Local Knowledge on Medicinal Plants of Batak Mandailing and Nias Communities in Batang Toru, North Sumatra, Indonesia

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Abstract. Knowledge and the use of medicinal plants by the local community is quite a lot in Indonesia. However, local knowledge about medicinal plants from Batak Mandailing and Nias communities in North Sumatra is still rare. The research objective was to explore local knowledge using medicinal plants in several villages in Batang Toru and surrounding areas, South Tapanuli Regency, North Sumatra Province. The methods used were including open discussion and direct field observation. To better assess the extractive activities and the utilization of the plant diversity by the local people, an index of cultural significance (ICS) analysis was employed. The results recorded at least 110 plant species, including 93 genera and 49 families as medicinal plants for 40 types of diseases. Plants found to be utilized as medicinal plants in single or more plant species. Among the medicinal plants used by the community were Acorus calamus, Styrax benzoin, and Zingiber officinale and a kind of mushroom (Lignosus sp.). The ICS analysis for the potential value of each species showed that hunik (Curcuma longa) was the most important species and well utilized by local community in the Batang Toru area.

Keywords: medicinal plants, batak mandailing, nias community, north sumatra, indonesia.

1. Introduction
Indonesia is known as a country that has a high ethnic diversity. As an agrarian community, the life order of its people is always characterized by its proximity to natural surroundings. Their knowledge in utilizing plants varies greatly between ethnic groups with each other, depending on the environment and resources that support them, such as knowledge about medicinal plants, food or fish poison. A close relationship with the natural environment is reflected in the utilization of plant resources. Plant is used for traditional medicinal source in Indonesia about 1,000 – 1,300 species [1]. A lot of traditional knowledge about the use of medicinal plants from various ethnic had been developed by herbal medicine and pharmaceutical industry into herbal product or phytopharmaca product that is very saleable in the market [2].

One of the non-conservation forest areas that still has relatively intact forest with a closed canopy cover is in Batangtoru watershed area, situated between the three districts of South Tapanuli, Central Tapanuli, and North Tapanuli in North Sumatra. This region provides habitat for the Sumatran tiger and...
the Sumatran orangutan [3]. The primary rainforest in Batang Toru area is also a well-balanced forest and has a high above-ground biomass of about 551.8 - 623.0 T / ha [4].

In Batang Toru District, South Tapanuli, North Sumatra there are some ethnics which majority of them are Java, Batak Mandailing and Nias ethnics. The knowledge of society is important as a basic information to know diversity of plants. This knowledge is necessary to be documented before the original information going extinct.

2. Study sites and methods
The study of traditional knowledge of the local people in Batang Toru District, South Tapanuli, North Sumatra on plant resources was done by open-ended discussion and direct observation in the field. Our method with 29 respondents namely 19 were men and 10 were women respectively. The respondents were local people i.e., 18 respondents were among 40 – 60 years old, 9 others were below 40 years old and two others were above 60 years. The research was conducted in several villages of Aekpineng, Sumuran, Sipisang, Napa, Aek Ngalol, Beringin (Batuhoring), Kampung Baru, Tamosuk (wek IV). Majority of community in Aekpineng, Sumuran, Beringin and Tamosuk villages are Java, Batak Mandailing and Nias. Data was collected in accordance to [5-7]. The local name and use of each plant were recorded, specimens were made into voucher of herbarium specimens and identification of each scientific name was conducted at the Botany Division, Research Center for Biology – Indonesian Institute of Sciences. To better assess the extractive activities and the utilization of the plant diversity by the local people, an index of cultural significance (ICS) analysis was employed [8]. The formula is:

\[
ICS = \sum_{i=1}^{n} (q_{i} \times i_{i} \times e_{i})_{n_{i}}
\]

\[
ICS = \sum_{i=1}^{n} (q_{1} \times i_{1} \times e_{1})_{n_{1}} + (q_{2} \times i_{2} \times e_{2})_{n_{2}} + \ldots + (q_{n} \times i_{n} \times e_{n})_{n_{n}}
\]

- \(n_{1} \ldots n_{n}\) = the total number of uses for each species
- \(q_{1} \ldots q_{n}\) = score or value to the quality of the plant species. For primary food the score is 5; secondary food is 4; the other, secondary material, or medicine is 3; ritual use is 2; mere recognition is 1
- \(i_{1} \ldots i_{n}\) = score of intensity use of each plant species. The intensity score as follows: very high = 5; moderately high = 4; medium use = 3; low use = 2; minimal use = 1.
- \(e_{1} \ldots e_{n}\) = score of exclusivity value. The exclusivity value for preferred choice = 2. One of several or many possible sources = 1; and secondary source 0.5.

