

FIELD SURVEY OF *PAPHIOPEDILUM CANHII*: FROM DISCOVERY TO EXTINCTION

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Adapted for *Slipper Orchids* by Sandy Öhlund

Introduction

There are events that happen slowly and some that occur so quickly that no one is aware of the danger: extinction of flora and fauna is imminent in many unexplored areas of the world. It has become much easier to change the landscape and accelerate the extinction of species that inhabit primary forests and untouched habitats. Logging, mining and agriculture take their toll. But the photo of a new species on social media will immediately bring collectors, both local and foreign, who invade these pristine areas and decimate the habitat in hopes of a quick profit. Because of this, the recently discovered *Paphiopedilum canhii* is now an endangered species with a precarious future. And there we have it: extinction at the speed of the Internet.

Botanists and biologists painstakingly chart the situation, but their field studies are filed away in libraries, herbariums and dusty natural history museums; those who might help the situation are not made aware of the impending catastrophes and extinctions. Some interested parties choose to make solutions more difficult with bureaucratic rules and laws that are counterproductive to saving the habitats and species in peril.

Here we have adapted a field investigation on the situation of *Paphiopedilum canhii* by Leonid Averyanov and his group, in order to make their findings more available. We are grateful to have field surveys to make the public aware of the tenuous existence of species such as *P. canhii*, and to encourage meaningful action to save critically endangered endemic species. We are indebted to Prof. Averyanov and his colleagues for their work and acknowledge the sponsors of this important study. (For additional information and references, please see "*Paphiopedilum canhii* in Laos Phou Phachao Mountain – Mountain of *Paphiopedilum canhii*" by Averyanov, *et al.*, in *Orchid Digest*, 78:2, pp. 96-101.)

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Summary

A research expedition program funded by The Rufford Small Grant Foundation, the American Orchid Society and the Chicago Zoological Society (Chicago Board of Trade Endangered Species Fund) to undertake a field assessment of the recently described species *Paphiopedilum canhii* has been completed. New original data relating to habitat and natural conditions of five subpopulations have been obtained. Associated plant species and vegetation have been described and documented. The factors leading to rapid extinction are analyzed and discussed. The data obtained support an assessment of the present status of the species as critically endangered, approaching full extinction in the near future. Conservation of this species in its natural habitats (Fig. 1) would require very urgent actions that may be unrealistic, and *ex-situ* cultivation of the species may be the only way to effectively prevent its imminent extinction. Some recommendations for approaches to orchid protection are briefly proposed.



Fig. 1. *Paphiopedilum canhii* in its natural habitat on a vertical limestone cliff

Background

The rocky limestone formations of northern Vietnam contain gravely endangered primary forest that harbors remnants of a unique area of *Paphiopedilum* speciation and diversity. Studies of this area have revealed the existence of more than 25 isolated endemic species of *Paphiopedilum*. Many of these species have been described by

authors outside of Vietnam; very little information has been available about these species, and the natural habitats are often destroyed by the time the new species are described. Field studies are undertaken, but over-collecting has often decimated the population of the new taxa. Local endemic species such as *P. vietnamense* and *P. tranlienianum* have become extinct by the time of their description. In addition to commercial collecting, deforestation and total habitat collapse have led the way to species extinction.

For the recently described *Paphiopedilum canhii*, the Vietnamese NGO The Center for Plant Conservation (Vietnam Union of Science and Technology Associations) organized field investigations. Under the guidance of Center director, Dr. Nguyen Tien Hiep, and the Vice-Dean of the Faculty of Science (National University of Laos), Dr. Somchanh Bounphanmy, the main goals were delimiting the distribution of the species, describing the habitats, determining the conservation status with International Union for Conservation of Nature (IUCN) criteria, and suggesting protection strategies.

