Ethnobotany of spice plants in Tanjung Botung Village, Barumun District, Padang Lawas Regency, North Sumatra, Indonesia

R Rambey1, A S J Lubis1, A Susilowati1, A B Rangkuti1 and O Onrizal1

1Faculty of Forestry, Universitas Sumatera Utara, Jl. Tri Darma Ujung No 1 Kampus USU, Medan Sumatera Utara 20155, Indonesia

E-mail: ridahati.rambey@usu.ac.id

Abstract. Indonesia is one of the largest spice-producing countries in the world. Forests in Indonesia have biodiversity that holds the potential for spices which must always be protected. Community gardens in Tanjung Botung Village in various land-use patterns such as agroforestry gardens, people's yards are a place to grow various types of spices, both grown wild and deliberately cultivated. This study aims to determine the species of spices and their uses in Tanjung Botung Village, Barumun District, North Sumatra. The research method was carried out by in-depth interviews with 20 respondents of local communities. The respondents were chosen by snowball sampling method. There are 33 species of spice plants used by the community, consisting of 13 (39.4%) tree species and 20 (60.6%) herbs. Part of plant used, namely 18 species of fruit (54%), six species of leaves (18%), three species of rhizome (9%), two species of bark (6%), two species of tubers (6%) and stem of a species (1%).

1. Introduction

Indonesia is one of the countries with the highest biodiversity in the world and the largest spices producer. Some species of spices have natural essential oils or other components that affect the taste of some drinks and foods [1]. Indonesia is also one of the most important spice exporters in the world. On average, Indonesian spices accounted for 21.06% of the total world spice market in 2013 [2]. Until now, it is estimated that there are 400-500 species of spices in a world with Southeast Asia as a spice center world. In Southeast Asia, there are at least 275 species of spices [3]. Spices are ingredients that are rich in antioxidants, including terpenoids and phenolics. Spices also contain vitamins and minerals [4]. Spices have been used for the purpose of enhancing taste and color, and aroma since ancient times. Spices are also used as food and beverage preservatives because they contain phytochemicals [5].

In Indonesia, spices are traditionally grown using an agroforestry system. Structurally, spice plants fill the middle story and the understory. In addition to agroforestry land, spice plants are also usually planted in home gardens for several functions, namely as yard fences, as shade plants, food and vegetable reserves, medicinal reserves, as ornamental plants, and wild plants [6]. Spices can also be summed up as aromatic materials derived from plant parts such as flowers, fruit, bark, stems, and seeds. According to part used, spices are grouped into four, namely: spices from stems, spices from flowers, spices from seeds, and spices from the fruit [7].
Tanjung Botung Village is located in Barumun District, Padang Lawas Regency, North Sumatra Province, Indonesia. In general, the people who live in the village of Tanjung Botung are 95% ethnic Mandailing [8]. People are very dependent on spices in their daily cooking activities, such as onions, chilies, garlic, ginger, tomatoes, coriander, turmeric, and others are mandatory ingredients in every dish. There are one species of spice that is typical of the Padang Lawas area, namely holat (Phyllanthus emblica), which is one of the ingredients used in traditional cuisine in Tanjung Botung Village.

The potential of the species of spices commonly used by the community in this village has never been documented before. Therefore, research on the species of spices used by the villagers is very interesting to study as information material for those in need. This study aims to determine the species of spices and their uses in Tanjung Botung Village, Barumun District, Padang Lawas Regency, North Sumatra.

2. Materials and methods
This research was conducted in Tanjung Botung Village, Barumun District, Padang Lawas Regency from June to September 2020. The research method was carried out by in-depth interviews with local communities and an inventory of spices in the field [9]. Species inventory was carried out by recording all species found in agroforestry gardens, home gardens, or from the market. The interview method used was snowball sampling [9]. There are 20 key respondents in this study who are considered as views on the use of spices, namely community leaders and the elder. Interviews were conducted to determine the species of spice and their uses. Identification of plants found at the observation site is carried out directly in the field with the help of the identification of local community species. Plant species were identified using a collection of identification guides [10,11]. The data obtained is then analyzed descriptively.

3. Results and discussion

3.1 Ethnobotany spices
The use of spices in Tanjung Botung Village has been carried out since ancient times. The majority of the people are ethnic Mandailing. To cook side dishes, spice ingredients such as onions, chilies, tomatoes, and others are mandatory ingredients that must be present in every dish. There are also spices typical of the Mandailing ethnic area, namely holat (Phyllanthus emblica). According to [12], spices are natural food additives that have been used for thousands of years to improve the sensory quality of food. The parts of the spice plant used include fruit, leaves, skin, seeds, roots, rhizomes, and others. For example, the Dayak customs in East Kalimantan use local ingredients as spices such as Albertisia papuana, Hodgsonia macrocarpa, Aleurites moluccana, Pangium edule, Ricinus communis, and Sumbaviopsis albicans to prepare their food in a certain way [13].

