

NEPENTHES PROJECT 2002

A CONSERVATION EXPEDITION OF NEPENTHES IN SUMATRA ISLAND

FINAL REPORT
JANUARY 2004



Nepenthes Project Team
Collaborated between



Supported by



Background picture of cover: Sumatra Island; Cover Picture: *N. aristolochioides* illustration on wall of Kerinci Seblat National Park (KSNP) Information Centre Office Sungai Penuh; Setting and Layout: P. Akhriadi

" Kami tidak ingin tempat hidup kami dirusak,
kami tidak ingin hutan, alam dan lingkungan kami
dibakar, digunduli dan disia-siakan.
Kami ingin dijaga, dilestarikan ditempat kami hidup.
Tataplah kami, nikmatilah kami,
tapi kami jangan dianiaya dan disiksa.
Kami ingin dinikmati oleh anak cucu manusia beribu-
ribu tahun lagi."

(Q-ting)



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Preface

For three years *Nepenthes* Team have been supported by BP Conservation Program to conduct research and conservation activity in Sumatra Island. As follow up work of *Nepenthes* Project 2001, *Nepenthes* Project 2002 was continue to access and gathered some conservation aspect of *Nepenthes* in Sumatra Island and continued some educational conservation activity in several sites that recommended by *Nepenthes* Project 2001.

Conservation is not new information for Sumatran public communities, but the implementation of this activity in the field absolutely limited. Sometimes, local capability is against with the ability of the government to encounter environmental problem and economical conflict also aggravate this condition. Meanwhile the governmental unit for conservation focused their activity to managed the illegal logging and animal trade. So the conservation for the threatened plant nearly neglected.

Information about *Nepenthes* is not available for most Sumatran public communities. Most of the participants that involved in Essay Writing Competition only get the information from brochures and leaflet that distributed by *Nepenthes* Team to local communities. The solution for this problem must be found as soon as possible so that the young generation can participate actively in *Nepenthes* conservation program.

The environmental education for local communities that conducted by *Nepenthes* Team in Sumatra Barat give a positive impact to public community in relation with *Nepenthes* and forest conservation. Conservation links in Sumatra Barat apparently can be implemented to Sumatran communities in the broad scale. As long as our experience in the field the environmental education for local communities is the best way to continue *Nepenthes* conservation in Sumatra Island. BP Conservation Program through *Nepenthes* Grant Project have been given us the opportunity to conduct this program.

Padang, Januari 2004
Nepenthes Project Team

NEPENTHES PROJECT 2002
A Conservation Expedition of *Nepenthes* in Sumatra Island

Final Report
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Summary

Nepenthes project 2002 is a joint initiative of conservationist, student's organization of Nature Concern and environmental NGO in Sumatra Barat. As a follow up work of Nepenthes Project 2001, the team have been continued to assess the conservation status and ecological requirements of threatened *Nepenthes* species on remaining lowland and montane forest of Sumatra Island. This data will be used to produce documentation of identifying area in urgent need of protection and providing the justification for the designation of protected areas. The Team also used the data that compiled by Nepenthes Project 2001 to establish long term-conservation link between students, organization of nature concern, environmental NGO, science institution, local communities and government. Preparing plans conservation strategy outside of the natural habitat ("ex-situ conservation strategies") and preparing Sumatra Barat as a pilot project sites to conserve *Nepenthes* In Sumatra Island.

Twenty-four and twelve natural hybrids of *Nepenthes* had found in Sumatra Island Five of its proposed as Critically Endangered species based on IUCN status category among others: *Nepenthes adnata*, *N. aristolochioides*, *N. dubia*, *N. longifolia*, and *N. sumatrana* and three species proposed as Endangered species based on IUCN status category among others: *N. albomarginata*, *N. rafflesiana* and *N. talangensis*. We recommend to continuing protecting and conserving of six important sites for *Nepenthes* in Sumatra Barat (Mahek, Kelok Sambilan, Talang Babungo, Gunung Talang, Gunung Talamau and Gunung Gadut). We also recommend four sites in Sumatra Utara (Gunung Pangulubao, Gunung Sibayak, Gunung Sinabung and Gunung Sibuatan), three locations in Jambi (Gunung Tujuh area, Gunung Kerinci area and Kerinci Region) and one location in Riau (Bengkalis) as new protecting and conserving sites to conserve *Nepenthes* in Sumatra Island.

Establishment of long term-conservation link between students, organization of nature concern, environmental NGO, science institution, local communities and local government in six important sites to conserve *Nepenthes* in Sumatra Barat had been give a positive impact to *Nepenthes* and habitat surrounding the species. This link will be expanded in broader scale in relation with conserving natural habitat of *Nepenthes* in Sumatra Island.

The ex-situ conservation sites establish in Arboretum Universitas Andalas Limau Manih Padang, Sumatra Barat. Nepenthes Team has been growing several kinds of lowland *Nepenthes* species in that location. Three species success to growing these are *N. ampullaria*, *N. mirabilis* and *N. gracilis*.

Nepenthes Project 2002
A Conservation Expedition of *Nepenthes* in Sumatra Island
Project Proposal January 2002

AIM

1. To assess the conservation status and ecological requirements the threatened *Nepenthes* species dependent on remaining lowlands and montane forest of Sumatran Island and use this data to produce documentation identifying areas in urgent need of protection and providing justifications for the designation of protected areas.
2. Prepare Sumatra Barat as a pilot project sites to conserve *Nepenthes* In Sumatra Island.

OBJECTIVES

A. CONSERVATION

Sumatra Island

- ❖ To identify globally important sites requiring protection for *Nepenthes* species in Sumatra Island and use this data to facilitate the drafting of action plans and conservation strategies.

Sumatra Barat

- ❖ To evaluate proposed protected areas of *Nepenthes* in Sumatra Barat including private nature reserve and government designated sites and produce preliminary management plans for such areas.
- ❖ To establish long terms-conservation links between students, organization of nature concern, environmental NGO, science institution, local communities and government.
- ❖ Prepare a plans conservation strategy outside of the natural habitat (“ex-situ conservation strategies”) and concentrate this activity in arboretum of Andalas University.

B. Taxonomy and Ecological fieldwork

- ❖ To provide distributional data and assessment of *Nepenthes* conservation status in Sumatra Island.
- ❖ To complete detailed ecological studies of *Nepenthes* species to facilitate the drafting of action plans and conservation strategies. This will concentrate on threatened habitat of endemic species.

C. Training

- ❖ Give training for “guide” and local communities in the proposed of protected areas to complete information of status and existence of *Nepenthes* in Sumatra Barat and gather ideas and their basic capability to conserve natural resources.
- ❖ Prepare leaflet for Sumatran public communities.

D. Environmental Education

- ❖ *Nepenthes* coloring competition for kindergarten and elementary students school.
- ❖ *Nepenthes* essay writing competition for senior high school.

All of the idea from training and competition will include in management plans strategy appointment to conserve *Nepenthes*.

BACKGROUND AND JUSTIFICATION

A. Threatened Habitat

Sumatra, the westernmost of the main islands of Indonesia, is 1,800 km long and 400 km wide. Stretching the entire western side of Sumatra, the Bukit Barisan Mountains form the backbone of the island. The western slopes are very steep while on the eastern side they slope gently to the plains and swamps of eastern Sumatra. Sumatra and the islands of its coast are part of Republic Indonesia and this island is divided into eight provinces. Oil, agriculture and logging are mainstays of the economy. Sumatra has a wide variety of vegetation type that was described in detail by Whitten (1984) and Laumonier (1997).

Fifty-two percents of Sumatra Island are covered by forest (FAO, 2000). But, the recent data shown the forest area in Sumatra was decreasing as a result of land conversion. The principal threats include drainage of the peat swamp, palm plantation, illegal logging, village expansion, and forest fires caused by the uncontrolled burning of cultivated land. Fires were especially devastating in Sumatra in 1997-1998. If those threats continue, the forest of Sumatra will disappear in the near future.

The current situation of the forest in Sumatra is in bad condition and ecosystems are threatened globally, Laumonier (1997) notes:

1. 33% of Sumatra was covered with undisturbed forest, whereas 29% comprised secondary forest types, 24% was under agriculture and about 13% had been logged
2. There is no fact lowland forest left. Only isolated pockets remain and vast cultivated areas mainly devoted to conversion into industrial agriculture use surround these (oil palm and rubber states). In a few decades, lowland forest will have disappeared in Sumatra completely if logged-over forest not maintained under sustainable management.
3. Hill forest affected and are currently being decimated by the genetic forest exploitation by precedes the depending disappearance of such resource and by local agriculture conversion.
4. Only the mountain and swamp forest still cover an appreciable area.

Study about vegetation and Physiography of Sumatra by Laumonier (1997) was highlighted the fact that intense deforestation actually taking place. The loss of biological diversity specific to low altitude ecosystem is critical. Current deforestation could have catastrophic ecological consequences for developing region such as Sumatra and probably ever have repercussion on global issues.

Sumatra is the second Island after Borneo that has the highest diversity of *Nepenthes*. Clarke (2001) found 29 species of *Nepenthes* in Sumatra Island that distribute on lowland until the montane forest. Eighteen species of them were distributed in Sumatra Barat (Nepenthes Project, 2001). Unfortunately, this species are not popular and far less well-known, meanwhile their population decreasing constantly caused by destruction of their natural habitat.

Dedi M. Masykur Riyadi Deputy of BAPPENAS for the Regional and Natural Resources Section (in *Media Indonesia*, 2001) claimed all the lowland forest of Sumatra will have been deforested in 2005. Paul Brown mentioned the same prediction in *The Guardian* (2001). Lowland and montane forest are the potential habitats for *Nepenthes* species. Clarke (2001) mentioned of 29 Sumatra *Nepenthes* are described in his book, eight occur only in upper montane forest, whereas nine others occur in both upper and lower montane habitats.

Habitat destruction is the biggest problem that caused disappearance of *Nepenthes* in their natural habitat. Habitat destruction mostly caused by human disturbance (road broadening, plant cultivation, human settlement, village expansion) and natural disaster. The other things, the local communities lack understanding of conservation value for this species.

Nearly all of the lowland forest of Sumatra and several location of montane forest have now been cleared or disturbed. The remnants of this forest are one of the global conservation priorities. The taxonomic and ecological fieldwork by *Nepenthes* Project 2001 clarified the importance habitat sites of *Nepenthes* in Sumatra Barat were disturbed. Undoubtedly, that condition also happens in the entire habitat *Nepenthes* in the other region of Sumatra Island.

B. Threatened species

The biological important of Sumatran forest is well known. This region has long been supported living great animal like Sumatran Tiger, Sumatran Elephant, orangutan and good habitat for giant flower of *Rafflesia* and *Amorpophallus*. Few people known Sumatran Forest also have the highest diversity of *Nepenthes* species after Borneo and several of them are endemic for Sumatra Island (Clarke, 2001). The species and their IUCN status category are described below:

- | | |
|-------------------------------|-------------|
| 1. <i>N. adnata</i> | DD (CR) |
| 2. <i>N. albomarginata</i> | LR (nt) |
| 3. <i>N. ampullaria</i> | LR (lc) |
| 4. <i>N. angansanensis</i> | VU {LR(cd)} |
| 5. <i>N. aristolochioides</i> | CR |
| 6. <i>N. bongso</i> | LC (cd) |
| 7. <i>N. densiflora</i> | LR (cd) |
| 8. <i>N. diatas</i> | EN {LR(cd)} |
| 9. <i>N. dubia</i> | CR |

10. <i>N. alata</i> (<i>N. eustachya</i>)	LR (lc)
11. <i>N. gracilis</i>	LR (lc)
12. <i>N. rosulata</i> (<i>N.gymnamphora</i>)	LR (cd)
13. <i>N. inermis</i>	LR (cd)
14. <i>N. jacquelinae</i>	DD
15. <i>N. lavicola</i>	VU {LR (cd)}
16. <i>N. longifolia</i>	VU
17. <i>N. mikei</i>	VU {LR (cd)}
18. <i>N. mirabilis</i>	LR (lc)
19. <i>N. ovata</i>	VU
20. <i>N. rafflesiana</i>	<u>LR (lc)</u>
21. <i>N. reiwartiana</i>	LC (lc)
22. <i>N. rhombicaulis</i>	VU
23. <i>N. singalana</i>	LR (lc)
24. <i>N. spathulata</i>	LC (lc)
25. <i>N. spectabilis</i>	LC (lc)
26. <i>N. sumatrana</i>	CR
27. <i>N. talangensis</i>	EN
28. <i>N. tenuis</i>	DD
29. <i>N. tobaica</i>	LR (lc)

This status based on Anon (1994) *cit.* Clarke (2001).

Nepenthes Project 2001 clarified and proposed the new status of *Nepenthes* in Sumatra Barat based on the recent condition of *Nepenthes* species in the field. Losing of *Nepenthes* species from their habitat cannot be avoided, all of the Sumatran *Nepenthes* are threats by destruction and losing of their habitat. Nepenthes Project 2002 continued to gather taxonomic and ecological aspect of *Nepenthes* in Sumatra Island and make recommendation for this species on large scales in the national level.

C. Protected Areas

Nepenthes Project 2001 team had identify and proposed six locations that need urgent protection to conserve *Nepenthes* in Sumatra Barat. This data used by Nepenthes Project 2002 team to push relevant government institution make an action to establish conservation area for *Nepenthes* in Sumatra Barat. Nepenthes Project 2002 gathered support from student's organization, organization of nature concern, environmental NGO, local people and Indonesian Science Institution (LIPI) to give some perception to conserve this species. For long terms objectives Sumatra Barat will prepared as a pilot project sites to conserve Sumatran *Nepenthes*.

PUBLIC AWARENESS

- ❖ The endangered species of *Nepenthes* in Sumatra Barat used as a mascot in coloring competition and the result of this competition produced as 2003 calendar and distributed to public communities in Sumatra Barat.
- ❖ Published of *Nepenthes* Project 2002 in Indonesian media.
- ❖ Give the information about status and existence of *Nepenthes* in Sumatra Island for:
 - Student's organization of nature concern in several Universities in Sumatra region.
 - Environmental government institution in each province of Sumatran Island.

CONSERVATION ACTION

1. The main activities of *Nepenthes* Project 2002 are the environmental education, included direct and indirect conservation action. The environmental educations are concentrated for Sumatra Baratn communities as follow up work of previous project.
2. Carried out urgently required surveys for threatened *Nepenthes* species in Sumatra Island.

***Nepenthes* Project 2002 will:**

- ❖ Identify globally important sites requiring protection for *Nepenthes* species in Sumatra Island and use this data to facilitate the drafting of action plans and conservation strategies.
- ❖ Evaluate proposed protected areas of *Nepenthes* in West Sumatra and produce preliminary management plans for such areas.
- ❖ Establish long terms-conservation links between students, organization of nature concern, environmental NGO, science institution, local communities and government.
- ❖ Prepare a plans conservation strategy outside in the natural habitat ("ex-situ conservation strategies) and concentrate this activity in arboretum of Andalas University.
- ❖ Training and produce leaflet for the public communities.

- ❖ *Nepenthes* Coloring and *Nepenthes* essay writing competition for the young generation.

SCIENTIFIC METHOD

Our primary aim in the field is to assess the current status and ecological requirements of the threatened species of *Nepenthes* in study sites. This will be complemented by broad-based taxonomical surveys incorporating quantitative and qualitative components. Our scientific methodologies have been formulated with these aims in mind.

- Survey and identify species of *Nepenthes* and compare these data with the dried specimen in Herbarium of Andalas University (ANDA) and Herbarium Bogoriense (BO).
- Make distribution map of *Nepenthes* Sumatra Island, we will use GPS to compile these data.
- Population density will count in quadrangular plot 10m x 10 m for each species. Flowering and fruiting plants will be count to compile viability data for each species of *Nepenthes*.

RESULT OF THE PROJECT

A. TAXONOMY AND ECOLOGY

Nepenthes Team carried out the research in seven Provinces in Sumatra Island with total regency that observed are forty-two. The provinces that accessed are Sumatra Utara, Sumatra Barat, Riau, Jambi, Sumatra Selatan dan Bengkulu. We surveyed lowland and montane habitat of Sumatran *Nepenthes* along this expedition surveys. Discovery of new population **two Critically Endangered Nepenthes** in Sumatra Island are the **highlight evidence** for the newest conditions of their distribution area. With the intensive work, The Team also reviewed some species that reported by Nepenthes Project 2001. In this project report, *Nepenthes gymnamphora*, *N. longifolia*, *N. sumatrana* and *N. eustachya* successively used as substitution for *N. rosulata*, *N. rafflesiana* var. *longicirrhosa*, *N. spinosa* and *N. alata*. The full result are presented below:

Distribution And Population Density

Based on observations and collections in the study site, *Nepenthes* Project Team had found **twenty-four *Nepenthes* species, twelve natural hybrids and four unclearly identified species**. All the specimens are deposited at Herbarium ANDA. The total numbers of specimen that had collected from the field are three hundred and eighty four since *Nepenthes* Project 2001. The collection numbers of specimen, that we had collected initially as NP (*Nepenthes* Project) and we start the number from NP 01 till NP 384. Each specimen has three or four specimens duplicate except in occasionally condition we have less than three specimens duplicate. All of the specimen from the fieldwork of *Nepenthes* project was mounting and labeling well this time and deposited in Herbarium Universitas Andalas. All the specimens signed with *Nepenthes* Project stamp in left side of the top margin in each sheet.

For identifying the specimen we used some reference among others Miquel (1852), Macfarlane (1908), Danser (1928), Kurata (1973, 2001), Des M (1994) and Clarke (2001). We also compare the specimen that we had collected with the *Nepenthes* specimens of Herbarium ANDA and BO. All the species are described below:

THE SPECIES

The team found twenty-four species (including *N. izumiae* described by Clarke, pers. com) from twenty-nine species of *Nepenthes* that reported exist in Sumatra Island. Population number, geographical distribution and distribution map are arranged well to maintain and monitoring these species in the future. *N. angansanensis*, *N. densiflora*, *N. diatas*, *N. lavicola*, *N. mikei* and *N. tenuis* not accessed in the survey. Team failed to find *N. mikei* and *N. tenuis* in the field, meanwhile four other are distributed in Aceh Province that un-accessibility to conduct the research this time.

Nepenthes adnata Tamin & M. Hotta ex Schlauer

Caulis: rosette, erect and climbing; cylindrical. **Folium:** adnate; costae green; longitudinal veins indistinct; margin red hairy; tendril \pm 8 cm long. **Rosette and lower pitchers:** blackish red, ovoid in the lower, narrower in the middle and cylindrical at upper part; with fringed hairs at the wings; mouth red-blackish, oblique, thin peristome; lid green, cordate, horizontally, spur unbranched. **Upper pitchers:** not found.

Specimen examined: Kelok Sambilan, NP 87.

Distribution: Sumatra Barat (see appendix 2 and 3A).

Notes: This species firstly described by Tamin & Hotta (1986). A specific character for this plant is adnate leaf base. This diminutive species only found in a small area in Kelok Sambilan (*Nepenthes* Team, 2001). In mid year of 2003, the team was found a new population in Lembah Harau Nature Reserve (the highlight evidence for its distribution). This location not so far from the type habitat and its in the same region. Their real condition are critically endangered

and we only found small numbers of mature plant in its population (see appendix 1).

Habitat conditions in the new location is not different with type habitat, forest cutting, collecting wood by local people and conversion natural forest to cultivated land in Harau Nature Reserve are the main problem that threatened the species.



Fig. 1. A red pitcher lip of *N. adnata*.

Nepenthes albomarginata T. Lobb ex Lindl.



Fig. 2. *N. albomarginata* with its white ring band at peristome below

Caulis: rosette, erect and climbing; cylindrical, brownish. **Folium:** sessile, gradually attenuate towards the base, lanceolate; costae red; longitudinal veins distinct or not; margin red hairy or glabrous; tendril \pm 1-2 cm long for rosette and have a loop for mature plants. **Rosette and lower pitchers:** green and red spots, ovoid in the lower 1/3, cylindrically upper 2/3; with fringed hairs at the wings from top to bottom; mouth red, round, slightly oblique throughout, have a white ring band under peristome; lid red, cordate, horizontally, spur branched. **Upper pitchers:** green, infundibular in the lower and cylindrical in upper part; lid green, elliptic, horizontally, spur unbranched. The other parts of upper pitcher are similar with the lower pitchers.

Specimen examined: Kelok Sambilan, NP 95; Mahek, NP 101.

Distribution: Sumatra Barat (see appendix 2 and 3B).

Notes: *N. albomarginata* is easy to recognize in the field, only this species that has white ring band under its peristome. Both of lower and upper pitchers have this character. We only found this species in Kelok Sambilan and Mahek and not found in the other location in Sumatra Island along the survey. In Kelok Sambilan the population of this species is very small and will disappear in early future. The road in Kelok Sambilan, is intensively broadened in 2002-2003 and the life continuity of this species in Kelok Sambilan unpredictable. In Mahek, *N. albomarginata* is distributed in the road bank of the main road to Mahek. If the road broadened by local government the species will disappear from Sumatra Island **forever** (see appendix 1).

***Nepenthes ampullaria* Jack**

Caulis: rosette, erect and climbing; cylindrical, 0.7 cm in diam., internodes 4.8-5.2 cm. **Folium:** coriaceous, sessile, oblong to lanceolate, 19.0-19.5 x 4.3-4.7 cm; base with red hairs; costae green; longitudinal veins 2 each sides, distinct; hairy reddish beneath surfaces; margin entire with reddish hairs; apex acute; tendrils \leq 14 cm long, reddish hairy. **Rosette and lower pitchers:** green with red blotches; urceolate with two broad wings bearing green fringed hairs at the front from top to bottom, wing 0.8-1.1 cm; Mouth horizontal, wide, ovoid, green; peristome thin and broad, 1.7-2.0 cm; Lid long, narrow and cuneate or elliptic, generally reflexed and angled greater than 90° away from the lip, no appendages. Spur branched. **Upper pitchers:** it produced as a cluster at node and all other parts similar to lower pitcher. **Inflorescens:** a raceme, peduncle 1 cm long, pedicels 0.4 cm long, rachis 9.8 cm long, 2-flowered.

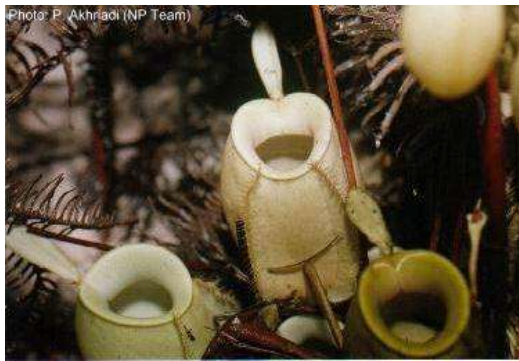


Fig. 3 (Left) The whitish green pitchers of *N. ampullaria*. Fig.4. (Right) The rarely upper pitcher of *N. ampullaria*, it is very small and nice pitchers.

Specimen examined: Lunang, NP 24; Rokan Hulu, NP 117, NP 119.

Distribution: Bengkulu, Jambi, Riau, Sumatra Barat and Sumatra Utara (see appendix 2 and 3C).

Notes: *N. ampullaria* are the common species that easily found in the lowland forest in Sumatra, but in Kerinci, team was found its population in highland forest about 1100 m a.s.l. The pitchers usually have varied color and size depends on the habitat where it's lived. In open area their color are green with dark red spots and in shade area the pitchers fully green. The species found in Padang Sawah have green pitchers with orange-red peristome. We found all of it in patches of *Gleichenia* shrubs (see appendix 1).

***Nepenthes aristolochioides* Jebb & Cheek**

Caulis: erect and climbing; glabrous, cylindrical, internodes 7.3-8.4 cm. **Folium:** sessile, spatulate to lanceolate, 9.7-16.8 x 1.2-2.7 cm, glabrous; costae flatted above and raised beneath; longitudinal veins distinct each surfaces; margin glabrous; apex acute to acuminate; tendril insertion sub-apical, hairy, have a loop in mature. **Rosette and lower pitchers:** not found. **Upper pitchers:** dark yellow with red blotched; infundibular in lower part, broad ovoid in upper part; 5.3-9.1 cm high; wings reduced to ribs; mouth red, round and oblique, positioned in front and slightly below a small



Fig. 5. A nice pitcher of *N. aristolochioides*.

dome formed by the pitcher wall; peristome broad, expanded, incurved, 0.3-0.8 cm wide, teeth indistinct; lid ovate to oblong, 1.7-3.2 x 0.9-2.3 cm, horizontal and slightly sloping, base cordate; spur unbranched, 1.6-1.9 cm long. **Inflorescence:** a raceme, peduncle 2.1-4.1 cm, pedicels 1.5-1.9 cm with a simple mid bracteole, rachis 9.3-11.6 cm. Female similar to the male, but with a shorter rachis and fruit 1.7-1.8 cm.

Specimen examined: Kerinci, NP 225, NP 281

Distribution: Jambi (see Appendix 2 and 3D)

Notes: Firstly the Team accessed Gunung Tujuh (type habitat) to do observation of this species. Only three sub-population numbers with small number of mature plant found. Clarke (2001) noted Robinson and Kloss specimen labelled as being collected from Gunung Kerinci, but for long time this species cannot be found in this region till Nepenthes Team carried out the intensive survey on Mar 2003. Although Nepenthes Team only found a small population number with small mature plant (see appendix 1), this discovery is the highlight evidence for its distribution in the recent time.

***Nepenthes bongso* Korth.**

Caulis: rosette, erect and climbing; cylindrical. **Folium:** sessile and reddish hairy on the base, oblong-lanceolate; costae green, distinct or faint; longitudinal veins indistinct; margin red hairy; tendril \pm 16-21 cm long. **Rosette and lower pitchers:** brown or red, ellipsoid in the lower and cylindrically above; with fringed hairs at the wings; mouth brown or red, wide, sloping, peristome expanded and teeth relatively long; lid red, cordate, horizontally, spur branched. **Upper pitchers:** infundibular and widening

gradually throughout; mouth red with greenish lines, sloping, width; lid greenish, horizontally, cordate; spur unbranched.

