An ethnobotanical survey of medicinal and other useful plants of Muruts in Sabah, Malaysia

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Abstract

Kulip, J. (Ethnobotany Section, Forest Research Centre, Forestry Department Sabah, P.O. Box 1407, 90715 Sandakan, Sabah, Malaysia) 2003. An ethnobotanical survey of medicinal and other useful plants of Muruts in Sabah, Malaysia. Telopea *10(1): 81–98*. This paper presents the results of ethnobotanical studies on medicinal and other useful plants used traditionally by the Muruts in Sabah. They have rich ethnobotanical resources. A total of 91 species of plants were noted and collected during the surveys. Among them are 68 species of medicinal plants and 64 species of other useful plants. Reports from plant informants were obtained during field studies in February 1994, in March 1998, in May 1998, in May 2000 and in February 2001. For each species are given the botanical name, Murut name(s), collection number, medicinal uses, as well as plant part(s) used, and other uses. The popularity of plants with traditional uses among the Muruts is fading due to migration, restriction from religion, lost interest of younger generations and heavy dependence on modern medicine. Opening of forests for agricultural development and timber harvesting makes the resources scarce which is also contributing to the loss of knowledge. Awareness activities in Malaysia's primary and secondary schools on the usefulness of plants and their environment, and government policies on medicinal plants, have contributed significantly towards the preservation of indigenous traditional knowledge of plants.

Introduction

Sabah is one of the 13 states within the Federation of Malaysia and is located in the northernmost part of Borneo. It is the second largest state in Malaysia with a landmass of approximately 7.4 million hectares. The total forested area is 4.7 million hectares. The climate is marine equatorial with an average temperature of 74–88° F (23–32° C). The rainy season, locally called 'Musim hujan', is around November to February. This is also known as the North-east Monsoon. The South-west Monsoon, which is less wet, is from May to October, making the annual rainfall 60–120 inches (1525–3050 mm, or sometimes up to 4,500 mm). Sabah, being part of Borneo, is rich in plant biodiversity. There is also an abundance of medicinal plants and other plants for everyday use.

Population in Sabah as at 2000 is about 3.0 million (Dept. Statistics 2000). There are 36 indigenous groups livng in Sabah; the Murut population is estimated at 91,700 and is the third largest. They are distributed in Keningau, Tenom, Nabawan/Pensiangan and Kalabakan districts. These districts are located in the interior and south-eastern parts of Sabah and the territory straddling the borders of Kalimantan (Indonesia) and Sarawak (Fig. 1). The definition of Muruts people adopted here is based on Tombung (1991) and King (1992).

Survey work on Muruts' ethnobotanical resources on medicinal plants and other useful plants in Sabah began in early 1991 by the Sabah Museum and Universiti Kebangsaan Malaysia, Sabah Campus, while at the Forestry Department it began formally in 1999 even though collection of materials started in early 1994. A medicinal plant survey by Guntavid (1992) found that 38 species of plants were used by the Tangala Muruts in Kampung (Kg.) or village Inarad, Ulu Kinabatangan (upper Kinabatangan river). Fasihuddin and Hasmah (1992) found 57 species of plants were used as medicines by Muruts around Nabawan, Sepulut and Pensiangan area.

Medicines, or *Tatapis* (Paste)/*Babas* (antidote) in Muruts' language, from plant resources have been used for a long time by the Murut society to cure their everyday ailments. There is an equally long history of the use of wild plants for food, construction, house utensils, and social and religious functions. In the olden days herbal remedies provided the only relief when modern medicines were not available. Knowledgeable elders or medicine men usually administered the medicine. Depending on the ailments, the healing would often involve some kind of ritual. To the Muruts, the river and the forest represent the world. From them they derive their food, their medicine, their clothing and their house materials.

This paper presents the results of ongoing ethnobotanical research on the Murut people in Sabah. Its purpose is to preserve the precious cultural heritage of the Murut ancestors' use of plants. It is also hoped that further studies on the phytochemical contents of the plants will reveal some useful drugs for the benefit of mankind.

Location and Area of Study

The surveys focus on the various Muruts villages throughout Sabah (Fig. 2). Murut ethnic groups involved in these studies were Keningau Murut, Timugon Murut, Paluan Murut, Kalabakan Murut and Tagal Murut. Villages involved include Kg. (village) Melalap in Tenom district (Timugon Murut); Kg. Melinja and Bahagia B in Nabawan/Pensiangan district (Paluan Murut); Kg. Lingawon in Keningau district (Keningau Murut); Kg. Ulu Kalabakan in Kalabakan district (Kalabakan Murut); and Kg. Murni Empat and Enam in Nabawan/ Pensiangan district (Tagal Murut).

Kg. Melalap is located about 15 km from Tenom town center and consists of about 100 households; Kg. Melinja and Bahagia B are located about five km from Nabawan town center and consists of about 100 households; Kg. Lingawon is located about 10 km from Keningau town center and consists of about 50 households; Kg. Ulu Kalabakan is located about three km from Kalabakan town center and consists of about 50 households; and Kg. Murni Empat and Kg. Enam are located one km from Nabawan town center.

Ethnic groups such as the Murut turn to the forest for their daily needs and also for income. Produce such as wild vegetables, fruits and medicinal plants are gathered and sold in the weekly markets or 'Tamu' for an additional income.

The original vegetation cover of the research area can be classified as lowland mixed dipterocarp forests except for the Pensiangan area. A wet season usually begins in September and can last to January. At higher elevations such as in Pensiangan area, the forest is dominated by species of Fagaceae, Araucariaceae (*Agathis* spp.) and Myrtaceae, while at lower elevations such as in Tenom, Keningau and Kalabakan, species of Dipterocarpaceae, Leguminosae and Euphorbiaceae species predominate.