When *Paphiopedilum canhii* arrived in the local markets of Dien Bien and Son La, there was no information on its provenance. Since the limestone regions of these provinces along the Laotian border are known to be the home of strictly endemic orchid species such as *Bulbophyllum paraemarginatum*, *Dendrobium farinatum*, *D. trantuanii*, *D. vietnamense*, *Hayata glandulifera*, *Paphiopedilum x aspersum*, *P. barbigerum* var. *barbigerum* (*coccineum*), and *Sunipia nigricans*, Averyanov and his colleagues predicted that *P. canhii* had a restricted, very limited habitat in these rocky, karstic limestone regions of northwestern Vietnam and northeastern Laos. (Fig. 2)



Fig. 2
Area of field
explorations
for
Paph. canhii
in Indochina
and Vietnam

History of the Discovery of *Paphiopedilum canhii*

The Vietnamese people like orchids. Orchid collections and family orchid gardens abound in Vietnam. Orchids for home cultivation can be easily purchased in local neighborhood markets or simply along roads where they pass through areas with remnants of primary forests; these plants are usually offered for sale by local people. They commonly gather these plants from nearby areas, within degraded primary forest, or while forests are being either logged or burned for agricultural fields. These fields permanently replace the primary forests in botanically unexplored areas. Orchid collecting in these places sometimes results in the discovery of rare or undescribed orchids. Such is the story of the discovery of *Paphiopedilum canhii*.

In fact, *Paphiopedilum canhii* was discovered at the end of 2009 by unknown H'Mong (Meo) people who brought plants from a remote mountainous area to sell in Dien Bien City. A few of these plants came into the hands of Mr. Chu Xuan Canh, who cared for them in his garden; they flowered for him the following March. Soon it was evident that these plants were an undescribed species, and the taxon was named *Paphiopedilum canhii*, in honor of the man who flowered the cultivated plants. The new species was published by Prof. Averyanov in the May, 2010 issue of *Orchids*, the journal of the American Orchid Society. Due to a technical error, the species was republished later in Prof. Averyanov's monograph – "*The Orchids of Vietnam, Illustrated Survey, Part 2, Subfamily Orchidoideae*" in the second-quarter issue of volume 13 of the Siberian botanical magazine – *Turczaninowia*.

Publication of a newly discovered species attracts a great deal of attention from people involved in orchidology and horticulture. It also generates interest within the domestic and international orchid trade. The increased market demand for a newly described species leads to a rapid price escalation, which in turn stimulates plant collecting in the area. As a result, large numbers of plants of *P. canhii* immediately appeared in the local markets. In addition, the species' native habitat, long unknown, was explored by dealers and local collectors. Since it was determined that *P. canhii* was an uncommon endemic species with a very restricted habitat, an investigation of the area was mounted in order to gather information before the new species became extinct.

Methodology and Approaches

In planning the investigation, information was gathered from many sources: the local orchid markets, orchid enthusiasts, growers, and dealers in the area of Dien Bien

and Son La provinces. Additional data were obtained from local people, village authorities and local foresters. This information led to the conclusion that *Paphiopedilum canhii* likely occurred in the area of Dien Bien and Son La provinces near the Laotian border, most probably on rocky limestone. Since all slipper orchids grow in intact primary forests, any disruption or destruction of those forests would limit the areas of possible field research. The field overview and special surveys indicate that more than 99.5% of primary forest is gone. The rare remnant forests were found in just a few remote mountain regions.

Landscape and Landforms in the Area of *Paphiopedilum canhii* Habitats

Paphiopedilum canhii is known from a single locality of Dien Bien province near the Laotian border (Fig. 3). This area contains alluvial valleys, shale hills and low mountains, with isolated, rocky mesas or mountains of highly eroded limestone (Fig. 4). These are spectacular formations with rocky, vertical cliffs commonly up to 2600 to 3250 ft above sea level (800-1000 m), but occasionally reaching as high as 4200 to 4600 ft a.s.l. (1300-1400 m) (Fig. 5). Such habitats are home to many native slipper orchids. Most inaccessible mountain tops or cliffs in northwestern Vietnam still retain remnants of rich primary forests. The highest level of species diversity and endemism was observed in this area compared to any other mountain formations in the country. During the fieldwork in these degraded remnant forest patches, numerous rare and strictly endemic plant species were located, including *Paphiopedilum canhii*.