Specimen examined: Mt. Sago, NP 20; NP 21; NP 23.

Distribution: Sumatra Barat (see appendix 2 and 3E)



Fig. 6. Black rosette of *N. bongso*

Notes: *N. bongso* is one of the species that typically distribute in the montane forest. Clarke (2001) mentioned Jambi, Bengkulu, Sumatra Barat and Sumatra Utara are the distribution area of this species. But, as long as the survey Team only found this species in five locations with fourteen sub-populations in Sumatra Barat (see appendix 1). Team still proposed it to include vulnerable category of IUCN status, because disturbances of its habitat in several locations are increased in the recent time.

***Nepenthes dubia* Danser**

Caulis: climbing; cylindrical, blackish.

Folium: sessile, lanceolate; base auriculate, costae red; longitudinal veins indistinct; margin glabrous; tendril \pm 4 cm long.

Rosette and lower pitchers: not found. **Upper pitchers:** yellowish green; the lower tubular than above when view from the side and the pitchers wall was laterally appressed; mouth reddish yellow, round, horizontally, peristome cylindrical; wings reduced to ribs; lid very long, narrow, reflexed beyond 180⁰, no appendages; spur unbranched.



Fig. 7. *N. dubia*, one of threatened species in West Sumatra.

Specimen examined: G. Talamau, NP 59

Distribution: Sumatra Barat (see appendix 2 and 3F)

Notes: *N. dubia* is small pitcher plants that have nice color performance and only found in Gunung Talamau. No habitat disturbances happen in this mountain till this time (informed by the member of KCA-LH Rafflesia expedition 2003). The threats for this species potentially come from the plant collector. Only few number of individual found

in their habitat in 2001 (see appendix 1) and if the plant collector not do *Nepenthes* collection in large number, we optimistic the species still exist till now. Their IUCN status category is Critically Endangered.

***Nepenthes eustachya* Miq.**



Fig. 8. A big pitcher of *N. eustachya*

Caulis: rosette, erect and climbing; cylindrical, blackish. **Folium:** petiolate, lanceolate; costae red; longitudinal veins indistinct; margin glabrous; tendril \pm 5-25 cm long, have a loop on mature plants. **Rosette and lower pitchers:** red, large ovoid in the lower, narrowly in the middle and cylindrically above; with two red fringed hairs at the wings; mouth red or reddish, width, oblique; lid green upper surface and red spots beneath, horizontally, spur unbranched. **Upper pitchers:** red and large ovoid in the lower, narrowly in the middle, reddish white and cylindrically above; lid have a crest; all other parts similar to lower pitchers.

Specimen examined: Kelok Sambilan, NP 80; NP 81.
Distribution: Sumatra Barat and Sumatra Utara (see appendix 2 and 3G).

Notes: Mentioned as synonym for *N. alata* Blanco by *Nepenthes* Team (2001) and this time, the Team used *N. eustachya* as a substitute name for *N. alata* Blanco. This substitution is the result of intensive study of the specimen and compared with specimen in Herbarium ANDA and BO. It found in several areas in Kelok Sambilan, Mahek, Sirukam and Sibolga. Mostly grows in the road banks between *Gleichenia*, *Imperata* and small herbs like *Melastoma*. Although included to unthreatened species for long time, the remainder populations that still have in the natural habitat classified it to closely threatened species. This species only found in five locations with six sub-populations, with the large number of mature plants (see appendix 1).

***Nepenthes gracilis* Korth.**

Caulis: rosette, erect and climbing; triangular, green, 0.4 cm in diameter. **Folium:** coriaceous, sessile, auriculate-clasping and angled, lanceolate, 15-17 x 3-4 cm; costae distinct, green and glabrous; longitudinal veins 4 and not easily distinguished from beneath; margin glabrous, apex acuminate; tendrils insertion sub-apical or apical, \leq 16 cm long, have a loop in mature and glabrous. **Rosette and lower pitchers:** green, dark red and variation in color, ovoid in the lower and narrower to cylindrical above, 10.3 cm high, with red fringed hairs at the wings running from top to bottom, wing 0.3 cm wide;

glandular zone about ½ pitcher high from base; mouth oval with thin peristome; lid orbicular and horizontally, base cordate, no appendages; spur unbranched, 0.5 cm long. **Upper pitchers:** green, narrowly ovoid in the lower and cylindrical above, wings reduced to ribs; glandular zones extended about 1/3 pitcher high from base. All other parts similar to the lower pitchers.



Fig. 9. (left) Many pitchers of *N. gracilis* that climbing on another plant. Fig. 10. (right) A green pitcher of *N. gracilis* from many pitchers in its habitat

Specimen examined: Lunang, NP 25; Lima Puluh Kota, NP 106, NP 107, NP 108.

Distribution: Bengkulu, Jambi, Riau, Sumatra Barat, Sumatra Selatan and Sumatra Utara (see appendix 2 and 3H).

Notes: *N. gracilis* have the width range of distribution. This species found in six provinces in Sumatra Island. *N. gracilis* commonly found in the margin of the secondary forest. Most of it grows in dense population on the road banks in all of main road in Sumatra Island, from coastal area to lowland montane forest. In Sumatra Barat, it grows on the uncultivated rice-field and in the other region it seem growing in patches swamp in palm oil plantation and rubber plantation. In several locations, it individual numbers more than one hundred (see appendix 1).

Nepenthes gymnanphora Nees

Caullis: rosette and erect; cylindrical, reddish green.

Folium: sessile, auriculate-clasping, lanceolate, 5-22.5 X 6.5-7 cm; reddish green; pale green beneath; costae green-reddish; longitudinal veins indistinct, margin reddish hairy; tendril hairy, reddish, ± 8.2-22.3 cm long. **Rosette and lower pitchers:** green or red, both with dark red blotched; ellipsoid in the lower half and cylindrical above; with red fringed hairs at the wings running from top to bottom; mouth oblique, widely, sloping; peristome distinct; lid horizontally with red



Fig. 11. *N. gymnanphora* that had the upper pitcher

spots; spur branched. **Upper pitcher:** rarely produced, ovoid in lower part and cylindrical above, wings reduced to rib. All other parts similar to the lower pitchers.

Specimen examined: Mount Gadut, NP 27; Kerinci, NP 247.

Distribution: Jambi, Sumatra Barat and Sumatra Utara (see Appendix 2 and 3I).

Notes: Clarke (2001) notes that species as synonym from *N. rosulata* Tamin and Hotta's publications. Nepenthes project for the first used *N. rosulata* in 2001 report, but in 2002/2003 we used *N. gymnamphora* to substituted *N. rosulata*. The concept of *rosulata* used by Tamin and Hotta comes from the only rosette pitcher produced, but outside of Sumatra Barat we found the upper pitcher. For this reason we substituted the name of this species. All of the specimens that we collected from Sumatra Barat not have the upper pitcher. Unsurprisingly, if Tamin and Hotta used *N. rosulata* to describe their collection because only the rosette pitcher that only found in the field and some character have differentiation with *N. gymnamphora* that commonly distributed in Jawa Island. Contrary with the population in Sumatra Barat, the population in Sumatra Utara and Jambi produced the upper pitcher. From the field data collection, Nepenthes Team assumed that *N. gymnamphora* in Sumatra Barat have unusual character. Undoubtedly the intensive survey is needed to provide more evidence to present the differentiation. Or this unusual character only was variation of the species itself. *N. gymnamphora* is the typically montane species and abundant in the shade place. There are thirty-eight sub-populations found in fifteen locations (see appendix 1).

***Nepenthes inermis* Danser**

Caulis: climbing; cylindrical, blackish, have a spine. **Folium:** coriaceous, sessile, lanceolate, 7-9.2 X 2.2-2.4 cm; costae green; secondary nerves faint, margin smooth; tendril \pm 5-23 cm long. **Lower pitchers:** yellowish green, infundibular in lower part and narrower ovoid in upper part, c.a. 5 cm high; with two fringed wings running from top to bottom; glandular zone extended $\frac{1}{2}$ pitcher high from base; mouth oval, rather sloping, peristome thin 0.1-0.3 cm wide; lid narrower ovate, horizontally or rather vertically, no appendages; spur unbranched. **Upper pitchers:** greenish yellow; lower $\frac{2}{3}$ tubular than above when view from the side and the pitchers wall was adpressed; mouth orbicular, horizontally, peristome absent; lid very long and slightly linear, straightly vertical; spur unbranched.

Specimen examined: Mount Gadut, NP 29; Kerinci, NP 243, NP 246.

Distribution: Jambi and Sumatra Barat (see appendix 2 and 3J).



Fig. 12. (left) A small lower pitcher of *N. inermis*. Fig. 13. (right) The left pitcher is a pitcher with peristome like *N. dubia* and the right ones is the pitcher without perisrome.

Notes: *N. inermis* has green bright small pitcher and fully not have peristome in upper pitcher. The rosette specimen that we had collected from Jambi has the flattened peristome and the middle pitcher is looks-like *N. dubia* except in the lid character. This species is not very common in Sumatra Barat's mountain, we notes its distribution in several mountain in Padang and Solok region with the small population number. But in one sites of Jambi this species is very common. It's life as an epiphyte on the small tree in gap area in the forest. We found twelve subpopulations in five locations numbers (see appendix 1).

***Nepenthes izumiae* C. Clarke, T. Davis & R. Tamin**

Caulis: rosette, erect and climbing; cylindrical, blackish. **Folium:** sessile, winged, lanceolate; base auriculate-clasping, costae green; longitudinal veins indistinct; margin white or red hairs; tendril \pm 8-30 cm long, have a loop on mature plants. **Rosette and lower pitchers:** brown or reddish green and ovoid in the lower, narrower in the middle and cylindrically above; with greenish brown fringed hairs at the wings; mouth brown and reddish green, width, sloping; lid brown, base cordate, horizontally, have a crest on the base, spur unbranched. **Upper pitchers:** infundibular in the lower, narrowly ovoid on the middle, cylindrical above; mouth greenish brown, sloping, width; lid green, horizontally, cordate; spur branched.

Specimen examined: Mount Talamau, NP 60.

Distribution: Sumatra Barat (see appendix 2 and 3K).

Notes: This species described as *Nepenthes* species B by Clarke (2001), but he suggested us to use *N. izumiae* for our specimen (pers. comm.). It is the first collection for Herbarium ANDA from Mount Talamau, while



Fig. 14. A lower pitcher of *N. izumiae*.

Clarke was collected around Bukit Barisan to the north of Bukittinggi region. We still need more information about that species (see appendix 1).

***Nepenthes jacquelineae* C. Clarke, T. Davis & R. Tamin**

Caulis: rosette, erect and climbing; cylindrical, reddish green to blackish red, glabrous, internodes 2.6-11.8 cm; **Folium:** sessile, auriculate-clasping at the base, spatulate to lanceolate, 9.1-22.7 x 1.9-4.2 cm, costae red above at base then green and reddish green beneath, glabrous; longitudinal veins 3, distinct; margin hairy or not, apex acuminate; Tendril insertion sub-apical or apical and have a loop in mature, reddish green, glabrous, 13.8-32.2 cm long. **Rosette and lower pitchers:** reddish green to dark red, infundibular below and gradually cylindrical above, 3.9-11.7 cm high; with two fringed red wings running from top to bottom, wing 0.05-0.2 cm wide, gland zone 2/3 part below; mouth red-dark red, slightly horizontal, broad ovate, peristome thin and narrowly in front and expanded or lobed both sides, teeth distinct; Lid reddish to dark red above and reddish green beneath, oblong to ovate, base cordate, 1.8-4.4 x 0.8-3.2 cm; Spur unbranched, 0.5-1.4 cm. **Upper pitchers:** reddish green at the base or green then green above, infundibular below and gradually ovoid above, 3.9 cm high; wings reduced to ribs; mouth horizontally, elliptic, peristome indistinct, widely expanded after slightly narrower peristome in front; Lid green reddish above and green beneath, oblong, base truncate, crested at the base beneath, 6.1 x 2.1 cm; Spur unbranched, 0.5 cm.

Specimen examined: Bk. Barisan northern of Bukittinggi city, NP 384.

Distribution: Sumatra Barat (see Appendix 2 and 3L).



Fig. 15. (left) and Fig. 16. (right) Upper and lower pitcher of *N. jacquelineae*.

Notes: Described and published as a new species from Bukit Barisan north of Bukittinggi City by Clarke (2001). The team accessed the type locality in 2003 and the number of mature plant is likely sufficient for their life continuity for long time with the

exception their habitat not disturbed and the plant that not over-collected by plant collector (see appendix 1). We proposed LR (cd) for IUCN status category. Although recently found, these plant now available in plant market outside of Indonesia. We can predict how the plant going out to this Island. This is not good news for the team precisely.

Nepenthes longifolia Nerz & Wistuba



Fig. 17. A lower pitcher of *Nepenthes longifolia*.

Distribution: Sumatra Barat (see Appendix 2 and 3M)

Notes: *N. longifolia* described as *N. rafflesiana* var. *longicirrhosa* and *N. spinosa* by *Nepenthes* Team (2001). Tamin (pers. comm.) suggested to use that names in 2001. In 2003 after we studied the character intensively we found the specimen in Kelok Sambilan is not *N. spinosa*. Most of its character have similarity with character that belonging to *N. longifolia*. Finally the team decided to use *N. longifolia* as a substitute name for the specimen that collected in Kelok Sambilan. We found small population of this species in Kelok Sambilan, Harau and Mahek (see appendix 1). Clarke (2001) mentioned this species also found in Sumatra Utara province, but we are not found this species along the survey to this region. The habitat of *N. longifolia* in Kelok Sambilan is depleted as a result of road broadened in this location. The last survey that we carried out there on 2003 give the evidence the species disappear from their sites in Kelok Sambilan. The future conditions of this species in Mahek and Harau also unpredictable, because the increasing of the land conversion in these regions. Based on this condition we proposed CR for their IUCN status category.

Caulis: rosette, erect, climbing; cylindrical, have a spine near base of the leaf. **Folium:** sessile, auriculate-clasping, oblong to lanceolate; costae red or green; longitudinal veins distinct or not; margin glabrous, often red hairy; tendril \pm 50 cm long. **Rosette and lower pitchers:** dark red, ovoid in the lower, narrowly in the middle and cylindrically above; with two dark red fringed wings running from top to bottom; mouth red, width, oblique; lid dark red, elliptic to oblique, horizontally, spur unbranched. **Upper pitchers:** green, infundibular in the lower and tubular above; lid green, elliptic, horizontally, spur unbranched. All other parts similar to the lower pitchers.

Specimen examined: Kelok Sambilan, NP 86, NP 89, NP 90.

Nepenthes mirabilis (Lour.) Druce

Caulis: rosette, erect and climbing; cylindrical, green, 0.5-0.9 cm in diameter; internodes 8.5-16 cm. **Folium:** sub-coriaceous, sessile and petioled on mature plants with alae, elliptic-lanceolate, 18-29 x 4.5-7.3 cm; base auriculate, costae red; longitudinal veins 4-5, distinct; margin with rarely hairs, green-red; tendril insertion sub-apical, \pm 18-18.5 cm long, often have a loop on mature plants. **Rosette and lower pitchers:** green or green with red blotched, ovoid in the lower, narrower in the middle and cylindrically red above, 6.0-7.5 cm high; with two fringed wings running from top to bottom, wing 2.0 cm wide; glandular zone extended $\frac{1}{2}$ pitcher high from base; mouth red, width, oblique to oval; peristome expanded, 0.3 cm wide, teeth distinct; lid elliptic to orbicular, base cordate, horizontally; spur unbranched or trifid, 0.3 cm long. **Upper pitchers:** green and often with red blotched, variation in color; infundibular in the lower, narrowly ovoid on the middle, cylindrical above; wings reduced to ribs; spur branched, 0.6 cm long.

Specimen examined: Palupuh, NP 47; Padang Sawah, NP 52; Bengkalis, NP 124; Ogan Komering Ulu, 194.

Distribution: Bengkulu, Jambi, Lampung, Riau, Sumatra Barat, Sumatra Selatan and Sumatra Utara (see appendix 2 and 3N).



Fig. 18-20. Variation color in *N. mirabilis* pitchers

Notes: This species grows mostly in swamp forest, commonly found in coastal area, associated with *N. gracilis* and *N. ampullaria*. Like the others common species, *N. mirabilis* grows between shrubs of *Gleichenia*, *Melastoma* and *Dipteris*. In Pinagar, we found small population of *N. mirabilis* grows near the uncultivated rice-fields. This species has the widest distribution area. nearly all the provinces that we accessed have this species in their lowland forest. We found more than 10.000 individuals along the survey (see appendix 1).

Nepenthes ovata Nerz & Wistuba

Caulis: rosette, erect and climbing; cylindrical, green, internodes 1-12 cm. **Folium:** more coriaceous, sessile, auriculate-clasping, narrowly spatulate, 8-18.5 x 2.6-5.1 cm, costae white hairy beneath and glabrous above; longitudinal veins 1-3, distinct above; margin red hairy, apex acute; tendril insertion sub-apical, white hairy, 18.2-21.5 cm, have a loop in mature plants; **Rosette and lower pitchers:** red or green below and reddish green above; densely white short hairy, gradually ovoid below and cylindrical above, 17.4 cm high; with two fringed wings running from top to bottom and often till 1 cm distance mouth below, wing 0.1-0.2 cm; glandular zone indistinct; mouth red or dark yellowish green with red lines; sloping, ovate; peristome narrower in front and widely besides, a raised in front c.a 1.2 cm high, slightly lobed, widely outwards and expanded backwards at both sides, 1.2-4.1 cm wide, teeth distinct; lid green with red spots, sub-orbicular, a crested on the base beneath c.a 0.2 cm high, no appendages; spur unbranched, 1.8 cm long. **Upper pitchers:** green out side and green with red blotches inside, white short hairy, infundibular below and gradually broad ovoid above, 16.2 cm high, wings reduced to ribs, gland zone indistinct; mouth ovate-sub-orbicular, slightly sloping; peristome green with red lines, a raised in front, 5 lobes each sides, teeth distinct; lid sub-orbicular, 4.8 x 4.9 cm, a crested base beneath c.a 0.2 cm high; spur unbranched, 1.1 cm long. **Inflorescence:** a raceme, glabrous, peduncle 4.8 cm long, pedicels unbranched 0.5 cm long, rachis 8.8 cm long, fruit narrowly ovoid, 2.3 x 0.6 cm.

Specimen examined: Toba Samosir, NP 373, NP 377.

Distribution: Sumatra Utara (see Appendix 2 and 3O).

Notes: Along the survey the team only found this species in mountain ridges near Toba Samosir, although some of researcher also reported this species from several mountains that occurred in Sumatra Utara. The habitat is in mountain slope with the



Fig. 21. A fantastic lower pitcher of *N. ovata* that found in Sumatera Utara

ericoid mossy forest that also abundances with ferns mountain species *Matonia pectinata*. There are not so many individual found (see appendix 1). Although no highly risk that threaten for the species subsistence in this region this time, the animal-trap trail that found in the slope will fragment the *Nepenthes* habitat. The species that life in isolated places, such as the mountain slopes will get disturbances if the environmental conditions surrounding them got the disturbances, although the disturbances is very minimal. This species also apparently get pay attention by plant collector.

Nepenthes rafflesiana Jack



Caulis: rosette, erect and climbing; cylindrical, 0.9 cm in diameter; internodes 9-11 cm long. **Folium:** coriaceous, petioled, lanceolate to spatulate, 18-29 x 5.5-6.7 cm; base auriculate, costae glabrous, longitudinal veins 3 each sides, distinct, margin glabrous, apex acute; tendril insertion apical, long, have a loop in mature plants.

Rosette and lower pitchers: green or green with red blotched, broad ovoid below and narrowly ovoid cylindrical above, 18.5 cm high; with two fringed wings running from top to bottom, wing 3.5 cm wide; glandular zone extended 1/3-1/2 pitcher high from base; mouth sloping, oval; peristome expanded, 1.0 cm wide; lid elliptic-orbicular, base cordate, reflexed an angled 90° to 180° away from the mouth horizontally; no appendages; spur unbranched,

1.3 cm long. **Upper pitchers:** long infundibuliform, ± 25 cm high; wings reduced to ribs; glandular zone extended 2/3-3/4 pitcher high from base; mouth sloping or horizontal at front and gradually rather vertical, oval to orbicular; peristome widely expanded besides and a raised in front, 0.6-2.0 cm wide; lid oblong to orbicular, spur 0.7 cm long. All other parts similar to the lower pitchers. **Inflorescence:** a raceme, peduncle 17 cm long, pedicels 1.3 cm long, rachis 35 cm long, 1-flowered without bracteoles; sepal oblong, 1 x 0.5 cm. Female similar to the male but with short rachis.

Specimen examined: Bengkalis, NP 126.

Distribution: Riau and Sumatra Utara (see Appendix 2 and 3P)

Notes: We compiled the distribution data for this species from *Nepenthes* specimen in Herbarium BO. The distribution area of this species is in the Riau Archipelago and no collection from the Riau mainland are reported. Clarke (2001) noted besides in Riau Island, the region between Indrapura and Barus also the distribution area for this species. Team found three locations with eight subpopulation numbers of *Nepenthes rafflesiana* in Riau Mainland and Sumatra Utara region (see appendix 1). The habitat is in swamp lowland forest patches near human settlement and between the younger palm-oil plantations. They are commonly associated with dense *Gleichenia* shrubs in the granite sandstone substratum and *Scirpus* in the swap habitat. Only found one of mature plant in one subpopulation number found in Sumatra Utara. Based on their condition habitat and number of mature plant we proposed EN (C2a) for IUCN status category.

***Nepenthes reinwardtiana* Miq.**

Caulis: rosette, erect and climbing; triangular, dark red. **Folium:** sessile, auriculate-clasping, lanceolate, 22 x 4 cm; costae red, longitudinal veins indistinct, margin glabrous; tendrils dark red, \pm 5–23 cm long, have a loop in mature plants. **Rosette and lower pitchers:** green, ovoid in the lower, narrower in the middle and widening to gradually toward mouth; with two fringed wings running from top to bottom; glandular zone extended 1/3–1/2 pitcher high from base; mouth green, sloping, width, oblique; lid green, orbicular, horizontally; spur unbranched. **Upper pitchers:** infundibular in the lower, narrowly ovoid up to the hip, widening to gradually toward mouth. All other parts virtually the same as rosette pitchers. Generally the pitchers have two clear spots “like eyes” in the inner surface of pitcher.

Specimen examined: Agam, NP 26.

Distribution: Jambi, Lampung, Sumatra Barat and Sumatra Utara (see appendix 2 and 3Q).

Notes: *N. reinwardtiana* is common species and have wide distribution area in Sumatra. It is easily to recognized and identified from two “eyes spots” in inner parts of its pitchers. We can find it from the coastal areas to lowland montane forest. This

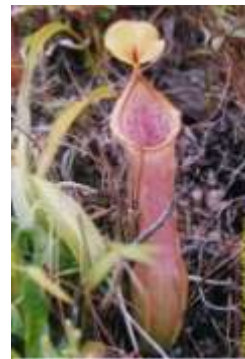


Fig. 23-24. An upper and the reddish lower pitcher of *N. reinwardtiana*

species exist in six provinces of Sumatra Island. This species found in twenty locations with twenty-eight subpopulations (see appendix 1). In several parts of Sumatra Island, the local people use the pitchers as “ketan” rice bowl to cook traditional food or “lamang” (usually the people use bamboo as a container to cook lamang).

Nepenthes rhombicaulis Sh. Kurata



Caulis: rosette and erect; triangular, reddish. **Folium:** sessile, red, lanceolate, \pm 10 x 5 cm, base auriculate, costae glabrous, longitudinal veins distinct 1-4, margin red short hairy, apex acute-acuminate; tendrils insertion apical, glabrous, \leq 20 cm; **Rosette and lower pitchers:** reddish or greenish, ovoid below and gradually narrower cylindrical above, \pm 15 cm, with two fringed wings running from top to bottom, wing 0.1 cm; gland zone

extended ¼-1/3 pitcher high from base; mouth sloping, ovate; peristome widely and expanded outwards, teeth distinct; lid reddish, ovate, base cordate, no appendages; spur unbranched, 0.7 cm long. **Upper pitchers:** not found.

Specimen examined: Toba Samosir, NP 370, NP 374.

Distribution: Sumatra Utara (see Appendix 2 and 3R).

Notes: This species found in one single location with nine subpopulations number (see appendix 1). This habitat is in the slope of mountain near Toba Samosir. This species only have small rosette pitcher in the ground and often piled up by the fallen leaves. This species seem to be looks-like the small rosette of *N. gymnamphora*, if we are not look closely.

***Nepenthes singalana* Becc.**

Caulis: rosette, erect and climbing; angular to cylindrical. **Folium:** sessile, lanceolate to spatulate; costae green; longitudinal veins indistinct; margin red hairs; tendril ± 10-25 cm long. **Rosette and lower pitchers:** dark red, infundibular in the lower most fraction, ovoid in the lower 1/3-1/2 and cylindrically above; with two red fringed wings running from top to bottom; glandular zone ½ in the lower; mouth reddish black, acuminate towards the lid; peristome expanded on the inner side, more or less cylindrical on the outer side and teeth relatively long; lid reddish black, ovate, base cordate, horizontally, no appendages, spur branched. **Upper pitchers:** green, ovoid in the lower, narrower and cylindrical above; mouth reddish or greenish, oblique; lid green, horizontally, ovate, base cordate; spur branched.

Specimen examined: Agam, NP 01.