2.1. Research site
Batang Toru District, South Tapanuli Regency, North Sumatra, and consist of 23 villages (figure 1). The total area of those is 351.49 km², within the elevation of 25 - 925 m above sea level. Batang Toru is geographically located near N 01°29'51” and E 99°02'21”’. Batang Toru district is inhabited by 17.996 (male) and 17.172 (female). The major occupations of local people are farming and merchandising. Rubber, chocolate and palm oil are the main production of Batang Toru district. The community living in the area are majority Java, Batak Mandailing, and Nias ethnics. Nias community is a settler from Nias Island located west of Sumatra island (Batang Toru). To communicate, among these ethnic, they use the same local language which can be understood by them, except Nias language, which is a little bit difficult. For example Javanese understand Batak language or vice versa, that include the name of plants.
3. Results
The local people in Batang Toru, North Sumatra also have knowledge in plant resources like to other local people in Indonesia. This ethnobotanical research listed about 110 species belongs to 93 genera and 49 families, 4 species of fungi (*Lignosus* sp., *impes, mata kebo, dan sapu*), used for medicinal purposes in human (table 1). Medicinal plants used vary in diversity and main families that have been used consist of Euphorbiaceae (9 species), followed by Zingiberaceae (8 species), Rutaceae (6 species) and Acanthaceae, Leguminosae, Malvaceae, Poaceae, Rubiaceae of 5 species respectively (figure 2). The plants are prepared in various ways. For medicinal purposes, a decoction of leaves, stem, fruits and root/tuber is often used; this is either drunk or rubbed on the body to treat one or more diseases or conditions. Most of the decoctions are made by simply crushing a particular part of plant with a mortal pestle, but some are made by boiling plant parts with water; after decanting and cooling, the liquid is drunk.

Parts of the plants used as medicinal plants were the leaves (98), rhizomes (39), roots (35), fruits (13), tubers (13), seeds (10), flowers (10), barks (10), stem (8), whole sections (7) and sap (1)(98), rhizomes (39), roots (35), flowers and the sap (1) (figure 3).

The ICS of medicinal plants is a quantitative method used by ethnobotanists to determine the cultural value of plants. Based on their uses, the plants were grouped into 5 categories, namely: >200 (very high), 100-199 (high), 20-99 (medium), 5-19 (low), and <5 (very low) (modified from [9]). The medicinal plants with medium values of ICS had the highest number of species (56), and followed by low categories (50) and high categories (5) (table 1).

The value of medicinal plants in Batang Toru varied from 4.5 to 195 (table 1). The medicinal plants with the highest value of ICS (195) was *hunik (Curcuma longa)* and the lowest value (4.5) was *sawi (Brassica rugosa)*. Medicinal plants high value are those which have many usages and are utilized frequently by local communities, while those having low value on ICS have fewer usage and are rarely used. The plants with high ICS value were *hunik (Curcuma longa), dan susu babiat (Lignosus sp.), and taya-taya babi (Dichrocephala integrifolia).*

*Taya-taya babi (Dichrocephala integrifolia)* is often sold to the market in Sibolga and its price Rp. 1,500/bundle and there are 10 plant/bundle. *Nilam (Pogostemon cablin)* is also known as medicinal plant, community has ever planted. Community has ever distillation and took its oil and its methods are sun dried, steamed then traditional distilled. Its price is Rp. 1,500,000 /kg on 1977, then Rp. 200,000 because
of mixed with *lagan* oil, society involved in about 30 – 40 %. It was harvested 3 times in one year. *Kapur* oil (*Dryobalanops sumatrensis*) is sold in Batang Toru district. Those species had economical values. Other product like *dan susu babiat / dan durabi* (*Lignosus* sp.) is used mushroom as medicinal source by Jawa, Batak and Nias ethnics. According to their belief, this fungi as a drop of milk of tiger (‘*babiat*’). Dried shape is to be hard like tuber (seleurotium), the tuber price sold Rp. 90,000/kg, and it is until 5 years if it stored. The knowledge of sickness that someone suffer from diseases, also because of *tarsapo* (spirit), because of *kula-kula ni halak* (because of charm), and because of *golang-golang* (because of devil).

**Figure 2.** Composition of species and family used for medicinal plants by people community

**Figure 3.** Part of Medicinal Plants Used as Medicines in Batang Toru
How to use the medicine of the plant diversity which are used in the society are as follows:

**Childrens medicine**

- **Bungo kaca piring** (*Gardenia augusta*) leaves mixed with **bunga raya** (*Hibiscus rosa-sinensis*) leaves, **andor baliang** (*Pericampylus glaucus*) leaves, 7 piece of **hunik** (*Curcuma longa*), 7 seeds of rice and water then crush and it is applied in crown of head, also compressed on the body. Those are for childrens that the body fever and under weight, also for an adult.
- For the thin children, used **siburnas** (*Pyrrosia* sp.), **hasior** (*Kaempferia galanga*), **dasun** (*Allium sativum*), **huni’ bungle** (*Zingiber purpureum*), **menir** (rice), **taya babi** (*Dichrocephala integrifolia*), 2-3 piece dan sapu (fungi of sapu) then crushed and made a round shape and dried out under the sun. An applied with a few water while wake up or go to sleep. Also hunik leaves roasted and applied on stomach. Don’t make cloth before dried. Leaves (3) of **dingin-dingin** (*Kalanchoe pinnata*) for under weight childrens.
- **Bengle** and **jeringau** spat on childrens or applied on the body.
- **Pace** leaves (*Morinda citrifolia*) mixed oil and roasted then applied on the childrens.
- **Apapaga** (*Centella asiatica*) mixed salt, boiled for the childrens.
- The young of **buluh jalar** stem (bamboo) boiled and shower for the under weight childrens (sapu-sapu).
- **Jerango** and bengle made a bracelet for the under weight childrens.
- 10 bundles of **siała** stem (*Etlingera elatior*) boiled in the morning and to shower for baby in order to fast for walk. (1 bundle = 7 piece, its measure is as long as baby foot)

**Headache medicine**

- Seeds of old **kates** (*Carica papaya*) mixed **kemenyan** (*Styrax benzoin*), crushed, then applied in the head for headache and flu.
- Roots of coconut mixed root of **bargot** (*Arenga pinnata*), root of **bambu kuning**, root of **jambu koling** (*Syzygium malaccensis*) each a handful then boiled and are shower for headache, stomachache and sprained.
- Bark of **lapazi** (*Omalanthus populneus*) is applied on the head.

