

*Cibotium barometz*

**Country – VIET NAM**

**Original language – English**

## ***Non-detriment finding for Cibotium barometz in Viet Nam***

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### **I. Background information on the taxa**

#### **1. Biological data**

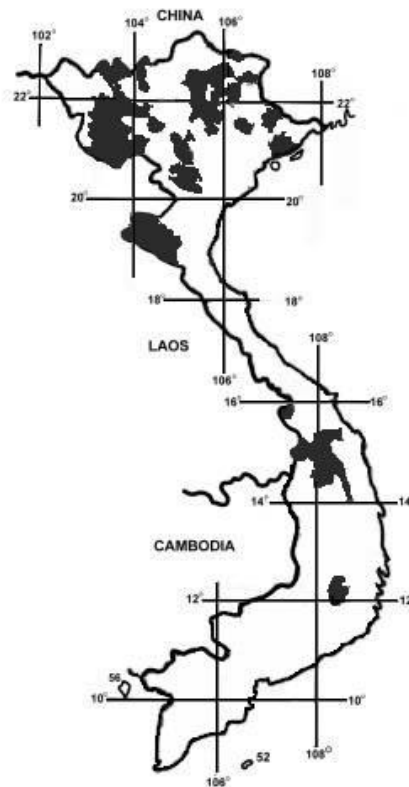
##### **1.1 Scientific and common names**

Scientific names: *Cibotium barometz* (L.) J. Sm. It belongs to Cibotiaceae (Smith et al. 2006).

Comon names: Cau tich (Dog's spinal column - Vietnamese Chinese), Long cu ly (Culy hair), Long khi (Monkey hair), Kim mao (Golden hair - Vietnamese Chinese), Cu lan (Do Tat Loi, 1999; NIMM-WHO, 1990; NIMM, 1999), Cut bang (Tay Ethnic), Co cut pa (Thai Ethnic), Nhai cu vang (Dao Ethnic), Dang pam (K'Ho Ethnic), Golden moss (English), pitchawar, agneau de scythie, cibotie (French).

##### **Distribution**

*Cibotium barometz* is mainly distributed in the tropical and subtropical regions of Asia including North – East India, Myanma, Thailand, Laos, South China, Malaysia, the Philippines, Indonesia, Japan and Viet Nam. In Viet Nam, this plant is widely distributed unevenly in mountainous provinces in the North, including Cao Bang (Ha Quang, Nguyen Binh, Thach An districts); Lang Son (Huu Lung, Loc Binh dist.); Quang Ninh (Ba Che, Hoanh Bo, Van Don dist.); Lai Chau (Phong Tho, Than Uyen dist.); Lao Cai (Bat Xat, Muong Khuong, Bao Thang); Yen Bai (Mu Cang Chai, Tram Tau dist.); Dien Bien (Dien Bien Dong, Tua Chua, Tuan Giao dist.); Son La (Quynh Nhai, Song Ma, Thuan Chau, Mai Son dist.); Hoa Binh (Mai Chau, Da Bac, Tan Lac dist.), Tuyen Quang (Na Hang, Yen Son, Chiem Hoa dist.); Bac Can (Ba Be, Na Ri, Bach Thong dist.), Thai Nguyen (Phu Luong, Dai Tu, Dinh Hoa dist.); Phu Tho (Thanh Son, Tam Son dist.); Vinh Phuc (Tam Dao dist.); Thanh Hoa (Quan Hoa, Ba Thuoc, Cam Thuy dist.); Nghe An (Ky Son, Tuong Duong, Con Cuong dist.)... and some high mountainous areas in the South such as Ngoc linh (Dak Gley, Dak Ha, Tu Mo Rong, Kon Plong dist.) in Kon Tum province, Quang Nam province (Tra My, Tay Giang dist.); Chu Yang Sin in Dak Lak provine and Bi Dup in Lam Dong province (Do Tat Loi, 1999; NIMM & WHO, 1990; Nguyen Tien Ban et al., 1996; Nguyen Tap in NIMM, 1999; Nguyen Tap in Do Huy Bich et al., 2004). Based on survey results and information from literature data, we mapped all the regions where this species was found in Viet Nam (Map 1).