Methods

Written permission from the office of the District Community Development and verbal permission from the village Chief concerned were usually applied for before entering any villages. Data were gathered by interviewing the plant informant(s), usually the knowledgeable villagers of Muruts elders (men and women) together with some young people who still used plants in their daily life. The interviews were conducted in Murut, which was spoken by all of the members of the Murut communities. The interview process was based on methods described by Martin (1995). Usually after a short interview, the plant informants would take us to their *ladang* (upland agricultural field), backyard gardens and into the forest. Fieldwork was carried out by a team of Ethnobotany Section staff from the Forest Research Centre of the Forestry Department Sabah, Sandakan.

Voucher specimens are deposited at the Ethnobotany Office at the Forest Research Centre Sabah, Forestry Department Sabah, Sandakan. Specimens that were easily identified in the field were not collected, only noted. Unidentifiable specimens were numbered and brought to the herbarium to be examined further.

Villages involved in these studies were namely Kg. Melalap on 1–15th February 1994 where we interviewed Madam Kasium Galawang (62 years); Kg. Melinja and Kg. Bahagia B on 9–23rd March 1998 where we interviewed Mr. Kumalu A. (60 years), Mr. Lasuan Liwau (45 years) and Mr. Muskin Bugan (60 years); Kg. Lingawon on 6–18th May 1998 where we interviewed Madam Murika Gambun (55 years); Kg. Ulu Kalabakan on 8–17th May 2000 where we interviewed Mr. Mantawasa Baukom (60 years); and Kg. Murni Empat and Enam on 14–26th February 2001 where we interviewed Mr. Lintong Eman (45 years). A Murut language translator was used during the surveys. Most interviews lasted four to five hours per day. According to their Native Customary Law, a person must give to the plant informant a *pingkaras* or a kind of compensation. The compensation is normally one black hen and a sum of (RM 20.00) per species of plants. For this survey a sum of RM 20.00 (US$ 5) was paid per day to the informants as a token of appreciation for their kind cooperation during the survey.

Results

Table 1 and Table 2 show the list of medicinal and other useful plants collected during the surveys. In total 91 species of plants were documented. Of these, 68 are indicated by Muruts informants as medicines, 64 as other useful plants (some of which were also used as medicines). Compared to previous collections by authors like Guntavid (1992) and Fassihuddin and Hasmah (1992), there are an additional 50 new records of medicinal plants collected during the present survey. The total number of Murut medicinal plants documented so far for Sabah, amounts to 143 species (Appendix 1) belonging to 44 families. Most prominent among plant families used by the Murut are Euphorbiaceae (10 species documented), followed by Leguminosae (6), Rubiaceae (5) (Appendix 2). There are 94 species found to be indigenous while 34 are introduced, naturalised, or only known from cultivation.

Plants which have a very high value, whether for medicine or other uses, are collected from the forest and often recultivated near the houses or in gardens so that there is a ready supply of the raw materials for future use. That is why many of these plants are quite commonly found in the village. A number of other plants however, can be found in nearby *ladang* (upland agricultural fields), disturbed forest or in relatively undisturbed mixed dipterocarp forest and roadsides.

TABLE 1. PLANTS TRADITIONALLY USED AS MEDICINES BY THE MURUTS COMMUNITIY IN SABAH, MALAYSIA

Botanical name and voucher specimen no. (if any)	Common names (Dialect)	Medicinal uses	Part Used	Method of Use
ACANTHACEAE				
**Justicia gendarussa* L.	Insasahi (Ka)	Stomach ache	Leaves	Leaves are boiled and taken as a tea
AGAVACEAE				
Dracaena elliptica Thumb	Sipak (Ka)	Tonic	Leaves and Flowers	Boiled in water and as a bath
**Cordyline fruticosa* (L.) Goeppert. SAN 138296	Pipisokalaganan (Ti)	Flatulence	Root	Pounded into paste and applied on the stomach
AMARANTHACEAE				
**Amaranthus spinosus* L.	Sansam Sau (P)	Epileptic seizures	Fresh leaves	Boiled in water and as a bath
**Cyathula prostrata* (L.) Bl. SAN 138278	Sansam Bawi (Ti)	Insect bites	Leaves	Pounded into paste and rubbed on the affected area
ANACARDIACEAE				
Semecarpus cuneiformis Blanco.	Kutang	Wounds	Leaves	Burnt to produce smoke to be inhaled
ANNONACEAE				
Desmos teijsmanii (Boert.) Merr. SAN 138271	Molisun Rumungkut (Ti)	Headache	Leaves	Boiled in water and as a bath
Phaeanthus ebrasteolatus (Pers) Merr. SAN 138288	Korokos (Ti)	Eyepain	Sap	Applied directly on eye
Uvaria grandiflora Roxb. SAN 138270	Nolilitan (Ti)	Waist pain and stomach ache	Leaves	Boiled in water to make a tea
APOCYNACEAE				
Alstonia angustifolia Wall ex DC SAN 138289	Tombirog (Ke) Tambailik (Ti & Ta)	Gastritis	Leaves	Boiled in water to make a tea
ARACEAE				
**Acorus calamus* L.	Kusul (P)	Stomach ache & fever	Rhizome	Boiled in water to make a tea
Aglaonema oblongifolium Schoot. FRCSE 424	Pilonos (Ta)	Boils	Leaves	Pounded into paste and applied on the affected area
Alocasia macrorrhizos (L.) G.Don f.	Buntui (Ke)	Itchiness	Sap from the stem	Applied directly to the affected skin
Homalomena propingna Schoot. FRCSE 414	Nyato (Ta)	Feverish cold	Pith	Heated and applied on forehead