Distribution: Jambi and Sumatra Barat (see appendix 2 and 3S)

Notes: This species found in mossy forest of Gunung Singgalang, upper montane and swamp forest around Gunung Kerinci. Contrary with Gunung Singgalang, Gunung Kerinci only has two small subpopulation numbers and got potential risk to disappear from their natural habitat. Gunung Kerinci is the famous mountain for the natural enthusiast and the population of *N. singalana* placed near to the mountain trek. Over collection



Photo: Hernawati (NP Team)
Fig. 26. An upper pitcher of *N. singalana* that found by the Team in montane of Jambi Province

and habitat fragmentation are the main problems for this species in Gunung Singgalang and Gunung Kerinci region.

Although twenty-one subpopulations found in the field (see appendix 1), the patches distribution as a result of habitat fragmentation will threat this species in near future. We propose the VU (C2 a, b) for the IUCN status category.

***Nepenthes spathulata* Danser**

Caulis: rosette, erect and climbing; cylindrical. **Folium:** coriaceous, sessile, long spathulate, 14-24 x 2.5-6 cm; base auriculate; costae green, raised beneath; longitudinal veins indistinct, margin glabrous; tendril insertion sub-apical, 14-25.5 cm long, short hairy, have a loop in mature plants; **Rosette and lower pitchers:** green outside and red blotched inside, ovoid below and narrowly cylindrical above, 15.5-22 cm high, with two fringed wings running from top to bottom, wing 0.4-0.6 cm; glandular zone 1/3-1/2 below; mouth sloping, 2.1-2.9 cm in diameter, 4 lobes; peristome red, expanded outwards, 2.9-3.6 cm wide; lid green, elliptic, base cordate, a crested at base beneath 0.2-0.3 cm high, no appendages; spur unbranched, 0.9 cm long. **Upper pitchers:** infundibular at base, gradually ovoid below and cylindrical above, 10-17.5 cm high, wings reduced to ribs; mouth elliptic, 2-3 cm in diameter, peristome thin in front and expanded besides, 3 lobes, 0.3-0.8 cm wide; lid yellowish green, orbicular. All other parts similar to the lower pitchers.



Fig. 27. (left) A rosette pitcher of *N. spathulata* with widely dark-red lobes in it peristome. Fig. 28. (right) The bigger and longer ones of *N. spathulata* pitcher.

Specimen examined: Kerinci, NP 248.

Distribution: Jambi (see Appendix 2 and 3T).

Notes: Clarke (2001) noted that *N. spathulata* has wide distribution from Tanggamus in Southern tip of Sumatra till Kerinci region in Jambi. Nepenthes Team found this species in upper montane forest of Gunung Belerang and highland swamp forest in Kerinci region. The specimens had collected have varied color of pitcher from green till dark red-brown with the attractive color of peristome. We found sixteen subpopulations number in four locations (see appendix 1).

***Nepenthes spectabilis* Danser**

Caulis: rosette, erect and climbing, cylindrical, reddish-blackish, internodes \pm 8 cm.
Folium: coriaceous, red, sessile, auriculate-clasping, spathulate to lanceolate, 10-24.5 x 3.5-5.0 cm, costae glabrous or rarely short red hairy beneath, longitudinal veins 1-4 each sides, distinct; margin short red hairy, apex acute-acuminate; tendril insertion apical, red short hairy, 8-36.2 cm long, have a loop in mature plants. **Rosette and lower pitchers:** green with big maroon blotches, narrower ovoid below and gradually ovoid above, 12.3 cm high; with two fringed wings running from top to bottom, wing 0.4 cm wide; gland zone extended 1/3 below; mouth sloping, ovate; peristome cream with maroon lines, widely and expanded outwards, a raised in front, teeth distinct; lid reddish, elliptic to orbicular, base, cordate, no appendages; spur unbranched, 0.9 cm long. **Upper pitchers:** green with big maroon blotches, infundibuliform, widely cylindrical above, 28.2-29.2 cm high, wings reduced to ribs, gland zone $\frac{1}{2}$ - $\frac{2}{3}$ below; mouth sloping, ovate; peristome green with maroon lines widely backwards, slightly a raised in front, 0.9-1.5 cm wide in front and 2.3-2.4 cm wide under lid; lid green with maroon blotches above and green beneath, elliptic, base cordate, a crested on base beneath c.a 0.2 cm high, no appendages; spur unbranched, 2.2-4.4 cm long. **Inflorescence:** raceme, peduncle 9.5-13.5 cm long with dense short red hairy, pedicels 0.4-0.7 cm long, rachis 28.3 cm long,



Fig. 29. Upper pitcher of *N. spectabilis*

2-flowered on 1 pedicels. Female similar to the male, but with short rachis and fruit 2.3-4 cm long.

Specimen examined: Karo, NP 349.

Distribution: North Sumatra (see Appendix 2 and 3U).

Notes: *Nepenthes spectabilis* only distribute in Northern Sumatra (Sumatra Utara and Aceh Province). Clarke (2001) notes the wide range of distribution in Sumatra Utara

from Toba Samosir till Aceh. This species commonly found in mossy forest of mountain slope in Sumatra Utara. In Gunung Sibayak (type locality) this species found in the open area associated with *N. tobaica* and dense population of *Gleichenia* and *Dipteris conjugata*. Habitat condition in type location is very similar with most of mountain slope in Sumatra Utara, such as Gunung Sinabung and Gunung Sibuatan. We found more than 800 mature plants along as the survey (see appendix 1).

***Nepenthes sumatrana* (Miq.) G. Beck**

Caulis: rosette, erect and climbing; long spine internodes above, cylindrical, reddish hairy. **Folium:** petiole 4-8 cm long, winged, auriculate-clasping; lamina glabrous above, hairy beneath; oblong to lanceolate, 16-25.5 x 5-6.5 cm; margin glabrous, longitudinal veins distinct, apex emarginate; tendril insertion sub-apical or rarely apical, densely red hairy 13-31 cm long, have a loop in mature plants; **Rosette and lower pitcher:** reddish green with red spots, red tomentose hairy, ovoid below and narrowly cylindrical above, with two fringed wings running from top to bottom, wing 0.5-0.7 cm wide, reddish green; mouth red, sloping, oval; peristome with 2 teeth raised in front, lobed or not; lid red-dark red, elliptic, no appendages; spur unbranched. **Upper pitchers:** green, infundibular, wings reduced to ribs; mouth green with red lines, sloping; peristome expanded, 4 lobes, 3 teeth raised in front; lid green beneath and green with red lines above, orbicular, no appendages; spur unbranched, 1-2 cm long. **Inflorescence:** a raceme, axillar under the spine; peduncle 15.5 cm with 0.5 cm diameter; reddish and short hairy; pedicels 0.5-2 cm long; rachis 17 cm long, 2-flowered; fruit 0.7-5 cm.



Fig. 30. A green pitcher of *N. sumatrana*. This species found in small population numbers in their habitat and the habitat potentially get disturb, if road banks will be clearing.

Specimen examined: Sijunjung, NP 104.

Distribution: West Sumatra (see Appendix 2 and 3V).

Notes: *Nepenthes sumatrana* described as *N. spinosa* in Tamin and Hotta's publication (Clarke, 2001) and distribution area of this species reported from the Cupitan Sawahlunto Sijunjung. We failed to find this species in 2001 and species finally found in Sawahlunto Sijunjung outside of Cupitan areas on 2002. The type location of this species reported from Sibolga (Clarke, 2001). We are failed to find this species in type locality. Small number of mature plant (see appendix 1) and the limited extent of occurrence of this species placed it to Critically Endangered (CR) in IUCN status category.

Nepenthes talangensis Nerz & Wistuba

Caulis: rosette, erect and climbing; cylindrical-angular, reddish green. **Folium:** sessile, lanceolate to spatulate, costae green, longitudinal veins distinct, margin green hairy; tendril \pm 15-25 cm long. **Rosette and lower pitchers:** brown with red spots, infundibular in the lower half and gradually ovoid above; with reddish fringed wings running from top to bottom; mouth brown or red, oblique, slightly sloping; peristome widely, teeth indistinct; lid red or green with red blotched, elliptic, base cordate, horizontally, no appendages; spur branched. **Upper pitchers:** green; wings reduced to ribs; mouth recurved in front; lid greenish yellow. All other parts similar to the lower pitchers.



Fig. 31. An upper pitcher of *N. talangensis*, one of endemic species in Sumatera Barat

Specimen examined: Solok, NP 13.

Distribution: Sumatra Barat (see appendix 2 and 3W).

Notes: *N. talangensis* is endemic for Mount Talang, exactly Herbarium ANDA have some specimen of it, but misidentified as *N. bongso*. Their habitat is in mossy forest in higher slope of Gunung Talang. This mountain is popular for the mountaineer and there are so many trails that exist this time. The trails that exist increased the habitat fragmentation for *Nepenthes* in Gunung Talang. We noted nine subpopulations of this species in Gunung Talang (see appendix 1)

Nepenthes tobaica Danser

Caulis: rosette, erect and climbing; cylindrical, glabrous, have a spine at nodes above, internodes 0.5-13.5 cm. **Folium:** coriaceous, glabrous, sessile or sub petioled with alae, clasping, lanceolate to slightly linear, 7.2-23.8 x 1.4-2.4 cm; base auriculate, costae pale green-red; longitudinal veins 1-3 each sides, distinct, flatted above, raised beneath;

margin glabrous, apex acute-round; tendril insertion sub-apical, often apical, glabrous, \pm 4.9-17.2 cm long, have a loop in mature plants. **Rosette and lower pitchers:** variation in color like green, red and dark red; ovoid in the lower, narrower in the middle and cylindrically above, 7.2-14.6 cm high and variation in size, with two fringed wings running from top to bottom, wings 0.3-0.5 cm wide; glandular zone extended 1/3 pitcher high from base; mouth green with red lines and variation in color, oval, sloping; peristome thin, 0.05-0.1 cm wide in front and 0.3-0.5 cm besides, teeth slightly distinct; lid variation in color, oval to orbicular, base cordate, horizontal; spur bifid or trifid, often unbranched, 0.3-0.5 cm long. **Upper pitchers:** wings reduced to ribs; glandular zone extended $\frac{1}{2}$ - $\frac{2}{3}$ high from base; lid green upper and red beneath. All other parts similar to the lower pitchers. **Inflorescence:** a raceme, peduncle densely red hairy 12.2 cm long, 2-flowered, rachis glabrous 10.8-12.9 cm long.



Fig. 32-35. Shape and color variation of *N. tobaica* upper pitchers

Specimen examined: Agam, NP 56; Kerinci, NP 254; Dairi, NP 323, NP 325.

Distribution: Jambi, Sumatra Barat and Sumatra Utara (see appendix 2 and 3X).

Notes: *N. tobaica* very common in Sumatra Utara, we found more than 7000 mature plants (see appendix 1) along the survey. Distribute from the lowland until the montane forest, the main habitat is road bank, ditches or in the slope. It usually associated with *N. reinwardtiana*. This species also found in small patches in Sumatra Barat and Jambi.

THE NATURAL HYBRID

There are twelve natural hybrids that we found along the survey. The natural hybrid can be seen wherever two or more species of *Nepenthes* occurred in one location. The hybrid usually has intermediate character between the parental species. Almost of the natural hybrid that we found in the field are infertile. It is important to know about their fertility in relation with their evolution process. If the natural hybrid can fertilize each other and the offspring can produce mature plant, they will become stabilized to a separate species with the speciation process. Not easy to identify the natural hybrid

species if we are not known the character of the parents species precisely. We collected and maintain the natural hybrid specimens carefully to provide the evidence for research in the future. Study about fertility of the natural hybrid is the interesting subject for *Nepenthes*.

Nepenthes albomarginata* X *Nepenthes eustachya

Caulis: rosette, erect and climbing; cylindrical, brownish. **Folium:** sessile, lanceolate to spatulate; costae red; longitudinal veins distinct or not; margin red hairy; tendril \pm 4-8 cm long. **Rosette and lower pitchers:** red-dark red, narrower ovoid in the lower and cylindrical above; with two red fringed wings from top to bottom; mouth greenish yellow, round, slightly oblique throughout, have a yellowish white circle band under peristome; lid red, cordate, horizontally, spur branched. **Upper pitchers:** not found.

Specimen examined: Mahek, NP 102.

Distribution: Sumatra Barat (see appendix 2 and 3Y).



Fig. 36. A lower pitcher of the natural hybrids between *N. albomarginata* and *N. eustachya*

Notes: First collection for Herbarium ANDA, we found it in Mahek. As far as we know their distribution only in Limo Pulauh Kota region, exactly we only found one individual of mature plant and few of rosette plants in one single population (see appendix 1). We still need more information about this hybrid.

***Nepenthes ampullaria* X *Nepenthes gracilis* (= *N. trichocarpa* Miq.)**

Caulis: rosette, erect and climbing; cylindrical, 0.2-0.4 cm in diam. **Folium:** coriaceous, sessile, lanceolate, 4.5-11.5 x 0.7-2.5 cm; base simple or cuneate; costae red, longitudinal veins 4 each sides, distinct; margin entire, glabrous; apex acute;

tendrils glabrous. **Rosette and lower pitchers:** red or green; broad ovoid-urceolate with two broad wings bearing green fringed hairs at the front, ± 8.0 cm high; wing 0.4-1.8 cm; glandular zone 1/2-2/3 pitcher high from base; Mouth horizontal at front and oblique at rear, expanded, oval, green, 0.2-0.4 cm; peristome short and broad; Lid orbicular to elliptic, base cordate, generally reflexed and angled greater than 90° away from the lip, no appendages. Spur unbranched or trifid, 0.5-0.9 cm long. **Upper pitchers:** infundibular, green, cylindrical at cross section of lower parts; wings reduced to ribs; Mouth 0.1 cm wide; Lid angled smaller than 90° away from the lip. All other parts similar to the lower pitchers

Specimen examined: Rokan Hulu, NP 115, NP 125.

Distribution: Riau and Sumatra Utara (see appendix 2 and 3Z).

Notes: Described as *N. xtrichocarpa* by Miquel (1858). This hybrid found in Riau and Sumatra Utara Province. Found in four locations with one single sub-population with sixty-five mature plants. Found together with *N. ampullaria* and *N. garcilis* that have sympatric distribution.



Photo: P. Akhriadi (NP Team)
Fig. 37. Lower pitcher of the natural hybrids between *N. ampullaria* and *N. gracilis*

Nepenthes ampullaria X *Nepenthes mirabilis*

Caulis: rosette, erect and climbing; green, cylindrical. **Folium:** sessile, auriculate-clasping, angled and winged till 0.5 cm below nodes at internodes, oblong to lanceolate, 6.6-23.6 x 1.1-4.5 cm; costae red with reddish hairy, reddish above and green beneath; longitudinal veins 1-2, distinct; margin red hairy or glabrous; apex acute to rounded; tendril insertion sub-apical often apical, 4.6-10.3 cm long, rare red hairy or glabrous and have a loop on mature plants. **Rosette and lower pitchers:** green or blackish with white blotches, variation in color, ovoid in the lower and cylindrically above, 3.4-9.4 cm high; with two fringed wings running from top to bottom, widely on middle and gradually narrow above, 0.5-0.6 cm; glandular zone extended 2/3 pitcher high; mouth green or red, elliptic-orbicular, sloping; peristome 0.3-1.5 cm wide, expanded inwards, teeth indistinct; lid green with red blotched, linear to elliptic, base truncate, reflexed an angled greater than 90° away from the mouth horizontally, spur Spur unbranched, often branched, 0.2-0.5 cm. **Upper pitchers:** green, infundibular in lower part and tubular above; all other parts similar to the lower pitchers.

Specimen examined: Taratak, NP 65, NP 70; Kerinci, NP 258, NP 263.

Distribution: Sumatra Barat and Jambi (see appendix 2 and 3AA).

Notes: The Natural hybrid of *Nepenthes ampullaria* x *N. mirabilis* found in two locations with five sub-populations. Their habitat found in Taratak, the coastal area of West Sumatra and Kerinci region in Jambi. This Hybrid associated with *N. ampullaria*,

N. gracilis and *N. mirabilis* in the natural habitat (see appendix 1). Although had converted to coconut plantation by local people in 2001, some *Nepenthes* species in Taratak still exist till now. We only found one small population in Kerinci regions in swampy forest with the dense fern population.



Fig. 38. (left) A fantastic pitcher of the natural hybrids between *N. ampullaria* and *N. mirabilis* that found in Jambi Province. Fig. 39. (right) Upper pitcher of *N. ampullaria* X *N. mirabilis* that found with the Team in Sumatera Barat on *Nepenthes* Project 2001.

***Nepenthes ampullaria* x *Nepenthes rafflesiana*
(= *N. xhookeriana* Lindl.)**

Caulis: rosette, erect and climbing; cylindrical, 0.7-1.0 cm in diameter; internodes 4-5.7 cm long. **Folium:** coriaceous, sessile, spatulate, 13.5-29.5 x 3.5-6.5 cm, base auriculate-clasping; costae red, longitudinal vein 1 each sides of costae, distinct; margin red hairy immature and glabrous in mature; apex truncate or round; tendril



Fig. 40. An upper pitcher of the natural hybrids between *N. ampullaria* and *N. rafflesiana*

insertion sub-apical. **Rosette and lower pitchers:** green with red blotched, broad ovoid, cross section of lower parts cylindrically, 7 x 2.7 cm, with two fringed wings running from top to bottom, wing 0.8-1.0 wide; glandular zone extended fully of pitcher high from base; Mouth horizontally, round; peristome 1.2 cm wide, teeth distinct and short; Lid long and narrowly elliptic, reflexed and angled smaller than 90° away from the mouth horizontally, a keeled, no appendages; Spur bifid, 0.5 cm long. **Upper pitchers:** green with red blotches, infundibuliform; cross section of lower part rhomboid; wings reduced to ribs; glandular zone extended 2/3 from base; Mouth ovate, sloping; peristome widely expanded, 1.5 cm wide, raised 1 at front, teeth distinct; Lid ovate, base cordate, reflexed and angled greater than 90° away from the mouth

horizontally, no appendages; Spur unbranched, 0.5 cm long. **Inflorescence:** a raceme, peduncle 39 cm long, pedicels 1.5 cm long, rachis 23 cm long, tomentose, bracteoles; sepal ovate, 0.8 x 0.6 cm; fruit 1.4-4.0 cm long.

Specimen examined: Bengkalis, NP 122, NP 128; Pelalawan, NP 169.

Distribution: Riau and Sumatra Utara (see Appendix 2 and 3AB).

Notes: This hybrid found in Bengkalis, Pelalawan and near Sibolga. The specimen that collected from this location is the first *N. xhookeriana* collection for Herbarium Universitas Andalas. The commonly found in *Gleichenia* and *Melastoma* shrubs in lowland forest of Riau and Sumatra Utara. Only found in four sub-populations, three of them found in Riau. Need more intensive survey in Riau Province, perhaps we will find more population in that province (see appendix 1).

Nepenthes ampullaria x *Nepenthes reinwardtiana*

Caulis: rosette, erect and climbing; orbicular, red hairy, tomentose; **Folium:** sessile, angled, linear to long spatulate, 7.7-30.5 x 2.4-7.1 cm, attenuate at base, densely red hairy at base and beneath surface, costae red hairy both surface, longitudinal veins 4 each sides and distinct beneath, margin red short hairy, apex acute-round; tendril insertion sub-apical, densely red hairy, 9.5-20.9 cm; **Rosette and lower pitchers:** green, ovoid broad at lower part and narrowly elliptic at upper part, 9.2-11.5 x 5.5-6.2 cm; with two green fringed wings running top to bottom where both of tips narrowly and widely at middle (0.6-0.7 cm wide); Mouth green, elliptic to ovate, 5.2-5.7 x 4.1-4.9 cm; peristome 0.9-1.3 cm wide, teeth indistinct; Lid green, elliptic, 3.6-4.9 x 2.3-2.9 cm, base truncate angled greater than 90° away from the mouth horizontally; Spur branched, trifid, 0.8-1 cm long. **Upper Pitchers:** hairy, 4-5.9 x 1.2-1.4 cm; Mouth 1.4-1.8 x 1.3 cm, peristome 0.2 cm wide; Lid 1.2-1.6 x 0.6-0.8 cm, base truncate angled smaller than 90° away from the mouth horizontally; Spur unbranched 0.5 cm. All other parts similar to the lower pitcher.

Specimen examined: Kerinci, NP 252

Distribution: Jambi (see Appendix 2 and 3AC)

Notes: This hybrid found in one location with one single sub-population in one site of Kerinci region together with the other natural hybrid (see appendix 1). This is uncommon hybrid, because *N. ampullaria* and *N. reinwardtiana* usually not find grow together in same location. The specimen that we collected has the green bright color, which is very similar with the color of *N. ampullaria* in the shade place.



Fig. 41. The pitcher of *N. ampullaria* X *N. reinwardtiana* which is very similar in Jambi Province

Nepenthes ampullaria x *Nepenthes spathulata*

Caulis: rosette, erect and climbing, triangular, green, rarely with short spine at nodes above. **Folium:** coriaceous, sessile, angled and winged 0.5 cm long from nodes to internodes at the base, oblong to lanceolate, 9.4-114.4 x 2.8-3.6 cm, costae reddish or green both surfaces, longitudinal veins 2 each sides, distinct beneath; margin red hairy in rosette and glabrous in mature, apex acute-round; Tendril insertion sub-apical, densely short red hairy, 9.8-16.5 cm long, have a loop on mature. **Rosette and lower pitchers:** green with dark reddish blotches, ovoid, 12.3-12.5 x 4.5-5.1 cm, with two fringed wings running from to bottom, wing 0.5-0.6 cm wide with hairs 0.7-0.8 cm long; glandular zone ½ pitcher high from base; Mouth dark red to black, ovate, sloping, 3.9 x 2.3-2.9 cm broad; neck 1.4-1.5 cm; peristome, 1.4-1.5 cm wide, expanded without lobes, teeth distinct; Lid reddish green, elliptic to orbicular, 4.5-4.9 x 3.1-3.3 cm, base cordate, base truncate, angled smaller than 90⁰ away from the mouth horizontally; Spur bifid or trifid, 0.4-0.5 cm. **Upper pitchers:** green, slightly ovoid, 8.2-9.3 x 2.3 cm, wings reduced to ribs: Mouth 2.6-3 x 1.7-2.6 cm, neck 0.3 cm; peristome 0.7 cm wide and expanded at middle, teeth indistinct; Lid green, elliptic, 1.7-3.2 x 2.3-2.7 cm, base cordate, angled smaller than 90⁰ away from the mouth horizontally; Spur unbranched, 0.3-0.4 cm.

Specimen examined: Kerinci, NP 259

Distribution: Jambi (see Appendix 2 and 3AD)



Fig. 42-43. Rosette and aerial pitcher of the natural hybrids between *N. ampullaria* and *N. spathulata*

Notes: Unusual hybrid of *N. ampullaria* x *N. spathulata* uncommon and very rare. Contrary with *N. ampullaria*, *N. spathulata* is the montane species. They never found in same location before, but in Kerinci region they look like abundant and sufficient to do the cross-pollination. Only one single sub-population and one mature plant found (see appendix 1).

Nepenthes bongso X *Nepenthes gymnamphora*

Caulis: rosette and erect; glabrous, triangular, internodes 0.7-6.4 cm, often spine at nodes above. **Folium:** thin coriaceous, sessile to sub-petioled with alae in mature, lanceolate to spatulate, 9.7-30.6 x 3.2-5.1 cm; base auriculate-clasping and angled to a half of internodes; costae green,



Fig. 44. A lower pitcher of *N. bongso* X *N. gymnamphora* in its habitat

glabrous and distinct, longitudinal veins 3-5, distinct both surfaces; hairy both surfaces; margin red hairy, apex acute to acuminate; tendril insertion sub-apical, 9.6-37.2 cm long, glabrous. **Rosette and lower pitchers:** green with red blotched, broad ovoid in lower parts, 8.2-18.7 cm high; with two fringed wings running from top to bottom, wing 0.4 cm wide, reddish green hairs 0.6-0.7 cm long; mouth greenish red, ovate or broad oval, slightly horizontal in front and sloping throughout, expanded backwards, 4 lobes each sides; peristome

thin in front then 2 cm wide at each sides; lid green with red blotched, horizontally, orbicular to ovate, 7.2 x 5.8 cm, base cordate; spur bifid, 0.5-1.0 cm long.

Specimen examined: Solok, NP 74, NP 77,

Distribution: Sumatra Barat (see Appendix 2 and 3AE)

Notes: This natural hybrid found in one single population in Talang Babungo (see appendix 1). First time we identify the specimens as *N. rosulata* (in this report changed with *N. gymnamphora*). The pitcher is looks-like *N. gymnamphora* but both of mount and peristome are looks-like *N. bongso*. Team finally assumed that specimen as natural hybrid of *N. bongso* and *N. gymnamphora*. Both of parental species is abundant surrounding this natural hybrid.

Nepenthes gracilis X *Nepenthes rafflesiana*

Caulis: rosette, erect and climbing; cylindrical, 0.5 cm in diameter. **Folium:** coriaceous, sessile, lanceolate to spatulate, 18.0-26 x 3.7 cm, base auriculate-clasping, costae red; longitudinal veins 3, distinct; margin glabrous, apex acute; tendril insertion sub-apical, have a loop on mature. **Rosette and lower pitchers:** green to reddish green, ovoid in lower parts and cylindrical in upper parts, 7 cm high, with two fringed wings running from top to bottom; glandular zone extended ½ pitcher high from base; mouth oblique, orbicular, peristome narrower, 0.2 cm wide; lid orbicular, base cordate, horizontally, no appendages; spur unbranched, 0.7 cm long. **Upper pitchers:** green with red blotched, broad ovoid in lower part, narrower in middle part and cylindrical in upper part; wings reduced to ribs; glandular zones

extended ½ pitcher high from base; mouth oblique, oval; peristome narrowly expanded; lid orbicular, base cordate, reflexed an angled greater than 90° away from mouth horizontally; spur unbranched, 0.5 cm long.

