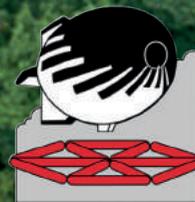


# **PERTINENCE OF THE STUDY OF FOREST CANOPIES FOR THE CONSERVATION OF BIODIVERSITY IN THE INDO-BURMA HOTSPOT**

Note of intention



**OPÉRATION CANOPÉE**

## PREAMBLE

The objective of Opération Canopée is to contribute to the study of the diversity of the fauna and flora of the canopies of humid tropical forests.

Opération Canopée associates local scientific experts with specialists of other nationalities and develops and tests air-borne techniques for access to the canopy, where biodiversity is richer than in all the other forest strata.

Depending on demand, opportunity and skills, the scientific disciplines involved are botany and ethnobotany, pharmacology, entomology, mammalogy, herpetology, ornithology, virology, medicine and climatology. Depending on the terrain and the geographic context, the scientific team is supported by specialists with other skills: aeronauts and architects, engineers, logistics experts, filmmakers and journalists.

Since the founding of Opération Canopée, more than 10 expeditions in the tropics in 4 continents have been organised on the basis of this model and with active support from the authorities at the sites.





## OBJECTIVES for 2015 - 2020

Opération Canopée echoes the overall logic of the Global Strategy for Plant Conservation (GSPC):

'The Global Strategy for Plant Conservation is a programme of the Convention on Biological Diversity.

In 2010, the Conference of the Parties to the CBD, by Decision X/17, adopted the Updated Global Strategy for Plant Conservation 2011-2020. The Strategy's vision is to halt the continuing loss of plant diversity and to secure a positive, sustainable future where human activities support the diversity of plant life (including the endurance of plant genetic diversity, survival of plant species and communities and their associated habitats and ecological associations), and where in turn the diversity of plants support[s] and improve[s] our livelihoods and well-being.'  
<http://www.plants2020.net/about-the-gspc>

In line with our previous expedition in the region (to Laos) and for the period 2015-2020, we propose a project centred on a major scientific question: 'What is the pertinence of the study of tropical canopies for the conservation of biodiversity?'

Tropical zones are described as being rich in biodiversity, with some zones being exceptionally rich. This, combined with the threats to the natural environment, has led to the reconnaissance of several hotspots in world biodiversity. The region we propose to study is part of the 'Indo-Burma hotspot' and covers a vast region with exceptional biodiversity.

Classic inventories based on transects often take into account only a fraction of biodiversity. They focus on trees with a trunk diameter of more than 10 cm and neglect a large proportion of biodiversity, whether this be on the ground, in the soil or in the canopy.

We propose to reposition canopy biodiversity in an integrated context, making it possible to quantify biodiversity at all the 'strata' of the tropical forest ecosystem with emphasis on the undergrowth and, above all, on the canopy. Inventories are much more difficult in the latter as both the canopy itself and the intermediate levels are usually inaccessible for scientists.

The project will also make it possible to ascertain whether the reputation of certain plant groups for being undetectable in traditional inventories is true. These plants—with orchids being the emblematic example—are all covered by conservation measures. Accurate evaluation of their detectability is a crucial point in any conservation policy for a given region.



## INDO-BIRMAN HOTSPOT

The Critical Ecosystem Partnership Fund (CEPF) has identified 34 zones as being hotspots of world biodiversity. They are sited in only a few regions and these are seriously threatened by human activities.

The Indo-Burma hotspot is one of them. It is a biogeographic ensemble corresponding approximately to Burma, Laos, Thailand, Cambodia and Vietnam, and also extending into China (Yunnan province) and India (eastern part of the country and the Andaman Islands). Only 5% of natural habitats remain in the Indo-Burmese peninsula, making it one of the four most seriously threatened hotspots.

This region of the Asian continent is complex, ranging from coastal zones to high mountains. It is crossed by the Mekong and includes the Tonlé Sap, the largest lake in South-East Asia. The diversity of landscapes is accompanied by a great variety of habitats. New species are discovered frequently in this star region for biodiversity that is particularly rich in plants, reptiles and batrachians.

In spite of substantial investment by governments and international organisations, the environment is still threatened: timber, hunting and trade in protected species, commercial plantations, drainage of wetland areas, etc.

This hotspot can only be protected after inventories of all its riches. This is a prerequisite for appropriate protection measures.