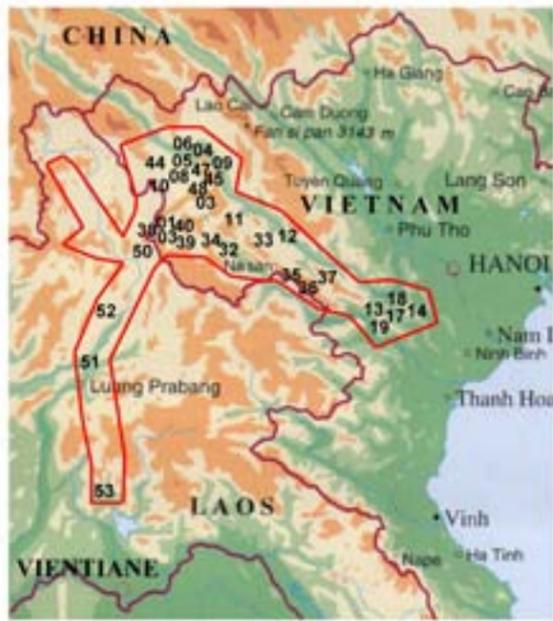


Fig. 3. Studied area of NE Indochina (outlined with red line) and localities of field work designated with black figures.



Fig. 4: Isolated massifs of rocky limestone hills and mountains in *Paphiopedilum canhii* area.



Fig. 5. Typical remnant eroded limestone mountains in Son La Province at elevations of 2600-3250 ft.

A small number of subpopulations inhabit isolated massifs of only a few scattered remnant limestone hills. These areas are highly eroded, marble-like rocky limestone with numerous steep slopes and vertical cliffs. These limestone formations topographically occur between rolling shale hills on the watershed of western tributaries of the Nam He River, but some of them tower above flat river valleys. The total area of this hilly limestone massif does not exceed 6.25 sq miles (4 km²).

The tops of remnant limestone hills at 3000 to 3900 ft a.s.l. (950-1200 m) still support severely fragmented, degraded pieces of primary forest that provide home to native species. These limestone refuges are surrounded by shale hills covered with weedy, secondary plant communities and valleys occupied by agricultural fields. Nine small primary forest stands were located in the area of *Paphiopedilum canhii* populations that might support acceptable habitats, but *P. canhii* populations were found in only five of these sites and in every case as very small subpopulations.

Main Vegetation in the Area of Study

Rich, primary, broad-leaved evergreen, closed submontane tropical forests represent the typical original pristine vegetation type within the area of *Paphiopedilum canhii* (Fig. 6). The presence of very diverse species, specific horizontal and vertical forest structures, permanent shade and humidity, as well as an absence of exotic or weed



Fig. 6: Rich, primary, broad-leaved evergreen, humid tropical forests in the *Paphiopedilum canhii* area

species are typical features of this native vegetation type. Unfortunately, the primary forest has largely been replaced by degraded secondary forest and scrub vegetation with many introduced weedy species.

In the habitat of *Paphiopedilum canhii*, there are many evergreen trees interspersed with a high number of deciduous trees, especially on mountain tops, south-facing slopes and cliffs. In spring these trees produce flowering canopies as the young leaves are developing.

Many weedy species appear quickly in fragments of primary woods opened by forest fires or logging. In the habitats of *P. canhii* there are numerous lithophytic and epiphytic plant species, including many ferns and orchids, as well as lianas, creeping and climbing species, mosses and lichens, often forming mats covering the rocky outcrops on the tops of hills and mountains. Epiphytes often completely cover the branches of old, gnarled trees.

