

Corbiculate Bees of the Golfo Dulce Region, Costa Rica

Piedras Blancas National Park
“Regenwald der Österreicher”

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broad range of topics, such as animal-plant interactions, herpetology, ornithology, entomology (especially of butterflies), limnology, chemical ecophysiology, biogeochemistry, geography and sociology. About 50 field courses and excursions have been organized, enabling students and scientists from universities all over the world to visit the Piedras Blancas National Park.

It is a special interest of our Society to provide our visitors and the many other friends and admirers of the tropics with information, in the form of books and brochures, on the biology and ecology of the local and regional rainforests and of the adjacent cultured land. Following the publication in 2001 of an internationally received "Field Guide of Flowering Plants of the Golfo Dulce Rainforests", five colourful brochures have been produced: "Amphibians and Reptiles of the Golfo Dulce Region"; "The Birds of the Golfo Dulce Region, Costa Rica"; "Das Leben hier und dort - La vida aquí y allá"; "Ecosystem diversity in the Piedras Blancas National Park and adjacent areas (Costa Rica)"; and "Fruits in Costa Rican Markets" as well as a scientific monograph "Natural and Cultural History of the Golfo Dulce Region, Costa Rica".

We are now proud to offer a further brochure

dealing with corbiculate bees, which – although small and less spectacular than amphibians, reptiles and birds – represent important components of our ecosystems and are present in our area in a huge variety of different and largely very colourful species. Furthermore, bees show a conspicuous pattern of behaviour. This small field guide has been made possible by the tireless activity and the continuous enthusiasm of Linde Morawetz, Maria Gruber, Stefan Jarau and Christian Reichle who gathered much valuable data and photographic records within the rainforests and the cultured landscapes around La Gamba. A booklet dealing with "Dragonflies of the Piedras Blancas National Park, Costa Rica Regenwald der Österreicher" is being published simultaneously.

It is our hope that this brochure – as our former booklets - will be a source of information and joy to lovers of tropical life, to scholars and students, to teachers and researchers at the University and – finally - to all the friends of the "Rainforest of the Austrians" and the "Tropical Station La Gamba".

For further information see:
www.lagamba.at
www.regenwald.at



The "Comedor"



Scientists in the air-conditioned laboratory



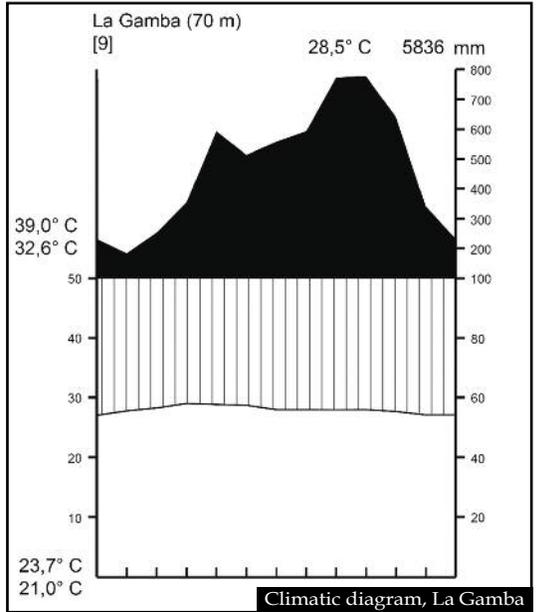
The pond in the garden of the station

The rainforests of the Golfo Dulce region

Werner Huber & Anton Weissenhofer

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The Golfo Dulce region is located in the southern corner of the Pacific coast of Costa Rica, near the border with Panama. Within this region are the Corcovado and Piedras Blancas national parks. The forests of the region are the only moist or wet evergreen lowland forests that still exist on the Pacific coast of Central America. The elevations range from sea level to 745 m on the Cerro Rincón, Peninsula de Osa; the annual precipitation is up to 6,000 mm with a short or almost nonexistent dry season from December until March; the relief is strongly



structured at the landscape level and contains many microhabitats and niches; and the soil types are diverse and the vegetation highly dynamic. All of these factors, coupled with the biogeographical position of the Golfo Dulce, have led to a very species-rich forest: about 2,700 species of higher plant have been recorded from the area.