**Nervous system: fever, malaria, powerless, injury, lever**

- Leaves of **bunga raya** crushed then compressed to the body or drunk for fever.
- Leaves of **randu** (*Ceiba pentandra*) for fever.
- Bark of **pule /goti** (*Alstonia scholaris*) mixed bark of **manggis** (*Garcinia dulcis*), bark of **langsat** (*Lansium domesticum*), **adas pulawaras** (*Foeniculum vulgare*), gula batu then the water drunk for fever.
- Leaves of **ketumpang** (*Pouzolzia zeylanica*) crushed, mixed **adas pulawaras** then drunk.
- 7 leaves of **sirih** (*Piper betle*) crushed and applied on the body.
- Leaves of citrus mixed leaves of **sembung** (*Blumea balsamifera*) for malaria.
- Leaves of **duu alite** pressed, added a few salt, then drunk for injury.
- Leaves of **dingin-dingin/zini-zini** (*Kalanchoe pinnata*) are applied on the body.
- Leaves of **sema-sema** (*Hibiscus rosa-sinensis*) mixed the water then drunk and its leaves are applied for fever.
- Seeds of **kedawung** (*Parkia roxburghii*) crushed, mixed palm oil then applied on the body.
- Leaves of **duru-duru** (*Melastoma affine*) boiled for the shower for the body powerless.
- Rhizome of **hadivo** (*Costus speciosus*) pressed, then its water drunk for injury.
• **Galunggung** (*Blumea balsamifera*) mixed root of **tongkat ali** (*Eurycoma longifolia*), **brotowali** (*Tinospora crispa*), turmeric and a few salt, boiled then drunk.

• **Tongkat ali** boiled then drunk

• Root, stem and leaves of **ciplukan/pultak-pultak** (*Physalis angulata*) boiled then drunk in the morning and evening for malaria and pain in the bones.

• Plants of **pultak-pultak** and bark of **langsat** are cut, dried out under the sun, boiled then drunk for malaria.

• Leaves of **dukung anak** (*Phyllanthus niruri*), **brotowali**, **sambiroto** (*Andrographis paniculata*) are dried out under the sun, boiled then drunk for malaria.

• Roots, leaves of **kates wulung** (black stem) are mixed turmeric, crushed, then filled and drunk for malaria, don’t drink this ingredient for hypotension.

• **Bark of pule and temu kunci** (*Boesenbergia rotunda*) are boiled then drunk every morning for **sakit kuning** (lever).

• Old leaves of **sukun** (*Artocarpus communis*), are boiled then drunk about 3 liter / day routinely for **sakit kuning**.

• Young leaves of **boi** (*Arthrophyllum diversifolium*) are pressed, added a few salt and hot water then drunk for fever, malaria.

• Bark of **habang-habang** (*Arthrophyllum diversifolium*) are cut, took inner of bark then dropped on eye for malaria.

• Leaves of **kanina** are pressed then drunk for fever.

• Roots and leaves of **tongkat ali** are boiled for **mogighi** (fever).

• Leaves of **zare-zare** (*Plectranthus scutellarioides*) are pressed then the water drunk for **mogighi** (malaria).

• Leaves of **kopoyu** are boiled then drunk for malaria.

• A tuber of **talibo tedepoto** (*Lignosus sp.*) is ate for heart-pain (N: vegetede).

• **Dan susu babiat/jamur susu harimau** (*Lignosus sp.*) is washed, mixed turmeric, chewed then spat for ulcers/cancer on breast, thigh.

• Leaves of **boi** and water are pressed then drunk and applied to the body.

### Hypertension medicine

• Fruit of **kates** is grated, pressed then drunk 3 times in the morning, noon and evening.

• Leaves of **pokat** (*Persea americana*) boiled then drunk.

• **Benalu kopi** boiled then drunk for hypertension and asma.

### Eye medicine

• Leaves of **pahit mata** (*Euphorbia hirta*) are wrapped with banana leaves then roasted, then dropped on eye after it rather warm.

• Rhizome of **hendivo** (*Costus speciosa*) is grated, its water for wash of eye which red colour.

• Young leaves of **seve-seve** are pressed then its water for wash of eye which itchy.

• Fungi of **mata kebo** is dropped.

• Shoots of **putih mata** are cut, then its sap dropped to eye and the mouth is taste bitter.

• Leaves of **ichi-ichi** and dew (**nambur**) in leaves are pressed then its water dropped on eye which pain because of thorn of salacca.

**Before and post pregnancy medicine and menstruation:**
• Temu gajah (temulawak) mixed pege (Zingiber officinale), hasior (Kaempferia galanga), saling batuk (Acorus calamus), lempuyang (Zingiber aromaticum) for post pregnancy.
• The materials of an ointment (lulur) are pege, hasior, kunyit bungle, hunik, lempuyang, dasut, lada (Piper nigrum), congkeh (Syzygium aromaticum), batu sawi (Brassica juncea), crushed and mixed water of old coconut for post pregnancy.
• Leaves of nazaleu (Graptophyllum pictum) are boiled, then drunk for post pregnancy.
• Leaves of fuyua (Urena lobata) are pressed then drunk for before pregnancy.
• Leaves of inai are boiled, added a few palm sugar then drunk when menstruation.
• Asam jawa (Tamarindus indica) mixed palm sugar, sometimes added kunyit and mixed hot water then drunk when menstruation.

