



ANIMA MUNDI

Adventures in Wildlife Photography

Issue 6, Year 2 - 2nd Quarter, April 2012

In This Issue:

WINGS OVER MINDO Ecuador's Mountain Hummingbirds

A DEADLY CHARM Snakes of Costa Rica

GHOSTS OF ETOSHA A portfolio by Christopher Rimmer

FROGFISH What a Big Mouth You Have!

ANIMA MUNDI

Adventures in Wildlife Photography

Plenty of colors to beat the blues

Putting together this issue of *ANIMA MUNDI - Adventures in Wildlife Photography* has proven to be even more enjoyable than usual - the impossibly colorful images of the tropical species gracing its pages provided a much welcome respite from the Arctic blizzards which lashed Italy during most of January and February, and contemplating such wondrous shapes and shades really helped us surviving the gloomy, freezing temperatures outside. The bad news about the economy - both worldwide and in Europe - were quite depressing too, and a little daydreaming about our past and future exotic travels was most welcome. It's a good medicine for melancholy - we hope these technicolored pages will have the same effect on you too!

As the new issue goes finally online, we too take wings and fly - not on the virtual invisible highways of the cyberspace, but luckily to our next travel destination...the island of Borneo and the fabulous, wildlife-rich basin of the mighty Kinabatangan river. Fingers crossed, we'll be able to capture once more some very special photographic material for a future issue of *ANIMA MUNDI* - this is certainly not our first trip there (we love the place!), but one can always hope to see something new and special...So stay tuned and bear with us - fantastic Hornbills, giant Saltwater crocodiles and undreamed-of insects will be showing up soon on these pages!

But before even starting to dream of Borneo, you'll be hopefully enjoying our current issue - a magazine as rich and as varied as it might be. We start on page 4 with a detailed trip report about the moist, cool forests of Mindo, Ecuador - a destination bird lovers cannot afford to miss and a true heaven for herps and insect aficionados. Ecuador proved itself to be a fantastic destination for wildlife photography during our recent 30-days long expedition there, and we also have in the works a huge travel report on Yasuni National Park in the Amazon - to be featured in

two photo-filled separate features on issues 7 (July) and 8 (October). If you have ever contemplated visiting the Amazon you don't want to miss them!

Remaining in the tropics, we usher in a new article format on page 37, aptly headed "Beauty of the Beast". It's a mostly photographic but nevertheless fact-filled homage to an animal, or a group of similar animals - in this issue, specifically, the beautiful and occasionally dangerous snakes of Costa Rica and more generally Central America. More striking subjects will follow in future issues, and we shall really strive to pay a long-overdue visual homage to many unluckily misrepresented creatures. The emphasis here is on visuals, so prepare for some seriously dizzying eye candy.

Our by now well-established format of the personal photographic Portfolio follows immediately after, starting on page 72 - this time it's the turn of Australian author Christopher Rimmer, who regales us with a stunning gallery in black and white of the ghostly elephants of the Etosha pan in Namibia. We love his evocative, atmospheric African portraits and we are quite certain you'll find them striking too.

This issue's contents are finally topped off on page 83 with a large feature on frogfish. Also known as anglerfish, these grotesque and absurdly-shaped fish are the unsung masters of camouflage of the coral reef, and we are quite certain our article will clearly explain to you how such static, clumsy creatures have been able to become incredibly successful ambush predators thanks to some truly fascinating evolutionary strategies. Plus, they make wonderful photo subjects!

Have a good trip!
Andrea & Antonella Ferrari
www.animamundimag.com

We appreciate your feedback - constructive criticism, useful suggestions and interesting contributions are most welcome.

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ANIMA MUNDI
 Adventures in Wildlife
 Photography
 is a Free Quarterly
 Online Magazine
www.animamundimag.com

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■ A Brown Vine Snake *Oxybelis aeneus* strikes a pose in a typical defensive display - this and several other stunning Central American species are featured in all their serpentine glory from page 37.

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WITH EXTRA VIDEO CONTENT

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THE PARTING SHOT

Andrea & Antonella Ferrari's

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TO TRAVEL IS TO LEARN.

When Giovanna Holbrook took on the challenge of leading two University of Florida science professors and a group of naturalists to the Galápagos Islands in 1971, she had no way of knowing the lasting impact that experience would have on her life and on the lives of those traveling with her. The group journeyed throughout the archipelago aboard a retired navy vessel, propelled by their spirit of adventure and thirst for knowledge. At that time, the Galápagos was just celebrating its twelfth year as a national park, conservation work at the Charles Darwin Research Station was still in its infancy, and tourism in the islands was virtually non-existent.

More than thirty years later, Holbrook Travel continues to serve the needs of teachers, students, academic institutions, and nature lovers. Although many changes have taken place over the years, Holbrook Travel has taken great care to remain true to its roots. As news of environmental concerns and world conflicts continue to fill the airwaves, it seems more important than ever to help people gain a better understanding and appreciation of the natural world and other cultures through firsthand experiences. In the words of Andrea Holbrook, president: “Our goal is to try to continue the great work my mother started.”

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A COOL, MOIST HEAVEN FOR PASSIONATE BIRDWATCHERS
WINGS OVER MINDO

Hand-held hummingbird photography - and much more - in Ecuador's most accessible and spectacular cloud forests


Cloud forests alive with the sounds of tropical birds

TEXT BY ANDREA FERRARI
PHOTOS BY ANDREA & ANTONELLA FERRARI

As most ANIMA MUNDI readers will have realized by now, we really aren't keen bird photographers – we seem to lack the often obsessive passion and knack one needs for this kind of subject, we do not like carrying and using tripods (apparently a must for serious bird shooters) in the field, and our telephoto lenses are neither long enough nor focusing fast enough for such skittish, flitting, fast-moving creatures. So when we decided to spend some time in Mindo during our month-long trip to Ecuador with our friends of [Tropical Herping](#), we looked at it mostly as a quiet, out-of-the-way location where we might relax for a short bit in the cool mountain cloud forest climate after the

exhausting heat and humidity of the Amazon, and where – with some luck – we might actually find and photograph some unusual and very desirable species such as the endangered Spectacled bear *Tremarctos ornatus* or Campbell's toadhead pit-viper *Bothrocophias campbelli*, both having previously been encountered in the area. We did not see either – with much disappointment for us, childish as we are – despite our half-hearted attempts, but little did we suspect upon our arrival in Mindo that after encountering some of its smallest and most frustrating inhabitants we'd find ourselves solidly hooked to – you guessed it – bird photography.

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A trio of Choco Toucans 
Ramphastos brevis silhouetted against the Mindo sky at dawn.



A dense tropical forest canopy with various epiphytic plants. A large bromeliad with yellow-green leaves and reddish-brown bracts is prominent in the upper left. A vertical spike of small red flowers is visible in the center-right. The background is filled with thick green foliage and tree trunks.

The Mindo cloud forest canopy is a veritable hanging garden of flowering epiphytes, mosses, lichens and arboreal orchids



Carefully scanning the forest canopy allows brief, tantalising glimpses of beautiful birds such as this Collared Aracari *Pteroglossus torquatus*.

Never having been passionate birdwatchers, we were in fact totally ignorant of Mindo's shining reputation as of one of tropical America's hotspots for this peculiar activity, together with Costa Rica's internationally well-know Monteverde and a handful of other localities: it seems the cool, moist environment of the tropical and equatorial montane cloud forest represents the ideal habitat for an exceptionally large number of spectacular bird species. And among those bird species – for us newcomers, at least – none were more visible, endearing or dazzling than the myriad of hummingbirds flitting and literally buzzing everywhere.

I do not expect our reader to be fully conversant with the somewhat exotic subject of hummingbird biology and extremes, so let me explain better. If I may quote from Wikipedia (any other good book on bird biology will tell you the same, however), "*Hummingbirds are birds that comprise the family Trochilidae. They are among the smallest of birds, most species measuring in the 7.5–13 cm (3–5 in) range. Indeed, the smallest extant bird species is a hummingbird, the 5-cm to about 20-mm Bee Hummingbird. They can hover in mid-air by rapidly flapping their wings 12–80 times per second (depending on the species). They are also the only group of birds able to fly backwards. Their English*

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A constant flurry of iridescent, rainbow-hued activity




■ A Purple-throated Woodstar *Calliphlox mitchellii* hummingbird shines like an iridescent jewel as it flies past in the Mindo cloud forest.

■ A stunning Andean Cock-of-the-rock *Rupicola peruviana* displaying on its lek in the montane rainforest. Mindo offers very good chances of admiring this uncommon and exceptionally wary bird. Below, three in-flight images of a briefly hovering Green Thorntail *Discosura conversii* hummingbird.





A colorful Collared 
Aracari Pteroglossus
torquatus gorges itself on
ripe bananas in the garden
of the Yellow House.



Left, a small Tree frog *Hypsiboas pellucens*, commonly observed in the moist habitat of Mindo's cloud forests. Right, top, a Rufous Motmot *Baryphthengus martii* feeding on wild bananas and, bottom, a male Flame-rumped Tanager *Ramphocoelus flammigerus*, also feeding on ripe fruit.



Shards of light zooming erratically everywhere



name derives from the characteristic hum made by their rapid wing beats. They can fly at speeds exceeding 15 m/s (54 km/h, 34 mi/h). Hummingbirds drink nectar, a sweet liquid inside certain flowers. Like bees, they are able to assess the amount of sugar in the nectar they eat; they reject flower types that produce nectar that is less than 10% sugar and prefer those whose sugar content is stronger. Nectar is a poor source of nutrients, so hummingbirds meet their needs for protein, amino acids, vitamins, minerals, etc. by preying on insects and

spiders". Unbelievable! How can such a hysterical dynamo – perennially buzzing from flower to flower with disconcerting speed and in perpetual, frantic motion - survive on nectar and the occasional insect alone? Our source continues to reveal that "With the exception of insects, hummingbirds while in flight have the highest metabolism of all animals, a necessity in order to support the rapid beating of their wings. Their heart rate can reach as high as 1,260 beats per minute, a rate once measured in a Blue-throated Hummingbird. They also consume more

than their own weight in nectar each day, and to do so they must visit hundreds of flowers daily. Hummingbirds are continuously hours away from starving to death, and are able to store just enough energy to survive overnight". Fascinating! But what about their most striking visual feature – their incredibly colorful, iridescent plumage? Apparently, "Many of the Hummingbird species have bright plumage with exotic colouration. In many species, the coloring does not come from pigmentation in the feather structure, but instead from prism-like cells

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A truly beautiful male White-necked Jacobin Florisuga mellivora, one of Mindo's most spectacular hummingbirds.



From left to right, another Collared Aracari *Pteroglossus torquatus*, a male Green-crowned Brilliant *Heliodoxa jacula* frozen in mid-flight and a Bronze-winged Parrot *Pionus chalchopterus*.





A male anole *Anolis equatorialis* confides in its exceptional camouflage as it lies immobile on a cloud forest tree trunk.



Left, a tall forest tree literally festooned with mosses and epiphytes rises from the misty, water-laden cloud forest of the Mindo valley. Right, top, a Golden Tanager *Tangara arthus*; bottom, a Squirrel Cuckoo *Piaya cayana*.