The tallest trees in the moist and wet evergreen lowland forests grow up to 60 m





Students with a huge tree with buttress roots in the forest

high (e.g. *Anacardium excelsum*, *Parkia pendula*, *Carapa guianensis*, *Brosimum utile* and *Caryocar costaricense*). Most trees retain their foliage throughout the year. Palms (about 45 species) such as *Socratea exorrhiza*, *Iriarteia deltoidea*, *Welfia regia* and *Asterogyne martiana* are typical features of the forest. *Heliconia* herbs are obvious near streams and in gaps. Lianas (e.g. *Bauhinia* and *Entada*), vines and epiphytes (Bromeliaceae, Orchidaceae) are found on many trees. About 100 species of orchid (e.g. vanilla) and 40 species of bromeliad are distributed in the region.

Hemi-epiphytic plants of the genus *Clusia* are abundant in the very wet parts of the forest while fig trees (*Ficus*) are more frequent in the drier regions (on the Corcovado plains). On the coast, the coconut palm (*Cocos nucifera*) and the “tropical almond tree” (*Terminalia catappa*) are the most conspicuous plants; in the mangroves this posi-

tion is taken by red mangrove (*Rhizophora mangle*) and mangle pinuela (*Pelliciera rhizophorae*). In addition to the various types of primary and secondary forest, the area also features other types of habitat such as pastures, pools, rivers, cultivated land and various kinds of plantation (e.g. oil palm, teak and manioc). Bees are very abundant and are found in all habitats.

Costa Rica’s geographic location on the ‘bridge’ between North and South America and the fact that the country formed a kind of refuge for tropical animals and plants during the last ice age has led to remarkable biogeographical patterns. Restricted-range plants and animals are abundant and many reach their northern limits in southern Costa Rica. The region is an excellent place for naturalists to enjoy tropical nature. An extensive system of trails in the Corcovado and Piedras Blancas national parks (La Gamba) offers



Interior of the forest of the NP Piedras Blancas

A brief introduction to bees

Stefan Jarau

Bees are a group of insects that belong to the order Hymenoptera, which translates as “membranous wings” (from the Greek *hymen* = membrane and *ptera* = wings) and refers to one of the typical characteristics of bees. There are approximately 20,000 species of bees (Hymenoptera: Apiformes) known to science today and they are currently divided into seven families. Representatives of five of the families also occur in the Neotropical region - Colletidae, Andrenidae, Halictidae, Megachilidae and Apidae. Unlike many other groups of organisms, bees do not show their greatest abundance and diversity in the moist tropical zones but in various warm-temperate and xeric regions. However, the highly social stingless bees and honey bees are exceptions to this general rule. In particular, the stingless bees, which comprise several hundred species, are abundant inhabitants of all tropical and subtropical regions around the world, with the exclusion only of some remote oceanic islands. Their species

diversity is largest in the American tropics, where they occur between northern Argentina and Mexico. Honey bees only colonized the American continent recently, where they were introduced by man. The hind legs of workers of stingless bees (tribe Meliponini) and honey bees (tribe Apini) as well as female bumble bees (tribe Bombini) and orchid bees (tribe Euglossini), show particular morphological structures known as corbiculae, used to transport pollen and other resources to the nests. These four tribes are thus considered to be closely related and to form a distinct group of bees within the family Apidae, subfamily Apinae, known as “corbiculate bees”. The present field guide is restricted to the members of this group of Apiformes from the Golfo Dulce region in SW Costa Rica. These bees represent important pollinators in the tropical rain forest and are certainly the most frequently observed bees in the area.