Laktagoga
• Leaves of sitopu/ ketopok (Claoxylon polot) are cook for vegetables.
• Water of nira (Arenga pinnata) which has been distillation about 1 glass/ day.
• Flower of pisang kepop/sitambatu/gaeziata (Musa paradisiaca) are cook for vegetables.
• Leaves of nasi-nasi (Sauropus androgynus) are cook for vegetables.
• Leaves of kacang panjang (Vigna unguiculata) are cook for vegetables.
• Tuo (water of veto/aren) is drunk Tuak drunk, especially for woman of Batak Toba and Nias ethnics.
• Leaves of bangun-bangun are pressed then its water cook for vegetables.
• Tuber of dan susu babiat is grated and mixed with a vegetable.

For someone want a baby, as follows:
• Shoot of pisang saba = pisang hutan (Musa acuminata), mixed chicken (black), crushed then the water is drunk on Tuesday, wednesday and Thursday night. They read Qur’anic verses namely ‘Al – Falaq’ 7 times and ‘Al Ikhlas’ 144 times and drunk.
• Leaves of gedruo(Cordyline fruticosa) mixed stem of menawa (Mallotus), stem of siholi (Neonauclea) and oil of ¾ coconut fruit then drunk.

Cough medicine:
• Leaves of taya-taya babi are crushed then its water drunk.
• A handful of apapaga mixed taya-taya babi, the water of sugarcane then crushed, mixed egg and milk.
• Fruit of ute nipis (Citrus aurantifolia) is cut and added lime, roasted then drunk.
• Rhizome of hendivo (Costus speciosa) is grated then its water drunk.
• Young leaves of bou (Hibiscus tiliaceus) are pressed then its water added sugar, batuk
• Leaves of boli added water, pressed then drunk.
• Leaves of kapasi (Ceiba petandra) are pressed, added water then drunk.
• Leaves of sema-sema (Hibiscus rosa-sinensis) mixed water then drunk.
• Leaves of rimbang (Solanum torvum) mixed soi-soi (Paspalum conjugatum) are boiled then drunk for cough which itchy in neck.

Ashmatic medicine
• Roots, leaves and flower of kecubung (Datura metel) are boiled then drunk.
• Leaves of taya-taya babi are crushed then its water drunk.

Toothache medicine
• Tuber of dan susu babiat is scraped and put on teeth by cotton.
• Leaves of menawa are boiled then the water for gargle.
• Appetizer leaves of *kates* and leaves of jambu orsik are boiled then drunk.

**Stomachache medicine**
• Bark of *balik angin*, *adas* (*Foeniculum vulgare*), *gambir* (*Uncaria glabrata*), sugar (*gula batu*) are boiled then drunk.
• Leaves of *ubi kayu* /gabirio (*Manihot utilissima*), leaves of papaya, turmeric/bulugudik (*Curcuma longa*) are wrapped in banana leaves then roasted, added petroleum oil then applied on stomach.
• Leaves and roots of *sirput/putri malu* (*Mimosa pudica*), root of *kates* /botik, leaves of *kucingan* are boiled then drunk for stomach disorder.
• Oil of *kapur* (*Dryobalanops sumatrensis*) as massage medicine for swollen.
• *Rhizome of ubi kayu* is grated, pressed and added sugar palm then drunk for maag.
• *Ubis* (*Ipomoea batatas*) are roasted/boiled then ate include its skin of tuber.
• Bark of *pule*, bark of *langsat*, root of rattan, root of coconut, root of *pinang* (*Areca catechu*) are boiled then drunk.
• Roots of *alang-alang* /waa goo (*Imperata cylindrica*) are boiled then drunk.
• Leaves of *balik angin* (*Ficus sp*) are boiled then drunk.
• Leaves of *sirput* (*Mimosa pudica*) and roots of *lalang* are boiled then drunk.
• Seedling of *pisang tambatu/p. kepok* (*Musa paradisiaca*) is cut, roasted, pressed then the water is drunk.
• Tuber of *dan susu babiat/jamur susu harimau* is ate directly.
• Roots, bark of *manggis* and bark of *langsat* is boiled then drunk.
• Young leaves of *soyo* are pressed then the water is drunk.

**Diarrhea medicine**
• Leaves of *jambu orsik* (*Psidium guajava*) is ate.
• *Sapilulut* and palm sugar are pressed then drunk.
• Leaves of *maziabu* (*Psidium guajava*) added hot water and salt then drunk.
• Leaves of *maziabu* are pressed, added salt and petroleum oil (3 drop).
• Young leaves of *gambir* are pressed, added water and a few salt then drunk.

**Disentry medicine**
• Roots of *sirput* (*Mimosa pudica*) and roots of lalang are boiled then drunk.
• Seedling of *pisang tambatu/p. kepok* (*Musa paradisiaca*) is cut, roasted, pressed then the water is drunk.
• Tuber of *dan susu babiat/jamur susu harimau* is ate directly.
• Roots, bark of *manggis* and bark of *langsat* is boiled then drunk.
• Young leaves of *soyo* are pressed then the water is drunk.