Green Thorntail *Discosura conversii*, a very small and rather inquisitive hummingbird species which is quite common in the cloud forest of Mindo.

within the top layers of the feathers. When light hits these cells, it is split into wavelengths that reflect to the observer in varying degrees of intensity. The Hummingbird wing structure acts as a diffraction grating. The result is that, merely by shifting position, a muted-looking bird will suddenly become fiery red or vivid green. However, not all hummingbird colors are due to the prism feather structure. The rusty browns of Allen's and Rufous Hummingbirds come from pigmentation. Iridescent hummingbird colors actually result from a combination of refraction and pigmentation, since the diffraction structures themselves are made of melanin, a pigment". As our images show, the above description fits the bill indeed – when lit by the sun's rays or a

camera strobe's flash from the correct angle, one of these tiny birds – in some cases not much bigger than a large hornet – can magically transform into a dazzling, fiery, iridescent shard of green, violet and blue, zooming erratically at incredible speed, stopping in mid-air and even disappearing in the blink of an eye – flying backwards and receding in the distance as a miniature meteor. Wow! Given their totally erratic and often unpredictable flight patterns, their incredible speed and – last but not least – their minuscule size, hummingbirds make very difficult subjects for the unspecialized nature photographer. They rarely perch for more than a few seconds – and, despite their shimmering plumage, one certainly doesn't want them to capture one perching, as these

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With its permanently wet and cool atmosphere, Mindo's cloud forest is a veritable haven for epiphytes and mosses. These graceful and thick hanging gardens offer an endless variety of microhabitats for a great number of reptile, amphibian and above all insect species.



Left, a moss-mimicking katydid belonging to the genus *Paraphidnia*. Right, a close-up portrait of a large *Cranidae* Opilionid, commonly known as Daddy Longlegs or Harvestman.





■ A male White-necked Jacobin *Florisuga mellivora* reveals its stunningly iridescent coloration. Hummingbirds will however “sparkle” only when lit from certain angles.

truly are creatures of the air. So how does one succeed in correctly framing a crazed tiny bird which is zooming to and fro, lighting it in the best possible way to reveal its iridescent shades and above all nailing it in tack-sharp focus? Logic dictates that to obtain unblurred images of such a fast subject one needs very high shutter speeds, but opening up the f. stops to compensate the corresponding loss of light means losing all hopes of depth-of-field, crucial in the sharp focusing of such a tiny creature. The recognized grand masters of hummingbird photography – a fine art in itself, requiring almost monastic dedication – such as our friends **Glenn**

Bartley and **David Hemmings** use and continually refine the use of multiple flashes and pre-focusing, organizing complex, highly professional set-ups in the field, where they identify flowers being reliably visited by foraging hummingbirds, frame them with pre-set focus and “ambush” their subjects once they approach and feed. This is, I repeat, a highly specialized technique requiring fairly complex equipment – monopods, tripods, several flash units – and above all a degree of fanatical patience we sorely and sadly lack, as one basically has to sit and wait until the hummingbird will actually (and hopefully) decide to visit the chosen

flower, possibly from the right angle and pausing long enough (ie one or two seconds) to be immortalized. This technique usually generates – when successfully used – exquisite, painting-like images of the jewel-like birds literally frozen in mid-air, every single detail and feather perfectly focused and sharply detailed. Stunning miniatures and a source of amazement always to all, no doubt, but in my eyes also lacking one crucial, iconic element of the hummingbird universe – the dazzling speed and unpredictability of its aerial aerobatics. So, being totally unable to imitate the technique described above, and also lacking the equipment to do so,

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Left, a macro portrait of a predatory rhinoceros katydid belonging to the genus *Copiphora*. Armed with a fearsome array of sharp spines, these nocturnal katydids will readily and painfully bite if picked up. Right, the colorful livery of a Chrysomelidae Leaf Beetle presumably advertises its toxic properties to would-be predators.





■ A juvenile, pencil-thin Gemmate anole *Anolis gemmosus* rests on a palm leaf frond at dawn, waiting for the sun's first rays.

ANIMA MUNDI
You Tube

Click on the image and watch a short video on Mindo's cloud forest and its bird life.

Wings Over Mindo





Left, the graceful uncurling of a young fern leaf. Right, top, the terrifying countenance of a large Whip scorpion, an Amblypigid belonging to the genus *Heterophrynus*. Bottom, a large Wandering Spider (Ctenidae). Both species are fierce nocturnal predators which can be found at night lurking in the understorey of Mindo's cloud forest.



■ The uniquely graceful profile of a White-whiskered Hermit *Phaethornis yaruqui* frozen in mid-flight. This is a relatively large species among those observed in Mindo's forests.



we opted to try something admittedly more amateurish but more suitable to our way of working – handheld hummingbird photography. The results are featured on these pages for all readers to judge – flawed, possibly, but somehow, at least in my opinion, capturing the veritable essence of the hummingbird tribe...motion and color. Between our long walks in Mindo's cloud forest in search of reptiles, amphibians and insects, we then sat for hours nearby flowers and feeders being reliably visited by the ever-present hummingbirds, and started experimenting. We used a soft ambient light mixed with our Nikon D300 in-camera strobe, supplemented by a remotely controlled, handheld SB600, to provide enough light to shoot at ISO speeds ranging from 400 to 800, with f-stops ranging from f 5.6 to f 13 and a shutter speed varying between 400/ sec - 1000/sec. As most of hummingbird species show best their iridescence when facing straight ahead – color codes being possibly used for intraspecific communication and interspecific challenging – using a camera-mounted

strobe makes perfect sense in this case. While these settings, once adjusted, proved relatively satisfactory – providing well-lit foreground birds on a sufficiently illuminated forest background – focusing proved to be a much tougher challenge. Our Nikons came out as clear losers when compared to our friend Lucas' Canon – his autofocus proved much faster and assured than our Nikons', which most often than not went on chasing forever and lost us valuable shots. Out of frustration, we tried manual focusing but had to give up after a few failures – hummingbirds just won't hover long enough to allow sharp manual focusing when doing handheld photography. In the end, we gave up trying to use our Nikon 80-400mm, which was too long anyway, and fell back on our Nikon 18-200mm, shooting at a distance of about 2 meters from the subject and allowing plenty of air around it when framing to avoid the chasing of the AF. Success rate was about 1 reasonably good image every 10 actually shot, most of the others being partially but crucially out of focus. I now can understand

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Insect life in Ecuador's montane cloud forests is stunningly rich. Top left, a Decaying-leaf-mimic katydid *Pycnopalpa bicordata*; bottom left, a large moth *Automeris* sp. flashes its brightly colored ocelli to scare away an intruder. Left, the alien and yet strangely seductive shape of a Green leaf mantis *Choeradodis stalii*.

*A minuscule extraterrestrial -
the Membracid from Mars!*



■ Alien-looking and smaller than a thumbnail, this tiny insect is a weirdly-shaped Treehopper, *Alchisme* sp. (family Membracidae).



Left, a Broad-billed Motmot Electron platyrhynchum rests on its tree perch at dawn. Right, backlit epiphytes at noon. Mindo's private lots are luckily criss-crossed by a large number of well-kept forest and mountain trails which allow visitors to explore the surroundings with relative ease.





■ A rather somberly colored male anole *Anolis equatorialis*, one of several similar species inhabiting Mindo's cloud forest. Most however are highly cryptic and very difficult to see in the forest environment.



More examples of Mindo's exuberant birdlife: above, Blue-gray Tanager *Thraupis episcopus*; right, Orange-bellied Euphonia *Euphonia xanthogaster*; far right, Swallow Tanager *Tersina viridis*.

why Canon equipment is generally preferred by most bird photographers.

Besides hummingbirds, Mindo and the secluded cloud forests ringing it brim with other stunning avian species – colorful aracaris, toucans, parrots, tanagers, motmots and even the fabled and rarely seen Cock-of-the-rock, whose noisy display on its cliffside, jungle-clad lek was one of the trip's highlights. Add to the mixture

a huge number of fascinating insects and a titillating sprinkle of dazzling reptile and amphibian species, all to be found in misty, rain-drenched forests, and the magical recipe for a great trip is complete.

We gratefully acknowledge the help offered in the identification of some species by our friends of Pontificia Universidad Católica del Ecuador, Carlos Antonio Rodríguez (birds) and Rafael Cárdenas (arthropods).



Orchids, mosses and epiphytes of innumerable species drape every available square inch of Mindo's wild cloud forest and guayaba orchards. This is a complex, highly layered environment - the ideal habitat for amphibian and insect life despite the occasionally low nighttime temperatures.



Two rainbow-hued Glasswing Nymphalid butterflies (family Ithomiinae) are mating at night, protected from roving predators by the lower face of a large leaf.



From left to right: a Western Basilisk Basiliscus galeritus resting on a tree branch, a Green Thorntail Discosura conversii - here caught urinating in mid-flight! - and a clump of flowering arboreal orchids. Ecuador's montane cloud forests are a true paradise for the latter, with many undescribed species.

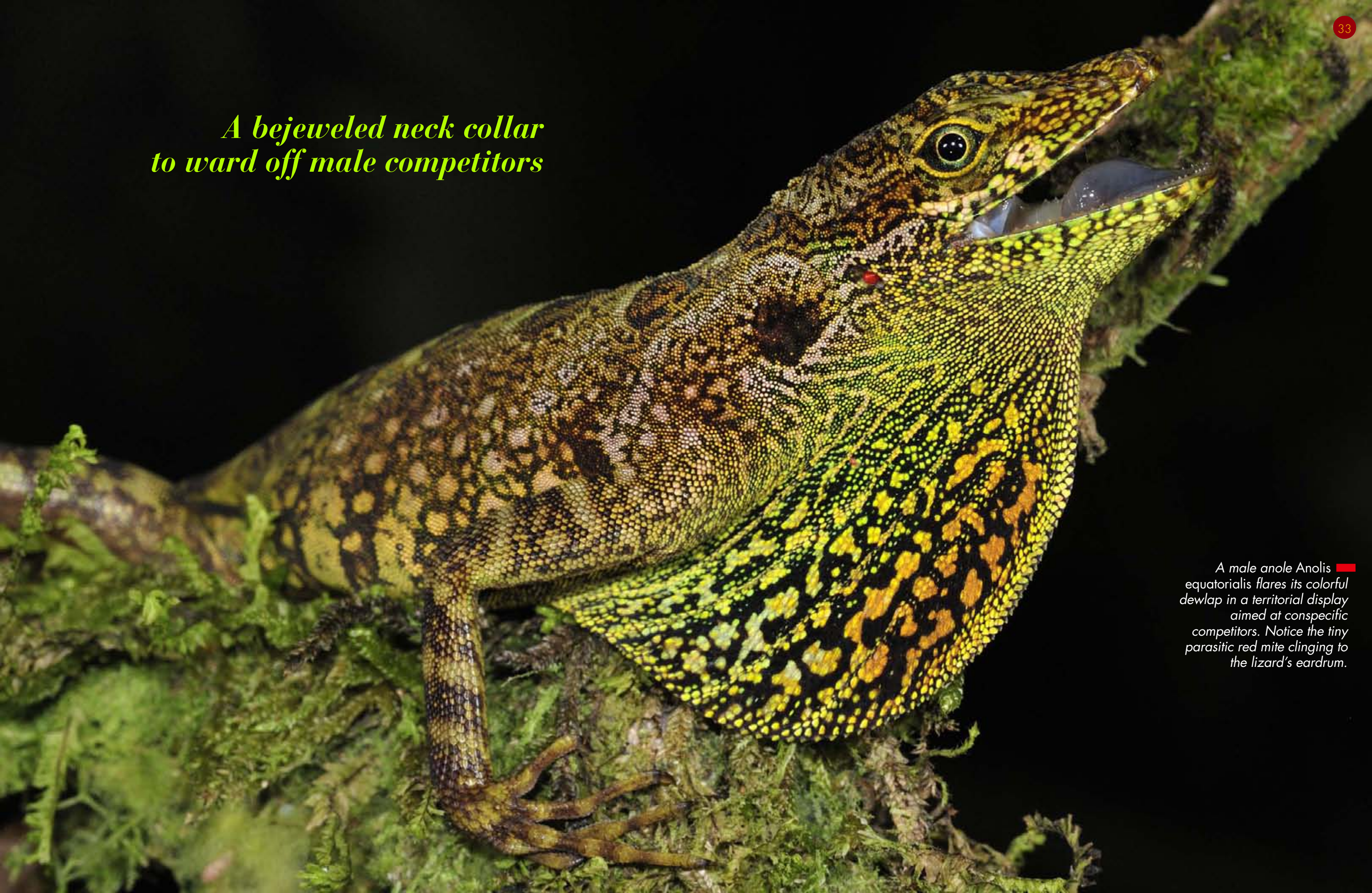




Ecuador's cool, wet cloud forests host a number of beautiful amphibians, and in particular several very interesting Tree frogs species. Left, *Hypsiboas pellucens*; right, *Dendropsophus carnifex*.



