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Submission date: 23-Jun-2023 03:14PM (UTC+0700)
Submission ID: 2121317374
File name: Genap_20_Angkola.pdf (1.61M)
Word count: 5324
Character count: 30195

Jurnal Biodjati 6(1):45-58, May 2021

e-ISSN : 2541-4208
p-ISSN : 2548-1606

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THE ETHNOBOTANY STUDY OF THE FOODSTUFFS BY LOCAL COMMUNITIES IN THE BULUMARIO VILLAGE, NORTH SUMATRA

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Received : November 30, 2020
Accepted : April 14, 2021

DOI: 10.15575/biodjati.v6i1.10353

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Abstract. *Food is a primary human need. Various foods are initially obtained from plant species. Village people have used various food plants based on local knowledge and belief. The aims of this research were to elucidate (1) various food plants traditionally utilization by local people of the Bulumario Village, North Sumatra; (2) plant organs of food plants that are traditionally used by the local people of Bulumario village. The method used in this study was qualitative. Data were collected through surveys, interviews, and participatory observation. A total of 46 respondents were interviewed consisting of 22 men and 24 women who determined by purposive sampling. Data were analyzed was descriptively using descriptive statistics. A total of 83 species belonging to 66 genera and 36 families have been used by local communities in Bulumario village as foodstuffs. Those used as a source of carbohydrates (7 species), fruit sources (15 species), vegetables (32 species), and spices (21 species). Based on plant part used, the foodstuffs are fruit (34 species), leaves (21 species), and stems (13 species). The composition of food plants are cultivated (53 species), wild (18 species), and semi-cultivated (12 species). Solanum torvum, Garcinia attrovidis, Etlingera elatior, and Zanthoxylum acanthopodium are spices especially in Bulumario Village which have bioactivity as an antimicrobial so they are potential to be developed as a natural preservative. Pakkat (Calamus hookerianus, Calamus metzianus, Calamus thwaitesii and Plectocomiopsis geminiflora) have the potential to be developed as a vegetable or carbohydrate source.*

Keywords: *Bulumario people, ethnobotany, plant food.*

Citation
Silalahi, M., Asmara, K. T. & Nisyawati. (2021). The Ethnobotany Study of the Foodstuffs by Local Communities in the Bulumario Village. *Jurnal Biodjati*, 6(1), 1-xxx.

INTRODUCTION

The relationship between food or foodstuffs with health is very important because consumers demand healthy, tasty, and natural foods (Abbasi et al., 2013). There aremany local wisdoms of different ethnicities in Indonesia. In ethnobotany research, food plants are grouped to staple food, substitute for staple food, vegetables, fruit, spices, and ritual food (Anggraeni, 2013). The staple food in Indonesia is currently very dependent on rice, whereas empirically there are many species of plants that are rich in carbohydrates, especially those from tubers.

Many local communities in Indonesia,

especially those living near forest use cultivated, semi-cultivated and wild plants as foodstuffs. Teklehaymanot & Giday, (2010) stated that wild plants can be used as food sources, especially in unfavorable environmental conditions. The wild plants as food ingredients are diverse, but it often disliked because of their bad taste and uncertain availability (Silalahi et al., 2018), even though wild plants are considered healthier (Pawera et al., 2020). Wild plants which can be eaten as food and medicines are threatened with disappearing (Abbasi et al., 2013), therefore it is necessary to conduct various studies to prevent loss of germplasm.

Ethnobotany research is one of the most efficient and time-effective ways to reveal the benefits of plants (Silalahi, 2020), including food ingredients. Amusa et al. (2010) stated that the results of ethnobotany research can be used as basic data for the conservation and sustainable use of biological resources. Most of the local knowledge only remains in the memory of the parents and may disappear within a few decades (Tardío et al., 2006). The local knowledge about the use and processing of foodstuffs is currently experiencing degradation due to various factors including the presence of information and technology, the presence of modern food (Sujarwo et al., 2014), various foodstuffs are becoming increasingly difficult to find (Purba et al., 2018), and lack of nutritional value information (Pawera et al., 2020). Documentation of food plants, especially wild edible plants, can serve as baseline data for future study of the nutritional value as well as to increase food diversity (Teklehaymanot & Giday, 2010). Local knowledge about foodstuffs, especially wild plants, differs from one ethnicity to another (Pawera et al., 2020), and between different ages (Silalahi et al., 2015). Silalahi et al. (2015) stated that the local knowledge of the younger generation (aged 30-50 years) is lower than that of the older generation (>50 years). Balemie & Kebebew (2006) stated that the urgent collection of germplasm from areas under human pressure is highly recommended.