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Botanical name and voucher specimen no. (if any)	Common names (Dialect)	Medicinal uses	Part Used	Method of Use
ARISTOLOCHIACEAE				
Aristolochia papillifolia Ding Hou. FRCSE 412	Babas Lontong (P & Ta)	Antidote, jaundice, inflammation of liver (Paluon). Diarrhoea (Tagal)	Inner bark	Boiled in water to make a tea
BIGNONIACEAE				
Oroxylum indicum (L) Kurz. SAN 138284	Ulunan Sangku (Ti)	Swelling	Bark	Soaked in hot water and rubbed on the effected area
BIXACEAE				
**Bixa orellana* L. FRCSE 409	Puloh (Ta)	Gastritis	Root's bark	Boiled in water to make a tea
BROMELIACEAE				
**Ananas comosus* (L.) Merr.	Tingkauran (P)	Dandruff	Young leaves	Crushed and rubbed on the head
CECROPIACEAE				
Poikilospermum suaveolens (Bl.) Merr. SAN 13823	Bunatol (Ti)	Post partum treatment	Sap from the stem	Stem is cut to get the sap and drink
COMBRETACEAE				
Combretum nigrescens King SAN 138290	Damat Dumalarom (Ti)	Internal injury	Root	Boiled in water to make a tea
COMPOSITAE				
**Blumea balsamifera* (L.) DC.	Tawawoh (P & Ta)	Runny nose Gastritis Stomach ache Flatulence	Leaves Roots	Boiled in water to make a tea
**B. riparia* (Bl.) DC FRCSE 407	–	Hypertension	Leaves	Boiled in water to make a tea with a mixture of *Hibiscus* sp. (Malvaceae) FRCSE 408
Elephantopus tomentosus L. FRCSE 419	Honsigup (Ta)	Bloody stool	Root	Boiled in water to make a tea
**Synedrella nodiflora* (L.) Gaertn. FRCSE 418	–	Tonic	Whole plant	Boiled in water and as a bath
COSTACEAE				
Costus specious Koen. FRCSE 416	Insasabu (Ka & Ta)	Asthma	Sap from the young stem.	Stem is cut to get the sap and drink
CUCURBITACEAE				
**Trichosanthes cucumerina* L. SAN 138292	Molisun Mamulal (Ti)	Body swelling	Leaves	Pounded into paste and applied to the affected area

Botanical name and voucher specimen no. (if any)	Common names (Dialect)	Medicinal uses	Part Used	Method of Use
DILLENIACEAE				
Dillenia grandifolia Wall. Ex. Hk.f. et. Thom.	Dudungin (Ta)	Stomach ache	Roots	Boiled in water to make a tea
DIPTEROCARPACEAE				
Shorea spp. (Eushorea)	Omnompik (Ta)	Food poisoning	Inner bark	Pounded into paste and eaten
EUPHORBIACEAE				
Antidesma montanum Bl. SAN 138297	Damat mandalom (Ti)	Chest pain	Root and leaves	Root is boiled in water to make a tea Leaves are pounded into paste and applied on chest
Baccaurea lanceolata (Miq.) Muell-Arg.	Limposu (P)	Abdomen pain	Fruit	Pounded into paste and applied on the abdomen
Bombax ceiba L.	Kapok (P)	Vomitting blood	Bark	Boiled in water to make a tea
Bridellia stipularis (L) Bl. SAN 138279	Bolingkut (Ti)	Diabetes Mellitus Thrush	Root Fruit	Pounded into paste and applied on the affected area
Eupathorium odoratum L.	Lambaian (P)	Cuts and wounds	Leaves	Pounded into paste and applied on the affected area
Glochidion macrostigma Hk.f. SAN 138273	Sondot Laling (Ti)	Feverish cold	Leaves	Boiled in water and as a bath
**Jatropha curcas* L.	Jarak (Ke)	Gastritis	Leaves	Boiled in water to make a tea
Macaranga gigentifolia Merr.	Binawong (Ka)	Thrush	Sap from the twig	Cut the twig to get the sap and applied on the affected area
**Phyllanthus urinaria* L. SAN 138282	Pilujala (Ti)	Coughing	Entire plant	Boiled in water to make a tea
FLACOURTIACEAE				
Casearia grewiaefolia Vent. var. *grewiaefolia* SAN 138276	Salokdan (Ti)	Swollen pancreas	Leaves	Pounded into paste and applied on the affected area
FLAGELLARIACEAE				
Flagellaria indica L. SAN 138300	Waau (Ti)	Semi-paralysis	Entire plant	Boiled in water and as a bath
GESNERIACEAE				
Cyrtandra aff. *areolata* (Staff.) Bl. Burtt. FRCSE 428 & 431	Pohodo (Ta)	Bloody stool Skin disease	Young stem	Raw stem is eaten and made a tea to treat bloody stool Ashes of burnt stem are applied to treat skin disease

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Botanical name and voucher specimen no. (if any)	Common names (Dialect)	Medicinal uses	Part Used	Method of Use
GRAMINEAE				
**Eleusine indica* (L.) Gaetner	Liagon (P)	Food poisoning Broken bones	Entire plant Internodes	For food poisoning entire plant is boiled to make tea For broken bones internodes are crushed and applied
**Cymbopogon citratus* (DC.) Stapf.	Sohumau (P)	Cough	Leaves	Pounded into paste and applied on the affected area
**Imperata cylindrica* (L.) Rausch.	Lalang (Ka)	Bleeding	Young leaves	Pounded into paste and applied on the affected area
Zea mays L.	Halai (Ka)	Stomach ache	Young fruit	Pounded into paste and applied on the stomach
GUTTIFERAE				
**Garcinia mangostana* L.	Timpurog (P)	Vomiting blood	Fruit	Eaten raw
HYPOXIDACEAE				
Curculigo latifolia Dryander	Tambaka (Ta)	Wounds	Sap from the pith of the stem.	Cut to get the sap and applied on the affected area
LABIATAE				
**Hyptis capitata* Jack. SAN 138187	Baing-Baing (Ti)	Stomach ache	Young leaves	Pounded into paste and applied on the affected area
**Orthosiphon aristatus* (Blume) Miq.	Misai Kucing (Ta)	Hypertension	Leaves	Boiled in water to make a tea
LAURACEAE				
Lindera pipericarpa Boerl.	Laindos (P)	Antidote for snake-bite	Leaves, fruits & barks	Pounded into paste and applied on the affected area
Litsea graciae Vidl. FRCSE 420	Novolo (P) Pengolaban (Ta)	Joint dislocation(P) Sprain (Tagal)	Inner barks	Pounded into paste and applied on the affected area
L. odorifera Valeton	Lawang (P)	Gastritis Stomach ache	Bark	Pounded into paste and applied on the affected area
LEGUMINOSAE				
Airgantha borneensis (Oliv.) Brummit SAN 138299	Molisun Matamis (Ti)	High temperature Toothache	Bark	Pounded into paste and boiled in water to make a tea and as a gargle
Cassia alata L.	Emon (Ke)	Ringworm	Leaves	Pounded into paste and applied on the affected area
Milletia nieuwenhuisii FRCSE 389	Ramus (Ka)	Thrush	Sap from the stem	Cut to get the sap and applied on the affected area