*A bejeweled neck collar
to ward off male competitors*



A male anole *Anolis equatorialis* flares its colorful dewlap in a territorial display aimed at conspecific competitors. Notice the tiny parasitic red mite clinging to the lizard's eardrum.

Female rhino katydid
Copipohora sp. - notice the
dagger-like ovopositor, used by
this strong-jawed predator to
lay eggs in the ground or
inside the tissues of plants.



At-a-glance travel guide

COUNTRY OF DESTINATION: **ECUADOR**



USEFUL TIPS FOR YOUR EXPEDITION

Some simple, common sense, field-tested advice and information to make the best out of your trip and avoid hassles, worries and problems

ROUTE: Your international flight will land at Mariscal Sucre International Airport, worryingly set smack in the middle of Ecuador’s high-altitude capital Quito. From there it’s a comfortable three-hour car drive due north-west on good, well-maintained roads to your destination, Mindo town and its Forest Reserve. The transition between the arid, desert-like dry eastern plateau and the lush, forested western mountainsides is quite surprising.

MEANS OF TRANSPORT: You might rent a car in Quito and drive yourself to Mindo but we do not advise you to - save yourself the trouble and have the trip organized by a local naturalist guide who is familiar with the routes and the best wildlife viewing

spots. Once in the Forest Reserve you will have to walk on very easy cloud forest trails criss-crossing several private properties and fincas. For a well-organized and successful trip we can heartily recommend the services of our friends Lucas Bustamante-Enriquez and Alejandro Arteaga of **Tropical Herping** - two young, enthusiastic biologists with a keen interest in nature, wildlife and photography.

CURRENCY: Since the year 2000 Ecuador has opted not to have a national currency of its own – all transactions are done in US dollars.

ACCOMODATION: Mindo is a birdwatchers and

nature lovers classic destination, and the local infrastructures have developed accordingly. Several private properties and farms with their own land and trails offer basic but comfortable accomodation – we have stayed at the lovely Yellow House or Casa Amarilla of the **Hacienda San Vicente**, and we can safely recommend it to all. Breakfasts at the Yellow House are delicious and its extensive network of trails designed and maintained by the conservation-minded owners will keep one occupied for weeks.

FOOD: Simple but basically healthy and filling. Ecuadorians love soups (try the delicious *Locro de Queso* – potatoes, cheese and avocado), meats and fish and are blessed all-year round with fantastic

From the Andes to the Amazon a land truly ruled by nature



vegetables and fruit. Always make sure the fruit squashes – which you don't want to miss! – are done with bottled water to avoid health problems. Simple but clean and inexpensive food – such as soup of the day and grilled trout - can be had at El Madrono restaurant in downtown Mindo.

LANGUAGE: Ecuadorian Spanish and English, especially in tourist areas where many foreigners congregate, such as Mindo.

WORRIES: Ecuador used to have a rather bad (and rather well-deserved) reputation regarding street muggings and tourist-related crimes. Things are much better now, but - like in so many other big cities worldwide - it's always better to be accompanied by local friends when visiting Quito's beautiful historical areas. Mindo and other rural areas are quite safe, but - like anywhere else - a measure of discretion is advised when going around at night or with expensive cameras and/or videocameras.

HEALTH: Located in a wide, open valley at 1.300 meters, Mindo has a cool, middle-altitude climate which makes it relatively safe from mosquito or sandfly-borne diseases, which are rampant in the Amazon provinces. Landing in Quito (2.800 meters, 9000 feet) upon one's arrival might however cause altitude sickness to the unaccustomed, so it's advisable to plan spending a couple of days there to better acclimatize. Food is generally quite safe, but avoid street-stalls snacks and always make sure your drinks have been concocted with bottled water.

CLIMATE: Pleasantly cool and occasionally warm during the day, all year-round. Ecuador - especially at altitude - is blessed with an eternal spring, and they say one can experience the four seasons in a single day in Quito. The climate in the Amazon further East can be very hot and muggy, but the cloud forests of Mindo are breezy and very pleasant. This is an equatorial climate, so expect frequent rainfall.

BESIDES: Don't miss exploring the historical center of the capital Quito, which has been extensively and lovingly restored and features some spectacular examples of colonial architecture from the Spanish domination. Quito is a truly vibrant metropolis - restaurants, theaters, art galleries and universities have much to offer to all, not to speak of the stunning vistas and landscapes surrounding it. On your way to Mindo you will also cross the Equator line, which is marked by the obligatory monument. Mindo has little to offer culture-wise, and can instead be only recommended for its lush nature and abundant wildlife. Ecuador is a rather small but exceptionally diverse Country, and it's almost impossible summarizing it in a few lines – a few hours's travelling will have one passing through high-altitude plateaus and valleys, stunning Andean landscapes and cloud forests – descending to the dry Pacific coast (and the Galapagos Islands) if going West and to the lowland rainforest of the Amazon – locally known as El Oriente - if going East. ●



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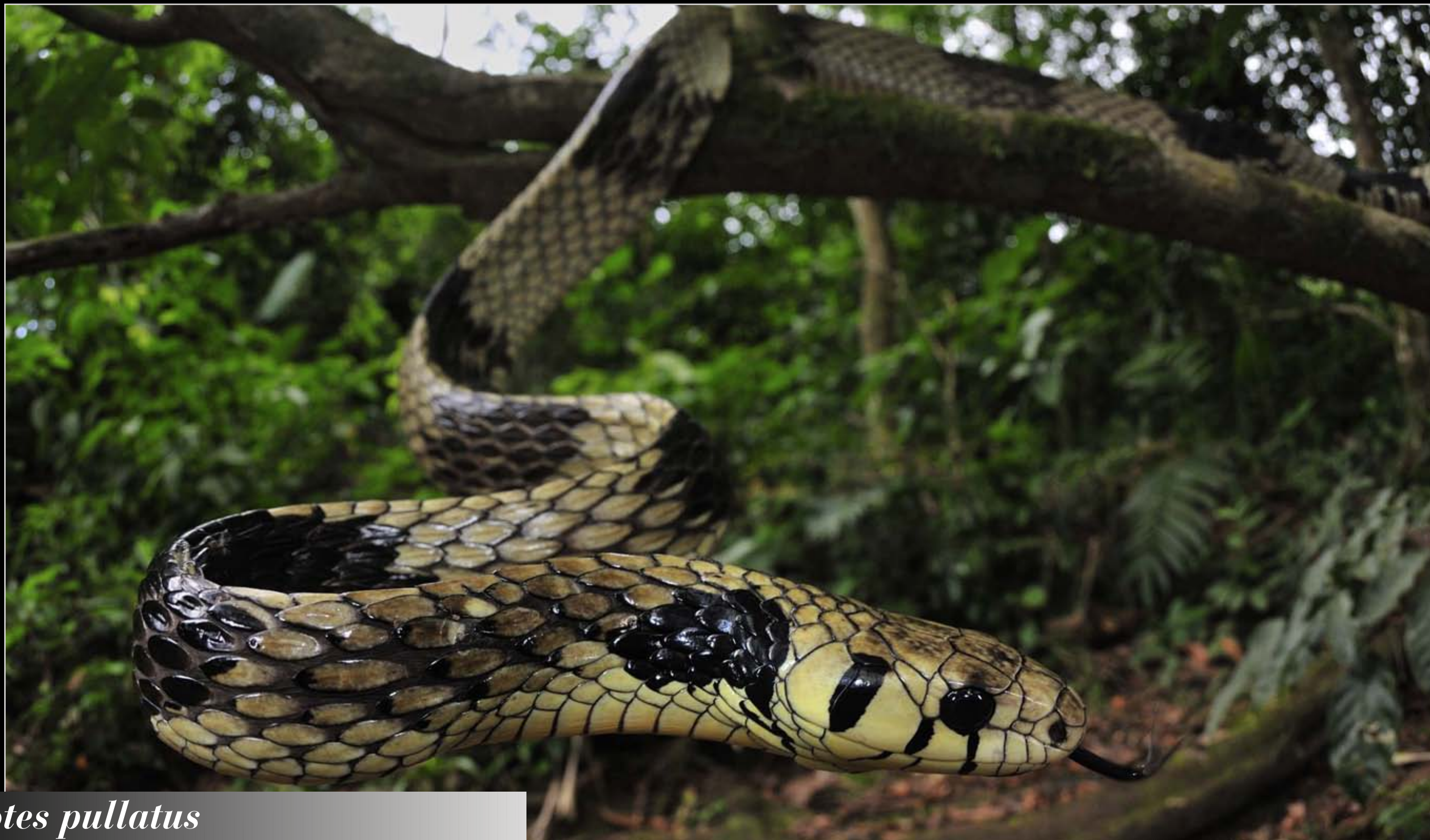
Beauty of the Beast



SNAKES OF COSTA RICA

A DEADLY CHARM

Large and small, colorful or drab, harmless or dangerously venomous - meet some of the most fascinating ophidians of Mesoamerica



Spilotes pullatus

Powerful, muscular, agile and fast-moving, this diurnal and highly variable species can attain a length of 2.6 meter / 8.5 feet. Relatively common in dry lowland riverine forest from Mexico to Argentina, it makes for an impressive encounter in the field, offering a most effective defensive display which includes mouth gaping, loud hissing and extreme inflating of the throat.



Corallus ruschenbergerii

About 2 meters / 6.6 feet long, relatively thin but strong and muscular, this nocturnal and strictly arboreal species is part of the Corallus complex, numbering several species all restricted to Central and northern South America. Non-venomous but ready to inflict multiple and very painful bites thanks to its greatly elongated frontal fangs.

TEXTS BY POMPILIO CAMPOS BONILLA & ANDREA FERRARI
PHOTOS BY ANDREA & ANTONELLA FERRARI
and POMPILIO CAMPOS CHINCHILLA

Costa Rica is a Central American tropical country which thanks to its prevailing environmental conditions can boast a rich diversity of snakes, with a total of 11 families, 64 genera and 139 ophidian species of aquatic, terrestrial and arboreal habits, distributed in almost all its territory, from sea level to an elevation of about 3000 meters. Only 22 of these possess a venom capable of causing harm to human health - these belong to the family *Viperidae* (pit vipers with heat-sensitive loreal pits, with haemotoxic venom) and *Elapidae* (coral and sea snakes, with neurotoxic venom). Due to the geological conditions present in the country, lowland areas feature several types of ecosystems, leading to the occurrence of cases of endemism - there are 13 endemic species of snakes in Costa Rica. Costa Rica has been a pioneer in research on venoms, currently producing high-quality antivenoms which cater not only nationally but also to neighbouring countries. This has led to a low percentage of deaths - on an average of 500 snakebite incidents annually, only 5 to 10 people die, these deaths usually occurring because the treatment was started many hours post-bite. Costa Rica has a very competent law in protecting wildlife, being included

in major international treaties and conventions for the conservation of nature. A member of CITES, it follows strict rules regulating the international trade in endangered species - therefore snakes enjoy benefits conferred by law, ensuring their survival. However, because of the myths and popular beliefs about snakes, many species of great ecological importance are still victims of human ignorance and are regularly killed, mainly in agricultural areas where workers are afraid of being bitten. The species that cause most accidents is the Terciopelo (*Bothrops asper*), which is found in different types of habitat including urban rural areas - this species is responsible for 80% of bites to people. Its haemotoxic venom has powerful necrotizing effects, so in many cases the person can survive but is left with the amputation of a limb. In Costa Rica there are several different centers specializing in herpetofauna - some are governmental, some private - where research, outreach and environmental education are regularly conducted.