3.2 Species of spice used by the people of Tanjung Botung Village
There are 33 species of spice plants used by the community, which consists of 13 (39.4%) tree species and 20 (6.6%) herb species (table 1). These species came from the Zingiberaceae family with six species (18%), Amaryllidaceae four species (12%), Poaceae four species (12%), Apiaceae three species (9%), and Rutaceae two species (6%). Family of Myrtaceae, Piperaceae, Lauraceae, Moraceae, Fabaceae, Clusiaceae, Pandanaceae, Solanaceae, Euphorbiaceae, Schisandraceae, Oxalidaceae, Myristicaceae, Arecaeaceae, and Phyllanthaceae, each family consists of one species (3%).

The utilization of plant parts in general used are fruit, leaves, rhizomes, skins, tubers, and wood. The results showed that the plant parts used by the community were 18 species of fruit (54%), six species of leaves (18%), three species of rhizome (9%), two species of skin (6%), two species of tubers (6%), and one species of the stem (1%). The spices used from the fruit/seed are cloves (Syzygium aromaticum L.), pepper (Piper nigrum L.), tamarind (Tamarindus indica L.), lime (Citrus x aurantifolia (Christm., Swingle), gelugur acid (Garcinia atroviridis Griff. et T.Anderson), Solanum torvum Swartz, coriander (Coriandrum sativum L.), cardamom (Wurfbainia compacta (Sol. ex Maton) Skornick. & A.D.Poulsen), Red chili pepper (Capsicum annum L.), Cayenne pepper (Capsicum frutescens L.), cumin (Cuminum
cuminum), candlenut (Aleurites moluccanus Willd.), lawang flower (Illicium verum Hook f), starfruit (Averrhoa bilimbi L.), nutmeg (Myristica fragrans Houtt) and kecombrang (Etingeria elatior (Jack) R.M.Sm.).

Table 1. Spice Plants used by the people of Tanjung Botung Village.

| No | Local name | Common name | Scientific name | Family | Part of the plant used | How to use | Habitus | Acquisition |
|----|------------|-------------|-----------------|--------|------------------------|------------|---------|-------------|
| 1  | Serai      | Lemongrass  | Cymbopogon citratus (L.) Rendle | Poaceae | Leaf                   | Bruised    | Herb    | Cultivation |
| 2  | Daun salam | Bay leaf    | Syzygium nervosum A.Cunn. ex DC. | Myrtaceae | Leaf                   | Direct use | Tree    | Cultivation |
| 3  | Lengkuas   | Galangal    | Alpinia galanga (L.) Swartz | Zingiberaceae | Rhizome | Bruised | Herb | Cultivation |
| 4  | Jahe       | Ginger      | Zingiber officinale Roscoe | Zingiberaceae | Rhizome | Bruised | Herb | Cultivation |
| 5  | Kunyit     | Turmeric    | Curcuma longa L. | Zingiberaceae | Rhizome | Crushed | Herb | Cultivation |
| 6  | Cengkeh    | Clove       | Syzygium aromaticum L. | Myrtaceae | Fruit | Direct use | Tree | from market |
| 7  | Merica     | Pepper      | Piper nigrum L. | Piperaceae | Fruit | Crushed | Herb | from market |
| 8  | Kaya manis | Cinnamon    | Cinnamomum zeylanicum Blume | Lauraceae | Bark | Direct use | Tree | from market |
| 9  | Cempoka    | Cempoka     | Cinnamon | Zingiberaceae | Rhizome | Crushed | Herb | Cultivation |
| 10 | Kencur     | Aromatic ginger | Tamarind | Fabaceae | Fruit | Direct use | Tree | from market |
| 11 | Asam Jawa  | Pandan      | Pandanus amaryllfolius Roxb. | Pandanaceae | Leaf | Direct use | Herb | Cultivation |
| 12 | Jeruk nipsis | Lime     | Citrus x aurantifolia (Christm.) Swingle | Rutaceae | Fruit | Squeeze | Tree | Cultivation |
| 13 | Asam galagur | Gelugur acid | Garcinia atroviridis Griff. et T.Anderson | Clusiaceae | Fruit | Slices | Tree | from market |
| 14 | Jeruk purut | Lime       | Citrus hystrix DC | Rutaceae | Leaf | Direct use | Tree | Cultivation |
| 15 | Daun pandan | Pandan     | Pandanus amaryllfolius Roxb. | Pandanaceae | Leaf | Direct use | Herb | Cultivation |
| 16 | Ketumbar   | Coriander   | Coriandrum sativum L. | Apiaceae | Fruit | Crushed | Herb | from market |
| 17 | Kapulaga   | Cardamom    | Wurfbainia compacta (Sol. ex Maton) Skornick. & A.D.Poulsen | Zingiberaceae | Fruit | Direct use | Herb | from market |
| 18 | Bawang putih | Garlic | Allium sativum L. | Amaryllidaceae | Tubers | Crushed | Herb | from market |
| 19 | Bawang merah | Onion   | Allium cepa L. | Amaryllidaceae | Tubers | Crushed | Herb | from market |
| 20 | Cabai merah | Red chili pepper | Capsicum annuum L. | Solanaceae | Fruit | Crushed | Herb | Cultivation |
| 21 | Cabai rawit | Cayenne pepper | Capsicum frutescens L. | Solanaceae | Fruit | Crushed | Herb | Cultivation |
| 22 | Daun prei  | Leek       | Allium ampeloprasum L. | Amaryllidaceae | Leaf | Slices | Herb | from market |
| 23 | Bawang batak | Batak onions | Allium schoenoprasum L. | Amaryllidaceae | Leaf | Slices | Herb | Cultivation |
| 24 | Jintan     | Caraway    | Cuminum cyminum L. | Apiaceae | Fruit | Crushed | Herb | from market |
| 25 | Kemiri     | Candlenut  | Aleurites moluccanus Willd. | Euphorbiaceae | Fruit | Crushed | Tree | from market |
| 26 | Bunga lawang | Lawang Flower | Illicium verum Hook f | Schisandraceae | Fruit | Direct use | Tree | from market |
The spices used from the leaves are *Cymbopogon citratus* (L.) Rendle, *Syzygium nervosum* A.Cunn. ex DC., *Citrus hystrix* DC, *Pandanus amaryllifolius* Roxb., *Allium ampeloprasum* L., and *Allium schoenoprasum* L. and *Apium graveolens* L. Types of spices from the bark of the tree are cinnamon (*Cinnamomum verum*) and bark of *Phyllanthus emblica*. Based on the habitus, spices consist of trees and herbs. The most widely used species came from 20 species of herb species (60.6%) and 13 tree species (39.4%). The herb species used are *Cymbopogon citratus* (L.) Rendle, *Alpinia galanga* (L.) Swartz, *Zingiber officinale* Roscoe, *Carcuma longa* L., *Piper nigrum* L., *Solanium torvum* Swartz, *Kaempferia galanga* L., *Pandanus amaryllifolius* Roxb., *Coriandrum sativum* L., *Wurfbainia compacta* (Sol. ex Maton) Skornick. & A.D.Poulse, *Allium cepa* L., *Capsicum annum* L., *Capsicum frutescens* L., *Allium frutescens* L., *Cuminum cyminum* L., *Etilingera elatior* L., *Apium graveolens* L., and *Oryza sativa* L.