Botanical name and voucher specimen no. (if any)	Common names (Dialect)	Medicinal uses	Part Used	Method of Use
LEGUMINOSAE cont.				
**Mimosa pudica* L.	Sikot Mou (Ke) Tenom Molu (Ka)	Stomach ache	Root	Boiled in water to make a tea
Parkia singularis Miq.	Kundai (P)	Kidney cleanser	Fruit	Eaten raw
Spatholobus cf. *gyrocarpus* Benth. in Miq. FRCSE 410	Ramus (Ka)	Thrush	Sap from the stem	Cut to get the sap and applied on the mouth
MALVACEAE				
**Urena lobata* L.l SAN 138286	Injilokot (Ti)	Thrush	Bark	Burnt to ashes and applied
		Bowel movement inducer	Flowers	Pounded into paste and applied on the abdomen
**Sida rhombifolia* L.	Dalupang (P)	Antidote	Leaves	Boiled in water to make a tea
MELIACEAE				
Lansium domesticum Corr. Serr.	Langsat (Ka & P)	Stomach ache Diarrhoea Colic	Bark	Pounded into paste and applied on the abdomen
MENISPERMACEAE				
Coscinium fenestratum (Gaerth.) Cole FRCSE 433	Babas Lingungan (Ta)	Thinning and yellowing skin	Entire plant	Boiled in water to make a tea
Fibraruea tinctoria Lour.	Tolungon (P & Ta)	Anti-malarial (Tagal) Hypertension	Stem	Boiled in water to make a tea
Stephania corymbosa FRCSE 396	– (Ka)	Antidote	Stem	Boiled in water to make a tea
Tinospora crispa (L.) Hook.f. & Thomsen	– (Ka)	Anti-malarial	Stem	Boiled in water to make a tea
RUBIACEAE				
**Jasminum aculeatum* (Blanco.) Merr.	Onsom-onsom (Ti)	Flatulence	Leaves	Pounded into paste with warm water and applied on the affected area
**Psychotria* cf. *sarmentosa* Bl.	Solovondo (Ta)	Itchiness	Stem	Burnt to ashes and rubbed on the affected area
ZINGIBERACEAE				
**Curcuma longa* L.	Kunyit (Ta)	Anti-fungal	Rhizome	Pounded into paste and applied on the affected area
**Zingiber officinale* Roscoe	Halia (Ta)	Flatulence	Rhizome	Pounded into paste and applied on the affected area

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TABLE 2. OTHER USEFUL PLANTS USED BY THE MURUTS IN SABAH, MALAYSIA.

Botanical name and voucher specimen no. (if any)	Common names (Dialect)	Category	Part Used	Method of Use
ARACEAE				
Homalomena propinga Schoot. FRCSE 414	Nyato (Ta)	Fish poison	Pith	Pith is pounded and soaked in water/stream
ANACARDIACEAE				
Mangifera indica L.	Longgom (Ka)	Edible fruit	Mesocarp	Eaten ripe, or unripe as pickle
M. pajang Kost.	Bambangan (Ka)	"	"	Eaten ripe
ANNONACEAE				
Gonoithalamus woodii Merr. FRCSE 390 & 415	Tampaliu (Ka) Kuluor (Ta)	Ghost scare	Whole plant	Hung on the upper main entrance or burnt
BAMBUSOIDEAE				
**Bambusa blumeana* Schult.	Kayawen(Ti)	Vegetable	New shoot	Cooked
Gigantochloa levis	Paling (Ti)	Vegetable Cooking Pot	New Shoot Internode	Cooked Cut
**Schizostachyum brachycladum* Kurz.	Bulu (Ti)	Dart's tip	Internode	Cut
S. pilosum S. Dransf.	Pus (Ka)	Straw	Internode	Cut small
BOMBACACEAE				
Durio graveolens Becc.	Ruyan (Ka)	Edible fruit	Aril	Eaten ripe
D. zibethinus Murray	Lampun (Ka)	"	"	"
BROMELIACEAE				
Ananas comosus (L) Merr.	Tingkauran (P)	Cotton	Leaves	Matured leaves are beaten and woven
CASUARINACEAE				
Casuarina sumatrana Miq.	Silinggaun (Ka)	Ornamental	Entire	Bug tree
CECROPIACEAE				
Poikilospermum suaveolens (Bl.) Merr.	Bunatol (Ti)	Vegetable	Young leaves	Cooked
DIPTEROCARPACEAE				
Shorea parvistipulata Heim. FRCSE 391	Roloi (Ka)	Stimulant	Young leaves	Betel pepper leaf as substitute for gambir
EUPHORBIACEAE				
Baccaurea puberula Merr.	Tampoi kuning (Ka)	Edible fruit	Aril	Ripe
B. lanceolata (Miq.) Muell-Arg.	Lipasu (Ka)	"	Aril & Mesocarp	Ripe aril Mesocarp eaten as pickle
Bombax ceiba L.	Kapok (P)	Pillow	Matured fruit	Fibre for pillows
**Manihot esculenta* Crantz.	Lui (Ka)	Edible	Root (tuber) Leaves	Cook

