



# Plant Diversity and Vegetation Surveys in the Green Corridor Project Area, Thua Thien - Hue Province

Leonid V. Averyanov, Phan K L c, Nguy n Ti n Hi p, Nguy n Ti n Vinh, Ph m V n Th , Tô V n Th o, Tr n Minh c, Ngô Trí D ng, D ng V n Thành, Lê Thái Hùng, Anna L. Averyanova, and Jacinto Regalado Jr.





# Introduction

**This report presents the results of plant diversity and vegetation surveys conducted in five areas in A Luoi, Huong Thuy and Nam Dong districts, Thua Thien-Hue province between March and May 2005.**





# Previous studies

The forests of Central Truong Son still remain poorly surveyed for most plant and animal groups and the knowledge of its rich biodiversity is far from adequately understood. Incomplete plant inventories have been published for Bach Ma NP (Mai Van Pho, 1994; Nguyen Nghia Thin and Mai Van Pho, 2003), Dakrong-Phong Dien NR (Le Trong Trai et al., 1999a), and Ngoc Linh NR (Le Trong Trai et al., 1999b).





# Aims

**The main aim of the survey is to describe the main types of forest vegetation in the Green Corridor project area, to improve understanding of plant species diversity, to assess and evaluate the areas of biological significance and determine priorities for conservation.**





# Methods

**Fieldwork comprised of sampling all spectrums of habitats in the study area at elevations ranging between 80 to 1150 m a.s.l.**





# Methods

**Observations and descriptions of the floras and main vegetation types were made, based on a set of 3550 herbarium voucher specimens with 1517 collecting numbers and on the study of plants in plot-based samples comprising “non-tree” and “tree” species plots.**





# Methods

**A total of 101 vegetation plots that represented all the main types of plant communities were established, consisting of 52 non-tree species plots and 49 tree species plots were described.**





# Survey Participants

**Leonid V. Averyanov, Anna L. Averyanova** – Viện thực vật học Kômarốp, Viện Hàn lâm khoa học Liên bang Nga, Xanh Pêtécxbua

**Phan Kế Lộc, Nguyễn Tiến Hiệp, Nguyễn Tiến Vinh, Phạm Văn Thụ, Tô Văn Thọ** – Viện Sinh thái và Tài nguyên sinh vật, Viện khoa học và công nghệ Việt Nam, Hà Nội

**Trần Minh Cường, Ngô Trí Dũng, Dũng Văn Thành, Lê Thái Hùng** - Trường Đại học nông lâm Huế, Đại học Huế

**Jacinto Regalado** – Viện thực vật Mítxuri, Xanh Lôi





# Study Sites

- **Nam Dong Distr., Huong Son Commune**
- **A Luoi Distr., A Roang Commune**
- **A Luoi Distr., Hong Kim & Hong Van Communes**
- **A Luoi Distr., Huong Nguyen Commune**
- **Huong Thuy Distr., Duong Hoa Commune**





[www.panda.org/greatermekong](http://www.panda.org/greatermekong)

# Map of study sites





# Results

**Over the course of the survey period, 869 vascular plant species (include ferns and fern allies, gymnosperms, and angiosperms) arranged in 489 genera belonging to 131 families were recorded.**





# Results

**These include 64 local endemic, endemic and sub-endemic plant species, 15 species possibly new to science, and a number of new genus and species records for Vietnam.**





# Plant Diversity

**Based on the survey team's botanical knowledge and experience in conducting such surveys in Vietnam this is estimated to represent approximately 50 % of the total richness of the area.**





# Plant Diversity

**It is estimated that the number of species of higher vascular plants in the study area is between 1700-2000 species.**





# Plant Diversity

**The flora is typical of the lowland flora of the Central Annamese (Truong Son) phytogeographic province. Indigenous elements, the ones that usually have restricted distribution, represent the largest score (at least 60%) in the flora of primary vegetation.**





# Biogeography

**In the scheme of modern phytogeography the study areas belong to Central Annamese (Truong Son) floristic province of Indochinese floristic region of Indomalaysian subkingdom of Paletropical kingdom (Averyanov *et al.*, 2003a, b).**





# Higher Taxa Assessment

The ten largest families in the studied flora are Polypodiaceae (sensu lato), Orchidaceae, Rubiaceae, Euphorbiaceae, Zingiberaceae, Annonaceae, Melastomataceae, Myrsinaceae, Fabaceae, and Moraceae. These families comprise about 52% of all species documented in the whole flora.