Specimen examined: Pelalawan, NP 170.

Distribution: Riau (see Appendix 2 and 3AF).

Notes: This hybrid only found in one single sub-population with four mature plants (see appendix 1). Only found in the road bank of Pelalawan, Riau Province, near the margin of rubber plantation. We also found *N. x hookeriana* in this locations.



Fig. 45. Lower pitcher of *N. gracilis* and *N. rafflesia* hybrids

Nepenthes gymnanphora X *Nepenthes spectabilis*

Caulis: rosette, erect and climbing; glabrous, triangular, red; internodes 0.8-6.3 cm.

Folium: coriaceous, reddish green, glabrous, sessile, oblong to lanceolate, 6.8-20.5 x 1.5-3.8 cm; base auriculate-clasping and alae to ¾ internodes; costae red both sides, longitudinal veins indistinct above and distinct 1 beneath in each sides, margin glabrous, apex acuminate; tendril insertion apical, red, hairy, angular, 11.3-23.2 cm



Fig. 46. A lower pitcher of *N. gymnanphora* and *N. spectabilis* hybrids

Female structure similar to the male but with shorter rachis and fruit 1-1.8 cm long.

long, have a loop in mature. **Rosette and lower pitchers:** glabrous, red with dark red or brown blotched, oval below and narrowly above, 8-11.7 cm high; with two fringed wings running from top to bottom, 0.2-0.4 cm wide, red; glandular zone extended ½ pitcher high below; mouth yellowish green with redlines, sloping, oval; peristome distinct, thin in front and expanded besides; lid green with dark red blotched above and reddish beneath, oblique to oval, 2.5-3.9 x 1.5-2.6 cm, base cordate, slightly horizontal; spur unbranched, insertion on 0.2-0.3 cm lid below, 0.3-0.8 cm long. **Upper pitchers:** narrowly oval below and cylindrical above, spur bifid. All other parts similar to the lower pitchers. **Inflorescence:** a raceme, peduncle 12.2-13.8 cm long, pedicels 0.4-0.6 cm long with a mid bractoeole, 2 - flowered, rachis 20.3 - 31.2 cm long;

Specimen examined: Karo, NP 359, NP 362.

Distribution: Sumatra Utara (see Appendix 2 and 3AG)

Notes: This natural hybrid found in montane forest, associated with *N. gymnamphora* and *N. spectabilis*. It is common in dense population of ferns such as *Gleichenia linearis*, *Dipteris conjugata* and *Pandanus* vegetation. We found three subpopulations with ninety-six mature plants in the field (see appendix 1).

***Nepenthes inermis* x *N. talangensis*
(= *N. xpyriformis* Sh. Kurata)**



Fig. 47. An aerial pitcher of the natural hybrids between *N. inermis* and *N. talangensis* that found in Sumatera Barat only

Caulis: rosette, erect and climbing; cylindrical, greenish. **Folium:** sessile, elliptic to lanceolate; costae green; longitudinal veins indistinct; margin white hairs; tendril \pm 10-20 cm long. **Rosette and lower pitchers:** not found. **Upper pitchers:** green, tubular in the lower half and gradually cylindrical above; wings reduced to ribs; mouth green, oblique, width; lid green, ellips horizontally; spur unbranched.

Specimen examined: Solok, NP 14.

Distribution: Sumatra Barat (see appendix 2 and 3AH).

Notes: Kurata (2001) was described this natural hybrid as *N. pyriformis*. This hybrid only found in the higher slope of Gunung Talang associated with *N. Talangensis* that endemic species for Gunung Talang. We only found small individual in our observation and we still need more information about this species in the future (see appendix 1)

Nepenthes ovata* X *Nepenthes spectabilis

Caulis: rosette, erect and climbing; angular, tomentose; internodes 5.7-6.3 cm. **Folium:** sub-coriaceous, sessile, clasping and angled till \pm 2 cm to nodes below; lanceolate, 19-21.2 x 2.2-3.2 cm; base auriculate; costae tomentose, longitudinal veins 2 each sides and distinct in dry; margin glabrous, apex acuminate; tendril insertion sub-apical,

tomentose, 19.5-25.7 cm, have a loop. **Rosette pitchers:** not found. **Middle pitchers:** buds pitcher tomentose; dark green with blackish blotched, infundibular in lower part and narrowly cylindrical above, 15.7-16.9 cm high; wings reduced to ribs at glandular zone and running from top to border of glandular zone, often running c.a. 0.5-1.0 cm to peristome below; glandular zone extended a half of pitcher high; mouth green with dark red strip lines, sloping, ovate, \pm 2.0 cm in diameter; peristome thin in front c.a. 0.2 cm wide, gradually wide to lid c.a. 0.4 cm wide, teeth distinct; lid oval, base cordate, no appendages; spur tomentose, unbranched, positioned 0.2-0.4 cm lid below, 0.7-1.0 cm long. **Upper pitchers:** not found.



Fig. 48. A lower pitcher of *N. ovata* X *N. spectabilis* hybrids

Specimen examined: Toba Samosir, NP 375.

Distribution: Sumatra Utara (see Appendix 2 and 3AI).

Notes: This natural hybrid found in the same slope

with *N. ovata*. Only found in one single subpopulation number with one mature plant (see appendix 1). *N. ovata* produces the ovoid or infundibular lower pitcher and with very board peritsome, meanwhile *N. spectabilis* produces the elegant, gracile and dark colored pitchers. The hybrid has the intermediate character both of them.

Nepenthes reinwardtiana* x *Nepenthes spathulata

Caulis: rosette and erect, triangular, green. **Folium:** sessile, auriculate-clasping and angled wing till 0.5-2.5 cm nodes below, lanceolate to narrowly spathulate, 10.2-17.5 x 2.3-3.8 cm; costae glabrous, red above and green beneath; longitudinal veins 2, distinct beneath; margin glabrous, apex acute; tendril insertion sub-apical, hairy, 6.9-18.7 cm long. **Rosette and lower pitchers:** green with red blotched above, with 'eye spots' inside, broad ovoid below and gradually narrower cylindrical above, 8.8-13.5 cm high, with two fringed wings running from top to bottom, wing 0.3-0.4 cm wide; glandular zone extended $\frac{1}{2}$ pitcher high from base; mouth red, sloping, ovate to elliptic, rarely with neck c.a 0.2 cm hig; peristome thin, 0.2-0.3 cm wide, teeth indistinct; lid green with red blotched, elliptic, slightly horizontal, base truncate, no appendages; spur bifid, 0.4-0.5 cm long. **Upper pitcher:** not found.



Fig. 49. 'Eye spots' inside of the pitcher from *N. reinwardtiana* X *N. spathulata* hybrids still present. This natural hybrid was found in Jambi Province only

Specimen examined: Kerinci, NP 259.

Distribution: Jambi (see Appendix 2 and 3AJ).

Notes: Kerinci region is the habitat for this natural hybrid. They are not common, only one single sub-population found with one mature individual (see appendix 1). It is found together with parental species and the other *Nepenthes* species in Jambi province.

UNCLEARLY IDENTIFIED TAXA

Along the survey we also found four species that not recognized well. Three of them collected in Sumatra Utara and one specimen collected in Sumatra Barat and all of them classified as unclearly identified taxa. Some character look different with the species that had been reported exist in Sumatra Island and also not identical with the natural hybrid. Finally the Team decided to place it in special group. Although not unidentified well this time, the population density are counted and mapping of their geographical distribution presented in this report.

Nepenthes sp1

Caulis: rosette and erect; cylindrical, green, spine in nodes above, internodes 1-4.5 cm. **Folium:** coriaceous, sessile, clasping, spatulate-oblong, \pm 20 cm long; costae green; longitudinal veins distinct above, indistinct beneath; margin glabrous, apex rounded; tendril insertion sub-apical, \pm 30 cm long, hairy; **Rosette and lower pitchers:** broad ovoid, reddish tawny pubescent, green with blackish blotches, \pm 15 cm high, glandular zone extended $\frac{1}{2}$ - $\frac{2}{3}$ pitcher high from base; two winged 0.1 cm wide; mouth sloping, elliptic, a raised in front; peristome blackish, expanded outwards, 2 lobes each sides,

teeth distinct; lid elliptic, base truncate; spur 0.3-1.2 cm long, trifid. **Upper pitchers:** \pm 20 cm high, reddish tawny pubescent, wings reduced to ribs; spur 1.2-1.6 cm long. All other parts similar to the lower pitchers. **Inflorescence:** a raceme, peduncle 3.5 cm long; pedicels 0.5-0.6 cm long, 2-flowered.



Fig. 50-51. The ovoid and fat pitcher of *Nepenthes* sp1

Specimen examined: Karo, NP 354.

Distribution: Sumatra Utara (see Appendix 2 and 3AK)

Notes: Character of *Nepenthes* sp1 looks very similar with *Nepenthes* spA that described by Clarke (2001). The pitcher and the peristome look very similar with *N. bongso*, but the coloration design of the pitcher rather similar with *N. spectabilis*. The pitcher closed by a dense brown short hairy. They only found in small patches in Karo Region and their habitat is potentially to disappear caused by land clearing. We only found one single population and twenty-four mature plants (see appendix 1). Tragically, the species have potentially to disappear. They will deplete before they can recognized well.

Nepenthes sp2

Caulis: rosette, erect and climbing; triangular, green, internodes 3.9-9.6 cm. **Folium:** petioled with alae \pm 5 cm long, auriculate-clasping and angled till nodes below, lanceolate, \pm 50 cm long, scurfy-like both surfaces; costae red base above till petiole, longitudinal veins distinct, margin reddish hairy, apex acuminate; tendril insertion apical, scurfy-like, green, \pm 45 cm long, have a loop in mature plants. **Rosette and lower pitchers:** ovoid in lower part and narrowly cylindrical above, reddish scurfy-like, \pm 8 cm high, with two fringed wings (0.1-0.2 cm) running from top to bottom; mouth green, sloping, ovate, peristome thin, teeth distinct; lid ovate, base cordate, reddish black above and reddish-green with reddish



blotches beneath, no appendages; spur unbranched, 0.6-0.8 cm. **Upper pitchers:** soft reddish hairy, green base so red and then dark red, ± 20 cm high; wings reduced to ribs; peristome a raised and curved in front, thin and gradually rather expanded; spur ± 2 cm long. All other parts similar to the lower pitchers.

Specimen examined: Pasaman, NP 378.

Distribution: Sumatra Barat (see Appendix 2 and 3AL).

Notes: This species found in the lower slope of Bukit Barisan North of Bukittinggi. Found only in small patches in the forest ground. Look like *N. longifolia*, but the leaf are more long and thinner. There thirteen mature plants found (see appendix 1) but only one individual that have a pitcher. Mature plant ascending their stem to the other vegetation and produce the pitcher with interesting color.

Nepenthes sp3

Caulis: rosette and erect; cylindrical, blackish green. **Folium:** auriculate-clasping, slightly angled, reddish green, spatulate to lanceolate, ± 15 cm long; costae reddish above, red short hairy beneath; longitudinal veins indistinct, margin red short hairy, apex acute; tendril insertion sub-apical, often apical, densely red short hairy, ± 20 cm long. **Rosette pitchers:** ovoid in lower part and cylindrical above, green with big dark red blotches, ± 15 cm high; with two fringed wings (0.5-0.6 cm) running from top to bottom; mouth sloping. elliptic, peristome widely backwards, 0.1-0.5 cm wide, teeth distinct; lid elliptic; spur unbranched, ± 2 cm long. **Middle pitchers:** slightly infundibular in lower part and gradually cylindrical above, red with big dark maron blotches, ± 19 cm high, with two fringed wings (0.1 cm); spur densely red short hairy, 0.5 cm distance under lid. All other parts similar to the rosette pitchers.

Specimen examined: Karo, NP 353.

Distribution: Sumatra Utara (see Appendix 2 and 3AM).

Notes: *Nepenthes* sp3 found in the same habitat with *Nepenthes* sp1. Some characters are similar with *N. spectabilis*, but glandular zone of this species broader than *N. spectabilis* and its spur have a dense short hairy. For a while the team separated this species from *N. spectabilis*.



Fig 53. *Nepenthes* sp3 lower pitcher

Nepenthes sp4



Fig. 54. An big aerial pitcher of *Nepenthes* sp4

Caulis: rosette, erect and climbing; cylindrical, reddish.
Folium: sessile, auriculate-clasping and rather angled, red, \pm 20 cm long, spatulate, costae rarely short red hairy, longitudinal veins distinct, margin short red hairy, apex acute-acuminate; tendril insertion apical, red short hairy, \pm 20 cm;
Rosette and lower pitchers: broad ovoid in lower parts and gradually cylindrical above, \pm 15 cm high, green with dark red blotches; with two fringed wings (0.1 cm) running from top to bottom; mouth sloping, ovate; peristome widely and expanded outwards, cream with dark red lines, big a raised in front, teeth distinct; lid elliptic, base cordate, reddish, no appendages; Spur unbranched, 0.9 cm. **Upper pitchers:** Infundibular in lower parts, broad ovoid in the middle and gradually cylindrical above, peristome have 1 or 2 raised in front, spur unbranched, \pm 4 cm long. All other parts similar to the lower pitchers.

Inflorescence: a raceme, rachis 28.3 cm long, peduncle 9.5 cm long with densely short red hairy, pedicels 0.6-0.7 cm long, 2-flowered. Female structure similar to the male, but with shorter rachis and have fruit \pm 4 cm long.

Specimen examined: Toba Samosir, NP 369.

Distribution: Sumatra Utara (see Appendix 2 and 3AN).

Notes: This species looks very similar with *N. ovata* x *N. spectabilis*, but the upper pitcher *Nepenthes* sp4 is ovoid infundibular and the peristome wider than *N. ovata* x *N. spectabilis*. We decided to separate this group for a while. Only found in Toba Samosir montane.

B. THE CONSERVATION

The main problem that threat *Nepenthes* in Sumatra Island is habitat destruction, removal by plant collector and lack understanding of conservation value for this species. All the provinces that we accessed to conduct research faced these problem, although in different intensity. *Nepenthes* in lowland and lower montane forest are seriously threatened by habitat destruction, meanwhile the montane species that usually included to remote protected area threat by over collection and habitat fragmentation. The conservation status of Sumatran *Nepenthes* species presented and discussed below.

Conservation Status Of Sumatran *Nepenthes*

The conservation status of *Nepenthes* that presented in this report compile based on the field data and habitat condition that we found in the field. All the natural hybrid and unclearly identified taxa classified as Data Deficient (DD) and not presented here. This estimation addressed for the species that had identified well. This data also compared with IUCN criteria for Sumatran *Nepenthes* (Annon, 1994 *cit.* Clarke 2001) and CITES Carnivorous Plant Checklist compiled by Bertrand von Arx (in press). The status presented below proposed only for the population in the study sites.

Table 1. The Conservation Status of *Nepenthes* in Sumatra Island

No.	Species	IUCN Criteria (Annon., 1994 <i>cit.</i> Clarke, 2001)	IUCN Criteria (proposed for West Sumatra, NP Team 2001)	IUCN Criteria (proposed for Sumatra, NP Team 2003)
1.	<i>N. adnata</i>	DD (CR)	CR (D)	CR
2.	<i>N. albomarginata</i>	LR (nt)	CR (C2a)	EN (C2a)
3.	<i>N. ampullaria</i>	LR (lc)	LR (lc)	LR (lc)
4.	<i>N. aristolochioides</i>	CR	---	CR
5.	<i>N. bongso</i>	LR (cd)	EN (C2a)	VU (C1 & 2a)
6.	<i>N. dubia</i>	CR	CR (B1,2e & D)	CR (B1,2e & D)
7.	<i>N. eustacya</i>	LR (lc)	LR (nt)	LR (nt)
8.	<i>N. gracilis</i>	LR (lc)	LR (lc)	LR (lc)
9.	<i>N. gmnamphora</i>	LR (cd)	LR (cd)	LR (cd)

10.	<i>N. inermis</i>	LR (cd)	CR (B2c & D)	LR (cd)
11.	<i>N. izumiae</i>	DD	---	DD
12.	<i>N. jacquelinae</i>	DD	---	LR (cd)
13.	<i>N. longifolia</i>	VU	---	CR (B2b, e & D)
14.	<i>N. mirabilis</i>	LR (lc)	LR (lc)	LR (lc)
15.	<i>N. ovata</i>	VU	---	VU
16.	<i>N. rafflesiana</i>	LR (lc)	---	EN (2a)
17.	<i>N. reinwardtiana</i>	LR (lc)	LR (lc)	LR (lc)
18.	<i>N. rhombicaulis</i>	VU	---	VU
19.	<i>N. singalana</i>	LR (lc)	EN (D)	VU (2A,B)
20.	<i>N. spathulata</i>	LR (cd)	---	LR (cd)
21.	<i>N. spectabilis</i>	LR (cd)	---	LR (cd)
22.	<i>N. sumatrana</i>	CR	---	CR
23.	<i>N. talangensis</i>	EN	EN (B2c & D)	EN (B2c & D)
24.	<i>N. tobaica</i>	LR (lc)	DD	LR (lc)

The Threatened Species

We propose and classified eight of Sumatran *Nepenthes* as threatened species that need urgent protection based the recent condition of the population and their natural habitat. The species discussed above.

Nepenthes adnata

Only exist in two small populations and small number of mature plants in Kelok Sambilan and Harau. The population in Harau recently found by Nepenthes Team in 2003. The highlight discoveries provide us the evidence of the new distribution area for this species. The threat for this species is conversion of their habitat to cultivated land (Harau) and habitat fragmentation caused by wood gathering by local people. Nepenthes Team has been monitoring the continuity of this species as long as possible.



Fig. 35. Only two small population of *N. adnata* exist in the wild

Nepenthes albomarginata

This species rarely found this time, along the Sumatran Expedition survey we cannot found it in the field, except in Mahek and Kelok Sambilan. The population in Kelok sambilan is depleted from their habitat as a result of the road broadened, only the population in Mahek that exist this time. In Mahek they also not very abundant and the habitat is in the road bank of the main road to Mahek. This habitat particularly threat by road broadened.

Nepenthes aristolochioides

Presently know from small population number in Gunung Tujuh, the remote mountain that visited by many visitors, mountain climber, birdwatcher, and fisherman and also the tiger trapper. When conduct the survey we found one of three peaks that we surveyed have so many trail that fragmented the forest. This condition apparently affected this species in there, the plant look unhealthy. The other threat for this species is over collected and most of the enthusiast is foreign. The discoveries of new population by Nepenthes Team in 2003 provide the highlight evidence for the recent distribution area of this species. Despite the new population site are found the treat for this species are not decreased, because the site potentially to get disturbances in near foreseeable. The treat also come from some herbivore that eaten the young plant of this species, we found the trace and feces of the animal in the new population area.

Nepenthes dubia

Nepenthes dubia presently exist in Gunung Talamau. Restricted of the distribution area classified it to Critically Endangered IUCN status category. This species only found in small population number. Removal this species from their natural habitat is the higher risk that threaten the species. Although no habitat destruction reported from that mountain, sheltered many places in the mountain by visitor will increase disturbances for this species.

Nepenthes longifolia

Also classified by Nepenthes Team to endangered species. The classification comes based on several reasons. Firstly the distribution area is limited this time, only in Sumatra Barat and



Sumatra Utara. Although reported found in Sumatra Utara, we failed to find it along the *Nepenthes* expedition survey. Kelok Sambilan is the main habitat for *N. longifolia*, recently clearing for road broadening. When we access that places in 2003, this species completely disappear from that area. Only few mature plants that still exist in the slope of the hill in Kelok Sambilan.

Nepenthes rafflesiana

This species had been reported from Sumatra Utara and Riau Archipelago. No specimen that reported from the mainland of the Riau Province. We found this species from the mainland of Riau Province in 2003 survey. *Nepenthes* Team classified this species as Endangered species. The reason for it is the limited distribution area and the high risk of habitat destruction. In Riau mainland this species found in the *Glecheinia* shrubs near the human settlement and in swamp between the palm-oil plantations or in the younger palm oil plantation. It habitat was potentially got the highest risk to be cleared by human activities and if it is happen, this species will disappear.

Nepenthes sumatrana

Nepenthes sumatrana is lowland species that reported in the restricted distribution area in Sawahlunto and Sibolga. The team failed to found this species in Sibolga and only found the small patches of their population in Sawahlunto region. Like the other lowland *Nepenthes*, this species also threat by habitat destruction caused by conversion of natural forest to cultivated land and road



Photo: P. Akhriani (NP Team)
Fig. 57. Upper pitcher of *N. sumatrana* in dense *Gleicheinia* shrubs

broadened. Discoveries this species in Sawahlunto is the highlight evidence for their existence in the field. The type locality of this species failed to found in 2001 survey.

Nepenthes talangensis



Fig. 58. Lower pitchers of *N. talangensis*, one of threatened and endemic species in Sumatra Island

Nepenthes talangensis presently know from Gunung Talang. This species particularly threat by habitat destruction and conversion of natural forest to cultivated land. The remnant of this habitat in the higher slope of this mountain also faced by habitat fragmentation result by several trails that exist in there commonly used by several visitors in the recent time. If the disturbances are not controlled the species will faces the bad condition and the population that still exist in there will decrease sooner. Some plant enthusiast also hunting this species for collected.

Habitat Conditions

We presented the brief introduction about natural habitat of *Nepenthes* in seven provinces of Sumatra Island that we accessed to conduct the research. The recent condition presented above.

SUMATRA UTARA

Nepenthes commonly found in western part of this province, distributed from the coastal region till the montane forest. *Nepenthes* in the coastal region threat by road broadened and sand excavation from the road bank. Sand excavation activity created in

almost main road in Sumatra Utara, especially around Tapanuli Tengah, Humbang Hasundutan and Dairi. These regions are the potential habitat for several kinds of threatened species of *Nepenthes* such as *N. sumatrana*, *N. longifolia* and *N. rafflesiana*. *Nepenthes* in the montane forest apparently not suffering by habitat destruction, except in few ridges of one mountain in Toba Samosir are fragmented by animal trapper trails.

SUMATRA BARAT

Sumatra Barat Province is potential habitat for *Nepenthes* species. Eighteen species of *Nepenthes* reported from this province, most of them are endemic and classified as threatened species. Contrary with *Nepenthes* habitat in Sumatra Utara, most of montane habitats in Sumatra Barat are seriously threaten by habitat destruction. Almost the lower montane forest was converted to cultivated land. Road broadened also threat some *Nepenthes* population in this province. The remnant of the *Nepenthes* habitat in this province is global priority to conserve *Nepenthes* species. The conservation effort to conserve *Nepenthes* in Sumatra Barat has been done for three years by Nepenthes Team



Fig. 59. One of montane habitat for *Nepenthes* in Sumatera Utara.



Fig. 60. Habitat destruction in one of mountain in Sumatera Barat.

RIAU

Nearly all parts of Riau Province are lowland habitat and consist of several islands in the eastern part. Contrary with the mainland, the island in eastern Riau had surveyed by researcher for long time. Most of the *Nepenthes* specimen that deposited in BO that collected in Riau is labelled from Riau Archipelago. Nearly all the lowland forest was converted to palm-oil plantation and rubber plantation. Almost the remnant of the natural habitat is swamp and secondary forest that dominantly by small shrubs, *Nepenthes* found between the vegetation in there.



Fig. 61. *Gleichinia* shrubs, suitable habitat for *Nepenthes* in Riau Mainland

JAMBI

Highland and montane forest is the potential habitat for *Nepenthes* species in Jambi. Several wonderful species occur in highland till the montane forest. Some of the volcano and mountain in this region still have a good natural forest except the regions around Gunung Kerinci and Gunung Tujuh Area. Most of the lower montane forest in there was converted to cultivate cinnamon and vegetable crop. Illegal logging also caused forest destruction in Jambi and this condition increased year by year. Gunung Kerinci and Gunung Tujuh area are the main habitat of one Critically Endangered *Nepenthes* species. This wonderful species hunted by *Nepenthes* collector around the world. Beside that, in Jambi also exist various kinds of Natural hybrid of *Nepenthes*.



Photo: P. Akhriadi (NP Team)
Fig. 62. Gunung Tujuh is important habitat for Critically Endangered *Nepenthes* species in Sumatra Island

SUMATRA SELATAN

Sumatra Selatan province placed in the southern lowland part of Sumatra Island. Most of the regions consist of the swamp lowland forest. The natural habitat apparently converted to rubber and palm-oil plantation. Only the small parts of secondary natural forest exist. No endemic species of *Nepenthes* reported from this province. The lowland *Nepenthes* species commonly found in the roadside or in the shrubs vegetation in secondary forest.



Fig. 62. One of habitat for *Nepenthes* in Sumatra Selatan.

LAMPUNG

Lampung located in southern tip of Sumatra Island. Nearly all the natural forest converted to cultivated land. Coffee, clove, pineapple, paddy-rice and cassava are the main planted plants in this province. Human settlements full fill the gap between these plantations. *Nepenthes* only found in small patches in the margin of the plantation or in roadside. There are not so many species found in there.



Fig. 63. Views of one mountain in Lampung Province.



Fig. 64. The Giant Flower *Rafflesia* that spread when the Team conducted survey in Bengkulu

BENGKULU

This province located in the west coastal area of Sumatra Island. *Nepenthes* species commonly found in road bank in secondary forest. Only the common species that occur in the lowland that found in this province. This province is famous as the potential habitat for the giant flower *Rafflesia arnoldi*.

Social Economic Conditions

There are several names that used by Sumatran people to recognize *Nepenthes* (see appendix 6.). Tahul-Tahul is the local name for *Nepenthes* in Sumatra Utara. Only the local name in Sumatra Utara that relatively different, meanwhile in the other provinces used the same name with the Sumatra Barat people. Apparently all of the names have the same meaning with the name that used by Minang and Melayu people.