Botanical name and voucher specimen no. (if any)	Common names (Dialect)	Category	Part Used	Method of Use
EUPHORBIACEAE cont.				
Koilodepas longifolium Hook. f.	Kayu Ulas (Ka)	Bow	Bole	Smaller bole
Macaranga tanarius (L) Muell. Arg.	Daun Bayangan (Ka)	Wrapper	Leaves	To wrap rice
HYPOXIDACEAE				
Curculigo latifolia Dryander.				
FRCSE 413	Tambaka (Ta)	Edible fuit	Aril	Ripe
GRAMINEAE				
**Saccharum officianarum* L.	Tebu (Ka)	Drinkable	Sap	Matured stem
**Zea mays* L.	Halai (Ka)	Edible fruit	Cotyledons	Cook
GUTTIFERAE				
Garcinia parvifolia (Miq.) Miq.	Kandis (Ka)	Edible fruit	Aril & Mesocarp	Ripe aril Ripe mesocarp dried and cooked as vegetable
FLACOURTIACEAE				
Trichadenia philippensis Merr FRCSE 421	Tulok-Ulok (Ta)	Magical use	Leaves	To make thief's feet bleed; leaves are placed on the sole
LAURACEAE				
Lindera pipericarpa Boerl.	Laindos (P)	Lethal to chicken	Fruits	Ripe
Litsea graciae Vidl. FRCSE 420	Novolo (P) Pengoloban (Ta)	Edible fruit	Aril	Ripe
Eusideroxylon zwageri T. & B.	Belian (Ka)	Blow-pipe	Young bole	A hole made through
LEGUMINOSAE				
Bauhinia kockiana Korth. Var. *kockiana* FRCSE 414	Kulih Bakah (Ta)	Prevent evil-craft from enemy	Entire plant	Fresh
Derris cf. *trifolia* Lour. FRCSE 388	Apa (Ka)	Flavour	Leaves	Cooked
Milletia nieuwenhuisii J.J. Smith	Romus (Ta)	Knife handle	Wood	–
MARANTACEAE				
Donax canniformis (Forst.) Schum	Lias (Ta)	Basketwork	Outer stem & fish trap	Stem split into strips
MELASTOMATACEAE				
Dissochaeta monticula Bl. FRCSE 427	Bina (Ta)	Lethal to mammals	Root's sap	Used as blowpipe poison
MELIACEAE				
Lansium domesticum Corr. Serr.	Langsat (Ka & P)	Edible fruit	Aril	Ripe

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MENISPERMACEAE				
Pycnarrhena cf. *tumetacta* Miers. FRCSE 388	Apa (Ka)	Flavour	Leaves	Dried and added to cooking
MUSACEAE				
Musa textiles Nee.	Punti (Ka)	Edible fuit Vegetable	Aril Pith & un-opened flowers	Ripe Cook
MORACEAE				
Antiaris toxicaria (Pers.) Lesch.	Paliu (Ka)	Poison	Latex	Poisons darts
Artocarpus communis J.R. & G. Foster	Kemansi (Ka)	Edible fruit	Aril	Ripe
A. elasticus Bl.	Puputul (P)	Bird trap	Latex	
A. odoratissimus Blanco.	Tarap (Ka)	"	"	Ripe
A. integer (Thumb.) Merr.	Luon (Ka)	"	"	Ripe
A. tamaran Becc.	"	Hat or shirt	Bark	Broad strips of bark beaten till flat
Ficus beccarii King. FRCSE 417	Tatali (Ta)	"	"	"
MYRTACEAE				
**Psidium guajava* L.	Kaliabas (P) Liabas (Ka)	Edible fuit	Mesocarp	Raw/ripe
MYRSINACEAE				
Embelia philippinensis A. DC. FRCSE 387	Papaling (Ka)	Edible	Young leaves	Salad
PALMAE				
Areca catechu L.	Kusob (Ta) Pinang (Ka)	Stimulant	Endocarp	Mature fruit eaten raw
Arenga undulitifolia Becc.	Polod (Ta)	Fire starter (tinder)	Soft net	–
Calamus spp.	Rotan lasun, pipit (Ka)	Vegetable Rope	Tip of the plant Cane	Cook Matured cane
**Cocos nucifera* L. Becc.	Piasau (Ka)	Edible fruit Broom	Endocarp/Juice Outer part of old fruit.	Young/matured Matured endocarp used as source of oil
Cryostachys lakka Becc.	Pomutoson (Ka)	Ornamental	Whole plant	
Eugissonia utilis Becc. FRCSE 393	Paluon (Ka)	Edible Sago Dart's cock	Pith Pith	Pressed Matured pith
Licuala spp.	Silan/Tanom (Ta)	Vegetable	Pith	Cooked
Meteroxylon sagu Rottb.	Lumbio (Ta)	Edible sago	"	Pressed
Oncosperma tigillarium (Jack) Ridl	Nibong (Ka)	Vegetable	Tip	Raw or cook

Botanical name and voucher specimen no. (if any)	Common names (Dialect)	Category	Part Used	Method of Use
PALMAE cont.				
Pandanus leuconatus B.C. Stone FRCSE 395	Boboungis (Ka)	Matting	Leaves	Dried and woven
Plectocomiopsis geminiflora (Griff.) Becc. FRCSE 411	Ambarua (Ta)	Vegetable	Stem's shoot	Cooked
SAPINDACEAE				
Lepisanthes fruticosa (Roxb.) Leenh. SAN 138272	Talikasan (Ti)	Edible fruit	Aril	Ripe
Nephelium lappaceum L.	Kayakan (Ka)	"	"	"
N. ramboutan-ake (Labill.) Leenh.	Rumokot (Ka)	"	"	"
SOLANACEAE				
Solanum turvom Sw.	Lintahun (Ta)	Softener	Fruit	Cooked with meat
FUNGI				
Polyporus umbellatus FRCSE 392	Ongkulan (Ka)	Edible mushroom	–	Cooked
Auricularia auricula-judae FRCSE 394	Tondungol (Ka)	"	"	"
Cantharellus cibarius	Sunsulit (Ka)	"	"	"
FERN				
Nephrolepis biserrata (Sw.) Schoot.	Pakis (Ta)	Vegetable	Tip	Cooked

NOTE: *: introduced, naturalised or only known from cultivation; FRCSE: Forest Research Centre Sabah Ethnobotanical Collections Series; SAN: Sandakan Herbarium Series; P: Paluan; Ka: Kalabakan; Ke: Keningau; Ti: Timugon; Ta: Tagal.