**Backache (obat goting)**
• Leaves of *kumis kucing* (*Orthosiphon aristatus*), leaves of pokat and apapaga (*Centella asiatica*) are boiled then drunk.
• Leaves (3) of *bosi-bosi* (*Timonius wallichianus*) and tongkat ali are cut, dried put under the sun and boiled then drunk.
• Leaves of *bosi-bosi* are dried out under the sun added hot water, then drunk like tea.
• Leaves (5 –7) of *manggis* (*Garcinia dulcis*), leaves of *kumis kucing* (*Orthosiphon aristatus*), turmeric for backpain.

**Sprains (tersilpuk), breaks**
• Leaves of *opu-opu* (*Crinum asiaticum*) are roasted, added palm oil then wrapped.
• *Sibernas-bernas* (*Pyrrosia* sp.) and dasun are fried with coconut oil then put on leaves of opu-opu then wrapped.

• Leaves of *lio-lio* (*Gendarussa vulgaris*) are added coconut oil then put on banana leaves then roasted and applied.

• Leaves of (*Hibiscus indicus*) are pressed, added coconut oil then wrapped.

• *Brotowali* (*Tinospora crispa*) and sambiroto are boiled then drunk

**Magic: spirit, charms, devil**

• Leaves of *sipilit* (*Gendarussa vulgaris*) are cut, added fruit of *ute pangir* (*Citrus hystrix*), *ute pasir* (*Citrus* sp.), *ute apas*, *ute rudang* and water for the bathing.

• Leaves of *sirih* (*tawuo*), lime, and jambe.

• *Jenggot jin* (*Lycopodium* sp.) is boiled then it is for the bathing.

• Roots of *pinang* (*Areca catechu*), rattan, coconut fruit of jeruk purut, koro putih/hijau and adas pulawaras are boiled then drunk. Read Qur’anic verses of An’am (15) before drunk.

• Tuber of *dan susu babiat* (*fungi*) is ate, directly.

• Herb of *ati air* (*Hydrostemma motleyana*) (2/3/more) are boiled then drunk.

• Young leaves of *gedruo* (*Cordyline fruticosa*) are pressed then drunk and applied to the body.

• Leaves, fruit of *belimbing* (*Averrhoa carambola*), roots of *jeruk nipis* (*Citrus aurantifolia*), roots of *jeruk kolang* (*Citrus aurantiaca*), roots of *jeruk susu* (*Citrus sp.*), roots of *jeruk sunde* (*Citrus sp.*) added the water then boiled for the bathing.

• Stem of *buluh julur* is boiled for the bathing.

• Leaves, flower of *bunga pancur*, fruit of *jeruk purut*, leaves of *hatunggal /hanjuang merah* (*Cordyline fruticosa*), leaves of *sanggul* (*Ocimum americanum*) and the water for the bathing.

• Tuber of *dan durabi* (*fungi*) is cut, added leaves of *sirih*, gambir, lime then chew as masticatory.

• Leaves/ stem of *sitarak* (*Costus specious*), *dingin-dingin* and the water for the bathing.

• Flower of *fuyua* (*Urena lobata*) is crushed then drunk.

• Leaves of *Zau-zau* (*Lycopodium cernuum*), *tanayae*, *gezero*, *gedruo*, *sirih* (3-9) and a few salt are pressed then the water is drunk and for the bathing other one.

• Leaves of *duu soyo* (*Hemigraphis alternata*) are pressed then drunk.

• *Siala* (*Etlingera elatior*) and *sirih* (each 7 piece) are boiled then drunk.

• 7 piece of *kunyit*, rice and water then drunk 3 times and applied to face, hand and foot.

• Fruit of *jeruk purut*, *jeruk susu*, *jeruk nipsis*, *jeruk hapas* (each 3 piece) are cut and rice, water (1 glass) then drunk and for the bathing.

• 7 piece of flower of jasmine (*Jasminum sambac*), rose (*Rosa chinensis*), *cempaka* (*Michelia champaca*), leaves of *pandan* (*Pandanus amaryllius*), *jeruk purut*, *jeruk nipsis* for the bathing.

**Healthcare**

• *Temulawak*, *lempuyang ageng*, *jahe*, *kencur*, *gula jawa*, *asam jawa*, *kunir merica*, *kencur*, *kunyit*, *jahe* are crushed, pressed, boiled then drunk

• *Kunyit asam* (beverages which consists of turmeric and tamarind)

• *Beras kencur* (beverages which consists of rice and kencur (*Kaempferia galanga*)
Urinary problems
• Roots of alang-alang are crushed, added the water and egg (yellow one only) then drunk.

Measles
• Leaves, bark of dalu-dalu (Shirakiopsis indica) and leaves, fruit of jeruk purut are boiled for the bathing.
• Herbs of ciplukan are boiled.
• Fruit of coconut (old and dried) are grated, pressed then applied in the morning and evening.
• Swollen, ulcers medicine.
• Leaves of ketumpang are crushed, and adas pulawaras then are applied.
• Leaves of seve-seve, lime and spit are applied to ulcers.
• Tuber of dan susu babiat is grated for swollen.
• Jamur impes (fungi) for swollen.
• Flowers of fuyua (singular/5) and a few salts are crushed then applied.