The Batak ethnic group is an ethnic group living on the island of Sumatra which consists of 5 sub-ethnicities, namely Karo, Phakpak, Simalungun, Toba, and Angkola -Mandailing where all generally live in the highlands of Lake Toba. Most of the Angkola -Mandailing Batak live in South Tapanuli Regency, around the Dolok Sibual-buali Nature Reserve (CADNR). Local knowledge of foodstuffs from wild plants tends to be degraded (Pawera et al 2020) and the same is true for communities around CADNR. Bulumario Village, is one of the CADNR buffer villages that still uses those from the forest as food, including various types of Arecaceae (Asmara, 2020). This study aimed to determine (1) the types of food plants, (2) the parts that are used; (3) the status of cultivation by the village community Bulumario.

MATERIALS AND METHODS

Research Site

The research was conducted in August - October 2019 in Bulumario Village, Sipirok Sub-district, South Tapanuli District, North Sumatra (Figure 1). It is estimated that Bulumario Village is thought to have existed since the 1830s and its location is close to the CADNR area. The average temperature of 23.5°C during the day and 15.5°C at night with an average humidity of 35-100%. The customary organizational structure in Bulumario village consists of *Harajaon* ("king"), *Hatobangon* (clan representative), richer (moderator), *Panusunan Bulung* (parents older), and *alim ulama*. Astronomi-

cally Bulumario Village is located at 01° 35' 23 "N and 099° 12' 33" E with an area of 3000 Ha at an altitude of 750-1374 1374 m above sea level (masl) with undulating hill topography.

Respondents

The method used in this study was qualitative with ethnobotanical approach (Martin, 1995). Some techniques, including deep interviews and plant species determination, were employed. Deep interviews or semi-structured interviews were conducted with informants that purposively selected by considering population diversity such as gender and age. The total informant was 46 individuals consisting of 22 males and 22 females or 10% of the Bulumario inhabited. Respondents were selected based on purposive sampling with the snowball method. The criteria used for respondents are knowing and using food plants, especially wild or semi-cultivated ones. Village history, demographics, customs, and topography were carried out by interviews with the village head and also the customary leader. The interview used interview guideline regarding ethnobotany aspects, including local name, the part that was used, how to use it, and the source of obtaining food plants, then specimen vouchers were made then identified.

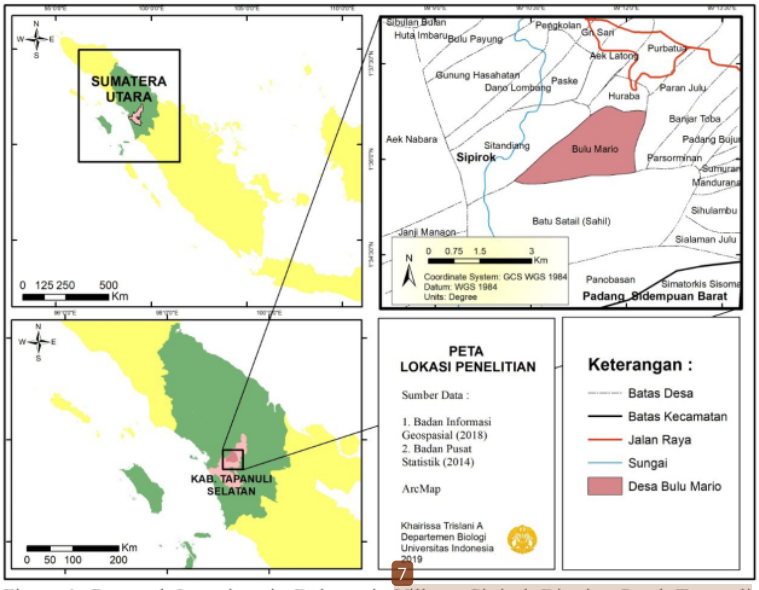

Figure 1. Research Locations in Bulumario Village, Sipirok District, South Tapanuli Regency District, North Sumatra.