Map 1 – Schematic distribution of *Cibotium barometz* in Viet Nam  
(Regions are occurrence of the species are indicated with dense shading)

## 1.2 Biological characteristics

**1.2.1 Provide a summary of general biological and life history characteristics of the species** (e.g. reproduction, recruitment, survival rate, migration, sex ratio, regeneration or reproductive strategies, tolerance toward humans)

*Cibotium barometz* is recognized as a tree fern and hygrophilous and slight shade enduring especially when young. Rhizome stout, prostrate, are densely covered with shining brown long hairs. Fronds close; stipes thick, up to 1 m long or more, triangular in transverse section at base, densely bearing caducous adpressed hairs, stipe and rachis green, turning purplish beneath with age; with a continuous or broken row of linear aerophores on each side of stipe, base of stipe with a mass of long (1-1.5 cm) hairs, upper part of stipe and rachis covered with small, appressed flaccid hairs becoming glabrescent; laminae 2-pinnate-pinnatifid, 1.5-3 m long; medial pinnae 40-80 x 15-30 cm, lower pinnae shortened, deflexed; pinnae many, alternate, stalked, pinnules short stalked, usually of about equal length on either side of rachilla; pinnule-segments slight falcate, apiculate, margins crenulate to serrulate-serrate; veins free, fertile ones simple, sterile simple or forked; laminae subcoriaceous, upper surface deep green, lower surface glaucous, glabrous on both sides, except the hairy midrib; venation visible on both surface, free, lateral veins simple or forked. Sori 1-5 pairs on pinnule-segments; indusia bivalvate, outer indusia round, inner ones more or less oblong; outer valve of indusium usually large; paraphyses dark reddish brown. Spores pale yellowish, with equatorial flange.

Reproduction of the plant normally occurs through spores in sexual propagation. Plants can produce large quantity of spores. Spore-bearing period lasts from August to December. It is observed that old rhizomes can spout some lateral buds, which grow into large rhizome. By spore propagation, the populations increase quickly and become large and dense in valleys and forest edges. However, it takes several years (over 4 years) for an individual grow into a mature spore-bearing plant. It also takes time to reach an exploitable plant of which rhizome is over 1.5 kg in weight.

### **1.2.2 Habitat types.**

*Cibotium barometz* is common in tropical and subtropical regions and in Viet Nam. The species can be found in valleys, forest edges, along stream-banks together with other plants or under canopy of the Pine forests (in Kon Tum, Dak Lak and Lam Dong provinces) ranging from 300 to 1.000 m (in the North) and 800 to 1.500 m (in the South). It adapts to warm and humid climatic conditions. Optimum average temperature varies between 20 and 23°C, the rainfall ranges from 1.800 to 2.600 mm every year. It prefers red-brown ferralitic and acid soils (Nguyen Tap in NIMM, 1999 and in Do Huy Bich et al., 2004).

### **1.2.3 Role of the species in its ecosystem**

When *Cibotium barometz* forms a very dense population or dominates in community, it plays an important role in covering free land, preventing the erosion and keeping the humidity of the soil, especially when it grows under the canopy of Pine forests and along the stream-banks.

## **1.3 Population**

**1.3.1 Global Population size** (Population size may be estimated by reference to population density, having due regard to habitat type and other methodological considerations, or simply inferred from anecdotic data)

In China, *Cibotium barometz* is distributed mainly in the South (Guangdong, Hainan, Guangxi and Yunnan), but there is no data about the population size of this species (Xian-Chun Zhang et al., 2008). In addition, there is no information on this species in India, Myanma, Thailand, Laos, the Philippines, and Indonesia.

### **1.3.2 Current global population trends**

increasing       decreasing       stable  
 unknown

## **1.4 Conservation status**

### **1.4.1 Global conservation status** (according to IUCN Red List)

Critically endangered       Near Threatened  
 Endangered       Least concern  
 Vulnerable       Data deficient

## 1.4.2 National conservation status for the case study country

**1996:**

Status: Threatened (T) – (In Red Data Book of Viet Nam, 1996)

Main threats: - Habitat loss / Degradation  
- Harvesting

**Present:** This species is currently not included in neither Red Data Book of Viet Nam (2007) nor the Red List of Medicinal Plant in Viet Nam (2001 & 2006). It can be understood because of *C. barometz* have been found in other locations in Son La, Dien Bien and Kon Tum with large quantity. It approximately thousands of tons. Especially, there is a 10.000 ha of forest where *C. barometz* is found will become reservoir for Son La hydroelectric project. Therefore, it is urgent to exploit *C. barometz* here before it turns into a riverbed.

## 1.4.3 Main threats within the case study country

No Threats

Habitat Loss/Degradation (human induced)

Invasive alien species (directly affecting the species)

Harvesting [hunting/gathering]

Accidental mortality (e.g. By catch)

Persecution (e.g. Pest control)

Pollution (affecting habitat and/or species)

Other \_\_\_\_\_

Unknown

## 2. Species management within the country for which case study is being presented

### 2.1 Management measures

#### 2.1.1 Management history

In 1996, *Cibotium barometz* was included in the Red Data Book of Viet Nam (Part II – Plant) as an officially protected plant. However, this species is currently not included in the Red Data Book of Viet Nam (2007) and in the Red list of Medicinal Plants in Viet Nam (2001 & 2006).