Skin problems: itchy, stings, infections
• Leaves of galinggang, jahe, kunyit and lime are applied.
• Fruit of pinang and sulphur.
• Turmeric, ginger and sulphur for itchy.
• Roots of latong/ kemado are boiled for itchy.
• Leaves of galinggang padang (Nomaphila stricta) are crushed then applied for itchy.
• Leaves of lada behu/cabe setan (Clausena excavata) put on banana leaves and roasted then applied.
• Tuber of langgeh (Schismatoglottis sp.) and lime then applied because of stings.
• Tuber of dan susu babiat, leaves of sirih, gambir, lime are boiled then drunk for infections because of ikan pare (kind of fish), also it is for antidote.
• Stem of pisang saba/p. harangan is crushed then the water is drunk for stings (snake).
• Fruits of jarak (Ricinus communis) for infections.

Wounds
• Leaves of senduduk/ duru-duru
• Leaves of topas para/ sitambabela are pressed then the water applied.
• Leaves of ubi kayu are chewed then applied.
• Leaves of rumput manis /soi-soi are pressed

Table 1. Local and scientific names of medicinal plants in Batak Mandailing and Nias societies in North Sumatra, Indonesia

| No | Vernacular Name | Species Name | Family | ICS |
|----|----------------|--------------|--------|-----|
| 1  | Sambiroto      | Andrographis paniculata | Acanthaceae | 36  |
| 2  | Nazaleu        | Graptophyllum pictum   | Acanthaceae | 18  |
| 3  | Duu soyo       | Hemigraphis alternata  | Acanthaceae | 26  |
| 4  | Sipilit        | Gendarussa vulgaris    | Acanthaceae | 36  |
| 5  | Galinggang padang | Nomaphila stricta     | Acanthaceae | 18  |
| 6  | Saling batuk/jieringau (J) | Acorus calamus | Acoraceae | 54  |
| 7  | Apapaga        | Centella asiatica     | Apiaceae  | 54  |
| No | Vernacular Name          | Species Name          | Family     | ICS |
|----|--------------------------|-----------------------|------------|-----|
|  8 | Adas (J)                 | *Foeniculum vulgare*  | Apiaceae   | 45  |
|  9 | Gotil pule               | *Alstonia scholaris*  | Apocynaceae| 54  |
| 10 | Habang-habang            | *Arthrophyllum diversifolium* | Araceae | 54  |
| 11 | Pining/Jambe (J)         | *Areca catechu*       | Arecaleae  | 90  |
| 12 | Kelapa                   | *Cocos nucifera*      | Arecaleae  | 117 |
| 13 | Galunggung               | *Blumea balsamifera*  | Asteraceae | 42  |
| 14 | Taya-taya babi           | *Dichrocephala integrifolia* | Asteraceae | 108 |
| 15 | Topas para               | *Mikania micrantha*   | Asteraceae | 18  |
| 16 | Botik/Kates (J)          | *Carica papaya*       | Caricaceae | 114 |
| 17 | Manggis                  | *Garcinia dulcis*     | Clusiaceae | 54  |
| 18 | Sitarak                  | *Costus speciosus*    | Coctaceae  | 72  |
| 19 | Ubi rambat (J)           | *Ipomoea batatas*     | Convolvulac| 9   |
| 20 | Dingin-dingin            | *Kalanchoe pinnata*   | Crassulaceae| 54  |
| 21 | Sawi                     | *Brassica rugosa*     | Cruciferae | 4.5 |
| 22 | Kapur                    | *Dryobalanops samatrensis* | Dipterocarpac | 18  |
| 23 | Sitopu/ketopok           | *Claoxylon polot*     | Euphorbiaceae| 18  |
| 24 | Patik mas (J)            | *Euphorbia heterophylla* | Euphorbiaceae| 18  |
| 25 | Pahit/ Putih mata/       | *Euphorbia hirta*     | Euphorbiaceae| 36  |
| 26 | Jarak (1)                | *Malotus sp.*         | Euphorbiaceae| 27  |
| 27 | Lapazi                   | *Manihot utilissima*  | Euphorbiaceae| 45  |
| 28 | Ubi kayu                 | *Omalanthus populneus*| Euphorbiaceae| 18  |
| 29 | Dalu-dalu                | *Ricinus communis*    | Euphorbiaceae| 18  |
| 30 | Nasi-nasi/ katuk (1)     | *Saurops androgyrnus* | Euphorbiaceae| 18  |
| 31 | Jarak (1)                | *Shirakiopsis indica* | Euphorbiaceae| 18  |
| 32 | Daun sanggul             | *Dicranopteris linearis* | Gleicheniaceae| 9   |
| 33 | Zare-zare                | *Ocimum americanum*   | Lamiaceae  | 9   |
| 34 | Kumis kucing             | *Plectranthus scutellarioides* | Lamiaceae| 18  |
| 35 | Pokat                    | *Orthosiphon aristatus* | Lamiaceae| 36  |
| 36 | Galinggang               | *Persea americana*    | Lauraceae  | 36  |
| 37 | Sirput/ putri rnalu      | *Senna alata*         | Legumeinocae| 18  |
| 38 | No Vernacular Name       | Species Name          | Family     | ICS |
| 39 | No Vernacular Name       | Species Name          | Family     | ICS |
| 40 | No Vernacular Name       | Species Name          | Family     | ICS |
| No | Vernacular Name                  | Species Name            | Family            | ICS |
|----|---------------------------------|-------------------------|-------------------|-----|
| 41 | Kedawung                        | *Parkia roxburghii*     | Leguminaceae      | 9   |
| 42 | Asam jawa                       | *Tamarindus indica*     | Leguminaceae      | 54  |
| 43 | Kacang panjang                  | *Vigna unguiculata*     | Leguminaceae      | 18  |
| 44 | Dasun                           | *Allium sativum*        | Liliaceae         | 45  |
| 45 | Gedruo                          | *Cordyline fruticosa*   | Liliaceae         | 63  |
| 46 | Opu-opu                         | *Crinum asiaticum*      | Liliaceae         | 27  |
| 47 | Jenggot jin (1)                 | *Lycopodium sp.*        | Lycopodiaceae     | 9   |
| 48 | Zau-zau                         | *Lycopodium cernuum*    | Lycopodiaceae     | 9   |
| 49 | Aturangga batang / inai         | *Lawsonia inermis*      | Lythraceae        | 18  |
| 50 | Cempaka                         | *Michelia champaca*     | Magnoliaceae      | 9   |
| 51 | Randu                           | *Ceiba pentandra*       | Malvaceae         | 36  |
| 52 |                                | *Hibiscus indicus*      | Malvaceae         | 9   |
| 53 | Bungo raya                      | *Hibiscus rosa-sinensis*| Malvaceae         | 78  |