Most of the Sumatran people used the pitcher of *Nepenthes* to cook the traditional food that called “lamang” but in the recent time only few people that know and used it. In several locations in Sumatra the water in unopened pitcher used as medicine. The water in an unopened pitcher used for fever and eyes irritation medicines and it’s decoction roots with other plants ingredient can use to prevent child from “ngompol” (getting wet one’s bed) and in one region the water of unopened pitcher used to prevent dysentery. The utilization of the pitcher ingredient only based on self experience or suggest by herbalist.

Only few people from one location in Sumatra Utara used *Nepenthes* as an ornamental plant. Undoubtedly they are not know what kind species of this plant that they had collected, in accordance with their opinion *Nepenthes* is an orchid. Then they named this species with “The seldom of Giant Orchid”. In one side the activity of the people in there will give the positive effect to introduce the intrinsic value of this species to local communities. In the other side, if this activity not control and managed well it will be a serious threat for the wild species of *Nepenthes* in the future.

Nepenthes trade in Sumatra Island could not be proved until this time, although 15 taxa were treated as being endemic to Sumatra are trade internationally (Simpson, 1995 *cit.* Clarke, 2001). No evidence for *Nepenthes* trade in Sumatra Island, but *Nepenthes* going out from this Island and cultivated abroad. Definitely there are people or some people that take and bring the plant to outside of Sumatra. We could not identify the person that do and have responsibility to do that. The fact is, in the recent time one of the newest *Nepenthes* species from Sumatra Island going out, cultivated and trade outside of this island. We are very upset with this condition. Apparently the conventional method used to do this activity, come to the location site, make contact with the local people and collect important part of the plant that available to cultivate and bring it outside. Very simple, but is knockout the *Nepenthes* Team. When we spent our energy and time to introducing status and existence of this species for Sumatran people, the species available for trade in the other country. It is tragically. We know the knowledge and experience of the Sumatran people limited to solve this problem. We know the rule for that activity no clearly implemented by the responsible institution. Only one question for *Nepenthes* enthusiast “is it fair for Sumatran people?” Taking species and bring it to outside the Indonesian country without permission from the Indonesian institution is not ethical and must be classified as a crime.

Conservation Recommendation

The conservation effort to conserve *Nepenthes* in Sumatra Barat has been done since 2001 (*Nepenthes* Project 2001). The six important sites requiring protection in this province are monitored continuously in 2002-2003. The conservation effort have been done step by step. The local people in the study sites approached by several activities that conducted in their region. Increased the public capability to conserve their

environment is the main objectives of this activity. This approach apparently given the positive impact to the local people and emerged some ideas to conserve and managed their natural resources by themselves. Some conservation ideas had implemented well by the local village government in the several study sites, despite this positive effort has not get the sufficient respond from local government in the higher level. We optimistic the local people are the main actor that played the important rule to conserve natural resources in the study sites.

The persuasive effort must be continued slowly in order to the aware and enthusiasm of the local people can stable and be increased. The teacher of the elementary school is the following main target to get the information about the conservation effort of *Nepenthes* in Sumatra Barat. If we are success to approach them, the information about *Nepenthes* conservation effort in relation with improvement of the environment quality will continue to young generation in the study site.

Establishment of long terms-conservation links between Nepenthes Team, student organization of nature concern, environmental NGO, science institution, local communities and local Government in Sumatra Barat apparently given the positive impact for *Nepenthes* conservation and the environment surrounding this species. The simple diagram that shown the links presented on Diagram 1.

As long as we know, this link (Diagram 1.) had been given positive impact to *Nepenthes* conservation effort in Sumatra Barat. Nearly all the component involved and took part in this activity. This link will be improved in the future to the wider scale.

The effective way to conserve a species like *Nepenthes* in the remainder habitats is giving an opinion to local people about it intrinsic economic values. This approaches success to improvement the awareness of public communities in Sumatra Barat to take part in *Nepenthes* conservation effort. Links that have been established by Nepenthes Team in Sumatra Barat can be implemented in wider scale to the public communities in the other provinces of Sumatra Island.

The important step for that activity is identifying the potential target to conduct the conservation effort. Not all the people or group of the people in the communities capable to do this job. We must select the potential ones to encounter all the problems that faced to them and their environment.

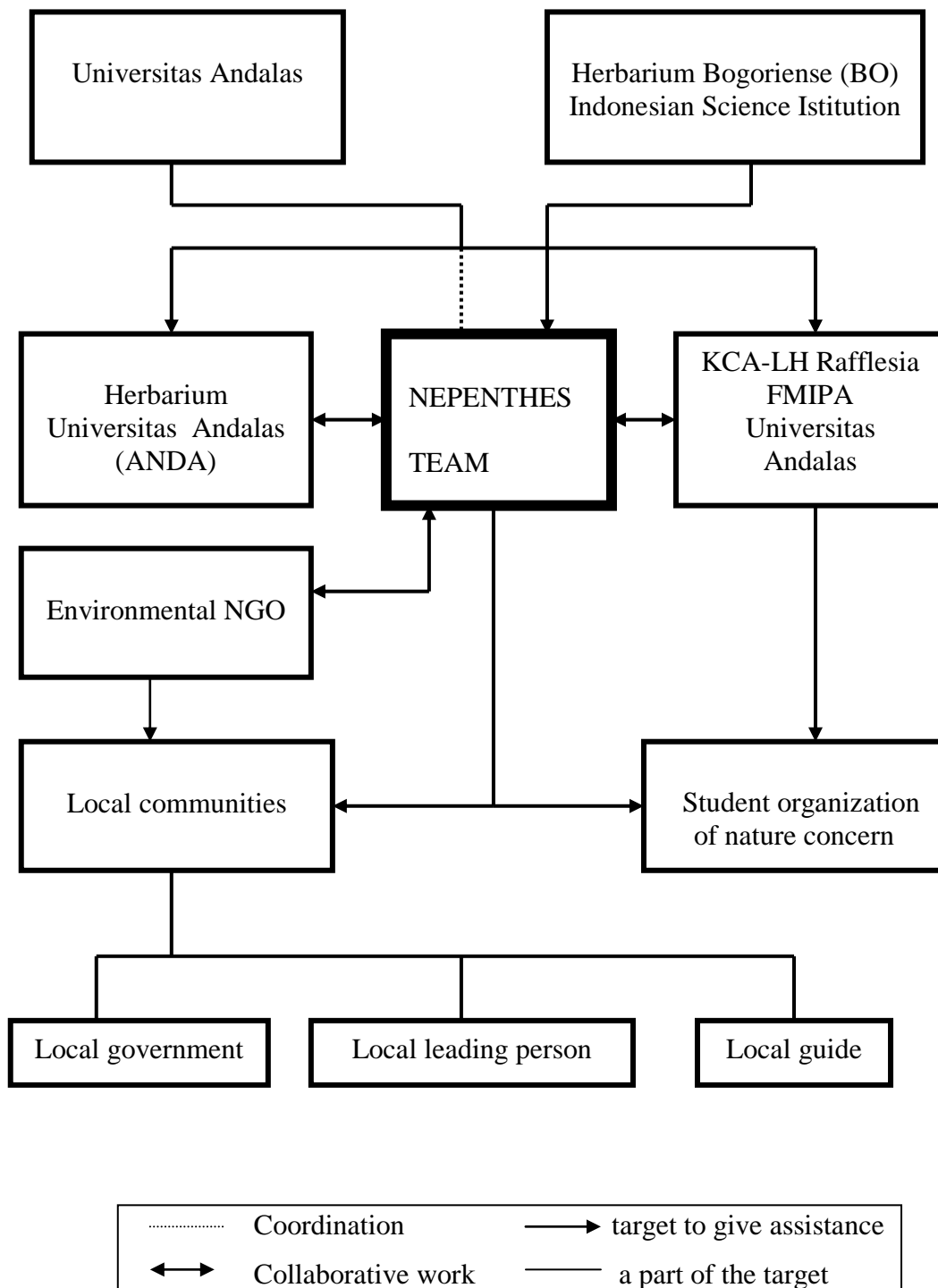


Diagram 1. The component that be involved for *Nepenthes* conservation effort in Sumatra Barat.

Important Sites Requiring Protection

According to numbers of species, threatened level and habitat condition and also participatory of local people in the study sites, we recommend protecting and conserving for several locations below as Protected area for *Nepenthes* species in Sumatra Island:

1. Sumatra Utara Province

- ❖ Gunung Panglubao
- ❖ Gunung Sibayak,
- ❖ Gunung Sinabung
- ❖ Gunung Sibuatan

2. Sumatra Barat Province

- ❖ Mahek
- ❖ Kelok Sambilan
- ❖ Talang Babungo
- ❖ Mount Gadut
- ❖ Mount Talamau
- ❖ Mount Talang

3. Jambi Province

- ❖ Gunung Tujuh areas
- ❖ Gunung Kerinci areas
- ❖ Kerinci Region

4. Riau Province

- ❖ Bengkalis

Ex-Situ Conservation Plans

Herbarium Universitas Andalas provided *Nepenthes* Team the space in Arboretum Universitas Andalas Limau Manih to establish the ex-situ conservation sites. The arboretum located not so far from Herbarium Universitas Andalas Limau Manih Padang. *Nepenthes* Team used that place to growing several kinds of lowland *Nepenthes* species. Only three species that success to grow, that is *N. ampullaria*, *N. mirabilis* and *N. gracilis*. Meanwhile *N. eustachya*, *N. reinwardtiana* and *N. albomarginata* despite till life until this time, they look unhealthy. Honestly we have limited experience to grow *Nepenthes* and hope the professional grower helping us in the near future. In long term-conservation plans that place will be arrange as an ex-situ habitat for all the lowland *Nepenthes* species in Sumatra Island. Intensive study about that plans still continues to fulfill the objectives.



Fig. 65-66. Arboretum Universitas Andalas

C. ENVIRONMENTAL EDUCATION

There are two main activities that we had done to conduct the environmental education for *Nepenthes* Conservation in Sumatera Barat that is *Nepenthes* Coloring Competition and Essay Writing Competition. These activities addressed to different audience. *Nepenthes* Coloring Competition addressed to kindergarten and elementary students school and Essay Writing Competition addressed to the students of senior high school. Training for guide, public leading person and local communities also included in this activity and be presented to the communities informally.

Nepenthes Coloring Competition (NCC)

The series of *Nepenthes* Coloring Competition (NCC) activities started on early July 2002 till late February 2003 in six important sites for *Nepenthes* Conservation in Sumatera Barat these are Mahek, Kelok Sambilan, Talang Babungo, Gunung Gadut, Gunung Talamau and Gunung Talang. These locations are important sites requiring protection for *Nepenthes* Conservation that recommended by *Nepenthes* Project 2001. The series of NCC activities completed in three or four visit in each location. *Nepenthes talangensis* Nerz & Wistuba one of endangered species that endemic for Sumatra Island used as mascot of NCC.



Fig. 67-68. *N. talangensis* as a mascot of NCC and one of the coloring pitcher by participant

After the competition in each event, *Nepenthes* Team give the brief introduction about *Nepenthes* to the student and followed by discussion about status and existence of *Nepenthes* with the local communities that invited to the competition. The winners of the competition got the trophy and school appliance as a reward. There was three main activities accompanying *Nepenthes* Coloring Competition that is:

1. Informal training to go by introducing status and existence of *Nepenthes* to vocal local people that concern about environment (including guide and local village leading person).
2. Introducing and discussing *Nepenthes* plans conservation with village local government
3. Producing and distributing *Nepenthes* poster to the local community

Training For The Local Communities

Nepenthes Team conduct the training informally, so we are not presented paper or presented electronic display to the local communities. We only use photo leaflet and poster as a presented media. We also not use a special room to do this activity. We usually try to visit the village leading person for the first and then, together with him we visited the public communities that occurred in that region. Commonly we use the village local government office as place to discuss and sharing knowledge with the local communities but we also used home, school, mosque and the small coffee shop to conduct the activity.



Fig. 69. Sharing and discussing about *Nepenthes* conservation efforts with local people.

The local communities are the important subjects for *Nepenthes* conservation, because they have more access to habitat of natural *Nepenthes* if we compare with the

other public component that involved in *Nepenthes* conservation efforts. In the matter of fact the local people have self-capability to conserve their own natural resources, the problem is how to increase their concern to do that. The public will become conscious after the struck by natural disaster, such as drought, inundation and soil erosion. These disasters have close relationship with natural forest disturbances.

Introducing the intrinsic value of the species to the local communities and use *Nepenthes* species as new icon for natural forest conservation, there was one of the persuasive efforts that had done by *Nepenthes* Team.

Produce And Distribute Poster To Local Communities



Fig. 70-71. Poster of *Nepenthes* with 2003 calendar and *Nepenthes* leaflet of 2001.

Nepenthes poster that distributed to local communities present the activity of *Nepenthes* Coloring Competition and the winner from all of the regions that involved in NCC activity. *Nepenthes* poster also distributed to students, students organization of nature concern, natural NGO, science institutions, the Government Units for conservation (UKSDA) and some visitors of Herbarium Universitas Andalas.

1. *Nepenthes* Coloring Competition in Nagari Batu Bajanjang

Batu Bajanjang is one of the nearest villages to Gunung Talang, This region included to Solok Regency, district Lembang Jaya and there was once of starting point to climbing and trekking to Gunung Talang. Most of the people are farmer and get their income from agricultural product such as tomato, potato, chili and cabbage. This

village also popular as “markisah” (*Passiflora quadrangularis*) producer in 1980-1995 and increasing prices of this fruit in 1995-1997 was trigger the local people to cultivate “markisah” and most of natural forest of Gunung Talang are cutting to this purposes. Forest destruction nearly reaches the summit of that mountain and this time, if we stand up in this village we can see the trace of cultivated “markisah-land” that leaving by the farmer. Gunung Talang is main habitat for *N. talangensis* besides four other species that occurred in this mountain.

Preparing of *Nepenthes* Coloring competition in Batu Bajanjang started in early July 2002. *Nepenthes* Team visited the village to meet the leading person of the village, that familiar with call “Pak Gunuang”. He and his family for long time are dedicated some part of their house to be a base camp for the climber and trekker of Gunung Talang. “Pak Gunuang” is understand very well the condition of Gunung Talang and all the worst condition that caused forest destruction in that sites. He had been ever guiding some foreign that visited the mountain to collect a large number of *Nepenthes* in the past. Unfortunately he didn’t have the identity of his quest because complication to understand the language of the foreign. He known how many kinds of *Nepenthes* that occurred in Gunung Talang, although he never known the scientific name, intrinsic value and the important of Gunung Talang as a habitat for endemic species of *Nepenthes*. We spent two days to sharing and discuss about status and existence of *Nepenthes* with him and his neighborhood.

Nepenthes Team together with Pak Gunuang visiting the village local government in office of Walinagari Batu Bajanjang. We met with Secretary of Wali Nagari and some village leading persons. We discussed about status and existence of *Nepenthes* and introducing the conservation effort from *Nepenthes* Team to conserve the *Nepenthes* species, as one of natural resources from Gunung Talang. They accepted *Nepenthes* Team visit very well and supported the idea to conduct *Nepenthes* Coloring Competition (NCC) in their village. They also promise to compile all the new information about *Nepenthes* from their people that have the information about existence of *Nepenthes* in Gunung Talang such as rattan-collector and animal trapper.



Fig. 72-73. NCC in the village near Gunung Talang

NCC event had been done in August 2002 at BPN office (village government house meeting). Forty students from one kindergarten and three elementary schools that occurred in Batu Bajanjang joined the competition. Some teacher and parent of the student come and see the competition. The winners are Putri Parwita Agusti (Sekolah Dasar Negeri No, 19 Batu Bajanjang), Novialdi (Sekolah Dasar Negeri No. 19 Batu Bajanjang) and Surmatro (Taman Kanak-Kanak (TK) Pertiwi, Batu Bajanjang) (Appendix 4). We invited the teacher and parent together with Nepenthes Team to decide the winner of the competition. They are friendly and hoping the activity can be continued in the future.

The series of NCC activities completed by presenting and distributing *Nepenthes* poster to local communities in Nagari Batu Bajanjang on January 2003. In this visit, Nepenthes Team got the information from the rattan-collector about existence of *Nepenthes* in Simanau region. The information reported by rattan-collector to the secretary of local government. We included this data to *Nepenthes* field database, although we can't access this location this year.

2. *Nepenthes* Coloring Competition in Nagari Talang Babungo

Talang Babungo there was once hilly village in Solok Regency, Hiliran Gumanti District. Most of the people are farmer and the main agricultural product from this village is rice and sugar-red. We can found traditional manufacture of sugar in this region. Some hills in Talang Babungo have *Nepenthes* population in good condition, at least three or four species occurred in this location. There are some hill in this region still have natural forest in good condition, although for the greater part changed to be un-irrigated field or cultivated land area. Wood gathering, forest burnt and conversion

to cultivated land are the main problem that caused forest destruction in this region for long time.



Fig. 74-75. Participants of NCC in Talang Babungo

Talang Babungo has the village leading person that concern about natural forest condition in that location. Besides, known very well about the forest condition he also concern about *Nepenthes* conservation in that village, although he can't prevent habitat destruction that done by the other local people. He is the full field assistance of Rusjdi Tamin (Head of Herbarium Universitas Andalas) and M. Hotta, when they are conduct the botanical research in Talang Babungo in 1980-1985, so the field experience of this man is undoubtedly. He have great respect for Rusjdi Tamin and for this, he named one of the hill in Talang Babungo as "Bukit Bapak Rusjdi". Bukit Bapak Rusjdi is ones of some ridge in there that still have *Nepenthes* population until this time. *Nepenthes* Team visited him to discuss about *Nepenthes* conservation effort. Not surprisingly, if we got full support to conduct the environmental education to conserve *Nepenthes* in his village

The local government accepted *Nepenthes* Team visit well and agree to help the conservation effort for *Nepenthes* in Talang Babungo. The also invited us to share knowledge and discussing about forest and *Nepenthes* conservation efforts with the village leading person in village elder meeting in Walinagari office. Walinagari promised us to discuss *Nepenthes* conservation efforts with the other people in their territory. They also give support to *Nepenthes* Team to conduct NCC in Talang Babungo through preparing event location and send the invitation letter to all the elementary school that occurred in their region.

NCC event had done at Madrasah Ibtidaiyah Mualimin (MIM) Talang Babugo on August 28, 2002. The winners are Defrizulmaida (Madrasah Ibtidaiyah Mualimin), Zikra Maud (Sekolah Dasar Negeri 45, Talang Babungo) and Erik Mukhtar E

(Madrasah Ibtidaiyah Mualimin) (Appendix 4). Some teachers accompanied their students until the competition offer and several personal from local government also come and see the competition.

On January 2003, when Nepenthes Team distribute *Nepenthes* poster to the local people in Talang Babungo, we got information about the conservation efforts that they have been done in their village. The local communities agree to stop wood collection from the remainder natural forest that still they have. Good sign for nature conservation.

3. *Nepenthes* Coloring Competition in Nagari Aua Kuniang

Aua Kuniang is the nearest village to Gunung Talamau, including to Pasaman Barat Regency, Pasaman District. This region is a potential cultivated area with good condition of soil, suitable climate and sufficient water supply. The lowland is completely had conversion to palm oil, rubber and orange plantation, besides paddy-rice field and the second crop that planted after paddy rice. The people also get their income from animal breeding and fishing. Generally the local communities have sufficient income and we found the disturbance of natural forest is minimal if we compare with the other location.

For the first time, Nepenthes Team visited local government to introduce status and existence of *Nepenthes* in Gunung Talamau. Most of them know about lowland species and never seen the mountain *Nepenthes* species. Although they are well come with our visit, not easy to make them allow Nepenthes Team to conduct the conservation activity in their region. It is more complex because they don't mind about *Nepenthes* conservation that has no economic value for their people. They also suspicious, we will do something that make their people injury.

For the second visit, we met the elder village of Aua Kuniang that also head master of ones elementary school in there. He accepted Nepenthes Team friendly and supported us to conduct environmental education for *Nepenthes* conservation in Gunung Talamau. Finally with his recommendation, Nepenthes Team got permission to conduct NCC in Nagari Aua Kuniang from the local government.



Fig. 76-77. Participants and their teachers in Gunung Talamau areas

On September 20-22, 2002 *Nepenthes* Coloring Competition carried out in SDN 11 Aua Kuniang. Twenty-seven students from 12 elementary schools in Aua Kuniang joined the competition. The teacher and parent supported this activity and asking enthusiastically several question about *Nepenthes* conservation effort to Nepenthes Team. Chyntia Desvariza (SDN 11 Aua Kuniang), Desi Sapriani (SDN 56 Aua Kuniang) and Nofritasari (SDN 19 Aua Kuniang) decided as winners.

When visiting the village for the fourth times on January 2003, we distributing *Nepenthes* poster in local communities and visited “the keeper” of Gunung Talamau. Undoubtedly, he is very concern with forest conservation especially for Gunung Talamau, although he does not know precisely the important value of this mountain as habitat of endemic *Nepenthes* species. Nepenthes Team informed status and existence of *Nepenthes* species and suggest him to use *Nepenthes* as new icon for conservation effort to saving the natural forest in Gunung Talamau.

4. *Nepenthes* Coloring Competition in Nagari Sarilamak

Sarilamak is the nearest village to Kelok Sambilan and there was once region in Lima Puluh Regency, Harau District. Commonly the people are farmer and brick producer. The main agricultural product from this region is “Gambir” (extracted from *Uncaria gambir* leaves) and nearly all the natural hilly forest in this region is converted to gambir plantation.

On September 2002, Nepenthes Team visiting three elementary schools in Sarilamak. Introducing and give the information about existence and conservation effort to conserve *Nepenthes* in Kelok Sambilan. Most of the teacher and the people surrounding the school known and can recognize some pitcher that we show to them.

Unfortunately we cannot meet with the local government, because they have some activity in residence office of Lima Puluh Kota.



Fig. 78-79. One of NCC participant had been seriously to coloring the *Nepenthes* picture and all of participant happiness when the Team take their photos in front of their school.

NCC event carried out in SDN 13 Sarilamak on October 2002. Only one school can participate, because the distance between school far enough to go on foot and no transportation to support them from their school to NCC event location. Thirty-one students joined the competition and all of them come from SDN 13 Sarilamak. Rahma Joni, Alfajri and Melia R. Pertiwi decided as the winners of the competition. Quite different with the other location, only the teacher that visit and see the competition because the position on this school relatively isolated from the village.

Late January 2003, *Nepenthes* poster distributed to the local people in Sarilamak and several traditional shop that occurred in Kelok Sambilan to inform about *Nepenthes* conservation effort in their location.

5. *Nepenthes* Coloring Competition in Nagari Mahek

Mahek is one village in Lima Puluh Kota Regency, Suliki Gunung Mas District. Although, this village isolated and have great distance from the residence capital city does not meant the people in there placed at a disadvantage. They have self-transportation unit, self-poultry farm and completed their needs from their agricultural product such as paddy rice, the second crop and especially from gambir plantation. Mahek also have good signs of few form the limestone hill surrounding the village, besides the traditional olden relief that always visiting by tourist. The disturbance of the

forest mainly caused by conversion of natural forest to gambir plantation. Exactly habitat of *Nepenthes* in this region have a great distance from the village and commonly occurred in the main road banks before we are entry to Nagari Mahek, not in natural forest. The threat for *Nepenthes* will increase if the main road to Mahek is broadened. As long the road are not broadened, for a while the natural habitat of *Nepenthes* still secure from destruction.



Fig. 80-81. The teacher see their students in NCC at Mahek. With present local people, they see all about NCC process till the end and they follows the discussing and sharing about *Nepenthes* conservation efforts with the Team.

Contrary with the other location, discussing about *Nepenthes* conservation effort in Nagari Mahek for the first time had done in “kedai kopi” (small coffee shop) near the habitat of *Nepenthes*. Exactly only one shop occurred in this place and located far enough from the village. All the people that going out or entry the village must be to pass by the coffee shop. Most of the local people in this village used the coffee shop as resting place before they are continued their activity to go out or to entry the village. Most of the people that joined the discussion are teacher, merchant and several of them are the village leading person.

Commonly they are known about *Nepenthes* existence in their village and as common species this plant not be interested for them because not have economic value. They are surprisingly, when we inform the plant that overlooked by them there was once of the unique plant that only distributed in tropical region and support us to conduct the educational conservation activity in their village.

NCC event had been done in October 2002 at SDN 19 Mahek. Thirty students from twelve elementary schools in Mahek participated in NCC competition. The teachers and the local people that come and see the competition enthusiastically to

asking about *Nepenthes* and the conservation effort for this plant. They also suggest us to cultivate *Nepenthes* as ornamental plant. The winners of NCC in Mahek are Dewi Suci Andini (SDN 69 Tigo Sakato, Mahek), Hernize Yanto (SDN 35 Koto Tinggi, Mahek) and Yanda prima Hatta (SDN 07 Tigo Sakato, Mahek). We really appreciate all of the support that give by local people to conduct NCC in Nagari Mahek.

Nepenthes poster distributed to the local people in Nagari Mahek on February 2003. The local leading person in there hoping the educational environmental education can be continued in the future to increased the ability of local communities to conserve their natural resources.

6. *Nepenthes* Coloring Competition in Nagari Ulu Gadut

Ulu Gadut is the nearest village to Gunung Gadut in East of Padang City. Gunung Gadut has the high diversity of the plant and animal and potential habitat for at least three species of *Nepenthes*. Most of the people in Ulu Gadut are farmer, animal breeder and rattan-industrialist. The disturbance of the forest in Gunung Gadut especially caused by forest cutting by the local people that triggered by local conflict. The natural forest is cutting and converted to cultivating land area, especially to cultivate “Durian” (*Durio zibethinus*) and “Manggis” (*Garcinia mangostana*).