Data Analysis

Data analysis was carried out qualitatively and quantitatively. Qualitative analysis was carried out by describing the results of the types of food plants using descriptive statistics (Silalahi et al., 2015). To complete the data, various secondary data published in journals were taken. qualitative data was analyzed by cross-checking, summarizing, synthesizing, and made narrative, while quantitative analyzed by statistical descriptive.

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RESULTS AND DISCUSSION

Various Food Plants

The foodstuffs are plants that are used as a source of nutrition and materials used in food processing. A total of 83 species belonging 66 genera and 36 families have been used by local communities in Bulumario Village as food (Table 1). The local community in Bulumario Village differentiates foodstuffs-ingredients into 6 main components, namely the source of carbohydrates (staple food, staple food substitutes), vegetables, fruit, spices, and food wrappers (Figure 2). The habitus which most of them herb (51 species) followed trees (19 species) were the most abundant plant used. The source of carbohydrates is recognized by local people as a source of energy, which means that before they carry out strenuous physical activity, they are always preceded by consuming rice or rice substitutes.

A total of 7 species used as a source of carbohydrates in Bulumario village, such as rice (*Oryza sativa*), cassava (*Manihot uttilissima*), taro (*Alocasia* sp.), and sweet potato (*Ipomoea batatas*). The use of *O. sativa* is the main source of carbohydrates that the community uses most intensively because it is easy to obtain, easier to process, and tastes better than other carbohydrate sources. This has resulted in other sources of carbohydrate such as *Manihot uttilissima* and *Ipomoea batatas* which have long been cultivated by the community, but tend to be abandoned because the tubers are rarely consumed.

Empirically, it can be seen that taro is easy to find in the fields and is less cultivated so it tends to run wild. Taro tubers sprout easily, making them resistant to various environmental conditions. The itching sensation produced by taro tuber sap making people less like using taro as a source of carbohydrates compared to rice and sweet potatoes. Various studies have shown that the carbohydrates produced by cassava and taro are complex carbohydrates so that the metabolic process takes longer so that they are suitable for use as a source of energy for a long time and are considered safer for people with diabetes mellitus.

A total of 32 species have been used as vegetables by local people in Bulumario village. The types of vegetables found are almost similar to those found in various other ethnicities such as eggplant (*Solanum tuberosum*), cabbage (*Brassica* spp.), and cassava leaves (*M. esculenta*). The young leaves of *M. esculenta* process as traditional Batak ethnic food known as *ikayu lalat*, which most popular and familiar vegetables among local people in Bulumario Village. The *ikayu lalat* are glitters made from young leaves of *M. esculenta* which are pounded together with the young fruit of *Solanum torvum* with a spice similar to curry (Figure 3). The *bulung gadung* known as mashed cassava leaves, this dish is quite popular for the people of North Sumatra and has been long commercialized so that its main vegetables in some food stalls in the district capital.

Table 1. Diversity of Plants as Foodstuffs by Local Communities in The Bulumario Village, North Sumatra