Pompilio Campos Bonilla is a Costa Rican biologist and herpetologist. Together with his son Pompilio Campos Chinchilla he regularly conducts field surveys and educational talks on his country's herpetofauna.



Atropoides mexicanus

Formerly classified as *Atropoides nummifer*, this is an extremely stout, medium-sized pit viper which can get 90cm /3 feet long.

Terrestrial and nocturnal, it won't flee if approached but will stand its ground and readily bite if touched.

This medium-elevation species is most often observed on forested mountain slopes from Mexico to Nicaragua.

Atropoides mexicanus





Boa constrictor

A heavy-bodied, beautifully-patterned, terrestrial and arboreal giant snake which can reach a length of 4.5 meters / 15 feet and whose distribution – in its many different subspecies – ranges from Mexico to Argentina. A powerful, mostly nocturnal, non-venomous species which can however inflict painful and messy bites if mishandled or disturbed.

Boa constrictor



photo Pompilio Campos



Porthidium volcanicum



photo Pompilio Campos

Another very rare, beautifully patterned Hog-nosed pit viper which is related to the extremely common *Porthidium nasutum* but which is less than 50 cm / 1.6 feet long, being endemic to Costa Rica and only known from the Valle del General in the province of Puntarenas.



Atropoides picadoi

This colorful but well-camouflaged pit viper – endemic to the steep, cool Cordilleras of Costa Rica - can attain a length of 1.20 meter / 4 feet and is generally found in premontane rainforests, where it lies in ambush among buttressed tree roots and forest floor leaf litter. Bites are rare as the species is uncommon, but its venom is strong enough to be life-threatening.

Atropoides picadoi



photo Pompilio Campos



Agkistrodon bilineatus

Popularly known as "Cantil", this is a stoutly-built pit viper which can attain a length of 50 cm / 1.6 feet and which can be easily identified by the two light longitudinal lines on its head. Terrestrial, venomous and ready to bite if molested, it inhabits semiarid woodland from the Yucatan peninsula of Mexico to north-western Costa Rica.

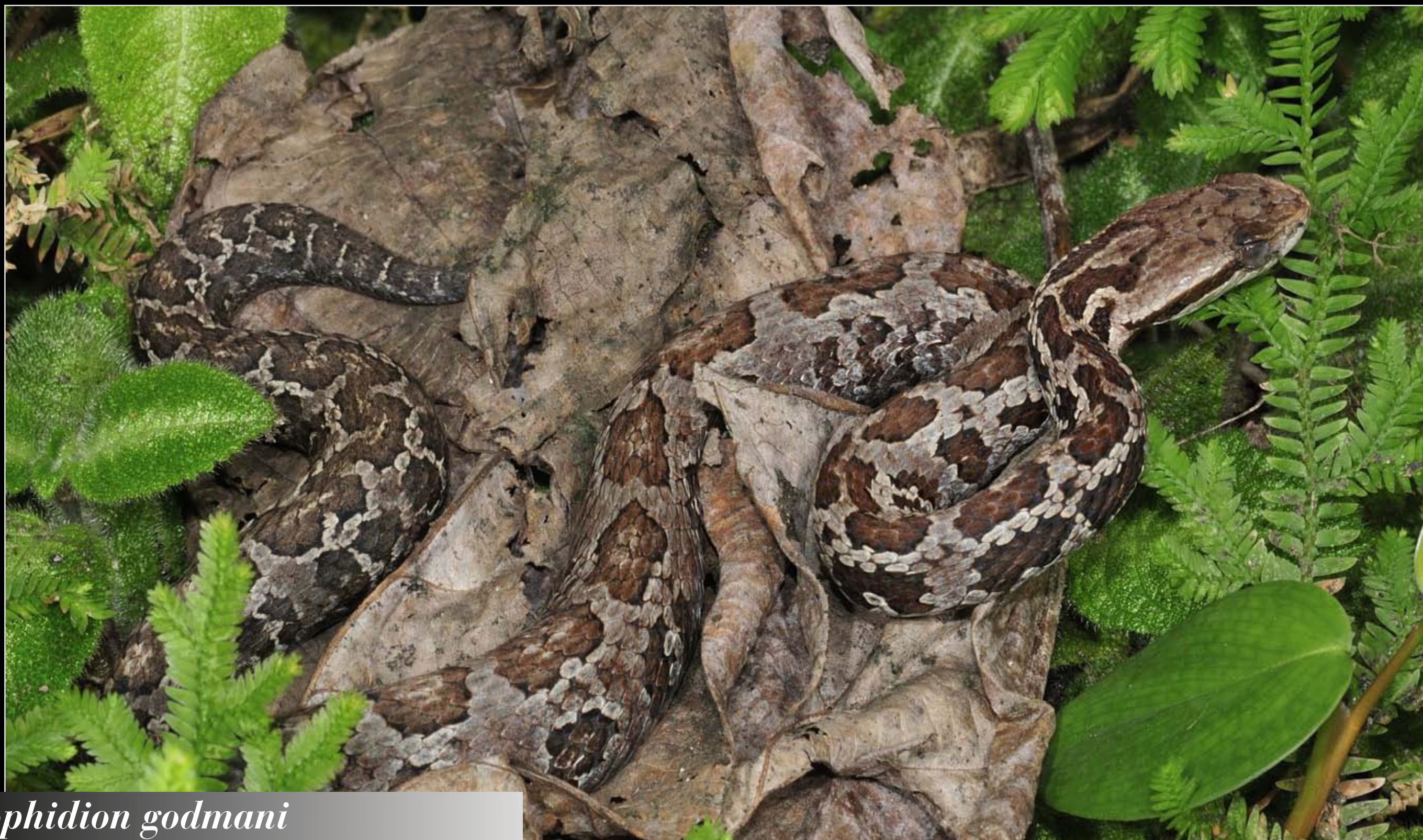


Bothriechis schlegelii

The Eyelash pit viper is one of Costa Rica's most famous venomous snakes – and one of its most dangerous. It can get about 90cm /3 feet long, it is usually superbly cryptic and can be readily identified by the diagnostic enlarged, horn-like scales above its eyes. Highly variable, nocturnal and arboreal, this exquisitely camouflaged snake is ready to bite if touched. This is the so-called "lichen" phase.



Bothriechis schlegelii



Cerrophidion godmani

A small, dark-blotched mountain species which reaches a maximum of 80cm /2.7 feet. Diurnal, terrestrial and rather uncommon, it feeds mostly on small rodents and inhabits cool, moist montane environments from Mexico to Western Panama.

photo Pompilio Campos



Micrurus mipartitus

A ringed, bicolored Coral snake up to 1.2 meter / 4 feet long, uncommonly observed in the undisturbed Atlantic lowland and premontane rainforests of Costa Rica. Its distribution range extends from Nicaragua to Panama on the Atlantic versant and from Panama to Ecuador on the Pacific slope. Nocturnal and usually very timid, but potentially deadly as all Coral snakes.



Cerrophidion godmani



Bothrops asper

Locally known as "Terciopelo" ("Velvet") due to the lustrous sheen of its cryptic, colorful livery, a large and dangerous species which can reach a length of 2,50 meters /8 feet. Superbly camouflaged and highly venomous, agile, fast and very aggressive if disturbed, this is a very common Central American species which is to be admired as much as it is to be feared.

Bothrops asper





Leptophis ahaetulla

About 2 meter / 6.6 feet long, thin and fast-moving, this bright green and agile arboreal snake is normally active during the day, when it can be occasionally observed as it hunts for lizards and sleeping frogs on trees and shrubs. If disturbed it will try to intimidate the intruder with an impressive open-mouth display, followed by repeated biting if the disturbance persists.



Leptophis ahaetulla



photo Pompilio Campos

Bothriechis lateralis

A bright green arboreal pit viper which shows a diagnostic light lateral stripe on the side of the body and which barely reaches a length of 1 meter/ 3.3 feet. This is another rarely observed, exceptionally cryptic species of the undisturbed premontane and montane (700-2000 meters) rainforests of Costa Rica and western Panama.



Lachesis stenophrys

A gigantic, relatively slender pit viper which can grow to be 4 meter /13 feet long, equipped with a beautiful cryptic livery, long fangs and extremely toxic venom. Nocturnal, terrestrial and very aggressive if harassed, this is a truly impressive species which is however rarely encountered in the field in Costa Rica. The three species belonging to this Genus are the largest venomous snakes of the Americas.



Oxybelis aeneus

Pencil-thin but almost 1 meter / 3.3 feet long, this exceptionally cryptic and unmistakable species is almost invisible when resting on tree or low shrubs branches. If disturbed it will readily offer an impressive gaping-mouth display, showing the blue-black lining of its oral cavity and attempting to bite. This mildly venomous species' bulging and front-facing eyes offer binocular vision.



Oxybelis aeneus



photo Pompilio Campos

Bothriechis supraciliaris

This colorfully patterned but nevertheless highly cryptic Eyelash pit viper is strictly related to the more common *Bothriechis schlegelii*, but its endemic range is apparently restricted to southwestern Costa Rica, where it is found at higher elevations (800-1.700 meters) than the former. Commonly known as the Blotched Palm pit viper.



Crotalus simus

Formerly classified as *Crotalus durissus*, this Costa Rican rattlesnake can get 1.80 meter / 6 feet long. This is an agile, thickly-built and beautifully patterned pit viper which inhabits the semiarid premontane and lowland forests of Costa Rica's Pacific slope. Fast-moving and ready to aggressively defend itself if threatened, this is a very dangerous species due to its large size and its powerful venom.



Crotalus simus



Porthidium nasutum

The Hog-nosed pit viper is a colorful, cryptic and highly variable species about 60 cm / 2 feet long. Venomous and ready to bite in self-defense, it is restricted to Costa Rican rainforest habitats and it is often found lying - in ambush and perfectly camouflaged - among leaf litter or near rotting logs.

Porthidium nasutum



photo Pompilio Campos



Lachesis melanocephala

A giant pit viper which can reach a length of almost 4 meter /13 feet and which is occasionally encountered in the undisturbed lowland rainforests of the southern Pacific slope of Costa Rica, near the Panama border. Very dangerous and often aggressive, the three *Lachesis* species are commonly known as Bushmasters and are the only American crotalids to lay eggs.



Drymobius margaritiferus

One of the most commonly seen species of snakes in Costa Rica, this harmless, beautifully patterned and fast-moving species is about 1 meter /3.3 feet long and is usually active during daylight. Its distribution ranges from Southern Texas to Nicaragua and El Salvador. This specimen was about to shed its skin and for this reason it is not as brightly colored as it usually is.



Bothriechis schlegelii

Aptly called "Oropel" ("Golden skin") in Costa Rica, this is possibly the most spectacular of the Eyelash pit viper's numerous color phases. This dangerously venomous species is found in lowland and premontane rainforests from Mexico to Ecuador and Venezuela, but this stunning all-yellow morph appears to be endemic to Costa Rica.

Bothriechis schlegelii



photo Pompilio Campos

Micrurus nigrocinctum



photo Pompilio Campos

A typical tri-colored Coral snake which reaches a maximum length of 1 meter / 3.3 feet. Common but very shy, strictly nocturnal and rarely encountered under wet lowland and premontane rainforest debris and leaf litter. Albeit small-fanged, like all Coral snakes this species is extremely dangerous and perfectly capable of delivering a deadly bite thanks to its powerful neurotoxic venom.