#### 2.1.2 Purpose of the management plan in place

To achieve sustainable use of the natural resources of this herb medicine, and to ensure that the export will not be detrimental to the survival of this species in Viet Nam.

#### 2.1.3 General elements of the management plan

Constrain the annual export from Viet Nam, as well as domestic use by medicinal factories.

#### 2.1.4 Restoration or alleviation measures

In National Park and Nature Reserve, collecting of *Cibotium barometz* is prohibited. In addition, collection permit must be obtained from Forestry branch in province prior to collecting plant from the wild.

## **2.1. Monitoring system**

### **2.1.1. Methods used to monitor harvest.**

*Cibotium barometz* is not included in any protected or threatened plant list regulations. However, as the same other non-timber forest product, It is prohibited to harvest from Protected areas. In out side of Protected area it is control by local forest rangers. By which, the collector required permit from commune people committee, then in turn the forest ranger in charge to examine the product and areas of exploitation

### **Confidence in the use of monitoring.**

## **2.2 Legal framework and law enforcement** (Provide details of national and international legislation relating to the conservation of the species)

Since 1996, *Cibotium barometz* had been listed in CITES Appendix II, this plant was restrictively exploited mainly for domestic use in traditional medicine. However in 2001, more data of natural resources have been collected as well as the urgent need to exploit this plant in the area belong to Son La hydroelectric project, Vietnamese CITES office set quota of 153 tones to export from Viet Nam. The export amount in following years is: 84 tones in 2002, 66 tones in 2003, 38,5 tones in 2004, 111 tones in 2005, 61 tones in 2006 and 55 tones in 2007.

Besides that, from 2006 up to now, Forestry branches in Son La and Dien Bien provinces have issued permit of collecting populations in the area where will become a reservoir and some other areas outside NP. and NR. (in Thuan Chau dist., Son La prov. and Muong Lay dist., Dien Bien prov.). According to our survey (NIMM, 3-2009), the exploited amount in these areas ranged between 200 - 300 tones/year.

## **3. Utilization and trade for range State for which case study is being presented**

**3.1 Type of use (origin) and destinations (purposes)** (e.g. commercial, medicinal, subsistence hunting, sport hunting, trophies, pet, food). Specify the types and extent of all known uses of the species. Indicate the extent to which utilization is from captive-bred, artificially propagated, or wild specimens.

*Cibotium barometz* is well valued as a medicinal herb. In traditional medicine, is believed that the rhizome replenishes the liver and the kidney, strengthens the tendons and bones and relieves rheumatism conditions. Thus, it is widely used to cure rheumatism, limb-ache, lumbago, neuralgia and pollakiuria in aged humans and leucorrhoea. It also cures sciatica, micturition, enuresis and body-ache in pregnant women. The golden hair covering the rhizome is used for poulticing the wounds and cuts in the limbs to stop bleeding. According to literature, *C. barometz*'s rhizome is also employed as a tonic and vermifuge. The hair, in suitable application, can arrest capillary bleeding by mechanical action. Up to now, there is no artificial cultivation of *C. barometz* in Viet Nam; all the materials used are collected from wild populations.

### **3.2 Harvest**

**3.2.1 Harvesting regime** (extractive versus non extractive harvesting, demographic segment harvested, harvesting effort, harvesting method, harvest season)

In Viet Nam, the rhizome of *Cibotium barometz* is usually collected in dry seasons (autumn or winter). During that time, the rhizome have a low water level and it will be easy to be dried and lose less weight compared to fresh materials. The evidence shows that the ratio between dried and fresh rhizome ranging from 67 to 70%. It means the fresh rhizome will lose 30 to 33% its dried weight.

**Harvesting method:**

Leaves are removed first, then rhizome is dug up, removed from the soil, hard fibrous roots, petioles, golden hairs and transported to the processing area (Picture 1).



Picture 1. Fresh rhizome before processing.

There are two ways in processing of fresh rhizome. The first way, rhizome is cut into slices by cutting machine or specialized knife (Picture 2).



Picture 2: Fresh rhizome are cutting by specialized knife

The second way is that rhizomes can be cleaned and steamed or boiled quickly in hot water before they are thinly sliced. In this way, raw materials turn to brown-yellow (Picture 3). After being cut, materials are dried in the sun or in the oven. Moisture content in dried materials must be below 13% (Vietnamese Pharmacopoeia III).

After preliminary processing, materials are packed in bag or sack (about 50 kg per bag or sack) and preserved in dry and cool place.



Picture 3. Dried materials

### 3.2.2 Harvest management/control (quotas, seasons, permits, etc.)

Since 2001, Vietnamese CITES office has officially set quota for exporting *Cibotium barometz*. Appropriate seasons for exploitation are autumn and winter. Forestry branch in province has responsibility for controlling localities and exploitation amount and issuing collection permits. Collecting the populations inside Nature reserves and National parks is prohibited.