Characteristics of *Paphiopedilum canhii* Habitats and Common Lithophytic Associates

Shady vertical cliffs with northern, northeastern and northwestern exposures on steep rocky slopes of remnant limestone hills and mountains covered with intact primary broad-leaved evergreen forest were consistent features of the habitat of all the subpopulations of *Paphiopedilum canhii*. The species grows on the upper portion of hilly slopes and high vertical cliffs, usually between 130 to 200 ft (40-60 m) below the hilltops (Fig. 7). However, occasionally plants almost reach the summits of these mountains where they grow in shady humid crevices. Plants typically grow as lithophytes on rough solid vertical walls covered with scattered mosses in constant humidity and in permanent shade of the canopy of primary forest. Very often the plants' roots are attached only to solid unbroken limestone walls without any fissures or holes. The remnant primary forests supporting all populations of *P. canhii* studied were still intact but very endangered, given the constant threat of logging.

Numerous lithophytic ferns and orchids are commonly found growing with *P. canhii* in its native habitats. Orchids in the same area include several *Bulbophyllums*, *Calanthe triplicata*, *Coelogyne fimbriata*, *Dendrobium chrysanthum*, several *Epigeniums*, *Liparis*, *Oberonias*, and others. Furthermore, *P. canhii* sometimes grows with other slipper orchids, such as *P. concolor* and *P. dianthum* and in close proximity to populations of *P. barbigerum* var. *coccineum* and *P. malipoense*, that theoretically provide the possibility for the creation of natural hybrids.



Fig. 7: *Paphiopedilum canhii* in its natural habitat, growing on vertical cliffs covered with orchids and mosses, in stable humidity and shade

***Paphiopedilum canhii* in its Native Habitats and Estimation of its Present Status**

In this investigation, *Paphiopedilum canhii* was found in five subpopulations on isolated limestone mountains in an area of less than 0.19 mi² (0.5 km²). The total area of probable species occurrence is even smaller, estimated at an area of 0.135 mi² (0.35 km²). In fact, the actual area of this species growing on vertical cliffs is certainly less than a few hundred square meters. The total number of specimens in all five subpopulations before commercial collecting may be estimated at between 10,000-15,000 mature (flowering-size) individuals, and it is possible that these five subpopulations represent the total extant area of *P. canhii*. In December of 2010, no intact colony was located and the majority of colonies in all five subpopulations had been completely collected. Only occasionally, on the most inaccessible cliffs, were remnants found of poor quality juvenile or weak, stressed specimens. Decimation of previously larger colonies was 99 to 100%. It is estimated that between 2009 and 2010, 99% of the plants in the five studied subpopulations were removed by collectors, and that surviving mature (flowering size) specimens in all subpopulations represent 0.01% of the species' former population (see Fig. 7). As commercial collecting will not immediately cease, these are probably the last images of *P. canhii* in nature.

Based on these data and current original observations, *Paphiopedilum canhii* is presently estimated in IUCN terms as a critically endangered species, reflecting the fact that this species faces an extremely high risk of imminent extinction in the wild.

Taxonomy, Morphology and Biology of *Paphiopedilum canhii*

Paphiopedilum canhii was described by Prof. Leonid Averyanov and Mr. Olaf Gruss in 2010 on the basis of a few specimens of uncertain origin, purportedly collected in Son La Province and flowered in March of 2010 in Hanoi in a private orchid collection belonging to Mr. Chu Xuan Canh.

Later, the project participants found the species in Dien Bien Province. Extensive broad searches for *P. canhii* outside this area in Vietnam and Laos have yielded no positive results. Certainly, this species should now be regarded as a local Vietnamese endemic with very restricted distribution in the province of Dien Bien, northwestern Vietnam.

For a complete taxonomical description of *Paphiopedilum canhii*, please see the original description in: Leonid V. Averyanov, Olaf Gruss, Canh Chu Xuan, Loc Phan Ke, Dang Bui, Hiep Nguyen Tien. 2010. *Paphiopedilum canhii*. A New Species from Northern Vietnam. *Orchids*, Vol. 79, No 5, pp. 288-290.