Gunung Gadut is the forest research of Andalas University and the local communities involved to conduct the research for long time. They are the potential guide and professional assistance for the researcher, although they can stop the disturbance of the forest by the other local people in their village. At least they can inform the research staff of Andalas University about the destruction. They understand well about the *Nepenthes* conservation activities and promise us to participated to keep save the natural habitat of *Nepenthes* in Gunung Gadut.



Fig. 82-83. NCC in Gadut and sharing with the teachers after this competition in their office.

Nagari Ulu Gadut only has one elementary school and we visited the head master of the school to discuss about NCC. The teacher appreciated Nepenthes Team visit and supported NCC activities. On last October 2002 NCC event carried out in SDN 15 Ulu Gadut. Forty-one students participated and the winners are Mutiara Sari, Shifli Armeneli and Rudi Harto.

The last activity of *Nepenthes* Coloring Competition in Ulu Gadut was distributing *Nepenthes* poster for the local communities in late February 2003.

Nepenthes Team spent eight months to complete the NCC activities in Sumatera Barat. We met with the local communities in varies character and culture. As a part of Sumatera Barat people, we understand the differences very well. Economic, public income and education level in each location are different. But the important thing is enthusiasm of the local communities to know more about *Nepenthes* in their region. Most of them are hoping the activity can continues in the future. This is the challenge for Nepenthes Team to fulfill their hopes.

Essay Writing Competition (EWC)

Essay Writing Competition (EWC) carried out in October 2003, we invited 110 senior high schools that occur in Sumatera Barat to send the essay from their student. This activity aimed to compile the opinion and the conservation idea from the youngest generation. We offered three months to write the essay and the deadline for the competition is on December 22, 2003.

Nepenthes Team got full support from Andalas University to conduct this activity. The EWC participants will gain the reward from the Rector, Dean of Faculty of Mathematics and Natural Sciences and Head of Environmental Study Center of Andalas University. This activity also accompanied by visiting the winning school to introducing status and existence of *Nepenthes* and *Nepenthes* conservation efforts in Sumatera Barat to the students.

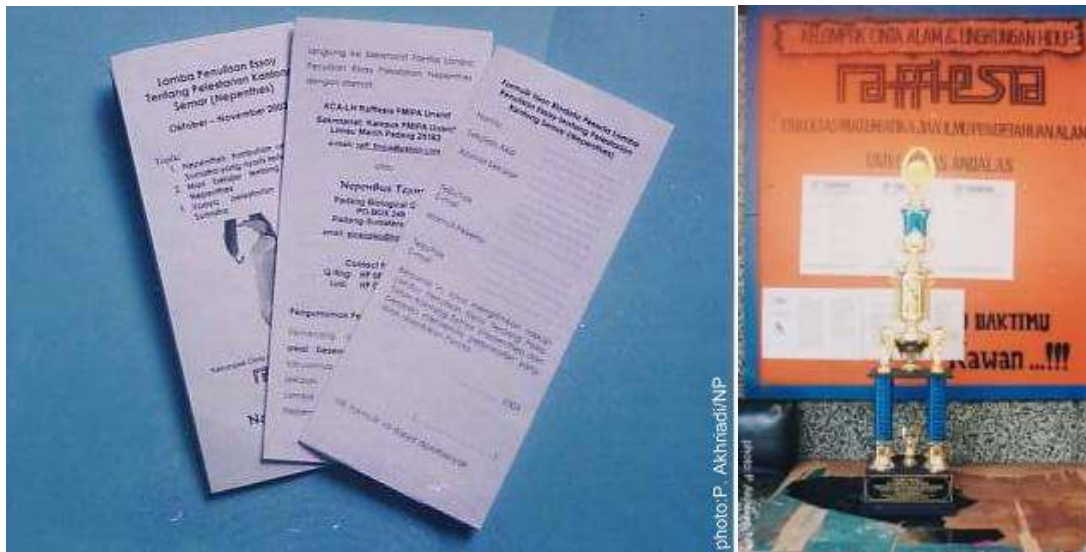


Fig. 84-85. Brochures and trophy of *Nepenthes* Essay Writing Competition

The first winner of the EWC is Mega Yulia from SMUN 1 Batusangkar that wrote the essay in a title “Upaya Pelestarian *Nepenthes* Sumatra” (Sumatran *Nepenthes* Conservation Efforts). The second ones is Gemariyani from SMUN 1 Rao with a title “Kantong Semar (*Nepenthes* sp) Yang Menawan dari Simamonen” (The charmed species of *Nepenthes* from Simamonen) and the third winner is Lassie Fitria from SMUN 1 Batusangkar with a title “*Nepenthes*, Tumbuhan Unik Hutan Sumatera Yang Nyaris Terlupakan” (*Nepenthes*, the unique species from Sumatera That Overlooked).

Nearly all the participants to be sigh about *Nepenthes* references. In the matter of fact *Nepenthes* references only available in limited number in the library of Andalas University. We understand well, the information from Internet also not available to them that domiciled outside of the town. Most of them only get the *Nepenthes* information from the brief introduction in brochures and leaflet that distributed to the local communities. Although, they have the limited references we really appreciate the enthusiasm participants to join the competition. We got some new information about the existence of *Nepenthes* habitat in their region and also the information about the utilization of *Nepenthes* in traditional cooked food festival. They also presented some ideas to conserve *Nepenthes*. The summarized of some interesting idea from EWC participants presented below:

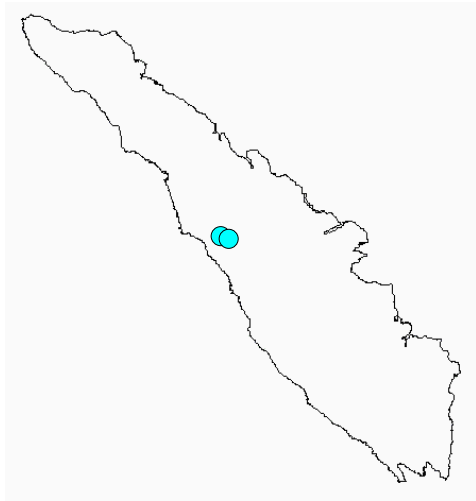
1. Give more information about *Nepenthes* to local communities trough by announcement in TV, Radio and Newspaper

2. Conduct the *Nepenthes* communal discussion that involved government, science institution and local people.
3. Increase the number of *Nepenthes* Conservation Competition activities
4. Socialize the rules of *Nepenthes* protection to local communities
5. Increase the ex-situ and in-situ of *Nepenthes* conservation action
6. Establish the movement s of excited *Nepenthes* conservation
7. Establish the organization of *Nepenthes* lovers.

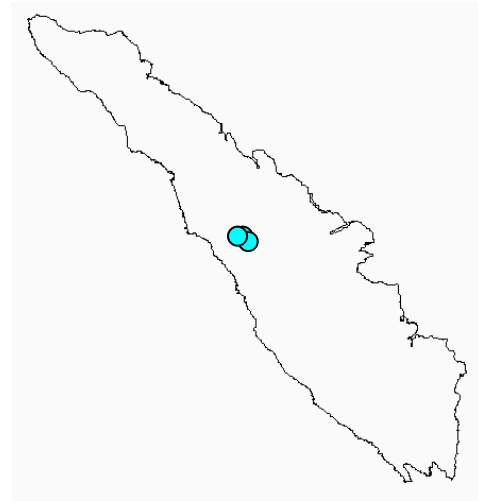
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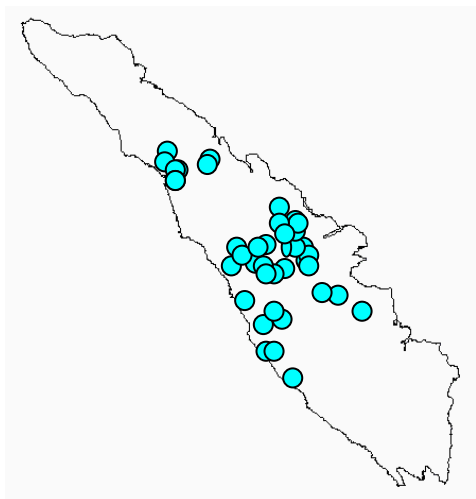
Appendix 3. Distribution maps of *Nepenthes* in Sumatra Island



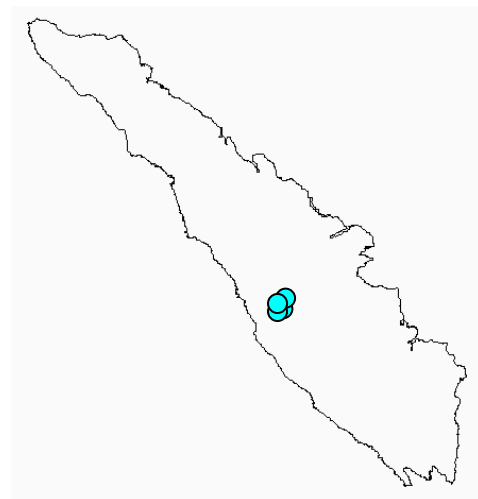
A. *Nepenthes adnata*



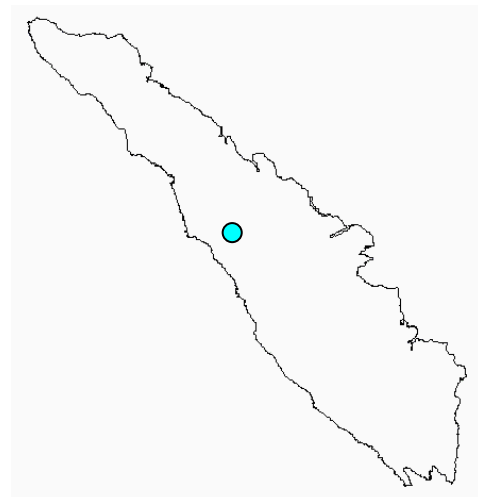
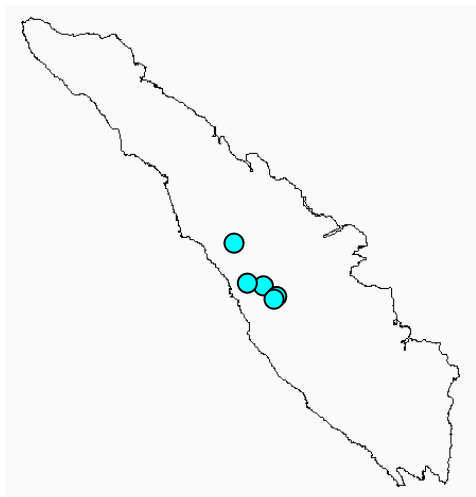
B. *Nepenthes albomarginata*



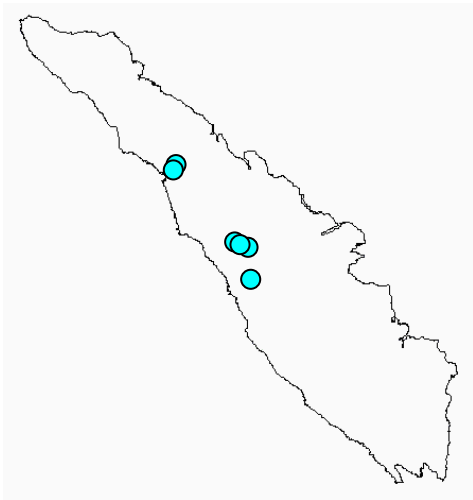
C. *Nepenthes ampullaria*



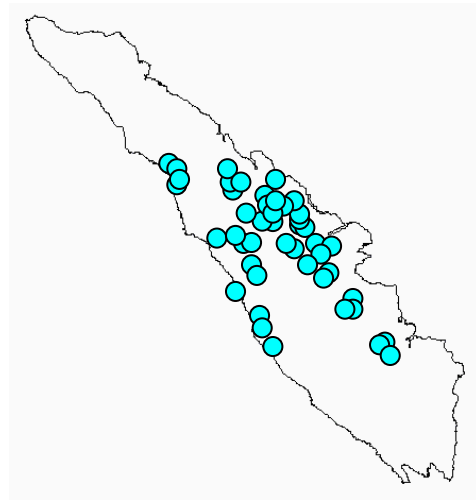
D. *Nepenthes aristolochioides*



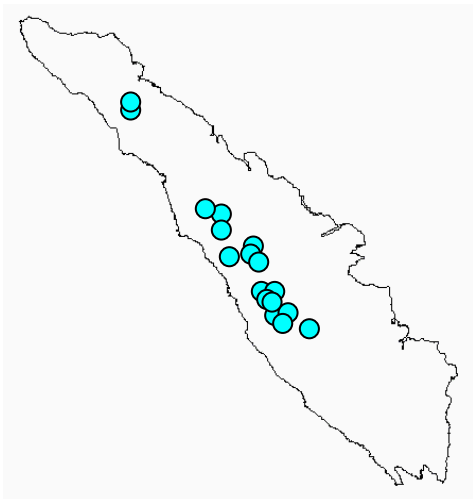
E. *Nepenthes bongso*



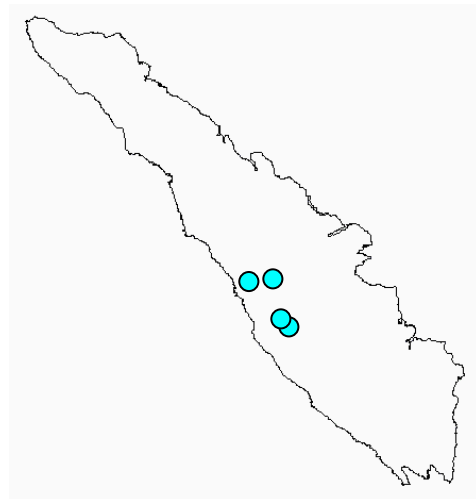
F. *Nepenthes dubia*



G. *Nepenthes eustachya*



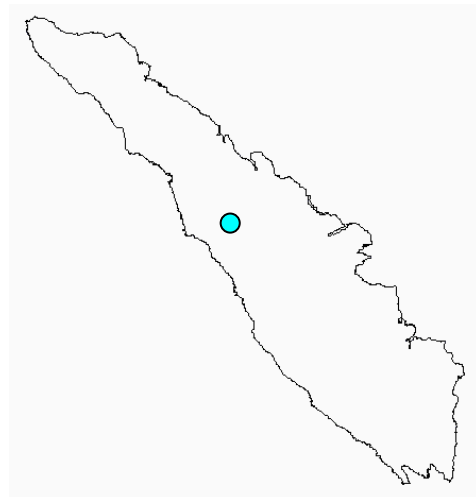
H. *Nepenthes gracilis*



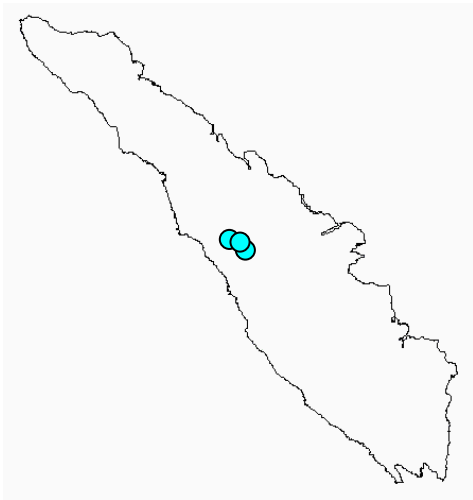
I. *Nepenthes gymnanphora*



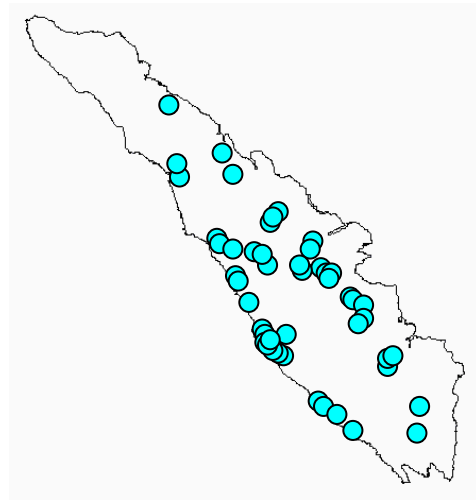
J. *Nepenthes inermis*



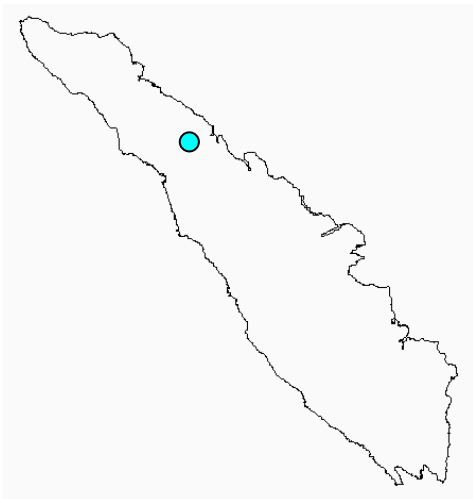
K. *Nepenthes izumiae*



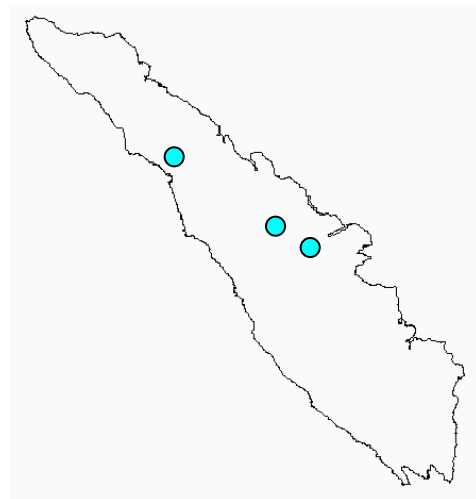
L. *Nepenthes jacqueliense*



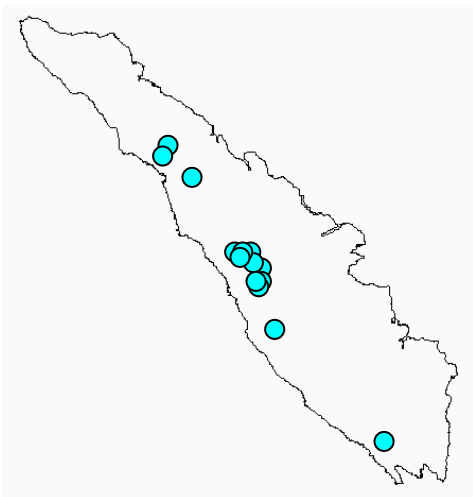
M. *Nepenthes longifolia*



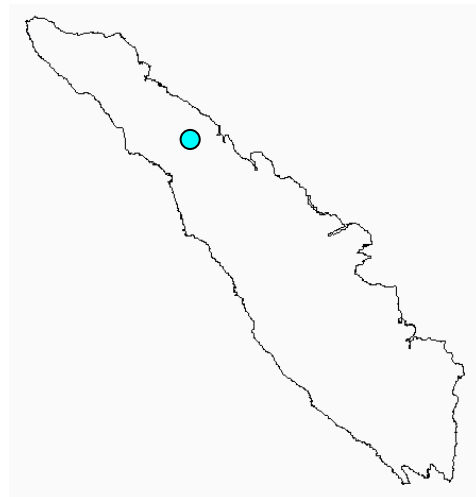
N. *Nepenthes mirabilis*



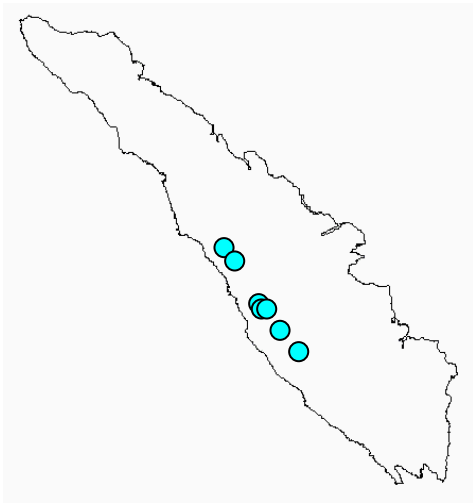
O. *Nepenthes ovata*



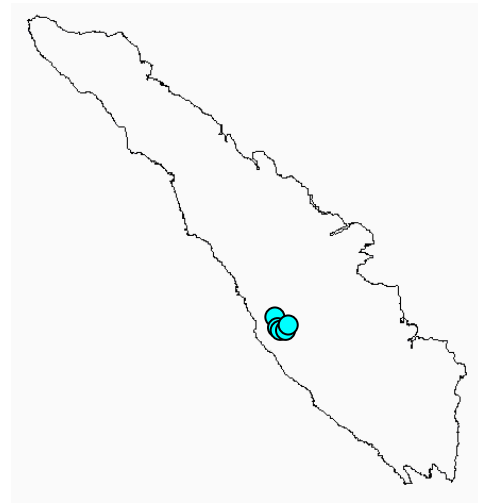
P. *Nepenthes rafflesiana*



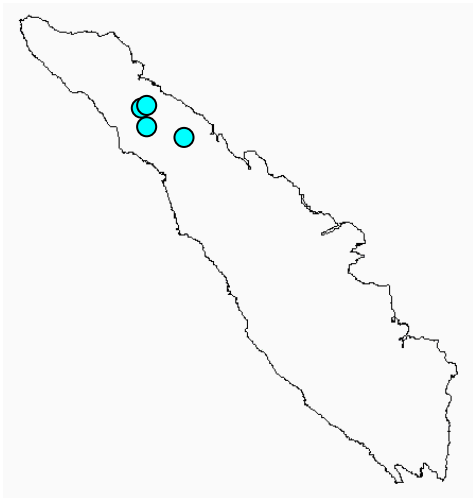
Q. *Nepenthes reinwardtiana*



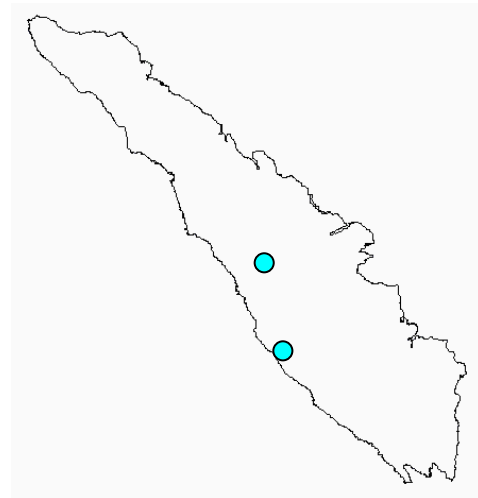
R. *Nepenthes rhombicaulis*



S. *Nepenthes singalana*



T. *Nepenthes spathulata*

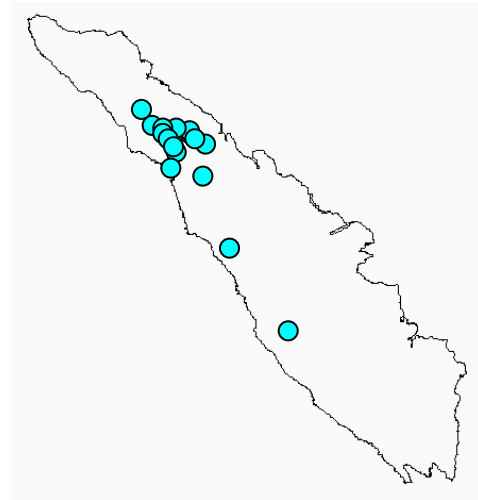


U. *Nepenthes spectabilis*

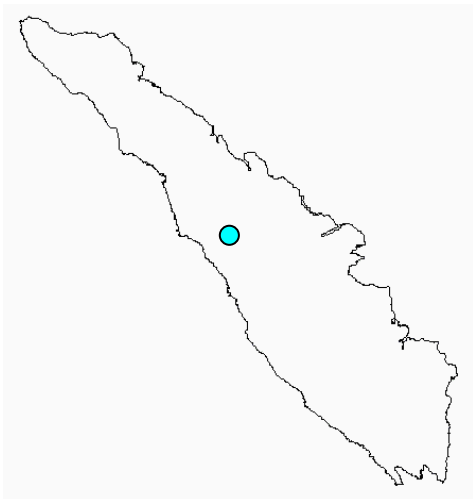
V. *Nepenthes sumatrana*



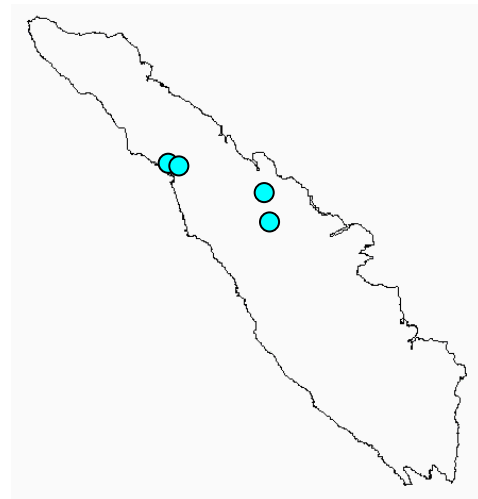
W. *Nepenthes talangensis*



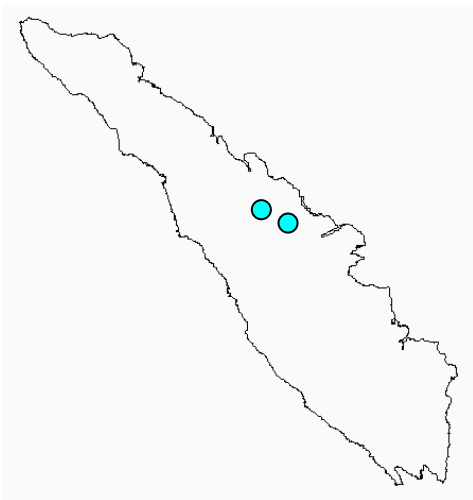
X. *Nepenthes tobaica*



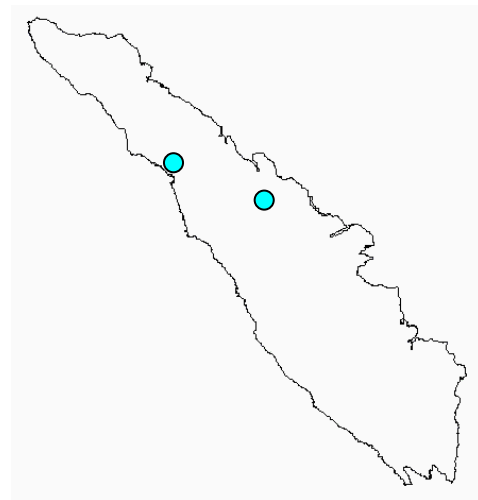
Y. *Nepenthes albomarginata* x *N. eustachya*