| 54 | Bou                             | *Hibiscus tiliaceus*    | Malvaceae         | 18  |
| 55 | Sapululut                       | *Urena lobata*          | Malvaceae         | 54  |
| 56 | Sirih-sirihan                   | *Clidemia hirta*        | Melastomataceae   | 9   |
| 57 | Senduduk                        | *Melastoma malabarthiscum* | Melastomataceae | 36  |
| 58 | Langsat                         | *Lansium domesticum*    | Malvaceae         | 72  |
| 59 | Andor baliang                   | *Pericampylus glauces*  | Menispermace      | 42  |
| 60 | Brotowali                       | *Tinospora crispa*      | Menispermace      | 72  |
| 61 | Sukun (J)                       | *Artocarpus communis*   | Moraceae          | 18  |
| 62 | Balik angin                     | *Ficus sp.*             | Moraceae          | 42  |
| 63 | Pisang saba                     | *Musa acuminata*        | Musaceae          | 27  |
| 64 | Pisang tambatu/p.kepok (J)      | *Musa paradisiaca*      | Musaceae          | 54  |
| 65 | Jambu orsik                     | *Psidium guajava*       | Myrtaceae         | 54  |
| 66 | Congkeh                         | *Syzygium aromaticum*   | Myrtaceae         | 9   |
| 67 | Jambu koling                     | *Syzygium malaccensis*  | Myrtaceae         | 24  |
| 68 | Ati air (J)                     | *Hydrostemma motleyana* | Nymphaeaceae      | 18  |
| 69 | Melati                          | *Jasminum sambac*       | Oleaceae          | 9   |
| 70 | Belimbing wuluh                  | *Averrhoa bilimbi*      | Oxalidaceae       | 9   |
| 71 | Belimbing                        | *Averrhoa carambola*    | Oxalidaceae       | 18  |
| 72 | Pandan                          | *Pandanus amaryllifolius* | Pandanaceae     | 9   |
| 73 | Dukung anak                      | *Phyllanthus niruri*    | Phyllantheaceae   | 18  |
| 74 | Burangir/sirihi                 | *Piper betle*           | Piperaceae        | 78  |
| 75 | Lada/ Merica                    | *Piper nigrum*          | Piperaceae        | 18  |
| 76 | Lalang                          | *Imperata cylindrica*   | Poaceae           | 45  |
| No. | Vernacular Name       | Batak      | Nias | Species Name          | Family       | ICS |
|-----|-----------------------|------------|------|-----------------------|--------------|-----|
| 77  | Lulangan              |            |      | *Ischaemum muticum*   | Poaceae      | 9   |
| 78  | Beras                 |            |      | *Oryza sativa*        | Poaceae      | 60  |
| 79  | Rumput manis Soi-soi  |            |      | *Paspalum conjugatum*  | Poaceae      | 36  |
| 80  | Tebu hitam            |            |      | *Saccharum officinarum*| Poaceae      | 18  |
| 81  | Namboru rasun         |            |      | *Polygala paniculata*  | Polygonaceae | 9   |
| 82  | Siburnas jantan       |            |      | *Pyrois sp.*          | Polypodiaceae| 9   |
| 83  | Siburnas betina       |            |      | *Pyrois sp.*          | Polypodiaceae| 9   |
|     | Dan susu babiat/ dan  |            |      | *Lignosus sp.*        | Polyporaceae | 144 |
|     | durabi Talibo tedepoto|            |      |                       |              |     |
| 84  | Mawar                 |            |      | *Rosa chinensis*      | Rosaceae     | 9   |
| 85  | Bunga kaca piring     |            |      | *Gardemia augusta*    | Rubiaceae    | 24  |
| 86  | Pace (J)              |            |      | *Morinda citrifolia*  | Rubiaceae    | 18  |
| 87  | Siholi                | *Neonauclea sp.*|      | Rubiaceae             | 18  |
| 88  | Bosi-bosi             |            |      | *Timonius wallichianus*| Rubiaceae    | 36  |
| 89  | Gambir                | *Uncaria glabrata* |      | Rubiaceae             | 54  |
| 90  | Ute hapas = u. kolang |            |      | *Citrus aurantiaca*   | Rutaceae     | 60  |
| 91  | Ute rudang = u. nipsis| Dima saa   |      | *Citrus aurantifolia*  | Rutaceae     | 63  |
| 92  | Ute mukur= u. pangirl  | *Citrus hystris* |      | Rutaceae             | 96  |
|     | jeruk purut (J)       |            |      |                       |              |     |
| 93  | Ute susde             | *Citrus sp.*|      | Rutaceae             | 9   |
| 94  | Ute susde Dima laesu  | *Citrus sp.*|      | Rutaceae             | 9   |
| 95  | Cirik-cirik manuk     | *Clausena excavata* |      | Rutaceae             | 18  |
| 96  | Tongkat ali           |            |      | *Eurycoma longifolia*  | Simaroubace  | 54  |
| 97  | Kecubung              | *Datura metel* |      | Solanaceae            | 18  |
| 98  | Pultak-pultak/        | *Physalis angulata* |      | Solanaceae            | 54  |
|     | Ciplukan (J)          |            |      |                       |              |     |
| 99  | Rimbang               | *Solanum torvum*|      | Solanaceae            | 18  |
| 100 | Kemenyan (J)          | *Styrax benzoin* |      | Styraceae             | 9   |
| 101 | Ketumpang (J)         | *Pouzolzia zeylanica* |      | Urticaceae            | 36  |
| 102 | Latong/Kemado         |            |      |                       |              | 18  |
| 103 | Temu kunci (J)        | *Boesenbergia rotunda* |      | Zingiberaceae         | 18  |
| 104 | Huni’/kunyit Unde     | *Curcuma longa* |      | Zingiberaceae         | 195 |
| 105 | Kunyit gajah          | *Curcuma xanthorizze* |      | Zingiberaceae         | 36  |
| 106 | Siala                 | *Etlingera elatior* |      | Zingiberaceae         | 27  |
| 107 | Hasior                | *Kaempferia galanga* |      | Zingiberaceae         | 87  |
| 108 | Lempuyang             | *Zingiber aromaticum* |      | Zingiberaceae         | 45  |
| 109 | Pege Lahia            | *Zingiber officinalae* |      | Zingiberaceae         | 87  |
| 110 | Huni’ bungle          | *Zingiber purpureum* |      | Zingiberaceae         | 63  |
4. Discussion

