastian de la Hoz and Juan Carlo de la Hoz. Every workday is exhausting because we are carrying and then using very heavy cameras, super-telephoto lenses, sturdy tripods, large gimbals or ball tripod heads. Thus it is crucial for my health to be able to rest and totally recuperate every night in order to be ready for the following day of botanical and zoological adventures in Parque Nacional Yaxha, Nakum and Naranjo.

Equally crucial is having a place to charge the batteries of the computers, or all the cameras, and of the cell phones. Solar power is great, but it lasts only an hour, or less, if you plug in multiple computers and cameras and flash batteries to charge. So a place with enough electricity to charge the entire mass of essential field work equipment is essential and thus very much appreciated.

Plus, we need at least some Internet access to communicate with out staff back in Guatemala City.

Contact Info: +502 5460 2934
VentasElSombrero@gmail.com or WhatsApp.

www.elsombreroecolodge.com/en-us

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BACK COVER PHOTOGRAPH:

Photo by: David Arrivillaga, FLAAR Mesoamerica, Jul. 4, 2019. Yaxha, Peten.

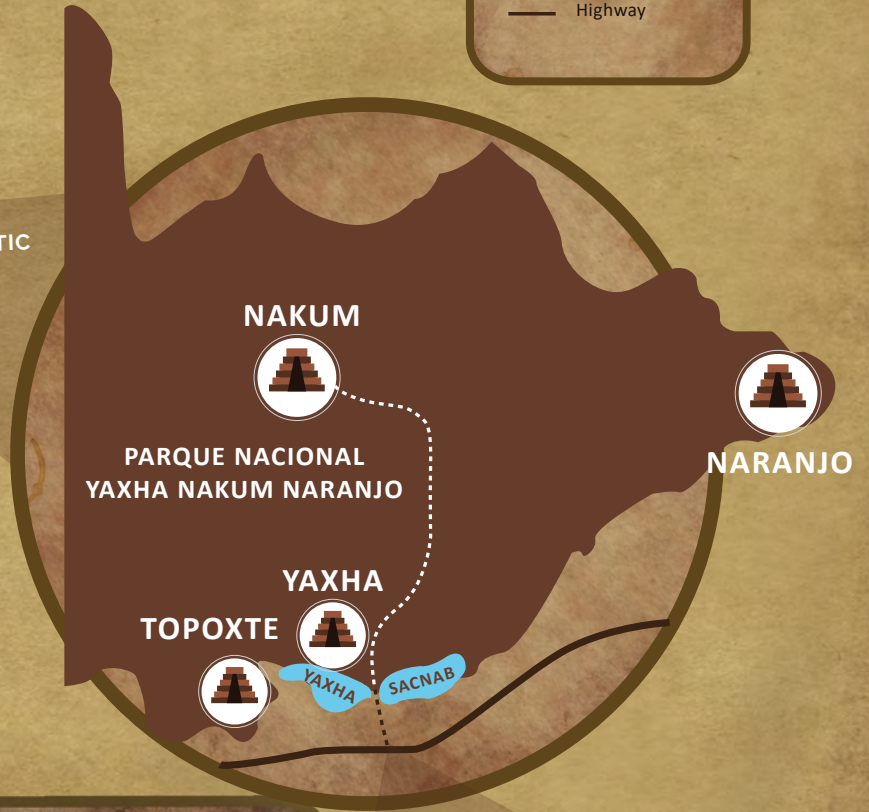
Camera: Canon T3i. Lens: Canon EF 300mm IS II USM. Settings: 1/50 sec; f/5.6; ISO 800.

HOW TO GET TO YAXHA?



