

## Opération Canopée in Khammouane Province Inventory of the biodiversity of forest canopies in Laos

**A**t the invitation of the Lao National Science Council, international researchers met from May 7th to June 8th, 2012 in the forest of Phou Hin Poun (Khammouane Province), near the village of Ban Natan, a few kilometres from the famous Konglor Cave. Organized by the French association "Opération Canopée" (Operation Canopy), the aim of this scientific mission is to begin an inventory of the biodiversity of forest canopies in Laos. A work of this scale has never before been undertaken in the area.



The "Canopy Star" is a mobile tree platform, made of carbon fibre and nets, with a span of about 12 metres

### A truly extraordinary science project

Since 1991, the association "Opération Canopée" has provided the international scientific community with different means of accessing tropical rainforest canopies. Several expeditions have been organized in Brazil, French Guiana, Gabon, Madagascar and Panama, to further the knowledge of naturalists concerning plant and animal biodiversity in tropical areas.

Emblem of the association and its team, the *Canopy Raft* (known in French as "*le Radeau des Cimes*") is probably the instrument that helped create the reputation of "Opération Canopée" worldwide. This unusual observation platform, measuring 300 to 600 m<sup>2</sup>, was carefully transported to tree canopy level using a huge hot-air balloon.

This totally unique platform has enabled dozens of scientists to study the upper part of the forest, an exceptionally rich biological interface that had seldom been studied previously.



The "Canopy Bubble" is a helium balloon

### Innovative structures to explore the Lao forests

For its first expedition

to Laos, Opération Canopée reunited the original founders of the *Canopy Raft*: botanist Francis Hallé, renowned for his research on plant architecture; hot-air balloon pilot and aerostatic tool developer Dany Cleyet-Marrel; and camp leader Gilles Ebersolt, architect and designer of the key platforms used during the different missions. To make the crew as light as possible, recently-developed innovative platforms were used in the Phou Hin Poun National Biodiversity Conservation Area. Located in the heart of this Conservation Area, the site was chosen for the diversity of the flora and fauna of its primal forest, bordered by the impressive karst cliffs also known as the "limestone forest".

The *Canopy Star* (or "*étoile des cimes*") is one of the most original inventions to have been used by Opération Canopée (see photo left). Relatively light, the device was lowered onto the top of a tree from a rainbow-coloured hot-air balloon baptised *Cinébulle*,

which was also used to film a panorama of the forest canopy. A second, transparent helium balloon, the *Canopy Bubble* (or "Bulle des cimes" in French), allowed the scientists to pull themselves across the canopy using a pre-installed rope system. Finally, the *Ikos*, a small aluminium cage weighing about 100 kg and accessible only by zip-line, allowed the scientists to spend the night among the branches of a tree for observations at dusk or after dark, the hours that are more conducive to animal activity.

### The multidisciplinary nature of the actors

Locally, the expedition relied on the expertise of Jean-François Reumaux, an expert with the National Science Council, founder of the company *Animo* and the *Gibbon Experience* conservation project in the forest canopy at Bokeo.

The scientists present in the camp had been selected to represent the diversity of ecological research in the regional context of South-east Asia. They included specialists in plants (botanists), birds (ornithologists), insects (entomologists), snakes and reptiles (herpetologists) and mammals (mammalogists).



Professor Francis Hallé contemplating the forest of Phou Hin Poun

The mission brought together researchers from eight different nationalities and backgrounds, notably from French scientific institutions such as the IRD (Development Research Institute), the CIRAD (Institute for Agronomic Research) and the CNRS (National Centre for Scientific Research), as well as many lecturers and students from the National University of Laos.

The multidisciplinary nature of the team of researchers, which the project leaders considered to be an important factor, has promoted scientific exchange and created

great intellectual synergy between the teams.

If it is still too soon to evaluate the results of *Opération Canopée*'s first mission, no-one can doubt for a moment the usefulness of the research being carried out. The latest annual report by the WWF states that about 120 animal species are discovered every year in the Greater Mekong area, which works out at a new species every three days. Species that, barely discovered, are already all too often on the verge of extinction, hence the importance of being able to identify them in order to better protect them.

The animal and plant specimens collected during this mission will enrich the country's scientific collections. Plant samples will be donated to the National Herbarium of Laos, an institute that has benefited from the support of the AFD within the framework of the "Sud Expert Plantes" programme of the French Ministry of Foreign Affairs. In parallel, a project to build a natural history museum is under consideration, in order to preserve and showcase the country's different scientific collections.

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During their mission in Khammouane province, entomologists were able to collect a multitude of insects of various shapes and colours