History of the Exploitation and Extinction of *Paphiopedilum canhii*

Extensive exploitation of *Paphiopedilum canhii* started immediately after its discovery in mid-2009. The species was first found by members of the local H'Mong (Meo) minority and collected along with other orchids for sale in the local markets of Dien Bien and Son La cities. This very distinct and unusual slipper orchid was highly valued by local orchid lovers, and in just a few weeks, rumors of an intriguing new species spread widely, reaching Hanoi and other large cities of northern Vietnam. The first specimens of this mysterious plant flowered at the beginning of 2010 in a number of private collections in Hanoi, Dien Bien and Son La cities. In the next few days, the internet was filled with images of this new flower. Illustrated publication of this new species in the world-renowned American Orchid Society *Orchids* magazine stimulated market demand and supported a rapid price escalation. Numerous international dealers arrived in Son La and Dien Bien cities in the spring of 2010; their purpose was to hunt for and trade this plant. The best clones at this time were traded at a cost of up to US \$100 for a single plant. The largest shipments of plants were supposedly imported into Taiwan and Europe.

Exciting rumors about high prices for plants provoked true orchid fever in the habitat of *Paphiopedilum canhii*. Local people from neighboring villages put aside their daily duties and, instead, went to the forest; on some days, more than 20 plant hunters collected plants.

Naturally, this large influx of plants rapidly exceeded the demand and very soon prices fell from US \$100 per plant to US \$50 per kilogram. By the end of 2010, prices had continued to fall and prices of US \$10-20 per kilo were common. Even at these prices, trade had seriously weakened; nearly all plants that did not sell were simply destroyed. Ironically, the wholesale collecting of the great majority of plants from their habitat was for no purpose. They brought no money to local people, no profits to local or international traders and no happiness to orchid lovers all over the world. These last specimens of this unique, critically endangered species, threatened with imminent extinction, were simply wasted. The lack of horticultural knowledge and experience necessary for successful slipper orchid cultivation prevents *P. canhii* from being successfully grown in local collections and nurseries. Even large flowering-size plants have little chance of survival in these conditions (Fig. 8). At the end of 2010, trade in *P. canhii* had completely stopped for three main reasons: having already purchased the best cultivars necessary for propagation and breeding, demand from foreign traders was gone, due to the difficulties encountered



Fig. 8: *Paphiopedilum canhii* in local nurseries of Dien Bien City

in cultivation; demand from domestic purchasers was gone; and the very few left in nature had made collecting them unprofitable.

As a very approximate estimate, 25-35 kg of *P. canhii* plants were collected during the short history of its discovery, exploitation and extinction in the wild. Since they are fairly small plants, 1 kg (2.2 pounds) of freshly-collected material contains about 300-350 mature (flowering-size) plants and commonly 200-300 juveniles. This suggests that at least 10,000-15,000 mature and juvenile specimens were collected. Direct observation in nature indicates that about 99.5% of the population was extinguished in only six months of exploitation. Cultivation under appropriate conditions, in the best-equipped nurseries, may prevent full species extinction. However, such activity is illegal due to CITES regulations. Not a single CITES export permit application for *P. canhii* has ever been processed, and all specimens of the species outside Vietnam came from the black market and remain illegal.

Remarkable Plant Species Associated with Habitats of *Paphiopedilum canhii*

Remnants of primary forests in the area of *P. canhii* often retain elements of the diverse, highly endemic flora. Many of these species vanished from other regions of Vietnam years ago, but in the studied area, they still survive and sometimes are represented by fairly large populations. The rarest and most interesting species observed here were slipper orchids, such as *P. concolor*, *P. malipoense*, *P. barbigerum* var. *coccineum* and *P. dianthum*. All of these discoveries essentially expand our knowledge about the distribution of these rare slipper orchid species and represent new records for northwestern Vietnam.