## METHODOLOGY

2015 – 2020 (reconnaissance in progress)

The first phase consists of contacting the scientific community in the host country, identifying resources and needs and also biological reserves or potential research sites. In parallel, we also have to convince the administrative authorities and institutions of the pertinence of the scientific approach and the issues involved.

The second phase consists of identifying the scientific programmes concerned, the possible links with local teams and experts and reconnoitring possible sites. The duration and content of the project will be defined and a preliminary budget drafted.

The third phase is that of the final organisation, consisting of detailing the budget according to possible resources and gaining access to pre-existing funding set up by major donors such as the World Bank or the European Union

The fourth phase is the field operation, combining aerial facilities and the grouped scientific community. A forest camp with capacity for 20 to 40 persons must be found or built. The period at the site is 30 to 60 operational days



## STUDY OF CANOPIES IN THE INDO-BURMA HOTSPOT

Inventory of the biodiversity in forest canopies in Laos (IBFCL) 2012 - 2015  
Scientific Director: Professor Francis Hallé, botanist.

In 2012, forest canopies in the karstic region in the Province of Khammouane were examined.

Operations were in two parts: 30 days in the dry season (January) and 45 days at the beginning of the first rains (May-June).

With organisation and assistance from a 13-person technical group, 35 scientists were divided into six teams: botany, entomology, herpetology, ornithology, mammalogy and virology. Much material was collected.

In botany, the 12,000 samples collected covered 890 species, including some 30 new ones. The National Herbarium of Laos tripled in size.

In entomology, insect counting is a big job that is still far from completion. The number of species collected is estimated to be about 1,500. New species include butterflies and moths, coleopterans, a dragonfly and possibly termites, together with a new species of scorpion. If new arthropods (not counting insects) are included, the figure of 100 new species discovered in 2012 is certainly not an exaggeration.

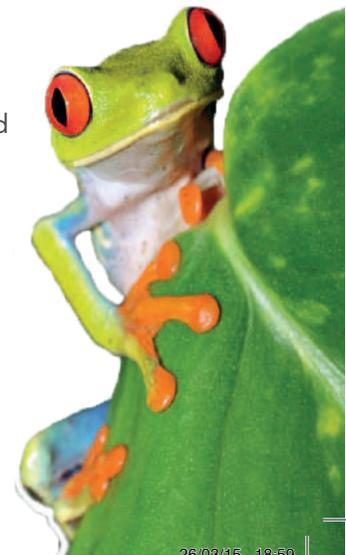
Herpetology, with 55 species observed, led to the discovery of several species that are new in Laos and three species new to science.

Ornithology, with 90 bird species counted in May, is the only discipline that considers that its performance could have been better. In spite of pressure from hunting in the Hin Boun valley and too late a season, preventing both the observation of migratory birds and a census of local species whose singing season was over, the ornithologists nonetheless observed 90 bird species in May 2012, including rare species such as the Purple-naped sunbird (*Hypogramma hypogrammicum*) and the Mountain hawk-eagle (*Nisaetus nipalensis*).

Although work in mammalogy was limited to the study of bats, the results were excellent, with the census listing 5 families and 24 species, two of which were new for Laos.

Virology was led by Institut Pasteur in Vientiane, but several months are needed before knowing whether the insects collected (mosquitoes and sand flies) are vectors of Japanese encephalitis, the West Nile virus, dengue or chikungunya.

Canopy vertebrates - birds and bats - may be reservoirs of the viruses sought.





## OPERATION CANOPEE, ACCESS PROVIDER

### Description

Opération Canopée is a group of enthusiasts who have pooled their skills to run research missions in tropical forest canopy. They include the initiators of the project— Francis Hallé, botanist, Dany Cleyet-Marrel inventor, designer and pilot of aerostats and Gilles Ebersolt, architect and the inventor of the Treetop Raft.

### Zones of operation

The Opération Canopée team has operated in its own name or in collaboration with the NGO Pro Natura International in the following places:

1985: first testing of the Raft on Mont Pilat

1986: first in situ test in Guiana

1989: first scientific mission to Guiana, preliminaries in Brazil

1991: forest mission in Cameroon

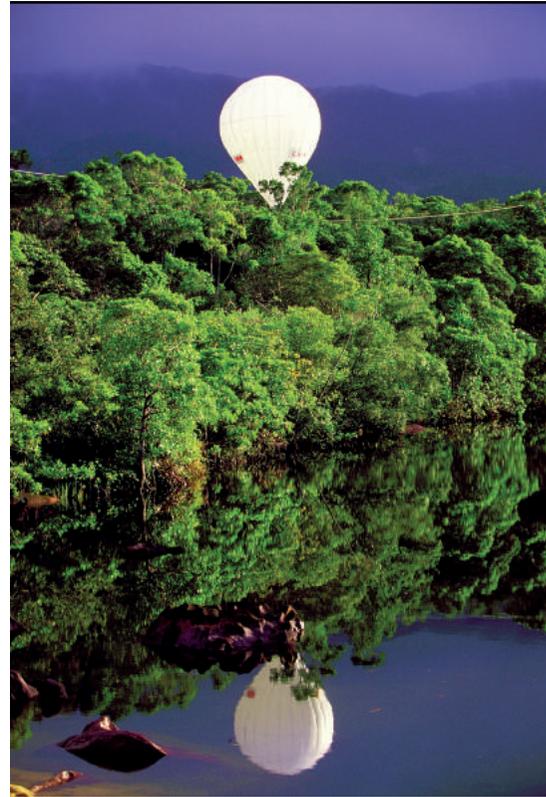
1996: Pronatura mission in Guiana

1999: Pronatura mission – La Makandé in Gabon

2001: Pronatura mission - Masoala in Madagascar

2004: IBISCA mission - Baro Colorado in Panama

2012: Khammouane mission in Laos



## Equipment

**Treetop Raft:** A combination of a pneumatic structure and a net. It is accessible to users and placed on the canopy using an aerostat.

**AS 300:** An 8,500 cubic metre dirigible designed specially for transporting the Treetop Raft and the Canopy Sledge is used to lift loads from the ground to the canopy.

**Canopy Sledge:** A nacelle suspended 10 metres below the dirigible from which 3 passengers can collect samples while moving.

**Canopy Bubble:** a 210 m<sup>3</sup> helium balloon provides access to the canopy for one person, following a previously installed line.

**Ikos :** a habitable dural structure fixed by climbers in the main branches of an emerging tree. It has capacity for three users for a stay or extended observations in the canopy.

**Cinébulle:** a 1,500 cubic metre motorised hot-air balloon is used for reconnoitring and carrying light material. The new electrical version makes possible contact with trees.

**Canopy Glider :** a helium/hot air balloon developed with Pro Natura International for botanical and entomological collection operations on forest canopy.

**Canopy Star :** a two-seater self-stressed device in carbon fibre that is set in the canopy using the Cinébulle. Use is similar to that of Ikos.

**Network:** the Canopy Bubble provides a link between the semi-fixed apparatus (Raft, Ikos and Star) and the ground. Rapid rotations are then possible between the base camp and the canopy stations (Laos 2012).

These eight facilities are completed by more conventional equipment such as the climbing gear used by 'tree surgeons' (ropes, ascenders, sling/pedals and carabiners), big shot line launchers to run ropes to the tops of trees, steel aerial runways, etc.

# PARTNERS OF OPERATION CANOPEE

Phou Hin Poun mission - Laos 2012

## Funding

MAVA Foundation

## Aid for preparatory operations

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Terra Botanica

Jardiland

EDF DCEL centre Ouest EDF délégation régionale des Pays de la Loire

Chanel

## Scientific and Technical Support

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Scientific partners in Laos

Biotechnology and Ecology Institute, Ministry of science and Technology, Lao PDR

University of Vientiane.

## Scientific partners in Europe

CIRAD

Institut français de Pondichéry

INRA

Institut Pasteur de Vientiane

IRD

MNHN Muséum national d'Histoire naturelle

Royal Belgian Institute of Natural Sciences

SHNAO

La Société d'Histoire d'Histoire Naturelle Alcide d'Orbigny

Biotope

## Links

<http://blog.radeau-des-cimes.org/wp-content/uploads/2011/10/outils-op-can.pdf>

<http://blog.radeau-des-cimes.org/wp-content/uploads/2014/09/Poster-Unesco.jpg>

<http://www.plants2020.net/a-propos-de-la-smcp/>

<http://blog.radeau-des-cimes.org/wp-content/uploads/2011/12/Dossier-complet-version-anglaise-23-12-2011-BD.pdf>

[http://www.cepf.net/where\\_we\\_work/regions/asia\\_pacific/indo\\_burma/Pages/default.aspx](http://www.cepf.net/where_we_work/regions/asia_pacific/indo_burma/Pages/default.aspx)

[http://www.cepf.net/about\\_cepf/Pages/default.aspx](http://www.cepf.net/about_cepf/Pages/default.aspx)

<http://blog.radeau-des-cimes.org>

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