MAP LEGEND

-  Archaeological sites
-  Airports
-  Earthworks
-  Highway



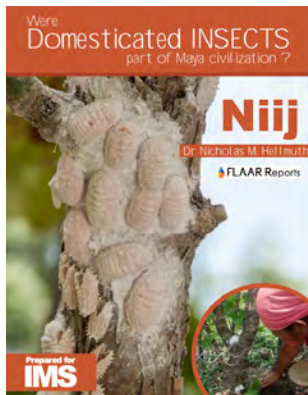
PROTECTED AREA



 **FLAAR**
MESOAMÉRICA

Go to the Mundo Maya airport in Santa Elena and then you will find a services of tourist vehicles to go to the archaeological site. If you want to go by car from Guatemala City, take the following route: Río Dulce - Poptún-Flores. At the junction further on you will find on the left the route to Tikal. Go straight on to the right towards Yaxha (towards Melchor de Mencos). In km. 521 at the village La Maquina, turn left to the site. Ecolodge El Sombrero is 50 meters before the entrance to National Park Yaxha - Nakum - Naranjo.

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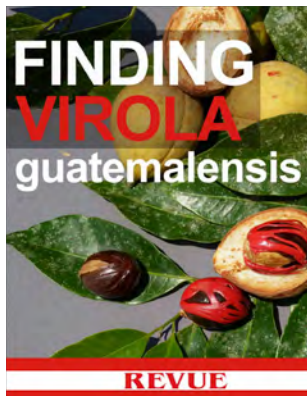
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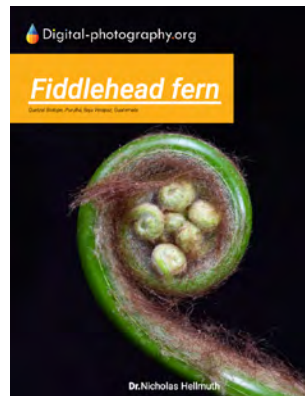
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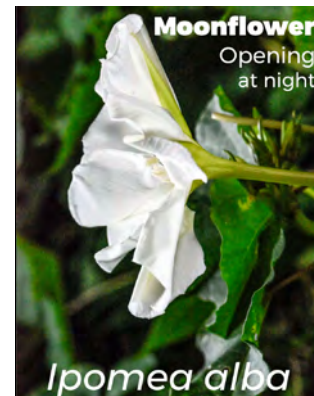
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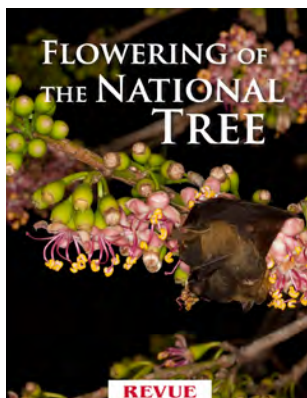
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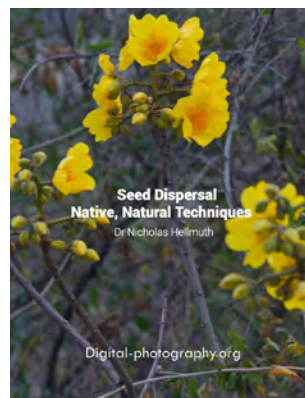
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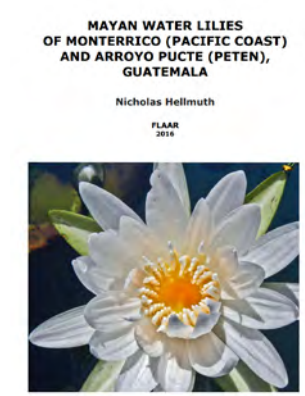
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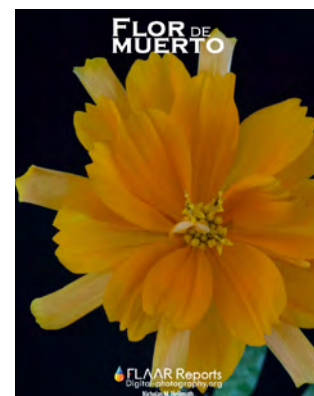
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