In most of the treatments with medicinal plants, the herbal preparations are administered orally. The specific amount of material could not be ascertained. The recommended dosage is normally a handful of leaves or few pieces of root, rhizome, stem or bark, flowers, fruits and seeds. For small herbs, the whole plant or a few plants may be used. Leaves are the most common part used. The roots are the second-most common part used in traditional medicine, followed by bark and the reproductive parts. They are used fresh or dry, chewed, or boiled in water and the decoction taken as tea. The herbal preparation is usually taken once or twice daily until the patient recovers. The ailments described by the plant informants have been interpreted according to Pescar and Nelson (1996).

Discussion

The knowledge of medicinal plants in Murut communities is normally passed on from generation to generation but this practice seems to be vanishing. It was estimated that there are only two to three persons in any village who know the many uses of plants, and they were usually the elderly. When asked if they still relied on herbal treatment, the response was that not all of the medicinal plants are used nowadays. Some of the reasons given were:

Only the elderly know most of the plants and where to get them: Some of the very useful medicinal plants are only known by the elderly, but because they are very old and their vision is mostly now poor this makes it difficult for them to recognize the plants. Even if their vision is good they may not be able to walk far.

Preparation of herbs takes time including finding the plants in the forest: The process of looking for the plants in the forest and the preparation of remedies is very laborious compared to buying them at the nearby market or going to the hospital. Each of the districts has its own government district hospital except for Kalabakan district where a government clinic is provided. These modern facilities make rural people dependent on ready-made modern medicines.

Religion: Some religions do not allow the use of any biological material for medicines.

Lost of interest of younger generations: Ancient customs of plant utilization are gradually disappearing. The younger generation is generally unable to recognise the plants nor their traditional use. They are dependent on modern medicines.

Migration to urban areas: Many Muruts people have migrated to urban areas to find paid work and access modern facilities.

Opening of forests: In recent years, Sabah faced a very rapid opening of forest for timber harvesting, development and agriculture. This has caused enormous changes to occur in Murut lives and in the way they utilize plant resources.

Realizing the economic potential of these medicinal and other useful plants and to conserve them, activities at Federal as well as at State level have been launched to save these plants from being neglected. At a Federal level, the Ministry of Education has introduced co-curriculum activities such as establishing a medicinal herb garden. School children at primary and secondary level are encouraged to learn about the medicinal value of some plants, for example, *Eurycoma longifolia* or 'Tongkat Ali' and *Morinda citrifolia* or 'Mengkudu'. The Ministry of Health Malaysia has also conducted a nation-wide campaign on the use and conservation of traditional medicinal plants. To date the Ministry has already registered about 1,300 medicinal plant products that are being sold in the markets. At the State level, the Sabah government has passed a new law this year [2001] concerning the use of indigenous plants; it is called the Sabah Biodiversity Enactment. The purpose is to regulate the studies of useful plants such as medicinal plants and for conservation of natural resources. The Chief Department of Sabah established a working group comprising all State departments, agencies and NGOs called the Sabah Herbal Industry Committee early this year [2001]. The objectives are to act as the Secretariat at State level to systematically document and regulate the utilization of the indigenous medicinal plants in a sustainable manner.

Conclusions

From this survey we have documented a total of 91 species of plants that are being used by Muruts throughout Sabah. Sixty-eight species are medicinal plants and 64 species are other useful plants, which includes wild fruit, handicraft materials, plants for social and religious purposes, and poisons. These plants are available in direct vicinity of the village or in the nearby forest.

The Muruts have a rich ethnobotanical knowledge, but this is fading due to migration to urban areas, a loss of interest among the young, religious restrictions or dependence on modern medicine. Opening of forest areas for agriculture, development and timber harvesting have also made the resources scarce.

The wealth of Murut knowledge of medicinal and other useful plants points to a great potential for research and the discovery of new drugs to fight diseases, new foods and other new uses.