# Higher Taxa Assessment

The ten largest genera of this flora are *Ardisia* (Myrsinaceae), *Ficus* (Moraceae), *Asplenium*, *Diplazium* and *Tectaria* (Polypodiaceae), *Alpinia* (Zingiberaceae), *Hedyotis* and *Lasianthus* (Rubiaceae), and *Begonia* (Begoniaceae).





## Comparison with other floras

**The flora of the GCP study area has pronounced similarity with the lowland floras of Bach Ma National Park and Phong Dien and Dakrong Nature Reserves. However, in Bach Ma National Park there are some species growing in submontane belt with mountain peaks higher than 1000 m a.s.l. that are lacking in our study area.**





## Floristic analysis using the orchids as a model

**The orchid family (Orchidaceae) is selected as an indicator taxa for preliminary floristic analysis and comparisons of the vegetation between the areas because it is the only plant family which at this moment has comprehensive data in Vietnam to make comparisons. The Orchidaceae are the largest family of flowering plants in the flora of Vietnam, which includes representatives of all floristic and geographical elements occurring in the habitats.**





# Floristic analysis using the orchids as a model

**The survey team discovered and documented four genera and 19 orchid species new for the flora of Central Annamese floristic province.**

**Some species are expected to be new records for science.**





## **Floristic analysis using the orchids as a model**

**Of the 138 orchid species known in Bach Ma NP and GCP area, 69 species (50% similarity) occur in both areas. Differences in elevation account for the differences in species assemblages. The orchid flora of the GCP area includes more lowland species than that of Bach Ma National Park which has more high elevation species.**





## Other key groups of plant species in GCP area

- Ferns and fern allies
- Gymnosperms
- Selected tree species
- Medicinal and ornamental plants
- Local endemic, endemic and sub-endemic species





# Ferns

**Ferns and fern allies represent roughly 7-10 % of floras of lowland areas, higher in floras of montane areas. It means that in GCP study sites the total expected number of species of ferns and fern allies is expected to be about 200. These groups of plants have little conservation value for all floras in the world. Only 5 species were listed in Red Data Book of Vietnam (Anon., 1996).**





# Ferns

**During our field survey about 270 numbers of ferns and fern allies were collected and identified to 145 species and 74 genera. In Bach Ma NP these groups of plants have higher diversity, up to 180 species, belonging to 73 genera and 28 families (Nguyen Nghia Thin, Mai Van Pho, 2003), whereas for the Phong Dien and Dakrong NR there are only 43 species belonging to 24 genera and 18 families listed (BirdLife, Report No 4, 1999).**





# Gymnosperms

No cycad species was found here.

Four coniferous species were found, namely *Podocarpus neriifolius*, *Nageia wallichiana*, *Dacrycarpus imbricatus* and *Dacrydium elatum*, belonging to the family Podocarpaceae

Only *Gnetum latifolium* is listed with certainty, the second species *G. indicum* has no voucher specimens.





# Trees

**Plot studies indicate that at least 80 % of tree species in all plots, from unlogged to heavily logged forests are almost the same (homogeneous) and comprised of only indigenous elements. There are broad-leaved, evergreen tree species.**





[www.panda.org/greatermekong](http://www.panda.org/greatermekong)

# Possible new discoveries to science





# Zonal vegetation

**There was only one zonal type of forest: the closed evergreen seasonal tropical broad-leaved lowland forest.**





# Zonal vegetation

**This zonal plant communities has been classified into seven main kinds of vegetation:**

- 1. Primary intact pristine closed evergreen broad-leaved lowland forest**





# Zonal vegetation

**2. Primary fractionally logged closed evergreen broad-leaved lowland forest,**





# Zonal vegetation

## 3. Secondary closed evergreen broad-leaved lowland forest,





# Zonal vegetation

## 4. Secondary semi-open evergreen broad-leaved lowland woodland





# Zonal vegetation

## 5. Secondary closed scrub





# Zonal vegetation

## 6. Secondary open scrub





# Zonal vegetation

## 7. Secondary open grasslands and fern communities.





**Indicator species of primary lowland forests of GCP area are: *Hopea pierrei*, *Dipterocarpus hasseltii*, *Parashorea stellata*, *Palaquium* spp., *Madhuca pasquieri*, *Canarium* spp., *Dacryodes* sp., *Aglaia* sp., and some others. They are dominant species.**





**Indicator species of the secondary forests are the abundance of fast growing and light demanding tree species such as *Cratoxylum* spp., *Memecylon edule*, *Ormosia* spp., *Peltophorum dasyrrhachis*, *Trema orientalis*, and some others.**





# Azonal plant communities

**Occasionally different azonal plant communities were observed, such as vegetation along streams at very low elevations, and lithophytic plant communities on vertical rocky cliffs and ridge tops.**