Oxybelis viridis

A large and bright green species which can reach a length of about 2 meters / 6.6 feet, this diurnal, narrow-headed, stunningly beautiful snake can be occasionally observed on shrubs and low trees where it forages for frogs, lizards and small birds. Mildly venomous, it will readily bite if handled. Its distribution ranges from Mexico all the way to Argentina.



Lampropeltis triangulum

Commonly known as "Milk snakes", these 50 cm / 1.6 feet long terrestrial and crepuscular constrictors are as fast-moving and shy as they are colorful, spending most of their life hiding among leaf litter. Their ringed livery probably mimics that of the deadly venomous and equally shy Coral snakes which live in the same rainforest environments.



Pseustes poecilonotus

A usually very colorful but wildly variable semiarboreal, active, diurnal snake which cannot be always easily identified in the field. Fast-moving and robustly built, this active species can reach a length of about 2.5 meter / 8 feet. Its distribution ranges from Mexico to Ecuador and the Brazilian Amazon.

Pseustes poecilonotus



photo Pompilio Campos

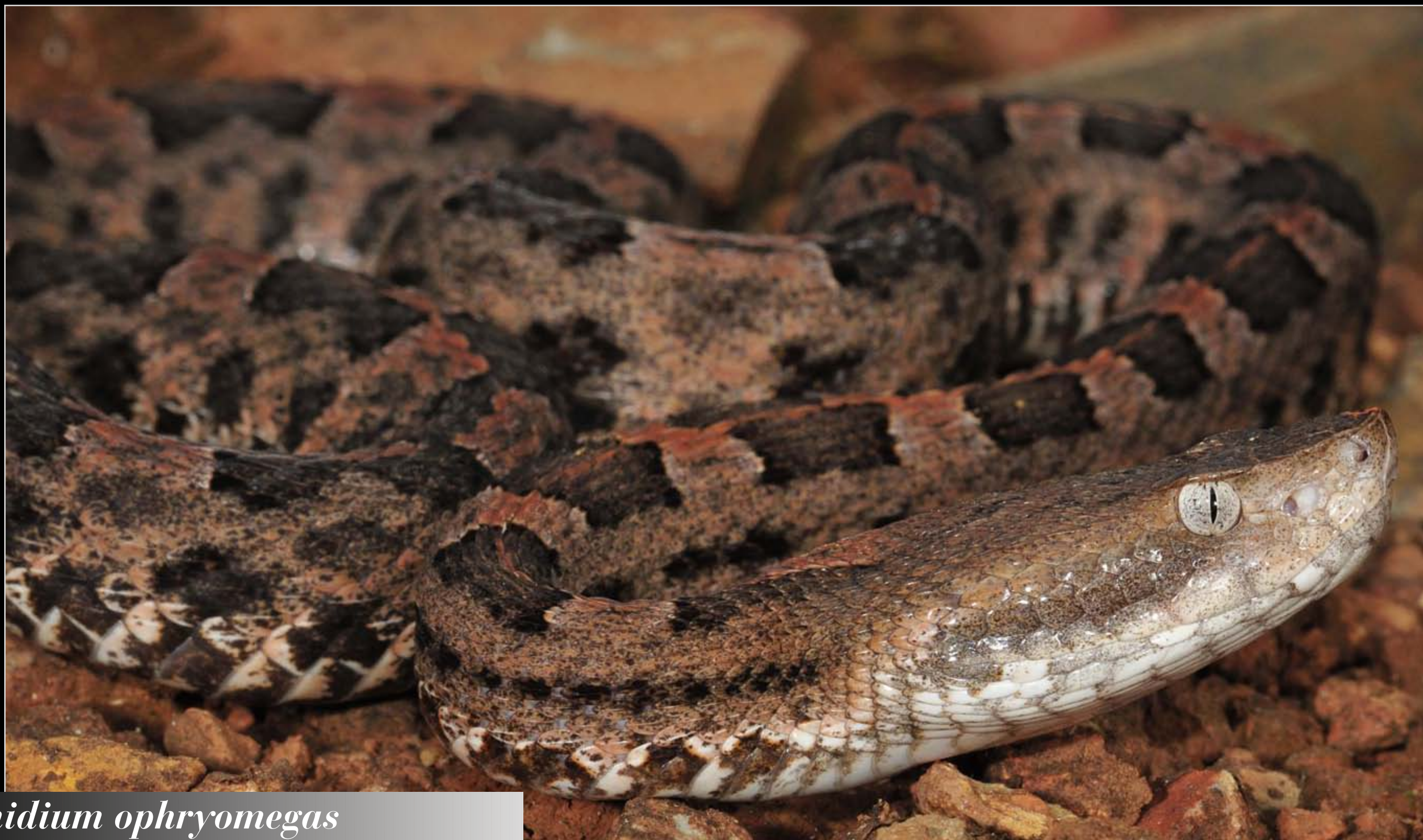


Porthidium porrasi

photo Pompilio Campos



The White-tailed Hog-nosed Viper is a recently described (2003) and rather uncommon species which is closely related to the much more common *Porthidium nasutum* but whose distribution is restricted to the Osa Peninsula and the southwestern Pacific slope of Costa Rica. This snake is less than 1 meter /3 feet long, usually orangish in shade and found among leaf litter.



Porthidium ophryomegas

A relatively common, beautifully patterned, 80cm /2.7 feet long pit viper species which is primarily found in lowland semi-arid forest on the northern and central Pacific slope of Costa Rica, Guatemala and Honduras. It is not generally considered dangerous for humans due to the small amount of venom injected in case of a bite.

Porthidium ophryomegas





Trimorphodon quadruplex

About 1.6 meter / 5.5 feet, rather lightly built and semiarboreal, this relatively common snake is mildly venomous and usually nocturnal. This is an active species which is not easily photographed as one would like and whose broad distribution ranges from Utah and Nevada in the USA to Costa Rica, Honduras and Nicaragua.



Trimorphodon quadruplex

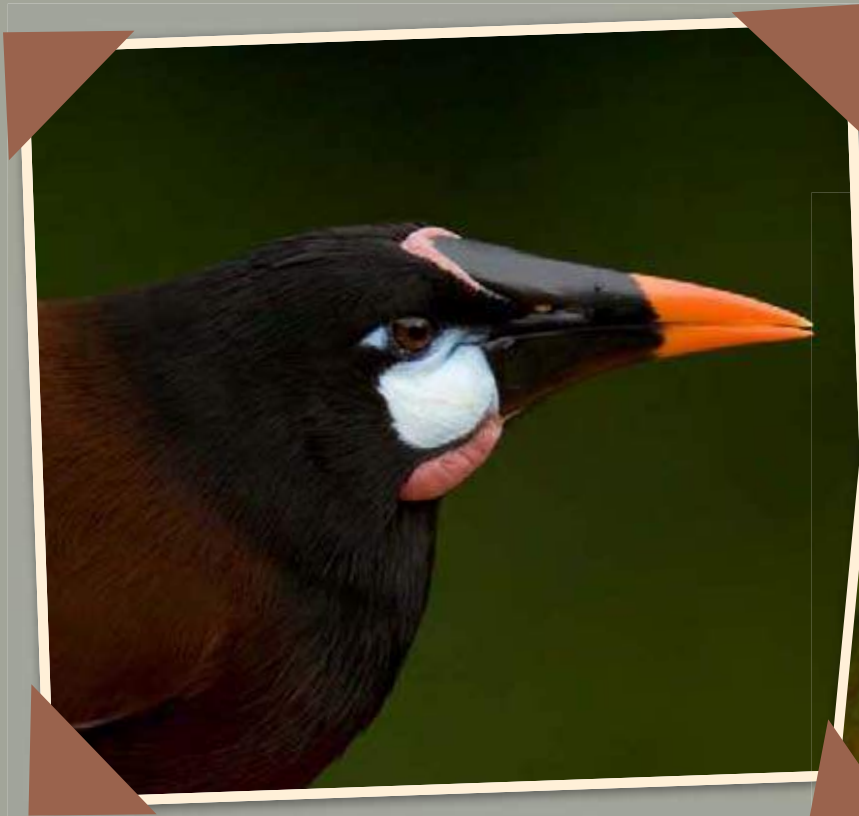


Bothriechis nigroviridis

A bright green, black-flecked pit viper about 1 meter / 3.3 feet long (most adults are usually smaller) which is restricted to the undisturbed premontane and montane (700-2.400 meters) rainforests of Costa Rica and western Panama. This is an uncommon, nocturnal and strictly arboreal species which is normally observed 2-3 meters above the ground in shrubs and small trees.

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The Ghost Elephants of Etosha Pan

Christopher Rimmer – a Wildlife Photographer in His Own Words

Award-winning Australian photographer Christopher Rimmer has spent four years photographing southern Africa in preparation for a large scale international touring exhibition of his work which opened in his hometown of Melbourne, Australia, in 2011. Here he writes of the final chapter in that journey, the trip to northern Namibia to photograph the famed ghost elephants of Etosha Pan



Okaukuejo is in north central Namibia and is the site of a former German colonial fort established in 1901. Almost 650 kilometers from Namibia's capital, Windhoek, Okaukuejo currently serves as the administrative centre for the world famous Etosha Pan National Park. I had come to Okaukuejo to locate and photograph the park's famed "ghost" elephants. The Etosha elephants' supernatural appearance is due to the white clay found in the area in which they take their afternoon mud baths.

The sun was dipping low on the horizon as I saw the gates of the Park appear at the end of the road. I had no doubt that I had arrived in a photographer's paradise. I spent the remainder of the evening preparing my four cameras for the long, hot days ahead. Early the following morning, I staked out a position at a waterhole just a few kilometers outside the camp's gates where reports had been coming in of sightings of large herds of elephants. However, when I arrived a single jackal skulked nearby and a few springbok stood motionless in the distant heat haze, but the waterhole was devoid of elephants.

As the hours dragged on and the temperature slowly climbed into the high thirties, I cooled myself by saturating a cotton scarf in water and wrapping it

around my head - even the barrel of the lens was almost too hot to touch. After five hours of this torture and just as I was thinking I could take no more, a massive herd of elephants appeared on the horizon, heading directly towards my lens! As they drew nearer, the young elephants ran ahead of the herd towards the waterhole. The combined sound of the elephants all trumpeting at once as they splashed around in the water, had to be heard to be believed. I could almost sense the pleasure and the relief these elephants seemed to be feeling - it was an extraordinary moment. I observed the Etosha elephants for two weeks, during which I came to recognize the complex dynamics that existed within the family groups. They are like humans in many ways; young males have a best older buddy to look out for them whilst the females all contribute to looking after the babies. I began to recognize each elephant individually and note small personality characteristics which made each individual unique. Now, back in a freezing cold Melbourne, as I survey my work hanging on the walls of Galleria Rocco, I am transported back to the hot, arid plains of Etosha Pan and to this remarkable group of elephants which have played such a prominent role in getting me thus far. ●

Young Bulls Greeting Each Other, Namibia

*Nikon D3X with Nikkor, 70 -200mm F2.8, Exposure 1/320 @ f7.1,
Lee Neutral Grad Filter number 3 with Lee Bellows lens hood.
Some of the young bulls seemed to be greeting each other.
They would approach and join heads, often one would place
his trunk in the mouth the the other.*



**Elephant Charging,**

Etosha Pan, Namibia.

Nikon D3X with Nikkor, 70 -200mm

F2.8, Exposure 1/400 @ f6.3

Possibly one of the most dangerous shots of the trip. This large bull suddenly charged my position.

I obtained this single frame before he backed off and walked back into the bush. It was subsequently used on the poster to advertise the "In Africa" exhibition.

Eye Contact, Etosha Pan, Namibia

Nikon D3X with Nikkor, 70 -200mm

F2.8, Exposure 1/100 @ f6.3, Lee

Neutral Grad Filter number 3 with Lee

Bellows lens hood.

This female seemed curious about the mirror slap of my camera and stared for some time in the direction from which the sound had come.