About 112 orchid species were observed as direct associates in habitats of *P. canhii* subpopulations. Some very rare orchids listed from a single collection were also found during our field exploration of the *P. canhii* habitat. Among the taxa discovered and proposed for future description as new to science are nine orchid species: a new genus and species - *Lockia sonii* and eight species of the genera *Bulbophyllum*, *Cleisostoma*, *Dendrobium*, *Hippeophyllum*, *Saccolabiopsis*, *Sarcoglyphis* and *Schoenorchis*. Also discovered and proposed for description is a remarkable new species of *Begonia* - *Begonia viscosa* - an important undershrub-dominant of rocky limestone areas of northern Laos.

Widely cultivated as highly prized ornamental plants - *Dendrobium trantuanii* and *Stereochilus brevirachis* - were found in their natural habitats. Both appear as notable

associates of *Paphiopedilum canhii* as does *Vanda brunnea*, a very important ornamental species, abundant in the area studied and with an outstanding variation in flower shape and color.

Main Factors of Orchid Extinction

Deforestation is the leading factor in the extinction of native floras globally. In tropical areas, forest removal leads very rapidly to degradation of the fertility of the soil. The loss of topsoil opens the way to rapid degradation of vegetation and terminates in a climax community of secondary shrub and herbaceous weed species. This process is irreversible. Primary forests with their very sensitive native species never regenerate. Extinction of such forests leads to a catastrophic decrease in the genetic diversity of the world. Such a stark scenario was observed within the area studied.

Primitive slash-and-burn agriculture and forest logging for domestic purposes and fuel are the main reasons for deforestation in areas of rapidly increasing human populations. Degraded pieces of remaining primary forests are presently estimated as less than 0.5% of the territory. Such unique remnant forest areas still occur in a few remote mountain regions. Their protection and conservation are impossible without urgent action of municipal, provincial, and governmental authorities. Without urgent and effective



Fig. 9. Logging of canopy of primary forest in *Paphiopedilum canhii* area



Fig. 10. Primitive maize fields replacing natural habitat of *Paphiopedilum canhii*



Fig. 11. Full collapse of rich, native vegetation through forest burning for agriculture



Fig. 12. Destruction of vegetation and mountains by mining and road construction in Dien Bien Province

action, the forest here will be completely destroyed in the near future. The survival of sensitive native species, including *P. canhii*, after forest destruction will be impossible (Figs. 9, 10, 11, 12).

Construction of roads, highways, mines, high-voltage power and communication lines, as well as any other large land exploitation projects are also important factors in the destruction of nature that follows primary forest extinction. For example, road construction in the area of *P. canhii* destroys not only vegetation, but also even the physical landscape.

Landscape desertification and aggressive weed introgression play the role of slow, but irreversible destructive factors in these last isolated refuges of primary forests in the world's tropical zones and result in higher summer temperatures and loss of air humidity, particularly during the dry seasons. This effect seriously depresses primary humidity-loving vegetation, particularly in its small isolated refuges. Under such conditions, most sensitive species slowly decline even in physically intact primary plant communities. Shade-loving native herbaceous lithophytes growing on vertical cliffs in conditions of permanent humidity represent the most sensitive and endangered group of species. Such species always vanish first, because vertical cliffs lose humidity much faster than other substrates during the

process of habitat destruction. *Paphiopedilum canhii* and its slipper orchid associates belong to just this group of species.

Destruction of native floras by aggressive exotic and weed species represents a huge problem globally. Eventually primary plant communities are transformed into secondary thickets of weed and alien exotic species. This process proceeds without obvious visible cataclysms, but leads to strong depression of native species and eventually kills most of them. This is particularly true for most sensitive and rare endemic orchids, including all species of *Paphiopedilum*.