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APPENDIX 1: LIST OF MEDICINAL PLANTS OF MURUTS

Botanical Name	Murut Name	Collection No.
Acorus calamus L.[3]	Kusul (P)	–
Aglaia rivularis Merr.[1]	Kalambiau	–
Aglaonema oblongofolium Schoot.*	Pilonos (Ta)	FRCSE 424
Agave cf. weberi[3]	Sipak (Ka)	–
Airgantha borneensis (Oliv.) Brummit.[3]	Molisun Matamis (Ti)	SAN 138299
*Alocasia macrorrhizos**	Buntui (Ke)	–
Aloe vera L.[2]	Bunga Raja	–
Alstonia angustifolia Wall ex DC[3]	Tambailik (Ti & Ta) Tombirog (Ke)	SAN 138289
Amaranthus spinosus L.[3]	Sansam Sau (P)	–
Ananas comosus (L.) Merr.*	Tingkauran (P)	–
Annona muricata L.[2]	Lampun Belanda	–
Antidesma montanum Bl.[2]	Damat Mandalom (Ti)	SAN 138297
Areca catechu L.[2]	Kusauh	
Arenga undulitafolia Becc.[3]	Polod (Ta)	–
Aristolochia papillifolia Ding Hou.[3]	Babas Lontong (Pa & Ta)	FRCSE 412
Artocarpus elasticus Reinw ex Bl.[2]	Kikian	
Artocarpus tamaran Becc.[3]	–	–
Baccaurea lanceolata (Miq.) Muell-Arg.[3]	Limposu (Pa)	–
Bauhinia sp.[2]	Pilasang	–
B. semibifida Roxb.[1]	Babaya Songkulibang	–
Begonia sp.[1]	Pamamampang	–
Bixa orellana L.[3]	Puloh (Ta)	FRCSE 409
Blechnum orientale L.*	Paku	–
Blumea balsamifera Harn.*	Tawawoh (P & Ta)	–
B. riparia (Bl) DC[3]	–	FRCSE 407
Bombax ceiba L.[3]	Kapok (Pa)	–
Bridella stipularis (L) Bl.[3]	Bolingkut (Ti)	SAN 138279
Caesalpinia sappan L.[2]	Sapang	–
Calamus pogonacanthus Becc. Ex. K. Winkl.[1]	Sambunil	–
Canarus sp.[2]	Dalat	–
Capsicum frutescens L.[2]	Baras	–
Casearia grewiaefolia Vent. Var. *grewiaefolia*[3]	Salokdan (Ti)	SAN 138276
Cassia alata L.*	Balilang (Pa), Emon (Ke)	–
Centotheca lappacea (Linn.) Desv.[1]	Pampopoi	–
Centella asiatica (L.) Urban*	Pegaga	–
Clausena excavata Burm.[1]	Tataih Nu Manuk	–
Colocasia antiquorum Schott.[1]	Ungkubab Nu Labi	–
Combretum nigrescens King[3]	Damat Durnalarom (Ti)	SAN 138290
Cocos nucifera L.*	Piasau (Ta)	–

P = Paluan, Ka = Kalabakan, Ke =Keningau, Ti = Timugon and Ta = Tagal
[1] = Collected by Guntavid (1992) [2] = Fasihuddin & Hasmah (1992)
[3] = Collected by Kulip (2001) * = Collected by all authors

Botanical Name	**Murut Name**	**Collection No.**
Cordyline fruticosa (L.) Goeppert[3]	Pipisokalaganan (Ti)	SAN 138296
Coscinium fenestratum (Gaerth.) Colebr.[3]	Babas Lingungan (Ta)	FRCSE 433
Costus specious Koen.*	Insasabu (Ka & Ta)	FRCSE 416
Curculigo latifolia Dryander*	Tambaka (Ta)	FRCSE 413
Curcuma domestica Val.[3]	–	–
Cyathula prostrata (L) Bl.[3]	Samsam Bawi (Ti)	SAN 138278
Cymbopogon citratus (Nees.) Stapf.*	Sohumau (Pa)	–
Cyrtandra aff. *areolata* (Staff.)Bl Burtt.[3]	Pohodo (Ta)	FRCSE 428 & 431
Dendrobium umbellatom Reichb.f.[2]	Tingasu	–
Desmos teijsmannii (Boert.)Merr.[3]	Molisun Rumungkut	SAN 138271
Dillenia grandifolia Wall.ex. Hk.f. et. Thorn[2]	Tembakau (Ka)	–
Dillenia sp.[2]	–	–
Dinochloa sp.[2]	Baran	–
D. scabrida S. Dransf.[2]	"	–
Dracaena umbratica Ridl.[1]	Dolol Apui	–
Elephantopus scaber L.[2]	Lambrunai	–
E. tomentosus L.[3]	Honsigup (Ta)	FRCSE 419
Eleusine indica (L) Gaetner.*	Liagon (Pa)	–
Erechtites valerianaefolia L.[2]	Sumayon	–
Eupathorium odoratum L.*	Lambaian (Pa)	–
Eurycoma longifolia Jack.*	Duli (P) Ruli (Ta)	–
Fibraruea tinctoria Lour.[3]	Tolungon (P & Ta)	–
Ficus aurantiacea Griff.[2]	Silabon-rondoh	–
F. deltoidea Jack.[2]	Agolauran	
F. lepicarpa Bl.[3]	Lintotobow (Ke)	–
F. racemosa L. var *elongata*[3]	Tandilan (P)	–
Ficus sp.[2]	Mamponoh	–
Flagellaria indica L.[3]	Waau (Ti)	SAN 138300
Forrestia griffithii C.B. Clarke[1]	Tatapis Da Aputulan	–
Garcinia mangostana L.[3]	Timpurog (Pa)	–
Glochidion macrostigma Hk.f.?	Sondot Laling (Ti)	SAN 138273
Graptophyllum pictum (L.) Griffithi[2]	Lalamih	–
Hanguana malayana Jack.[1]	Tatapis Da Umbir	–
Helecia serrata (R.Br.) Bl.[3]	Andaun Motukal (Ti)	SAN 138291
Hibsicus rosa-sinensis L.[2]	Bunga Raya	–
Hibiscus sp.[3]	–	FRCSE 408
Homalium foetida (Roxb.) Benth[1]	Lulumada	–
Homalomena propingna Schoot.[3]	Nyato (Ta)	FRCSE 414
Homalanthus populneus Geisel.[2]	Sipapaloi	–
Hoya sp.[1]	Pongkukubab	–
Hydnophtyum formicarium Jack[3]	Musalag Noh Kilou (P)	–
Hypoestes sp.[2]	Matopait	–
Hypolytrum nemorum (Vahl) Spreng[1]	Balasan Sungei	–