Battle at Etosha Pan, Namibia.

Nikon D3X with Nikkor, 70 -200mm F2.8, Exposure 1/400 @ f6.3, Lee Neutral Grad Filter number 3 with Lee Bellows lens hood.

This large female seemed to be the dominant matriarch of the first group. She would regularly attack any young male from the second group who approached the water hole whilst her family were there.



1

Second Group Dusting, Etosha Pan, Namibia

Nikon D3X with Nikkor, 70 -200mm F2.8, Exposure 1/400 @ f13, Lee Neutral

Grad Filter number 3 with Lee Bellows lens hood.

After the arrival at the waterhole a second group would move off to dust in the distance. (1)

Female group at the Waterhole, Etosha Pan, Namibia

Nikon D3X with Nikkor, 70 -200mm F2.8, Exposure 1/250 @ f13, Lee Neutral

Grad Filter number 3 with Lee Bellows lens hood.

Adult females and young males who comprised the first group drinking at the waterhole. (2)



2

Elephants at Etosha Pan, Namibia

Nikon D3X with Nikkor, 70 -200mm F2.8, Exposure 1/250 @ f8, Lee Neutral Grad Filter number 3 with Lee Bellows lens hood.

I waited many hours for the elephants to assume a line of symmetry that would result in a pleasing photograph which they kindly obliged in this frame.





Young Bulls Greeting Each Other, Namibia

Nikon D3X with Nikkor, 70 -200mm F2.8, Exposure 1/250 @ f13, Lee Neutral Grad Filter number 3 with Lee Bellows lens hood.

Young bulls coming at the waterhole would first slowly approach and greet each other, gingerly touching with their trunks and often put it in their mate's mouth. (1)

Young Bulls Greeting Each Other, Etosha Pan, Namibia

Nikon D3X with Nikkor, 70 -200mm F2.8, Exposure 1/320 @ f7.1, Lee Neutral Grad Filter number 3 with Lee Bellows lens hood.

Another fitting example of the social interaction going on between young males when they meet and greet each other. (2)



Young Bulls Greeting Each Other, Namibia

Nikon D3X with Nikkor, 70-200mm F2.8, Exposure 1/320 @ f13, Lee Neutral Grad Filter number 3 with Lee Bellows lens hood.

Young bulls greeting each other at the waterhole, showing distinct sign of social interaction - one could almost say affection in this case.



Elephants at Etosha Pan, Namibia
*Nikon D3X with Nikkor, 70 -200mm F2.8,
Exposure 1/400 @ f6.3, Lee Neutral Grad Filter
number 3 with Lee Bellows lens hood.*
One needs to wait long hours under the scorching
sun of Namibia to be able to get well-composed
images of the Ghost Elephants of Etosha.

Elephants at Etosha Pan, Namibia
*Nikon D3X with Nikkor, 70 -200mm F2.8, Exposure 1/160 @ f9,
Lee Neutral Grad Filter number 3 with Lee Bellows lens hood.*
The elephants' wrinkly skin and muted, chalky appearance
adds texture to the portraits, making them unique.



Elephants at Etosha Pan, Namibia
*Nikon D3X with Nikkor, 70 -200mm F2.8,
Exposure 1/250 @ f8, Lee Neutral Grad
Filter number 3 with Lee Bellows lens hood.*
Image composition and skin textures
gain much if portrayed in black and
white or sepia tones.



Second Group Dusting, Etosha Pan, Namibia
*Nikon D3X with Nikkor, 70-200mm F2.8, Exposure 1/400 @ f13,
Lee Neutral Grad Filter number 3 with Lee Bellows lens hood.*
After the arrival at the waterhole a second group
would move off to dust in the distance.





"My experience was EXCEPTIONAL! The trip exceeded my expectations in all areas. I hoped to get in a position to see owls and couldn't possibly have been happier. It was abundantly clear that David invested significant time and effort prior to the arrival of the group in scouting the area around Quebec and Ontario. He knew exactly where to go to find every species of owl. His knowledge and efforts were very much appreciated by the entire group. My primary objective was just getting in a position to photograph owls and was not expecting much in the way of photographic instruction. I was very pleasantly surprised and was very happy with the instruction. Prior to the trip I had a love/hate relationship with auto focus as it applies to photographing birds in flight. I've struggled with this for years. While I have a lot more to

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David Hemmings - President, Nature's Photo Adventures

learn, and need to work at honing my skills, the trip with NPA helped me tremendously in being able to photograph birds in flight. Photographing birds in flight was my main objective. Prior to the trip I was nearly clueless in comparison to my skills after the trip. You can also see from my bird list that I found the trip productive from a birding perspective as well".
Kevin McCarthy, USA

"I recommend NPA workshops! The level of services by workshop leaders was excellent. Quality of photographic instruction was exceptional and they

were always on hand to solve issues that arose, and I had more than my share of equipment issues. Quality of wildlife provided was good and I was amazed at how easily the subjects accepted new setups provided. Locations visited were right on for the species targeted. My most memorable moment was using the flash setups the first time and capturing an image of the Swordbill Hummingbird. I feel that my level of photography has improved with the custom functions that were set up on my camera for me and the resulting images that I obtained. Overall experience and

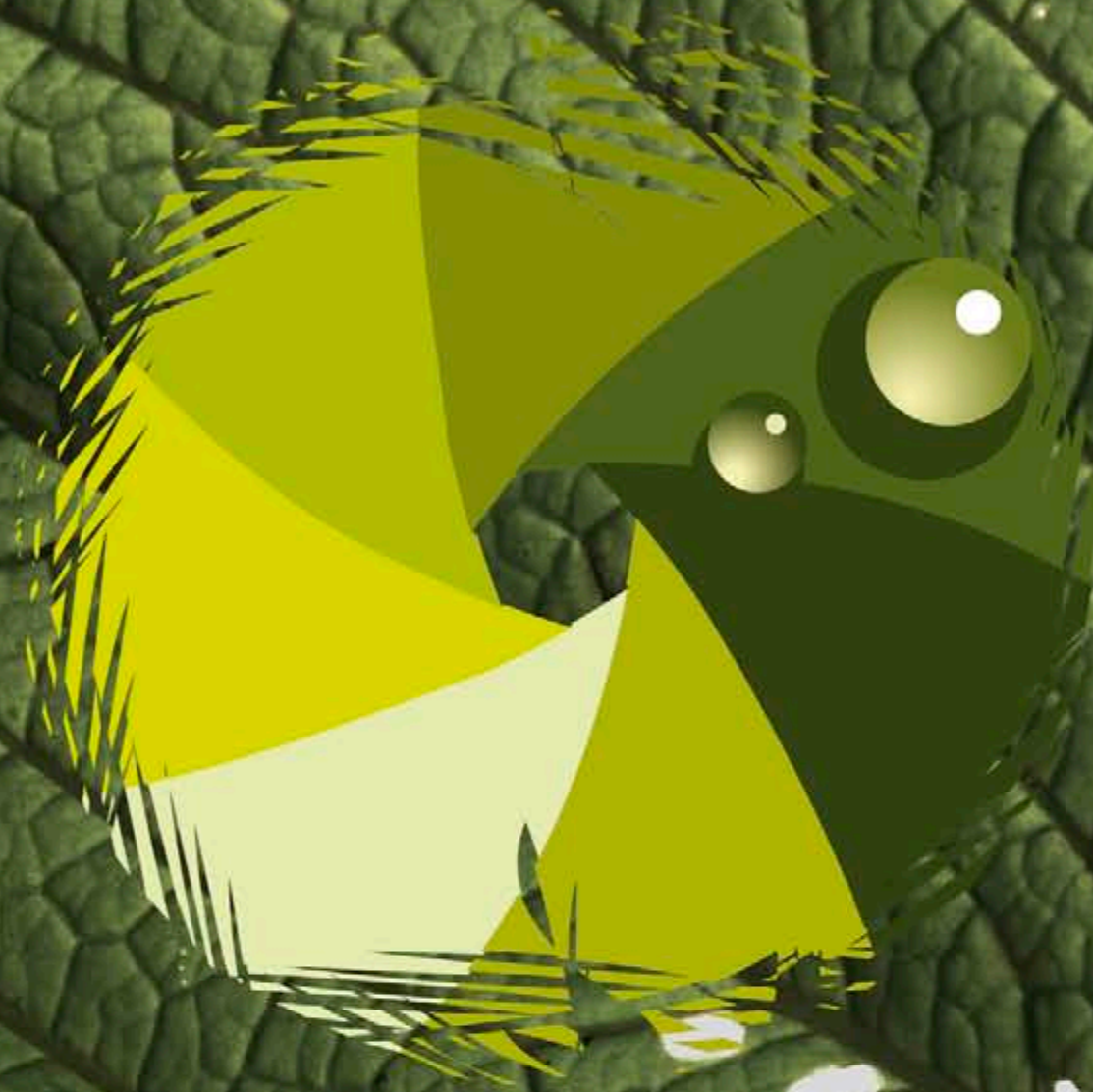
expectations were achieved and we were fortunate to have a very compatible group on our tour, which made it very enjoyable. This was my first workshop and I would recommend them to friends".
Rosemary Harris, Canada

"Great trip, great experience and great workshop leader. Great opportunity for capturing images of magnificent and uncommon (in southern USA) birds. Organizers contribute to great group dynamics and superb attitude. Cool techniques".
Eric Grossman, USA



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Spotlight

THE AMAZING FROGFISH
WHAT A BIG MOUTH YOU HAVE!

It's a rock! It's a sponge!
No, it's a fish! Dive with us and discover the life secrets of the coral reef's unsurpassed masters of camouflage

A portrait of an *Antennarius pictus* reveals the cavernous mouth and the stunning camouflage of this sit-and-wait predator - note how the spots mimic to perfection the oscula of a harmless sponge. Barely visible above the mouth is the illicium, its fishing rod-like apparatus.

TEXT BY ANDREA FERRARI
PHOTOS BY ANDREA & ANTONELLA FERRARI

*F*rogfish are weird, wonderful, lovable – and incredibly difficult to spot. Coming in all sizes and colors, these amazingly camouflaged predators are not rare at all, but divers might spend a lifetime exploring the reef without seeing one – even if it stands right out there in front of them. Ranging in size from a few inches to football-size, frogfish actually prefer exposed spots, usually perching contentedly for several weeks in a row on well-chosen, specific sponges: but their livery mimicks the sponge color and texture so incredibly well that it is often difficult recognizing them for what they are, even for experienced critter hunters. Their lumpy body greatly aids these clever hunters in disappearing in the surrounding landscape, and the endless variations in color patterns are exceptionally useful in disrupting the general shape of the animal, Grabbing corals and sponges with their modified pectoral fins, actually working as prehensile little webbed “feet”, frogfish are sit-and-wait ambush predators, relying on exceptional camouflage to escape their enemies and to confuse prey. They feed on fish and crustaceans as large as themselves (occasionally