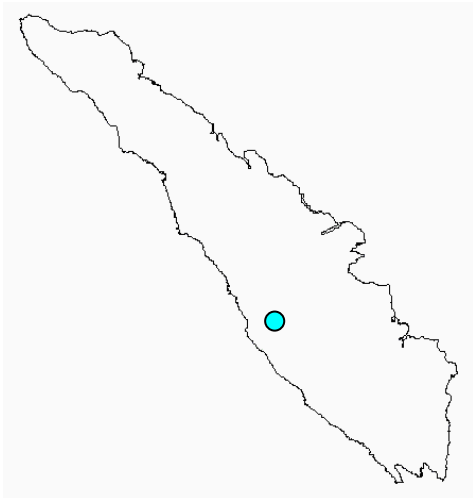
Z. *Nepenthes ampullaria* x *N. gracilis*



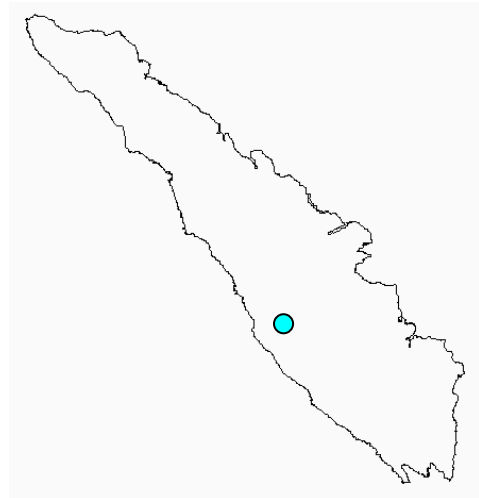
AA. *Nepenthes ampullaria* x *N. mirabilis*



AB. *Nepenthes ampullaria* x *N. rafflesiana*



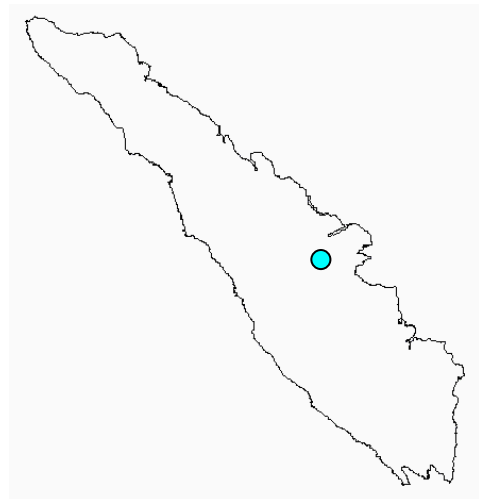
AC. *Nepenthes ampullaria* x *N. reinwardtiana*



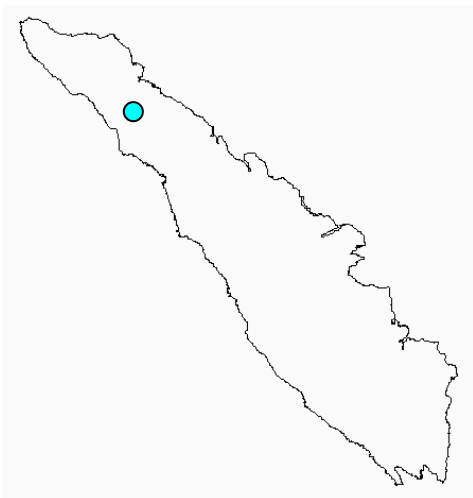
AD. *Nepenthes ampullaria* x *N. spathulata*



AE. *Nepenthes bongso* x *N. gymnanphora*



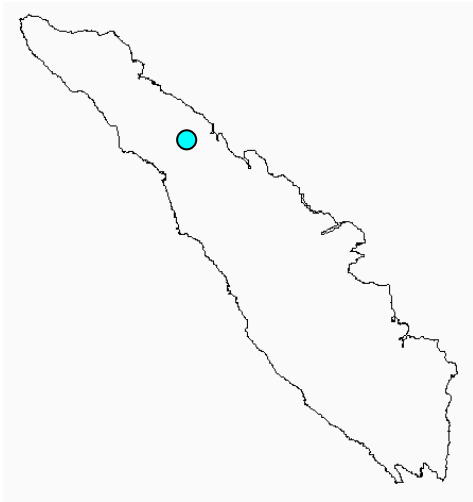
AF. *Nepenthes gracilis* x *N. rafflesiana*



AG. *Nepenthes gymnanphora* x *N. spectabilis*



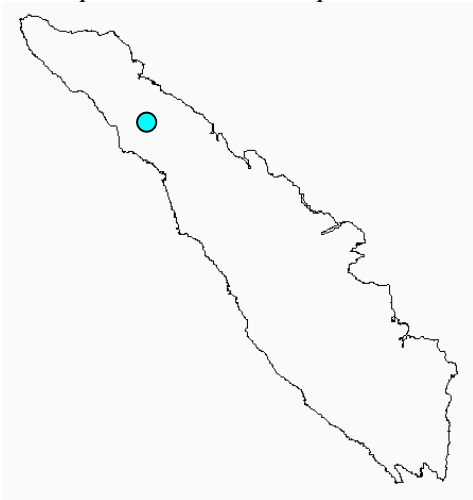
AH. *Nepenthes inermis* x *N. talangensis*



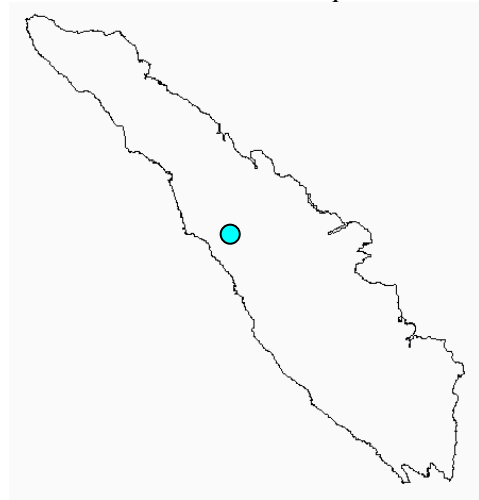
AI. *Nepenthes ovata* x *N. spectabilis*



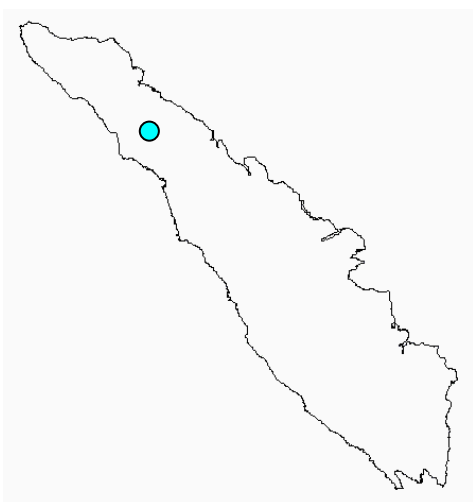
AJ. *N. reinwardtiana* x *N. spathulata*



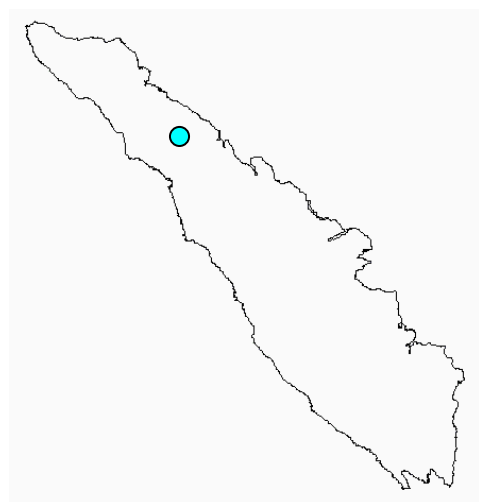
AK. *Nepenthes* sp1



AL. *Nepenthes* sp2



AM. *Nepenthes* sp3



AN. *Nepenthes* sp4

Appendix 4.

**NEPENTHES COLORING COMPETITION 2002 PARTICIPANTS
FROM ELEMENTARY SCHOOL IN WEST SUMATRA**

No.	Batu Bajanjang	Talang Babungo	Aua Kuniang	Kelok Sambilan	Mahek	Ulu Gadut
1.	Ineke Puspita Sari	Febri Nadra Indraf	Nofritasari ***	Ana Susanti	M. Nandi Zukri	Afriyogi Saputra
2.	Nelfi Afrianita	Erik Mukhtiar E ***	Asnani	Novia Ratna Sari	Andika Susanti	Ramadhan Ikhsan
3.	Dafnoweri	Yoki Gustian	Nora Annisa	Resa Mardiana	Wici Putri	M. Iqbal Gilang P
4.	Santi	Awwalul Amris	Andri AZ	Neti Farleni	Cica J Lestari	Defri Saputra
5.	Reza Febria	Rusdi Hendra	Desi Sapriani **	Tomi Afrial Putra	Dine Fahrurum	Ardana Gama P
6.	Marga Susnawati	Defrizulmaida *	Putri Hasanah	Rona Maita Sari	Yanda P Hatta ***	Randa Septiawan
7.	Dina	Lipia Susanti	Yossi valentine	Rian Septiananda	Riansa Putri	Rita Safera
8.	Desi Ria Elfira	Almudaris	Chyntia Desfariza *	Aldo Serena	Ihsan Mardathillah	Arif K Putra
9.	Neni Putri	Zikra maud **	Rizki Ratih	Desi Lestari	Wiwini Gusniyarti	Rezki F Razak
10.	Filalara Pertiwi	Zikria Rahmad	Fadil Mubarak	Edo Yolanda	Hernize Yanto **	Debi Afriadesi
11.	Cici Afrilia	Gevin Danial B	Rindu Perkasa	Erma Yulia RS	Sabja Risko	Fitri Fransiska
12.	Nike Ardila	Adrizamra	Wilya Angela P	Fitra	Dian Afriyani	Suzya Refriani
13.	Deni Putri	Resi Kurnia	Fitratul Fajrin	Fitria Ramanda	Sri Amelia FN	Randa Kurniawan
14.	Yuni Aktavia	Yesi Ratna sari	Gita Suci	Jefri Yonda	Dicky Ardiansyah	Agung Lazuardi
15.	\syahni Canda Putra	Rezki Yulia Rahmad	Sasria Erika	Lisma Ayani	M S Indrasari	Yosa Aulia Putri
16.	Ari Andika	Dewi Tata Surya	ADP Darwin	Megi Trio S	Boni Maisendra	Lusiana Arman
17.	Zikra Hidayat	Masrul Alarmini	Fadhilah Anursa	Nandi Eka Putra	Dewi Suci Andini *	Oksi Safda
18.	Novrino Putra	Eka Nofebrita	P Suganda Bahri	Nurhayanti	Winsi Novalia	Augia H Pratiwi
19.	Novialdi **	Helpi Sukriani	Y Dwika Utama	Rahma Joni *	Weni Lestari	Putra C Winata
20.	Hendra	Yuza Mardatilah	Rifeldi Admaizal	Ranti Jusmaneli	Nilam Sari	Ihsanul Fuadi
21.	Somad Abdul Arif	Rahmatulhusna	D Ozy Arisandi	Refi Yunita Sari	R. Mata Sari	Rudi Harto ***
22.	Parman	Dasrul Asri	Widya Ariani	Reko Amrizon	J. Puspa Irianto	Aditya S Halim
23.	Irza Fendri	Irwan Fajri	O Irma Dewi	Riski Yovandri	Kepri Mahata Putra	Ari Winanda
24.	Liance	Hatta Hamra	Gusti Dwi Randa	Rila Susanti	G. Yulia Ningsih	Defi A Saputra
25.	Elias	Surya Putra	K Edrian Saputra	Rory Setiawan	Angela Putri	Shifli Armaneli **
26.	Antono	Etyonedi	D Dwi Putri	Satriando Putra	N. Dwi Rantika	Nofita Sari
27.	Afrinal	Fujra Rahmi Y	Roby Gunawan	Silvi Kurnia	Weva Wahyuni	Nila Mardianti
28.	Nurul Ikhsan	Siska Wirma Oktavia		Tomi Pranoto	Ramona Fajrian	Zelvia Rahmadani

29.	Isma Repriadi	Wirzal Nitral		Alfajri **	W D Defatma Bukti	Neri Fadliyanita
30.	Roni Paslah	Yosi Rahmadani		Melia R Pertiwi ***	Rica Yulianti	Deci handayani
31.	Renggo Milka Yestri	Gusri Yonika		Tivani Yolandi		Putri C Pratiwi
32.	Rike Rafni Yanti					Mutiara Sani *
33.	Putrid Parwira Agusti *					Indah Utami Sri R
34.	Dasrul					M. Iqbal
35.	Nofri Gusnedi					M. Umar Yusuf
36.	Erma Yenti					Yuli Handayani
37.	Rani					Mantary
38.	Surmatro ***					Ananda K Paulin
39.	Helmi Candra					Stefanus Nofianto
40.	Nofrianto					Saidil Mufarid
41						Andrean Mufti

Notes: * First winner
** Second winner
*** Third winner

Appendix 5.

**NEPENTHES COLORING COMPETITION 2002
ELEMENTARY SCHOOL PARTICIPANTS IN WEST SUMATRA**

No.	Batu Bajanjang	Talang Babungo	Aua Kuniang	Kelok Sambilan	Mahek	Ulu Gadut
1.	SDN 19 Batu Bajanjang	SDN 16 Talang Babungo	SDN 94 Aua Kuniang	SDN 13 Katinggian	SDN 07 Tigo Sakato-Mahek	SDN 15 Ulu Gadut
2.	SDN 06 Batu Bajanjang	SDN 11 Talang Babungo	SDN 99 Aua Kuniang		SDN 19 Ranah-Mahek	
3.	SDN 34 Batu Bajanjang	SDN 07 Talang Babungo	SDN 30 Aua Kuniang		SDN 34 Tigo Sakato-Mahek	
4.	TK Pertiwi Batu Bajanjang	SDN 45 Talang Babungo	SDN 54 Aua Kuniang		SDN 39 Paruso-Mahek	
5.		SDN 26 Talang Babungo	SDN 22 Aua Kuniang		SDN 35 Koto Tinggi-Mahek	
6.		SDN 34 Talang Babungo	SDN 56 Aua Kuniang		SDN 63 Tigo Sakato-Mahek	
7.		MIM Jorong Tabek	SDN 19 Aua Kuniang		SDN 64 Ranah-Mahek	
8.			SDN 43 Aua Kuniang		SDN 65 Nenan-Mahek	
9.			SDN 11 Aua Kuniang		SDN 69 Tigo Sakato-Mahek	
10.			SDN 33 Aua Kuniang		SDN 75 Koto Tinggi-Mahek	
11.			SDN 01 Aua Kuniang		SDN 76 Paruso-Mahek	
12.			SDN 65 Aua Kuniang		SDN 46 Koto Tinggi-Mahek	

Notes:

SDN = Sekolah Dasar Negeri; MIM= Madrasah Ibtidaiyah Muallimin (Moslem Elementary School); TK = Taman Kanak-Kanak (Kindergarten)

Appendix 6.

MATERIAL AND EQUIPMENT

Material and equipment that we used in the field to prepare the *Nepenthes* specimen are: Plant scissors, Stick cutter, Chopping knife, Field Labels, Writing tools, Block Note, Plastic, Plastic sack, Plastic rope, Collotypes, Newspaper sheet and Alcohol 70%.

Specimen Examined

A large numbers of *Nepenthes* specimen that deposited at Herbarium Bogoriense (BO) and Herbarium of Andalas University (ANDA) were examined. Those that were deemed to be most relevant to the text are listed below. The letters in parentheses refers to the three first letters of the species to which the specimen belongs. Only those specimens with clearly identified collector and collection number are listed:

Ade, Debi, Mursal, Reni & Yanti 64, 65 (alb) --- Adnasyamdi 8 (gra) --- Afrinaldi, Fifi suryani 32/XIV AF (rei) --- A. Kleihorte 666 (rei), 517 (eus) --- Alston 13800, 13803 (alb), 14384, 14421, 13793 (eus), 14343 (mir), 13531 (sum), 14874, 15254, 15288, 14773 (tob), 14385 (gra) --- Ana Luly No 29 (alb) --- Andri, Yet, Yat, Ovi 7 (gra) --- Anton, Amalia, Nurmeilis, Ratnawita 22 (rei) --- Antoni Asdi 15 (mir) --- Ardel 9 (gra) --- Ardian, Cici, Narti, Reda, Reni 87 (mir) --- Ari, Ef, Nova, Pit 72 (gra) --- Ari, Fitri, Yul & Miki 24 (ala) --- Arif, Wati, yenni & Betty 63 (gra) --- AS & RT 289 (rei), 60 (gra) --- Asdat 16 (amp), 18 (gra), 17, 24, 27 (mir) --- As Yetti & RT 64 (rei), 63 (amp) --- Asferi A 21 (gra) --- Asmiarti 10AA (mir) --- Asmiati & R.Tamin 356 (gra), 357 (rei) --- Asra, Ira, Liza, Nelva & Vera 56 (ala) --- Aulia 154 (ala) --- Azmar, Vera, Mira, Sri & Yanti 73 (gra) --- Azwar Abidin, Wisnarti 13/X/AW (rei) --- Bahrul 333 (alb), 139, 310 (amp), 143, 399 (gra), 398 (mir) --- Barita, Fanus, Fit, Nel 74 (rei) --- Brohim 167 (ala) --- Beguin 231, 232 (amp) --- Berhoud 33 (rei) --- Beumee A468 (mir), 438, 448 (tob) --- Borssum 2580 (amp), 2088 (gra), 2680, 2754, 2087, 2896, 2509 (rei), 2251 (sin), 1785 (sum) --- Budiwarman 1, 2 (sin) --- Bunnemeijer 29, 6886, 6715, 6605, 6609, 6717, 6721, 6789, 6879, 6881, 7560, 7559, 7881, 7494, 1723, 1782, 6254, 6431, 7873 (amp), 5621, 5397, 5748, 4230, 5398 (bon), 3209, 1049, 3366, 3054 (eus), 1363, 1922, 7594, 7648, 7558, 6608, 7246, 7311, 6947, 6715, 7871, 6455, 6361, 6204, 6393, 6394, 6394, 6432, 6266 (gra), 5747 (ine), 6719, 6606, 6720, 6884, 6880, 6882, 6612, 6722, 7554, 7561, 7097, 7098, 6392, 7872 (raf), 1724, 1782, 1761, 2320, 6885, 6603, 6607, 6790, 6611, 6610 (rei), 4113, 4114, 2622, 9997, 2693, 4028, 4179, 9696, 10270, 10271 (sin), 2116 (mir) --- Burck 16 (rei) --- Chan, Yudi, Adek, Neng, Fad & Fi 53 (amp) --- C. Boden-Kloss 12286 (mir) --- Clarke, Davis & Tamin 1307, 1308

(jac) --- C. van de Koppel 18a (tob) --- C.N.A de Voogd 400 (mir) --- Daus, ega, Nila, Wit 22 (rei) --- Daus, Rina, Rini, Eli, Yuni, Citra 108 (gra) --- D. Burger 18 (gra), 19 (raf), 20 (amp) --- Dayar Arbain DA 332 (bon), DA 377 (sin) --- Deden, resti, Evi, Lani 58 (mir) --- Del 81 (amp), 83 (mir) --- Dela Jaya Rianti 1 (ala) --- Delita, Zul, Rinaldi 26 (gra) --- Des ,Elfa, henri,Elfa & Yenni 63 (ala) --- Des M 2, 208, 209 (rei), 264 (gra), 263 (mir) --- Des M & R. Tamin 523 (bon), 529, 503, 506, 507, 509, 523, 527 (sin), 5 (amp), 391, 466, 553 (mir), 515, 544, 607, 623, 8, 541, 510, 542, 355, 535, 81 (rei), 10, 11, 540 A, 436, 536 (gra), 91 (alb), 6, 7,9 (ala) --- Deti & Afrianoes 4 (alb) --- De Voogd 1273. 1440, 1225 (mir), 1159 (rei) --- Dewi, Mely, Afmeli & Desmira 8 (ala) --- Dian, Anda, Nur & Sari 62 (gra) --- Doni, Dian, Reni, Santi 68 (gra) --- Dwi N '91 112 (gra) --- Dwy 20 (gra) --- Efriwati, Salni 6 (gra) --- E.F de Vogel 2827 (tob) --- E. Jacobson 4, 2135, 2136 (alb), 147 (amp), 2415 (gra), 491 (sin) --- Eldiman 7 (rei) --- Empersi 43 (rei) --- Endang Syafariyani 159 (sin) --- Enny S.R '91 151 (gra), 128 (amp) --- E. Polak 605 (amp), 129 (gra), 138, 632 (mir), 617 (raf), 112 (tob) --- Erizal Cs 46 (gra) --- Erlo, Awil, Susi & Desi 106 (ala) --- Erman, Suraini 4 (gra) --- Erni, Yuli, Madi, Fitri, Betty 13 (mir) --- Ery 1006a (sin) --- ESA 11 (gra) --- F'97/G 5 2 (amp) --- Faizah, Rina Widiana 15 (gra) --- FDNYV 7 64 (gra) --- Feri Anton 20 (ala) --- Feri, Wiwi, Helda & Melda 59 (ala) --- Ferry, Maini, Rista, Rin, Win 35 (mir) --- Fit, Nung, Eci, Tis & Martin 64 (gra) --- Frangki, Ira, Neri, Rina, Vivi 80 (gra) --- F. Wyssling 19 (mir), 107 (sin), 3, 17 (spe), 44 (tob) --- F.H. Endert 308 E1122 (amp) --- F.W. Rappard 82 (amp), 210 (rei), 66, 67 (sin), 58, 120 (mir) --- H.Hasnah & R.Tamin 92, 96, 148 (amp), 398 (gra), 95, 251 (rei), sin (147) --- H. Nagamasu 4254 (dub), 3454, 3460 (bon), 3397, 3655 (sin) --- H. Okada, R. Tamin, Budjang & Anes 40 (ine), 73 (mir), 51, 74 (sin) --- Hanifa Marisa 44/H (mir) --- Hanniwati, Jondi, Diah Mukhlis 34 (gra) --- H. Okada, Y. Mori, S. Kubo, Syamsuardi & Muhammadin 1387 (gra) --- Harizon, Pinta Murni 39/III/HP (rei) --- Harmida 27 (ala), 48 (amp), 28, 49 (gra) --- Henri ,Renti, Fitria & Yosi 35 (ala) --- H.F. Sun 9733, 9926 (mir) --- Hisbullah 1075A (raf), 1076A (rei) --- H.P.L de Leew 20 (gra), 21 (amp) --- H.S. Yates 1070, 1628 (mir), 2013 (tob), 1393, 1394 (hoo) --- Henderson 20440 (am) --- Holttum 26101, 28102 (sin) --- Hootu J.H. De Haans 21, 79 (raf), 7, 21a (amp) --- Huitema 50 (gra), 114, 1135 (tob) --- Hutger et. Al 1 (tob) --- Iboet 53 (rei), 55 (mir) --- Idris, deri, Anis & Novi 48 (ala) --- Iin K 05/1k (ala) --- Ikhwan, Yan, Lola, Meri 49 (gra) --- Imam, Yanti, Wessi, Novi F'98 101 (gra) --- Irvan, Vera, Fitri, Desi, Idel & Lisa 49 (amp) --- Irya, Eva, Del, Titin & Yenni 57 (gra) --- Iskandar '91 62, 63 (gra) --- Islamia Susan 13 (gra) --- Isman A, Arsi, Donny, Afrianus & Ranti 45 (gra), 46 (mir) --- Isman Affandi 29 (gra) --- Izu 109 (alb) --- J.H. Coert 1467, 1647, 1633 (gra) --- J.H. de Maas 21b (gra) --- J.J. Afriastini 2751a, 2763 (amp), 2715, 2830 (gym), 2340 (mik) --- J.L Wyers 7 (raf) --- J.S. Burley, Tukirin et.al 1572 (mir) --- Jochems 3369 (rei) --- Jugah Kundi & Sangat S3274 (amp) --- Jumi 15 (mir) --- Karta, Nandi, Yosi, Ani & Nandra 1 (amp) --- Karta, Yosi, Nandi, Ani, Eka & Nadra 6 (gra) --- K. iwatsuki, G. Murata, J. Dransfield & Saerudin 243, 247 (amp), 151, 213, 244 (tob) --- Kostermanns 355 (hoo), 472 (rei), 372, 1261 (gra), 351, 1271 (amp), 766 (rei) --- Lina, ling, Taher, It 68 (gra) --- Linda, Risna, Welli 38 (gra) --- L.J. Tanopens 18 (spa) --- Lorzing 6342, 11530, 9590, 16633 (amp), 16895, 16898, 6343, 16425, 14183 (gra), 2840, 11443 (mir), 11507, 16998 (rei), 8297, 8230, 15772, 17103, 13874, 16233 (spe), 6573, 8602, 9443, 15454, 16085, 9859, 15137, 7612, 16733, 15991 (tob), 16897 (hoo) ---