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Botanical Name	**Murut Name**	**Collection No.**
Hyptis capitata Jack.[3]	Baing-baing (Ti)	SAN 138287
Imperata cylindrica (L) Rausch.*	Lalang (Ka)	–
Ixora capillaries Boern.[3]	Angin Tolunsung (Ti)	SAN 138275
Jasminum aculeatum (Blanco) Merr.[3]	Onsom-Onsom (Ti)	SAN 138285
Jatropha curcas L.[3]	Jarak (Ke)	–
Justicia gendarussa L.[3]	Insasahi (Ka)	–
Kalanchoe pinnata (Lam.) Pers.*	Tanom Tombiog	–
Lansium domesticum Corr. Serr.[3]	Langsat (Ka & P)	–
Leucosyke capitella (Poir.) Wedd.*	Balawian	–
Lindera pipericarpa Boerl.[3]	Laindos (P)	–
Litsea graciae Vidl.[3]	Novolo (P), Pengolaban (Ta)	FRCSE 420
L. odorifera Valeton[3]	Lawang (P)	–
Macaranga gigentifolia Merr.[3]	Binawong (Ka)	–
Micromelum minatum (Frost.) Seem[3]	Kimamansak (Ka)	–
Millettia nieuwenhuisii J.J. Smith[3]	Ramus (Ka)	FRCSE 389
Mimosa pudica L.*	Sikot Mou (Ke), Tanom Molu (Ka)	–
Neonauclea calycina Merr.[3]	Kembalu (P)	SAN 142048
Oroxylum indicum (L) Vent.[3]	Ulunan Sangku (Ti)	SAN 138284
Orthosiphon aristatus (Blume) Miq.[3]	Misai Kucing (Ta)	–
Parashorea malaanonan Merr.[1]	Melapi	–
Parkia singularis Miq.[3]	Kundai (P)	–
Paspalum conjugatum Berg.[2]	Belandak	–
Pavetta sp.[1]	Buntungon	–
Pedilanthus tithymaloides Poit.*	Tatapis Tindukon	–
Phaeanthus ebrasteleolatus (Pres) Merr[3]	Korokos (Ti)	SAN 238288
Phyllanthus urinaria L.[3]	Pilujala (Ti)	SAN 138282
Piper betle L.*	Molur Malat (Ti)	SAN 138277
Piper carinum Bl.*	Kimput-Pilot (Ta)	FRCSE 423
Plectocomiopsis geminiflora (Griff.) Becc.[3]	Ambarua (Ta)	FRCSE 411
Plumeria rubra L.[1]	Campaka	–
Poikilospermum suaveolens (Bl.) Merr.[3]	Bunatol (Ti)	SAN 138230
Polyalthia sp.[1]	Ubat Puru	–
P. bullata King[2]	Serat	–
Praravinia suberosa Merr.[1]	Kingkimut	–
Pronephrium asperum (Prest.) Holtt[2]	Ingkakahas	–
Psidium guajava L.*	Kaliabas (P), Liabas (Ka)	–
Psychotria cf. *sammontosa* Bl.[3]	Solovondo (?)	FRCSE 406
Saurauia longistyla Merr.[1]	Usod-usod	–
Selaginella argentea Sym.[2]	Sondotnulogo	–
Semecarpus cuneiformis Blanco.[3]	Kutang (Kg)	–
Schismatoglottis sp.[1]	Pongongondog	–
Schindapsus perakensis Hook.F.[1]	Pagawangan	–
Scleria bancana Miq.[1]	Onininsil	–
Shorea spp.[3] (Eushorea group)	Omnompik (Ta)	–

Botanical Name	Murut Name	Collection No.
Sida rhombifolia L.[3]	Dalupang (P)	–
Sindora sp.[2]	Talikakasam	–
Solanum torvum Sw.*	Lintahun (Ka)	–
Spatholobus cf. *gyrocarpus* Benth in Miq.*	Ramus	FRCSE 410
Stachytarpheta jamaicensis (L.) Vahl.[2]	Indalupang	–
Stenochlaena palustris (Brum) Bedd[2]	Kuraunolot	–
Stephania corymbosa (Bl) Wel.P.[3]	–	FRCSE 396
Strychnos ignatii Berg.[1]	Tataga Do Sangi	–
Synedrella nodiflora (L) Gaertn.[3]	–	FRCSE 418
Tetrastigma diepenhostii (Mq)Latiff[3]	Daramatin (Ti)	–
Tinospora crispa (L) Hook.f. & Thomson*	–	–
Trichosanthes cucumerina L.[3]	Molisun Mamulal (Ti)	SAN 138292
Urena lobata L.[3]	Injilokot (Ti)	SAN 138286
Urophyllum nigricans Warnh.[3]	–	FRCSE 425
Uvaria grandiflora Roxb.[3]	Nolilitan (Ti)	SAN 138270
Vitis trifolia (L.) Domin.[1]	Susumoloi	–
Zea mays L.[3]	Halai (Ka)	–

APPENDIX 2: PLANT FAMILIES MOST COMMONLY USED FOR MEDICINAL PURPOSES.

Euphorbiaceae (10 spp.); Leguminosae (6 spp.); Rubiaceae (5 spp.); Araceae (4 spp.); Gramineae (4 spp.); Menispermaceae (4 spp.); Annonaceae (3 spp.); Lauraceae (3 spp.); Moraceae (3 spp.); Malvaceae (3 spp.); Agavaceae (2 spp.); Amaranthaceae (2 spp.); Labiatae (2 spp.); Palmae (2 spp.) and Piperaceae (2 spp.).

One species each:

Acanthaceae , Anarcadiaceae, Apocynaceae, Aristolochiaceae, Asteraceae, Begoniaceae, Bixaceae, Bromeliaceae, Cecropiaceae, Combretaceae, Costaceae, Cucurbitaceae, Dilleniaceae, Dipterocarpaceae, Flacourtiaceae, Flagellariaceae, Gesneriaceae, Guttiferae, Hypoxidaceae, Meliaceae, Myrtaceae, Oleaceae, Proteaceae, Rutaceae, Simaroubaceae, Solanaceae, Vitaceae, Zingiberaceae

P = Paluan, Ka = Kalabakan, Ke =Keningau, Ti = Timugon and Ta = Tagal
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