### 3.3 Legal and illegal trade levels (To the possible extent, quantify the level of legal and illegal use nationally and export and describe its nature)

The dry sliced rhizomes of *Cibotium barometz* called "Cau tich". Approximately 200 tones of "Cau tich" is used widely in traditional medicine every year in Viet Nam. State-owned companies and private companies started to commercialize this medicinal material many years ago. In 1996, this plant was listed in CITES Appendix II; therefore, it was restrictively exploited mainly for domestic use in traditional medicine. So far, no illegal trade has been found in Viet Nam.

Since 2001, Vietnamese CITES officer has officially set export quotas about 30 – 150 tones of "Cau tich" and the main import country is China.

From October 2008 to February 2009, Son La Pharmaceutical Joint-Stock Company has bought about 300 tons of fresh rhizome of *Cibotium barometz* that was collected in the areas will become reservoir in Quynh Nhai district, Son La province.

## II. Non-detrimental Finding procedure (NDFs)

Provide detailed information on the procedure used to make the non-detriment finding for the species evaluated.

**1. Is the methodology used based on the IUCN checklist for NDFs?**

yes      no

**2. Criteria, parameters and/or indicators used**

There are several ways to estimate the deposit of natural resources of the rhizomes of *Cibotium barometz* such as field plot-survey method, field observations, field descriptions of plant communities and kinds of vegetation. To complete our estimation, we also referred to collect other information and data from the State-owned companies or private companies and the collectors in Son La, Dien Bien, Lai Chau and Ha Noi.

**3. Main sources of data, including field evaluation or sampling methodologies and analysis used**

The distribution of *Cibotium baometz* in Viet Nam is uneven. Therefore, we selected sample plots from some provinces in which a few counties were selected. For example, local collector in Son La said that in richest areas (unexploited) has about 12 - 16 kg fresh rhizomes of *C. baometz* can be collected each field plot in 2 x 2 meter. In Kontum province, *C. baometz* densely distributed under shade of Pine and mixed forests belong to 4 districts: Dak Glei, Dak Ha, Tu Mo Rong and Kon Plong. According to our field plot survey carried out in areas belong to "Dak Glei Investment and Development of Agriculture, Forestry and Service Company", there are about 1.600 ha of forest where the species is found in here. The maximum fresh rhizomes can be collected in field plot (rich areas) are 20 - 25 kg in weight, and the minimum are 10 – 12 kg. The biggest rhizome reaches 13 kg in weight. These provinces are examples of the most abundant with this species. Based on all results of field plot-surveys and data gathered from other sources we can estimate the biomass of rhizomes of *Cibotium barometz* in provinces and districts, about 10.000 tones of deposits of "Cau tich" in Viet Nam.

**4. Evaluation of data quantity and quality for the assessment**

It is difficult to estimate the deposit of natural resources accurately because of the difficulty of field survey and the limitation of sampled populations in its vast distribution areas. The annual sustained yield should be estimated at about 400 – 500 tones making up 5% of the standing stocks. The export quota of 300 – 350 tones per year is reasonable within five years, from 2009.

**5. Main problems, challenges or difficulties found on the elaboration of NDF**

The plants are widely and unevenly distributed in mountainous areas from the North to the South of Viet Nam, thus, our field survey is still very limited.

**6. Recommendations**

To ensure the long-term survival of wild populations and their associated habitats, management plans for collection should provide a framework for setting sustainable



harvest levels and describe appropriate collection practices that are suitable for *Cibotium barometz* through following actions:

i) Only the populations outside nature reserves can be collected under the permission and strict control of local governments and Provincial Forestry Branch. In addition, it should be focus on collecting in area of new reservoir belonging to Son La and Dien Bien provinces.

ii) Exportation of *Cibotium barometz* should be limited by strict quota at 300 – 350 tones per year within 5 years from 2009 for sustainable use;

iii) Develop guidelines on good collection practice for *Cibotium barometz*. The guidelines should be concerned to:

- Appropriate seasons or time period for collection (to ensure the best possible quality of materials).
- Standards of plants for collection: only plant of which rhizome weight is over 1,5 kg should be collected.
- Collection levels and collection practices to encourage the regeneration of source medicinal plant materials (Ex: leaving the nurslings, small plants and spore-bearing plants for reproduction and regeneration of maintaining their populations).
- Minimum frequency of collection: Duration time for the next collecting should be 10 years.

In future, export of final products rather than raw materials should be encouraged. It is hoped that researches on propagation through spore will be carried out for artificial cultivation and techniques for cultivating this plant in suitable areas. It will be help to reduce the pressure on wild resources of this much exploited species.

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