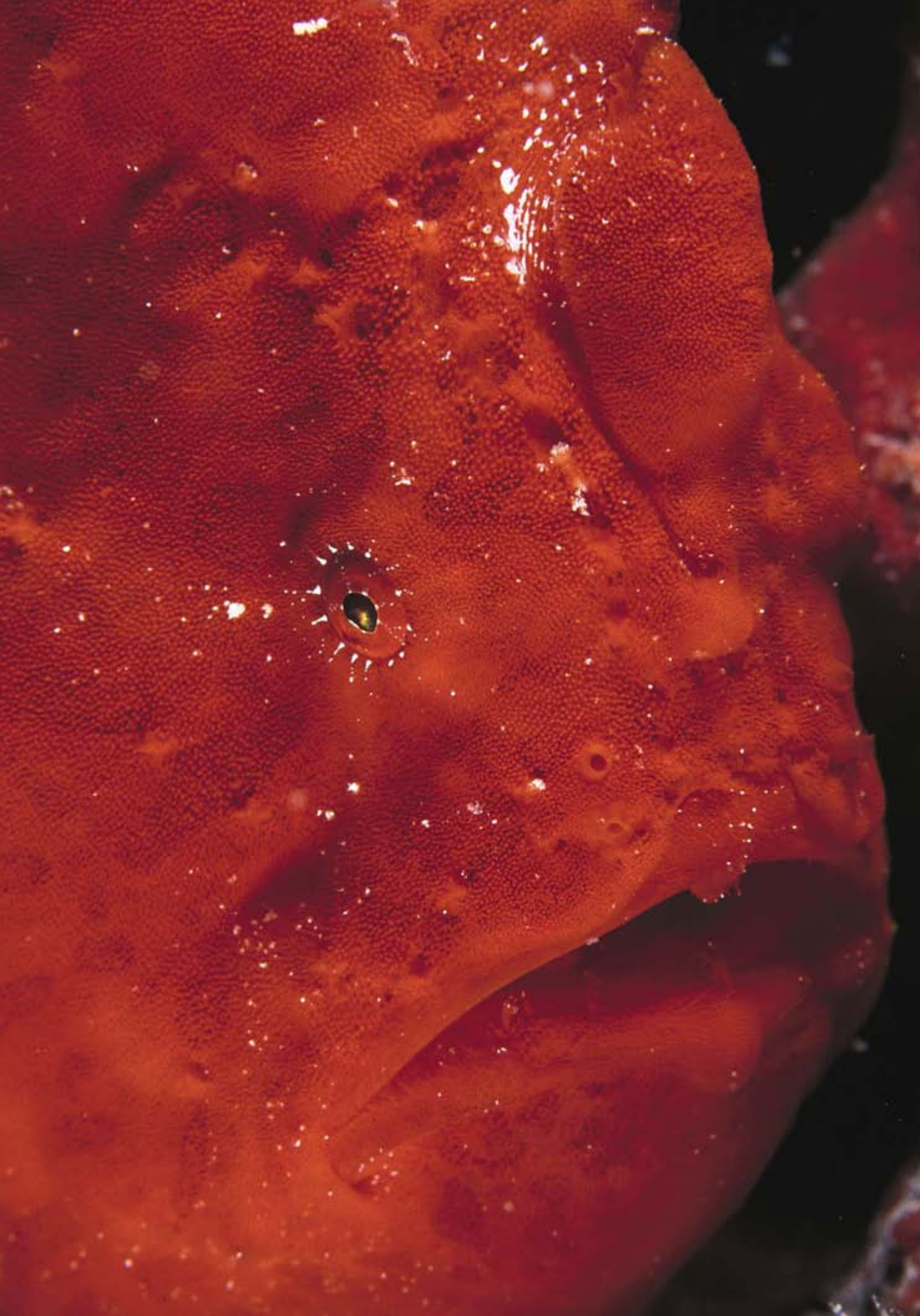
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Barely 2 inches / 4 cm long, a baby Painted frogfish *Antennarius pictus* sits on a sponge, well camouflaged and waiting for a tiny fish or shrimp to investigate. Confident in their exquisite camouflage, most frogfish usually sit in the open, but are nevertheless exceedingly difficult to spot in the complex coral reef environment .



A small sample of the infinite variety shown by frogfish species and liveries. From top left, clockwise: a bright yellow "hairy" morph of *Antennarius striatus*, a sponge-mimicking bright red *Antennarius pictus*, a typical *Antennarius maculatus* and a somber yellow-green *Antennarius pictus*, in this case uncommonly encountered on a sandy bottom.



Portraits of a bright red *Antennarius pictus* (far left) and a yellow *Antennarius commersoni* (left) reveal the sponge-mimicking texture of their bodies and the small, camouflaged eye. Revealed by the camera's underwater strobes' flash, their bright colors at depth appear in fact a brownish shade in natural light, helping these ambush predators to virtually become invisible in their habitat.

The entire frogfish existence is spent trying to look like something else entirely



■ Mimicking a toxic, colorful nudibranch to avoid predation, a tiny, less than 1 inch / 2cm long baby *Antennarius maculatus* sits brazenly in the open. Its fishing apparatus - the rod-like illicium topped by a pom-pom-like esca - is being wiggled in front of its mouth in the hope of attracting some unsuspecting prey and is perfectly visible here.

even bigger) which they can swallow alive in one single gulp thanks to their incredibly wide, protrusible mouth and their elastic stomach. In fact, they could be described as just that – a huge mouth and a belly to match, with a little fish added around them. To attract unsuspecting prey, frogfish have also developed a fascinating luring apparatus which looks (and works) just like a fishing rod: positioned between their eyes, a thin ray (called the *illicium* in scientific parlance) ends with a bit of fleshy tissue (called the *esca*, ie the lure) exactly shaped like a wiggling worm, a tiny fish, a pom-pom like bunch of worms or a little shrimp, depending on the frogfish species. Wiggling periodically this tasty-looking morsel in front of their cavernous mouth and relying on their spectacular camouflage to avoid detection, frogfish – also called anglerfish, with good reason – do not go for long without eating good meals.

A Variety of Frogfish

These highly specialized reef denizens number about 12 genera and at least 41 species worldwide, most of which are rather common in tropical waters: however, since they are so incredibly variable in color and size, it usually is rather difficult to correctly identify most species underwater. In fact, the only really reliable clue to their identification is

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Three more stunning color variations: a yellow-green *Antennarius pictus* (top far left), a pink *Antennarius pictus* (left) and an unidentified bright yellow species (bottom far left). Correct identification of most frogfish is in most cases difficult or next to impossible underwater - the only sure means to differentiate among species is the shape of the *esca*, which can look like a worm, a tiny fish, a small shrimp, a bunch of worms or something else but presumably equally appetizing.

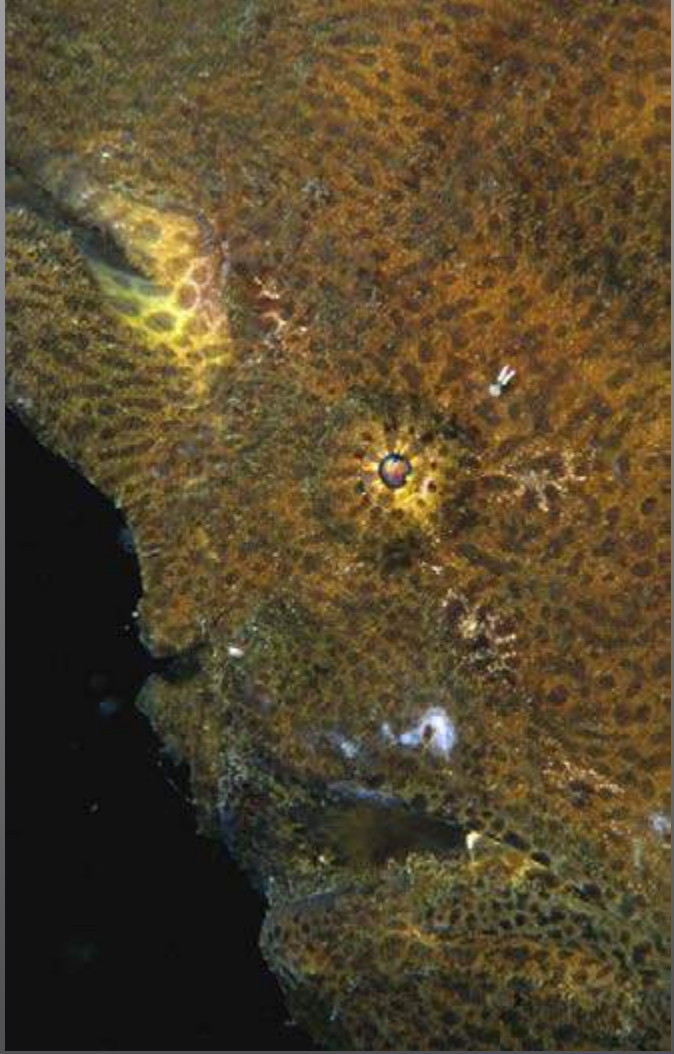


Left, the side views of two vastly different and quite atypical individuals of the Clown or Warty frogfish *Antennarius maculatus* show the difficulties encountered in identifying frogfish underwater - in this species' case the triangular blotches and the permanently erect first and second dorsal fins are diagnostic. Far left, a stunning portrait of an uncommon and exquisitely camouflaged species, possibly *Antennarius biocellatus*.

— A telling example of the frogfish - here *Antennarius pictus* - stupendous camouflage. These predators are capable - over a stretch of time - to assume the coloration of the sponges they have chosen as a perch.



the shape of their esca! The most common and most readily identified species are the following. The Painted frogfish (*Antennarius pictus*), up to 16 cm long, usually very bulky, can be bright red, white, black, green, purple or bright yellow and is usually found on sponges which it exactly matches in color: its body features several round ocelli and spots matching the holes of the sponge itself. The Giant frogfish (*Antennarius commersoni*) is larger (up to 30 cm) and usually found on jetty pylons, wrecks, corals and branching sponges: coloration is extremely variable, usually matching that of its perch and usually with spots, lines and wart-like growths in disruptive schemes. The Clown or Warty frogfish (*Antennarius maculatus*) is probably the most easily identified of them all, reaching 12 cm in size and sporting large, triangular red-brown spots on a bright white or bright yellow background. This species also features a permanently erect dorsal fin first ray above the eyes, and the skin shows easily visible, large pores and warts all over. A rarer but much sought-after species is the Striped frogfish (*Antennarius striatus*), reaching up to 20 cm and usually found in coastal areas with lots of vegetable debris and sponges. Background coloration can be brownish, yellowish, pinkish or whitish, but elongated blotches and



Top far left, a portrait of *Antennarius commersoni*; bottom far left, a close-up of a sponge-mimicking *Antennarius pictus*; left, Shaggy frogfish *Antennarius hispidus* sitting undetected among a bed of oysters. Careful examination of the image will actually reveal the presence of two individuals - a bright fuchsia one on top and a brown smaller one below it. This is quite uncommon as frogfish are a solitary species, and it might involve courtship and mating behavior.

Now you see me, now you don't - frogfish are true masters of camouflage

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Clockwise, from top left: a bright yellow, sponge-mimic *Antennarius pictus* on black volcanic sand, a detail shot of the gill opening under the "armpit" of the pectoral fins, a brightly patterned *Antennarius maculatus* luring (note the illicium and the esca being wiggled in front of its mouth) and a detail of the paw-like, "fingered" pectoral fins, used by frogfish to securely perch on sponges.



Far left, close-up of a well-patterned *Antennarius commersoni*. Left, a portrait of the so-called "hairy" phase of *Antennarius striatus*, apparently restricted to a few selected biotopes. Its extraordinary camouflage is possibly habitat-induced. Observations by scuba divers and photographers seem to indicate the fleshy growths of Hairy frogfish are seasonally shed.

*Never believe what you are seeing
when you encounter a frogfish*

— A Hairy frogfish *Antennarius striatus* sits in the open on the black volcanic sand of the Lembeh Strait, in Northern Sulawesi, looking exactly like a clump of weeds. Notice the diagnostic, boomerang-shaped, fleshy worm-like esca resting above its eyes. This species is almost invisible to the untrained eye, and it certainly is to its fish prey.