M. Hotta & H. Okada 1670 (eus), 1676 (rei) --- M.Hotta & R.Tamin 35, 42 (sin) --- M.Hotta, H.Okada & M.Ito 734 (sin) --- Hotta, R. Tamin, H. Okada & Syamsuardi 42, 61, 110 (bon) --- M.Hotta, R.Tamin, H.Okada & T.Kohyama 73, 87, 101, 110, 111, 113, 141, 142, 167, 171, 196, 206, 255 (sin) --- M. Jacobs 8212, 8261 (spa) --- M.A. Lieftinck 7, 8, 11 (spa) --- M.R. Henderson 20457 (raf), 20275, 20311 (rei) --- Maskuri 351 (tob) --- Mej. W.C. Keers 22 eus --- M.S Fadhil 5 (gra) --- Marlis 79 (sin) --- Masnadi M 337 (ala), 343 (alb) --- Masniati, M.Basri, Budiwarman 38 (gra) --- Meny, Mini, Armen, masrizal, Rico 19 (mir) --- Mis, Madi 27 (amp) --- Mis, Mai, Med, Nova 56 (mir) --- Nas & R. Tamin 252, 231, 225, 237, 250 (gra) --- Niniek Mulyati Rahayu 240, 241, 242 (amp), 239 (raf) --- Nino, Af, Andi & Ari 8, 17 (gra) --- Nepenthes Project (NP) 87 (adn), 95, 101 (alb), 102 (alb x eus), 24, 117, 119 (amp), 65, 70, 258, 263 (amp x mir), 115, 125 (amp x gra), 122, 128, 169 (amp x raf), 252 (amp x rei), 255, 281 (ari), 74, 77 (bon x gym), 20, 21, 23 (bon), 59 (dub), 259, 80, 81 (eus), 25, 106, 107, 108 (gra), 170 (gra x raf), 27, 247 (gym), 359, 362 (gym x spe), 29, 243, 246 (ine), 60 (izu), 284 (jac), 86, 89, 90 (lon), 47, 52, 124, 194 (mir), 373, 377 (ova), 375 (ova x spe), 14 (pyr), 126 (raf), 26 (rei), 259 (rei x spa), 370, 374 (rho), 01 (sin), 248 (spa), 349 (spe), 104 (sum), 31 (tal), 56, 254, 323, 325 (tob) --- Nur Avrila, Nas & ecological group 86, 87, (ala), 85 (amp), 88 (alb) --- Nur Avrilla 117 (mir) --- Okada, H & Mori, Y. 1178 (ala) --- On, Vera, Yat, Tin & Rina S 103 (amp), 102 (gra) --- Ouwehand 79 (tob) --- P. Buwalda 6250a, 6251 (amp), 6227 (gra), 6250, 6251 (raf) --- Peter, Betty, Mira, Syelli, Dewi 95 (gra) --- Pions, Eka Tp, Warti, Dewi & Len 39 (alb), 47 (ala) --- Pitra A, Delvia 53 (gra) --- Pitra, Eva, Santi & Yuli 28 (ala) --- Puspita 34 (gra), 43 (mir), 39 (rei) --- R Tamin 1142, 1143, 2206, 2211, 2289, 2290, 2291, 2292, 2297 (ala), 2205 (amp), 1190, 1200, 1271, 2046 (bon), 1150, 1156, 2208, 2212, 1004, 2250, 2293, 2295, 2296, 2301, 971, 1113, 1141, 2395 (gra), 416, 974, 977A, 1114, 2390, 2392, 2394, 986 (mir), 2294, 1261, 1142 (raf), 989, 373, 2210, 2243, 2253, 2286, 2287, 2288, 2289 (rei), 2326, 2337, 2353, 1072, 1264, 1265, 1266, 1267, 1268, 1270, 1271, 2048 (sin), 1141, 1149, 1156, 2209 (alb) --- Rusjdi Tamin & Asmiati 355 (ala), 347, 348 (alb), 424, 350, 359 (amp), 200, 354 (gra) --- Ruttner 188 (amp), 271 (rei), 192 (tob), 190, 191 (mir) --- Sari, Dewi, Las & Zul 56 (ala) --- Son, Markos, Murizal, D.Eman Susi Y 9 (gra) --- Son, Maros, Murizal, Demni & Susi Y 20 (alb) --- sonny'91 58 (alb), 85 (ala) --- Sri S Yanti 53 (amp) --- S. Yoshida 2063 (tob, 3168 (amp) --- S.H. Koorders 22360, 22361, 22362 (amp) --- S.M. Latif 12 (eus) --- Soepadmo 123 (amp) --- Soepadmo & Mukhtar 78 (gra) --- Sujatmoko 90, 91 (ala) --- Sulhadi 20 (gra) --- Sureni 33 (mir) --- Syafrudin I & Gifty Y 13 (gra) --- Teysmann 538 (alb), 536 (amp), 8, 531, 533, 3510, 11082, 11081 (gra), 528 (mir), 14 (raf), 539, 540 (rei), 3512, 3516 (hoo) --- Ujang Asril, Yuriatni 79/VNY (gra) --- Van de Leeuwen 22 (rei) --- Van de Meer Mohr 110, 126, 139, 5054 (tob), 1930 (gra) --- Van Leeuwen-Reinjvaan 3966 (rei), 12890 (tob) --- Van Steenis 1462 (amp), 1479 (raf), 3530 (rei), 8976, 3571, 3733 (sin), 6367, 6368, 8753, 8774, 8920, 9171, 9933, 9242, 9726, 6368 (spe), 6046 (mir), 1480 (gra) --- Victoberry 68 (gra) --- W. Burck 3 (amp) --- W. Grashoff 9 (amp) --- W. Meijer 15840 (spe), 3043, 5145, 5147 (sin), 4491 (ala) --- W.A.P de Boer 11 (eus) --- W.J.J.O de Wilde 13103, 13104, 14011 (spe) --- W.J.J.O de Wilde & B.E.E de Wilde 13190 (tob) --- Wawa, Rina, Lili, Fani & Fariza 44 (ala) --- Widi, Ranti 8 (gra) --- Y. Meeter 89 (mir) --- Y. Kus 80, 81 (mir) --- Yandi, Yuni, Leni & Mar 111 (gra) --- Yanti, Nardi, Yat, Ifa 71 (gra) --- Yanti, R.Tamin, Men &

Pit 24 (rei) --- Yardi, Lili, Linda, Nini, Yusnita 1 (mir) --- Yelita 163 (sin) --- Yenni 65 (gra) --- Yohanes R 11 (gra) --- Yossi M '94 34 (gra) --- Yumerjelita 14 (gra) --- Zaldi Patriyanus 12 (ala). 13 (gra) --- Zulva, Yetti, Albert B'88 2 (rei).

Vernacular Name Of *Nepenthes* Species In Sumatra Island

Air putih --- Ktidieng hantu
 Balingka --- Cerek-Cerek Antu
 Bangka --- Ketakong
 Baso --- Kumbuak-Kumbuak
 Bengkulu --- Periuk kera
 Bengkulu --- Kancing monyet
 Bonjol --- Caluang Antu
 Berastagi --- Kuburan laneng
 Halaban --- Kuran-Kuran
 Jambi --- Periuk monyet
 Kerinci --- Kancing Beruk/Kicung Beruk
 Mahek --- Katang-Katang
 Ngarai Sianok --- Saluang Antu
 Palembang --- Periuk kera
 Palupuah --- Katidiang Antu
 Parambahan --- Kantong-Kantong Baruak
 Matua --- Sicerek
 Pasaman --- Tampuang-Tampuang hujan
 Pinagar --- Caluang Baruak
 Puncak Pato --- Cupak-Cupak Baruak
 Sibolga --- Tahur-tahur
 Sirukam --- Kampia Baruak
 Talang --- Cawan-Cawan/ Galoe-Galoe Antoe
 Talang Babungo --- Kacubuang
 Tapan --- Kincuang Baruak
 Taratak --- Teko-Teko
 Halaban --- Mangkok-Mangkok

Teluk Kuantan --- Periuk-Periuk

Tapanuli --- Tahul-Tahul

Photography

All of the photographs were taken using a Nikon FM-10 with the following Nikon 35-70 mm lens, SIGMA AF Macro 1: 2,8 lens, +1 & +2 lens, UV filter and National Flash PE-201M. All the photographs use Fuji Superia (ASA 200) color film and flash was used occasionally. All of the photos that presented in this report taken by Pitra Akhriadi and Hernawati.

Appendix 7.

PROJECT IMPLEMENTATION

A. Itinerary

Phase 1.

01/05/ 2002: Organized research permission

01/06/ 2002: Preparing fieldwork equipment

15/06/ 2002: Full Team meeting and make job description

Phase 2.

Competition and Training Activities

For eight month, *Nepenthes* Team conduct *Nepenthes* Coloring Competition (NCC) and training activities (introducing status and existence of *Nepenthes* and discuss the conservation efforts for *Nepenthes* with local communities) in six important sites to conserve *Nepenthes* in Sumatra Barat. Detail activities listed below:

01-10/07/2002	(Preparing <i>Nepenthes</i> coloring competition)
14/07-12/08/2002	(Training in Batu Bajanjang and Talang Babungo)
22-25/08/2002	(NCC event in Batu Bajanjang)
26-28/08/2002	(NCC event in Talang Babungo)
06-08, 16-18/09/2002	(Training in Aua Kuniang)
13-15/09/2002	(Training in Kelok Sambilan)
20-22/9/2002	(NCC event in Aua Kuniang)
27-29/09/2002	(Training in Mahek)
05/10/2002	(NCC in Kelok Sambilan)
12/10/2002	(NCC event in Mahek)
22/10/2002	(Training in Ulu Gadut)
31/10/2002	(NCC in Ulu Gadut)
November 2002	(Preparing leaflet and <i>Nepenthes</i> poster)
December 2002	(Producing leaflet and <i>Nepenthes</i> poster)
10/01-26/02/2003	(Distributing <i>Nepenthes</i> poster to local communities)

Phase 3.**Fieldwork**

Survey and evaluated existence of *Nepenthes* in natural habitat and gathering socio economic data of *Nepenthes* from the local communities in Sumatra Island), detailed trip are listed below:

Fieldwork I	(Field survey)
22-27/01/2003	(Preparing <i>Nepenthes</i> Expedition Equipments)
30-31/01/2003	(Border area between Sumatra Barat and Riau Provinces)
01-07/02/2003	(Riau)
08-09/02/2003	(Jambi)
10-11/02/2003	(Sumatra Selatan)
12-14/02/2003	(Lampung)
15-18/02/2003	(Bengkulu)
07-10/03/2003	(Gunung Kerinci and Gunung Tujuh Areas)
13-16/04/2003	(Padang)
Fieldwork II	
May-July 2003	Preparing and setting <i>Nepenthes</i> sites for ex-situ conservation purposes in Arboretum of Andalas University Limau Manih Padang and processing <i>Nepenthes</i> specimen
Fieldwork III	(Field survey)
08-10/08/2003	(Gunung Talang)
22-24/08/2003	(Gunung Belerang)
25-29/08/2003	(Danau Kerinci Areas)
30/08-03/09/2003	(Gunung Raya Areas)
05-08/09/2003	(Gunung Masurai)
10-13/09/2003	(Gunung Kerinci Areas)
Fieldwork IV	(Field survey)
01-05/10/2003	(CA Lembah Harau)

07-10/10/2003 (Preparing *Nepenthes* expedition equipments)
 15-23/10/ 2003 (Sumatra Utara)

October 27-November 24, 2003 (The Fast-Month for the Moslem)

The fieldwork rested, *Nepenthes* Team use this resting time to compile all of the data that found in the field, continuing the processing of *Nepenthes* specimens and preparing draft and final report.

November 25-30, 2003 (Idul Fitri Holiday for the Moslem)

Fieldwork V (Field survey)
 07-09/12/2003 (Gunung Sibayak)
 10/12/2003 (Gunung Sinabung)
 11-12/12/2003 (Berastagi-Sidikalang)
 13/12/2003 (Gunung Sibuatan)
 15/12/2003 (hills around Parapat)
 16/12/2003 (Gunung Pangulubao)
 18-19/12/2003 (Bukit Barisan, Northern Bukittinggi)

Phase 4.

Competition and Training Activities (Essay Writing Competition)

10-14/10/2003 (Send the brochures and invitation letters of *Nepenthes* Essay Writing Competition to 110 SMU (senior high school) that occurred in Sumatera Barat Province)
 15/10-22/12/2003 (Essay Writing Competition schedule time)
 22-31/12/2003 (Final decision for the *Nepenthes* Essay Writing Competition Winners)
 Early January 2004 (Surrender the reward for the winners)

Late January 2004 **FINAL REPORT**

B. Logistic

Internal travel: private four-wheel drive vehicles will be hired to move between sites. A vehicle will be hired for the duration of field work in montane forest.

Accommodation: cheap hostels will be used while in towns. In the field Jungle sleeping units and tents will be used, with a large-tarpaulin to keep things dry.

Food: staples (e.g. rice and manioc) lentils and vegetables, supplemented by tinned food, will be bought in local towns.

Safety: a comprehensive medical kit will be carried at all times in the field, anti-malarial pills will be taken during the rainy season.

Permission: Nepenthes Project 2002 has the full support and permission of Herbarium Universitas Andalas (ANDA). The Nepenthes Project 2002 will collaborate with Herbarium Bogoriense (BO) to compile distribution data of *Nepenthes* in Sumatra Island. Permission also given from local government to enter their territory.

All of the team members will be equipped with life insurance for the safety.

Appendix 8.

PUBLIC AWARENESS ACTIVITIES

- July 22-24, 2002 Hernawati presented two papers (West Sumatran *Nepenthes* and *Nepenthes* in the past, this time and the future) on *Seminar of National Biology VIII*, Indonesian Biology Association in Padang City West Sumatra. P. Akhriadi also presented poster of *Nepenthes* in this event. More than 300 participant from The Research Institution, University and NGO in 17 Province in Indonesia participated on this seminar
- September 10, 2002 *Nepenthes* Team talks on one-day *Seminar of Conservation 2002 HIMABIO Unand* (Biology Student Association of Andalas University). This seminar was participated by some Biology Student Association from several Universities in Sumatra Island.
- July 26, 2003 *Nepenthes* Team distributed *Nepenthes* poster to participants of the *Fourth National Organic Chemistry Workshop* that regularly done in Padang City annually. The participants come from several universities and institutions in Sumatra, Java, Indonesian Borneo and Sulawesi.
- August 1-2, 2003 *Nepenthes* Team presented Poster on *Sixth National Seminar of Indonesian Woods Research Society, IwoRs*) in Bung Hatta Palace, Bukittinggi City. The participants come from Sumatra, Java, Indonesian Borneo, Bali, Nusa Tenggara and West Irian.

PROJECT PERSONNEL

As a joint initiative work between conservationist, student organization of nature concern and environmental NGO the project will work very closely with the Herbarium and foremost environmental organization in this region. The project team has been selected to provide the best combination of expertise and potential. There are ten persons. Six of them graduate and another are undergraduate students of Andalas University.

Hernawati. (Leader). Aged 31. Graduate student of Andalas University. Study about taxonomy and ecology. Currently work in Herbarium of Andalas University. Pusat Studi lingkungan Hidup's (Environmental Study Centre of Andalas University) surveyor. Participate in Gesneriaceae Project in Sumatra with SEAMEO-BIOTROP Bogor (1999-2000) and Flora of Rimbo Panti project with Herbarium Bogoriense (1998-2000). Nepenthes Project 2001 team members. Speak Indonesia and some English.



Akhriadi, Pitra. (Co-leader). Aged 22. Undergraduate student of Andalas University. Participating in Gesneriaceae Project in Sumatra with SEAMEO-BIOTROP Bogor (1999-2000). Intensive study for Annonaceae in West Sumatra. Several taxonomy and ecology field work for Herbarium of Andalas University (2000-2001). Member of Rafflesia (student nature concern organization). Speak Indonesia and some English.



Indra, Gusmardi. (Co-leader). Aged 32. Graduated from Andalas University. Plant Ecologist. Currently work in Andalas Bumi Lestari (Environmental NGO). Participate on survey of Sumatra Nature Study Centre (SNSC) activity. Participate in management of mangrove destruction in West Sumatra and Flora of Rimbo Panti project with Herbarium Bogoriense (1998-2000). Nepenthes Project 2001 team members. Speak Indonesia and some English.



Atmaja, Ferry. (Co-leader). Aged 23. Under graduate student of Andalas University. Member of PBC. One year survey Population of *Tapirus indicus* in Kerinci Seblat National Parks (1999). Participating in ornithology fieldwork in West Sumatra. Several taxonomy and ecology field work for Pusat Studi Lingkungan Hidup (Environmental study centre of Andalas University) (1999-2000). Nepenthes Project 2001 team members. Speak Indonesia and some English.



Nurainas. Aged 32. Lecturer of Andalas University. Taxonomist. Member of Sumatra Nature Study Centre. Field Surveyor for Plant Medicine Centre of Andalas University. Co-Author for Gesneriaceae project in Sumatra with SEAMEO BIOTROP Bogor (1999-2000). Nepenthes Project 2001 team members. Speak Indonesia and English.



Victoberry. Aged 31. Biology graduate from Andalas University. Taxonomist Currently work for Integrated Conservation and Development Project Monitoring, Component-C Kerinci Seblat National Parks (2000). Field surveyor for Plant Medicine Study Centre of Andalas University (1996-1999). Member of Padang Biological Club (PBC). Nepenthes Project 2001 team members. Speak Indonesia and English



Ardianto, Asferi. Aged 25. Biology graduate from Andalas University. Participate on plant survey for Herbarium of Andalas University. Participate in Study of *Globba* spp in West Sumatra (2000). One month Rainforest field work in Lembah Anai,



Rimbo Panti and Malampah (2000). Member of Padang Biological Club (PBC). Nepenthes Project 2001 team members. Speak Indonesia.

Bakar, B. Parsito. Aged 25. Biology graduate from Andalas University. One-month rainforest field work in Ulu Gadut and Pinang-Pinang Plot (2000). Several ecology and taxonomy field work for JICA. Member of Padang Biological Club (environmental NGO). Speak Indonesian and some English.



Petra, Irfan. Aged 24. Under graduate students of Andalas University. One month survey *Laporthea* spp in lembah Anai, Malampah and Rimbo Panti. Participate in Study of *Globba* spp in West Sumatra (2000). Member of KCA-LH Rafflesia of Andalas University. Speak Indonesia.



Novaldi, Igus. Aged 31. Biology graduate from Andalas University. Member of Andalas Bumi Lestari (environmental NGO) and have active participation in forest reboitation and conservation action in West Sumatra. Speak Indonesia and some English.



Nepenthes Team

Collaborated between



BUDGET JUSTIFICATION

Pre-expedition	(€)
Administration/Prospectus/Proposal	198,90
Equipment	659,93
Medical	196,59
Insurance 10 @ 50	500,00
Photographic	605,19
Expedition	
Food and accommodation	2401,56
Internal travel/vehicle hire	2099,66
Local labor	524,24
Counterpart allowances	900,07
Post-expedition	
Report production	375,07
Report translation	375,07
Preparing and distribute leaflet	300,05
<i>Nepenthes</i> coloring competition	499,95
<i>Nepenthes</i> essay writing competition	266,05
Training for the local communities	335,05
Administration	200,10
Telecommunication	300,05
Processing specimens	490,02
Preparing ex-situ conservation site	360,04

TOTAL **11587,58**

Nepenthes Project 2002
Current account
 Hernawati (0320708362)
 Bank Central Asia
 Kantor Cabang Utama Padang
 Sumatera Barat – Indonesia

Budget Justification

Pre-expedition	(€)
Administration/Prospectus/Proposal	130,83
Equipment	338,84
Medical	58,87
Insurance 10 @ 50	500,00
Photographic	235,95
Expedition	
Food and accommodation	1042,19
Internal travel/vehicle hire	294,36
Local labor	98,12
Post-expedition	
Report production	330,50
Report translation	309,50
Preparing booklet & poster	392,48
Questioner & One day training	167,19
Administration	148,17
Total	4047,00

Nepenthes project 2001
Current account
 Hernawati (0320708362)
 Bank Central Asia
 Kantor Cabang Utama (KCU) Padang
 Sumatera Barat - Indonesia

ACKNOWLEDGMENTS

Nepenthes Project 2002 is the follow up project that funded by BP Conservation Programme with the Expedition ID 1455. This project would not success to conduct without support and funding from The BP Conservation Programme. Birdlife International, Wellbrook Court, Girton Road, Cambridge CB3 0NA, UK.

We would like to express our gratitude for all of the people that have patience to share their knowledge and spent the time to give energy, support, suggest and consideration for the work of the Nepenthes Team. Without decreasing our honor for each of the people with our lowering we want to thanks for all of the people that had helped us.

Mr. Rusjdi Tamin, Head of Herbarium Andalas University (ANDA) which never exhausted to give support, suggest and consideration for Nepenthes Team to conduct the research and conservation activity. With our lowering we want to express our many thanks four your support.

Dr. Charles Clarke who gave some suggests, assisting and correction to conduct the research in the field. He always get ready to sharing knowledge and answering all of the questions that we asking to him. Thank you very much.

Prof. Anas Salsabila who never exhausted to assisting us to increased the capability to conduct the research.

Dr. Ardinis Arbain, Head of Pusat Studi Lingkungan Universitas Andalas (Environmental Study Center of Andalas University) that always give the support for Nepenthes team.

Prof. Marlis Rahman, Rector of Universitas Andalas who supported Nepenthes Essay Writing competition reward.

Prof. Sanusi Ibrahim, Dean faculty of Mathematical and natural Sciences of Andalas University that also supported Nepenthes Essay Writing Competition reward

Dr. Susumu Nakano (Hiroshima Shudo University, Hiroshima, Japan) who give assistance to study the animal in Nepenthes pitcher.

Dr. Irawati, Head of herbarium Bogoriense that allow us to examine Nepenthes specimens that deposited in Herbarium Bogoriense.

Deborah Martyr, Fauna Flora International that given some suggest for the fieldwork in several mountains in Jambi.

All of the members of KCA-LH Rafflesia that was spent energy and times to maintain and prepare all of things that we need to conduct Nepenthes Essay Writing Competition

Thank you for all of the members of Padang Biological Club (PBC) and Andalas Bumi Lestari (ABL) that given the constructive criticism and new idea to Nepenthes Team.

Thank you for all the people that supported Nepenthes Coloring Competition (Bapak Musbar and Local Government in Batu Bajanjang, Bapak Nurman and local government in Talang Babungo, Bapak Emmas and local government in Aua Kuniang, Head master of SDN 13 Katinggian, Bapak Yunior Efendi and local government in Mahek and Head master of SDN 15 Ulu gadut).

Also thanks To Pak Jimi and Doni (Driver and co-driver of Nepenthes Team) who keep saved our equipment as long as the expedition.

Thanks to Bapak Subandi ((homestay Subandi), Erwin (Sibayak Guest House), Neni Nurlina, Amak Batu Batu Bajanjang and Amak Talang Babungo that give us the comfortable stay.

Thanks to Indra Salputra, Nurlaila Sitepu, Jarulis and As lelek for your help to collect Nepenthes specimen from your region.

Thank you for all of the person that accompanied and guiding Nepenthes Team in the field. Endatno, Danil, Pak Nurman, Anton, Feri, Edi, Dep, Pak Aman, Pak Parmin, Nasril, Dedek, Pak Awaluddin, Karim Gunting, Dedi, Uji, Miden Simarmata, Becky, Al, Michael and Pak Sudirman,

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GLOSSARY OF MINANG AND INDONESIAN TERM

Aua	(bamboo)
Apak, Bapak	(father)
Babungo	(flowering)
Bajanjang	(sets like a ladder)
Barat	(west)
Batu	(stones)
Bukit	(hill)
Danau	(lake)
Gunung, Gunuang	(mountains)
Hujan	(rain)
Jorong	(a part of the state)
Kedai	(small shop)
Kelok	(sharp band of the road)
Kopi	(coffee)
Kuniang, Kuning	(yellow)
Madrasah Ibtidaiyah Muallimin	(Moslem elementary school)
Minang	(minang ethnic)
Melayu	(melayu ethnic)
Sekolah Dasar Negeri	(the government elementary school)
Selatan	(south)
Sambilan, Sembilan	(nine)
Taman Kanak-Kanak	(kindergarten)
Timur	(east)
Tinggi	(high)
Tujuh	(seven)
Utara	(north)
Wali Nagari	(headmaster of a state (within a nation, or of the people))

Field Work



Processing Specimens



Collecting in the field



Keeping in newspaper sheet after preserving with alcohol



Dried the specimen with oven



Sortering



Mounting



Mounting Tools

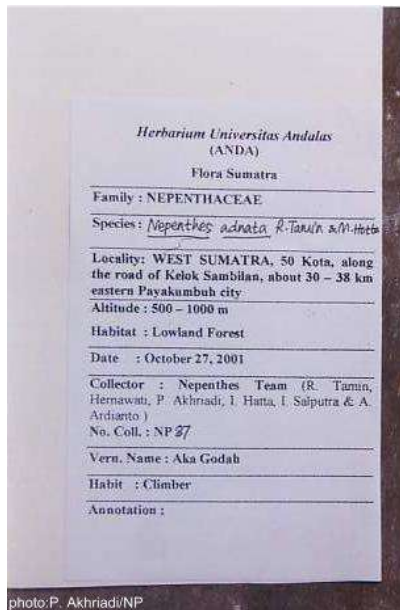


photo: P. Akhriadi/NP

Labelling



photo: P. Akhriadi/NP

Mounted specimen



photo: P. Akhriadi/NP

Insert to a Herbarium Map



photo: Hernawati/NP

Keep and arrange in the cupboard