In terms of use, these spices are in bruised, direct use, crushed, slices, scraped off, and squeeze. From the results of the study, it can be seen from Table 1 Based on the how to use of using spices, 13 species (39%) were used crushed, 11 species (33%) were used directly, 4 species (12%) were used in slices, 3 species (9%) were used bruised, 1 species (3%) were used scraped, and 1 species (3%) is used by means of a squeeze. Some of these spices are cultivated by the community either in agroforestry gardens, purchased at the market and some are grown wild in the yard of the house or community garden. Based on the source of spices obtained in this village, 17 species (51.5%) are cultivated by the community, 15 species (45%) are obtained by buying at the market and 1 species (3%) grows wild such as *Phyllanthus emblica*.

The types of dishes that are usually cooked by the people of Tanjung Botung village are stew, stir fry, curry, rendang, chili sauce, tamarind vegetables, holat and others. The use of spices in addition to adding flavor to dishes as well as coloring in food. According to [14] that spices not only add flavor to the dish and cancer. A large body of scientific research supports the cancer-preventive properties of spices, such as garlic, ginger, chili, turmeric, cloves, cinnamon, turmeric, and cardamom, the most commonly used flavoring food ingredients globally or deadly like diabetes. Based on [15], in the Tamiang tribe in Aceh, there are 31 species of spices and condiments plants consisting of 26 genera and 18 families used by the community. These species were used for preserving traditional cuisines such as *bubur pedas, ikan cang rebung*, and *anyang*.

4. Conclusion

There are 33 types of spice plants used by the community, consisting of 13 (39.4%) tree species and 20 (60.6%) herbs species. These spices come from the family of Zingiberaceae, Amaryllidaceae, Poaceae, Apiaceae, Rutaceae, Myrtaceae, Piperaceae, Lauraceae, Moraceae, Fabaceae, Clusiaceae, Panadaceae, Solanaceae, Euphorbiaceae, Schisandraceae, Oxalidaceae, Myristicaceae, Arecales, and Phyllanthaceae. In terms of plant parts used, namely 18 species of fruit (54%), six species of leaves (18%), three species of rhizome (9%), two species of skin (6%), two species of tubers (6%) and stems of 1 species (1%). The majority of the people are ethnic Mandailing. To cook side dishes, spice
ingredients such as onions, chilies, tomatoes, and others are mandatory ingredients that must be present in every dish. One of the local tree species used by the community as a spice is holat (Pylanthus emblica).

5. References

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