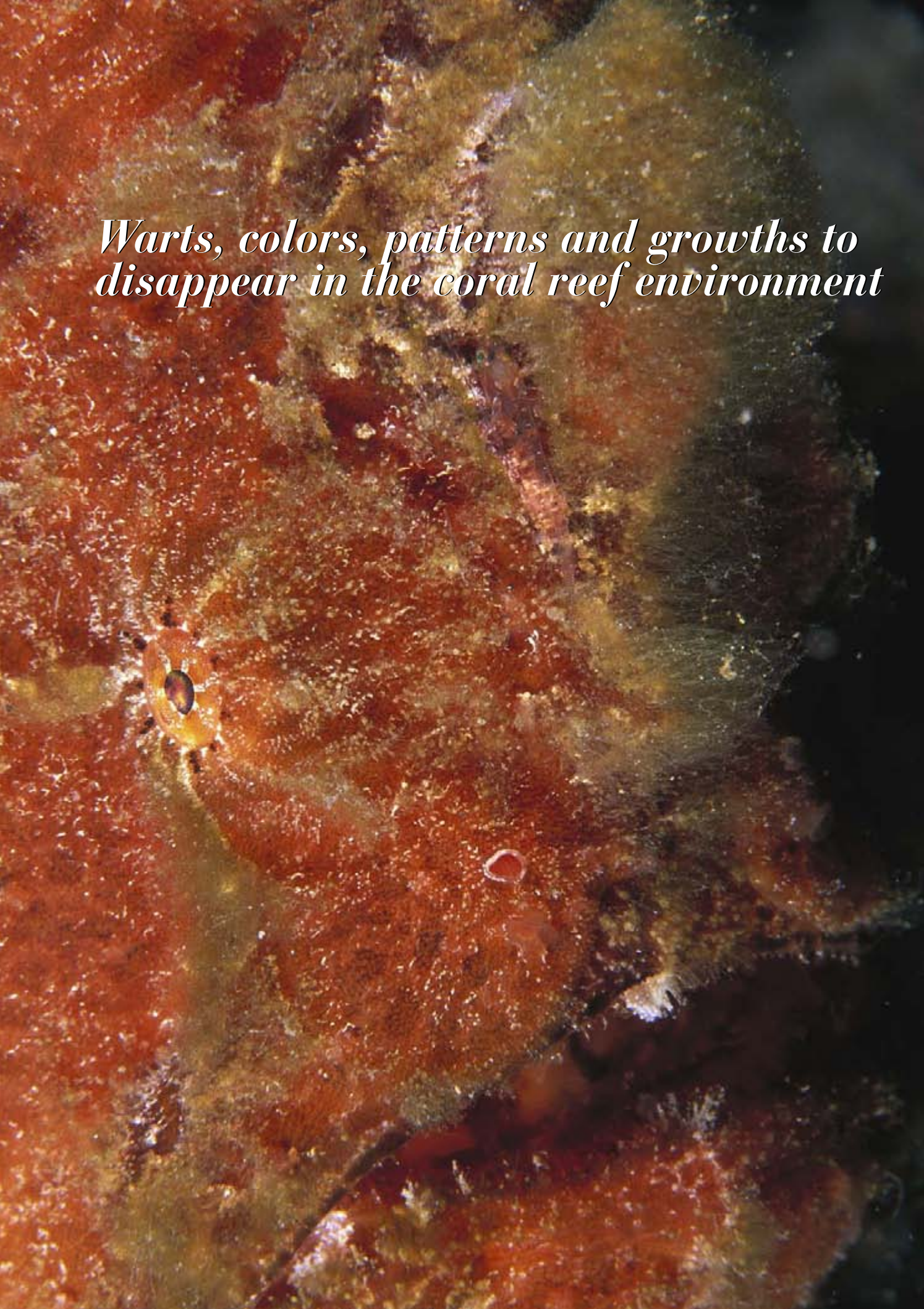
short darker stripes are always present, An interesting variation of this species is commonly observed in the Lembeh Strait in Northern Sulawesi, Indonesia, where Striped frogfish are also known as Hairy frogfish due to the long, hair-like dermal appendages they develop there, obviously as an adaptation to the peculiar local environment. Striped / Hairy frogfish are also easily identified by the large, fat, boomerang-shaped, worm-like esca. Less commonly (and less readily identified) observed species in SE Asian waters include the Spotfin frogfish (*Antennarius nummifer*) and the Freckled frogfish (*Antennarius coccineus*), both rather small and colorful but exceptionally well camouflaged, while the Sargassum anglerfish (*Histrio histrio*), reaching 15 cm, is a highly specialized species which is exclusively found on Sargassum floating mats: its coloration is exceedingly variable but always suiting its habitat, and this fascinating little fish can actually jump out of the water to rest on top of the floating mat if threatened from below, surviving for surprisingly long out of its natural element. Sargassum anglerfish are often found during the rainy season when large mats of Sargassum are washed to the shore following big storms, but otherwise live a pelagic existence. Several more species are present – some very small, others still undescribed – but

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Top far left, a bright orange *Antennarius pictus* mimics to perfection the sponge it is sitting next to. Bottom far left, *Antonella* watches a mauve *Antennarius pictus* on a Borneo reef. Left, the close-up of a large specimen - possibly *Antennarius biocellatus* - reveals a wealth of details. This individual is missing the esca at the tip of its illicium, possibly bitten off by a prey which was faster than its would-be predator.

Warts, colors, patterns and growths to disappear in the coral reef environment



The portraits of a Giant frogfish *Antennarius commersoni* (far left) and an *Antennarius pictus* (left) reveal widely different colorations and the occasional algal growth on the body which is shown by mature individuals living in murky waters. Notice how the colors and patterns shown by the mauve individual at left create a somatolytic (ie shape-breaking) effect, making the frogfish virtually unrecognizable.

the ones listed above are the most commonly observed, at least by persistent divers.

Lazy Liars

Frogfish are mostly sedentary, moving very little and remaining firmly affixed to their perches for days on end – and yet, when they have to move, they can do so with surprising speed and agility. Using their little webbed “feet” they can walk at speed on the substrate, moving with a slightly bouncing motion and looking exactly like little funny clockwork tin toys; and if forced to swim from one perch to the next, they will do so floating in midwater like air-filled balloons and propelling themselves not by flapping their fins as one would expect, but rather using jet propulsion, forcefully squirting water from their round gill opening situated under their pectoral fins “armpits”. Adding to all these wonderful peculiarities, small juveniles of at least two species – *pictus* and *maculatus* – will regularly and brashly sit out in the open, flaunting their bright, colorful liveries which they use to mimic poisonous nudibranches to avoid predation. Being so confident in their own camouflage, frogfish are easy to photograph...once you spot them! Check carefully among branching sponges, on encrusted jetty pylons and on wreck surfaces, examining strange-looking protrusions on exposed spots: once you’ve seen your first one, it will be much easier finding the next ones. ●



Three more examples of the variations shown by frogfish species and individuals. Top far left, a “hairless” phase of *Antennarius striatus*; far bottom left, a mauve *Antennarius pictus*. Left, a large, bright yellow, unmarked *Antennarius commersoni* rests on its elephant-ear sponge perch.



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The Parting Shot

As I work on every issue of *ANIMA MUNDI - Adventures in Wildlife Photography* I often pause and look out of the window of my studio, towards the wide open expanse of the Italian countryside. We live in an old farm by the river Po, quite isolated but surrounded by cultivated fields stretching for miles in all directions. Besides those in our big garden, large trees are few and far between - the local farmers have little patience with the old elms, poplars and wild maples which were so abundant in the area until a few decades ago, and the only big veterans still standing

today - protected by law and old traditions - are the enormous oak trees and walnuts luckily no one dares to chop down. There's little we can do about it - intensive wheat and maize cultivation requires heavy, cumbersome machinery, and big trees stand in the way of such monstrous pieces of equipment. But we do our best, and have transformed our property into a veritable little oasis for the local surviving fauna - we have permanent populations of little owls, dormice, hares, squirrels, frogs, toads and snakes, plus lots of other occasional visitors including hed-

gehogs, foxes, woodpeckers and various raptors. We once even saw a badger, which is quite unusual in industrialized Northern Italy! As our area was swept by freezing, ice-laden Siberian blizzards in January - temperatures reached -20°C at night - I happened to notice this fluffed-up Little Owl *Athene noctua* perching on a cherry tree right by my studio window, and I couldn't resist taking a portrait of it through the glass, with the snow-covered fields in the background. Aren't we lucky to be able to have such lovely visitors right by our doorstep? ●

An aerial photograph of the Raja Ampat archipelago in Indonesia. The image shows numerous small, forested islands of varying shapes and sizes, scattered across a vast expanse of clear, turquoise water. The water's color transitions from a deep blue in the open ocean to a vibrant green near the shorelines, indicating shallow reefs and sandy bottoms. The sky is filled with soft, white clouds, and the overall scene is one of a pristine, tropical paradise.

Raja Ampat ...

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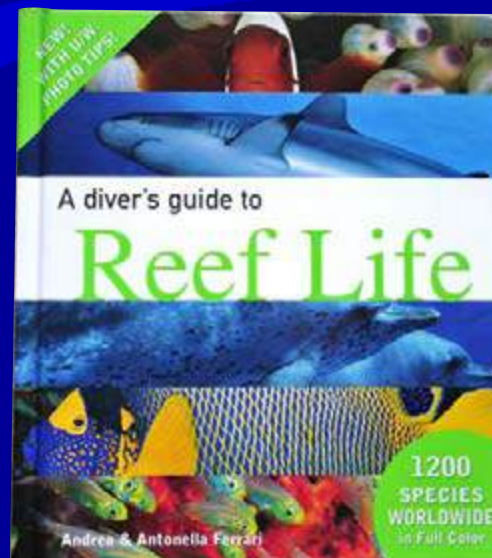
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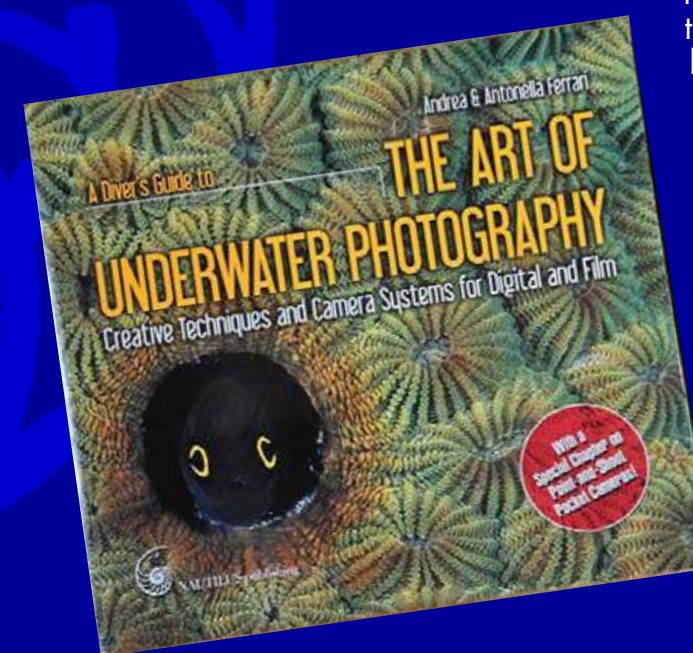
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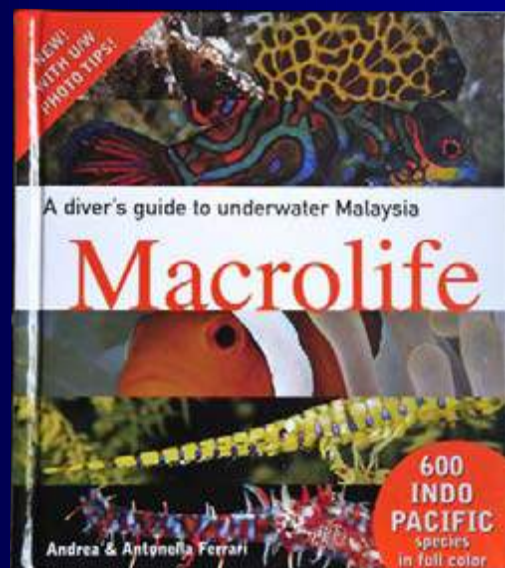
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