Commercial collecting is another important factor in the extinction of saleable non-timber plant species. Collection of food, spice and medicinal species is commonplace. However, commercial collecting of ornamental plants often helps to maintain these species in cultivation and may play a positive role in their survival. Collecting of the rarest endemic plants in irreversibly degraded habitats for cultivation under appropriate control may be the only way to conserve unique local plant diversity. This is true for many strictly endemic orchids including *P. canhii*, which could have become completely extinct before its discovery due to deforestation. The uncontrolled commercial collecting of this species has seriously depleted its population, but it has also provided an important chance for the plant's *ex situ* survival. Strictly limited collecting of rare orchids in nature for cultivation and propagation under the control of scientific and state/local authorities in similar situations can provide an interested market with cultivated seedlings and make commercial collecting of plants in nature unprofitable. Such an approach provides a practical means for rare species protection. Any collecting restrictions and prohibitions currently in practice appear to be absolutely ineffective in protecting rare market-valued species.

Summarized Conclusions

Paphiopedilum canhii is endemic to northwestern Vietnam with extremely restricted distribution, located in a single geographical area of less than 0.35 km². Ecologically this species is an obligate lithophyte growing at elevations of 900-1200 m a.s.l. in intact primary forests on cliff faces of remnant mountains composed of highly eroded crystalline rocky limestone.

Paphiopedilum canhii in its native habitats grows in association with a number of extremely rare orchid species that became extinct in other areas of Vietnam many years ago.

Commercial collecting due to international demand was a main factor in the decimation of the *P. canhii* population immediately following its discovery.

The intact total population of the species before mass collection is estimated at approximately 10,000-15,000 mature and juvenile specimens. About 99.5% of this population is presently gone due to uncontrolled commercial collecting.

Progressive deforestation and land exploitation are additional factors that threaten the remaining habitat for the species.

According to IUCN criteria *P. canhii* belongs to a group of critically endangered species approaching full extinction in nature.

Conservation of the species in nature needs immediate effective overall protection of its habitats.

Effective conservation of the species *ex situ* demands legalized collecting and transport of plants into high-technology nurseries.

The example of *P. canhii* distribution confirms the fact that strictly local endemism is very typical for limestone floras of northern Vietnam. Under the conditions of total, uncontrolled deforestation, a large number of similar local endemics will certainly become extinct in this area in the near future, many before they are discovered.

Because among such plants may be species of outstanding economic significance, botanical explorations of this area are urgently necessary for the salvation of global plant diversity and national plant heritage.

National Actions for Protection

Organization and establishment of protected areas for all existing habitats of *P. canhii*, including full conservation of remnant primary forests, strict limitation of land exploitation and effective prohibition of plant collecting are urgently needed. The total area necessary for protection does not exceed 1.54-2.3 mi² (4-6 km²).

Education and training in the design and implementation of conservation actions of local authorities (Municipality People's Committee, Forest Protection Department and associated local agencies) must be done immediately. The realization of an educational program for local people and local authorities with an explanation of the outstanding significance of *P. canhii* conservation for organization of highly-prized ecotourism visitation sites would be a shining example of a locality with the highest orchid diversity in all of the Indochinese Region. In fact, the organization of ecotourism in this area would partially solve the problem of local unemployment.

General Actions for Protection

The immediate creation of a high-technology "rescue center" for the cultivation, propagation and repatriation of critically endangered plant species (including *P. canhii*) is highly recommended. Such a center would be under the oversight of Vietnamese governmental/scientific agencies or in cooperation with official "rescue centers" abroad.

Strict limits on the collecting of rare orchids in nature, as well as cultivation and propagation under control of scientific and state/local authorities in cases similar to *P. canhii*, would fill the market with cultivated seedlings and make the commercial collecting of plants in nature unprofitable. Such approaches provide a real means to rare species protection.

Authorities should facilitate the sale of plants (including orchids) collected from habitats irreversibly damaged by total deforestation. Any restrictions on such sales play a strongly negative role in conservation of world plant diversity.

Immediate improvements to CITES regulations are necessary to minimize the bureaucratic mechanism. It should be recognized by the Parties to the Convention that current measures aimed at plant protection are often ineffective. In its present form, CITES irrationally expends considerable national and international human and financial resources while making no real, objective headway for protection of the natural environment.

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"The Media View"

by Sandy Öhlund