In a previous study, the local people of Dolok Sibual Buali Nature Reserve [10] and compared in the surrounding Dolok Sibual-Buali Nature Reserve and in Seberida, Riau Province [11], the diversity of medicinal plants from Batang Toru is higher. There are 10 plant species in Seberida area similar to Batang Toru such as Blumea balsamifera, Imperata cylindrica, Lycopodium cernuum, Melastoma malabathricum dan Pericampylus glaucus. Also there are 24 plant species of 88 plant species in Tesso Nilo National Park, Riau Province similar to Batang Toru such as Acorus calamus, Centella asiatica, Eurycoma longifolia, Gendarussa vulgaris and Pericampylus glaucus [12].

Based on informantion from the informans, there are 110 plant species and mushroom as a medicine to heal 40 kind of diseases, such as stomachache, headache, toothache and wound. Batak Mandailing community is known in order of odd counting in processing medicinal plants and use the Qur’anic verses. This tradisional medicine is used for healing children and adult. Several plant species are recognized for magic. The community that came from Nias also known diseases knowledge in magic and usually vomid blood. Some people will die after consume this potion.

Based on the inventory which has been done in Martabe Project, there were 62 species which had been included in ‘Tanaman Obat Indonesia I – V, such as Acorus calamus, Andrographis paniculata, Areca catechu, Centella asiatica and Crinum asiaticum [13-18]. Furthermore, some plant species have been included in South East Asia medicinal plants, such as Mimosa pudica, Clausena excavata and Pouzolzia zeylanica [19]. Among species of plants used in Batang Toru, there were 51 species similarly to those used in Batak Simalungun [20].

Some medicinal plants, which consumed by the people in Batang Toru, are also consumed by people from other places as medicinal plants. Taya-taya babi (Dichrocephala integrifolia) is a useful plant in which the leaves are used by Papua New Guinean to heal ulcers. Schmelzer [21] also mentions that, this plant contains the antiviral activity. Duu soyo (Hemigraphis alternata) is recognized and applied as medicine for dysentery in Java Island [22]. Sapululut (Urena lobata) is useful plant as medicine in childbirth [23].

The population and distribution of some medicinal plants has also been recorded in [3] such as kemenyan (Styrax benzoin) in Purnama Site plot, five top dominant species of trees; kapur (Dryobalanops sumatrensis) in Kejora Site plot, five top dominant species of seedlings.

According to Mogea et al. [24] Parkia roxburghii, is included among two hundred species of rare plants and acquired communities from the market. While the species of Acorus calamus is included on The IUCN Red List of Threatened Species.

According to Lau et al. [25] that several members of the genera Lignosus, which are collectively known as ‘cendawan susu rimau’ (in Malay) or tiger's milk mushrooms (TMM), are regarded as important local medicine particularly by the indigenous communities in Malaysia.

5. Conclusion

Local knowledge on plant utilization as medicinal ingredients which practised by Batang Toru community showed that it was a closed relationship between human being with nature (forest). There were at least 110 plant species belonging to 93 genera and 49 families including mushrooms recorded. Batang Toru community used various medicinal plant species to cure 40 kinds of diseases including nervous system, and still acknowledged the existence of magic. Medicinal plant having highest ICS value (195) was hunik (Curcuma longa), and that of lowest one (4.5) was sawi (Brassica rugosa).
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