Families	Scientific name	*Local name*	Uses	Habitus	Wild/Cultivated	Part of Uses
Alliaceae	*Allium ampeloprasum* L.	*Bawang prei*	Spices	Herb	Cultivated	Leaves
	Allium cepa L.	*Bawang narara*	Spices	Herb	Cultivated	Bulb; Leaves
	Allium sativum L.	*Dasun*	Spices	Herb	Cultivated	Bulbs
	Allium schoenoprasum L.	*Bawang Batak*	Spices	Herb	Cultivated	Bulb; Leaves
Amaranthaceae	*Amaranthus blitum* L.	*Bayam kotok*	Vegetable	Herb	Cultivated	Leaves
	Amaranthus gangeticus L.	*Siarum*	Vegetable	Herb	Cultivated	Leaves
Anacardiaceae	*Mangifera foetida* Lour	*Bacang*	Fruits	Herb	Wild	Fruits
Apiaceae	*Coriandrum sativum* L.	*Katumbar*	Spices	Herb	Cultivated	Fruits
	Apium graveolens L.	*Leaves sop*	Vegetable	Herb	Cultivated	Leaves
	Centella asiatica (L.) Urb.	*Apapaga*	Vegetable	Herb	Wild	Leaves
	Daucus carota L.	*Wortel*	Vegetable	Herb	Cultivated	Fruits
Araceae	*Xanthosoma sagittifolium* (L.) Schott	*Talas*	Carbohydrate resources	Herb	Semi Cultivated	Tuber
	Colocasia esculenta (L.) Schott	*Talas*	Carbohydrate resources	Herb	Semi Cultivated	Tuber
Arecaceae	*Cocos nucifera* L.	*Harambir*	Spices	Tree	Cultivated	Fruits
	Calamus hookerianus Becc.	*Pakkat*	Vegetable	Shrubs	Wild	Stem
	Arenga pinnata (Wurmb) Merr.	*Bargot*	Carbohydrate resources	Tree	Wild	Stem
	Calamus metzianus Schltdl.	*Pakkat*	Vegetable	Shrubs	Wild	Stem
	Calamus thwaitesii Becc.	*Pakkat*	Vegetable	Shrubs	Wild	Stem
	Plectocomiopsis geminiflora (Griff.) Becc	*Pakkat*	Vegetable	Shrubs	Wild	Stem
	Salacca zalacca (Gaertn.) Voss	*Salak*	Fruits	Tree	Cultivated	Fruits
Asteraceae	*Lactuca indica* L.	*Sijukat*	Vegetable	Herb	Wild	Leaves
Athyriaceae	*Diplazium esculentum* (Retz.) Sw.	*Pahu*	Vegetable	Herb	Wild	Leaves
Brassicaceae	*Brassica juncea* L.	*Sabi*	Vegetable	Herb	Cultivated	Leaves
	Brassica oleracea var. botrytys L.	*bunga kol*	Vegetable	Herb	Cultivated	Leaves
	Brassica oleracea var. italica Plenck	*rokoli*	Vegetable	Herb	Cultivated	Leaves

	Brassica oleracea var. capitata L.	*Kol*	Vegetable	Herb	Cultivated	Leaves
	Brassica rapa-pekinensis L.	*Sawi putih*	Vegetable	Herb	Cultivated	Leaves
Bromeliaceae	*Ananas comosus* Merr	*Honas*	Fruits	Herb	Cultivated	Fruits
Caricaceae	*Carica papaya* L.	*Botik*	Vegetable	Tree	Cultivated	Leaves
Clusiaceaea	*Garcinia atroviridis* Griff. ex T.Anderson	*Asam gelugur*	Spices	Tree	Cultivated	Fruits
Convolvulaceae	*Ipomoea aquatica* Forssk.	*Kangkung*	Vegetable	Herb	Cultivated	Leaves
	Ipomoea batatas (L.) Lam.	*Saung gadung*	Carbohydrate resources	Herb	Cultivated	Tuber
Cucurbitaceae	*Sechium edule* (Jacq.) Sw.	*Labu jipang*	Vegetable	Herb	Cultivated	Fruits
	Cucumis sativus L.	*Acimun*	Fruits	Herb	Cultivated	Fruits
	Cucurbita maxima Duchesne	*Labu*	Fruits	Herb	Cultivated	Fruits
Euphorbiaceae	*Aleurites moluccanus* (L.) Willd.	*Lajo*	Spices	Tree	Cultivated	Fruits
	Manihot esculenta Crantz	*Ikayu lalat*	Vegetable	Shrubs	Cultivated	Leaves
Fabaceae	*Archidendron pauciflorum* (Benth.) I.C.Nielsen	*Joring*	Vegetable	Tree	Semi Cultivated	Seeds
	Parkia speciosa Hassk.	*Parira*	Vegetable	Tree	Cultivated	Seeds
	Phaseolus vulgaris L.	*Kacang juguk*	Vegetable	Herb	Cultivated	Seeds
	Vigna unguiculata (L.) Walp.	*Kacang panjang*	Vegetable	Herb	Cultivated	Seeds
Floucortiaceae	*Flacourtia rukam* Zoll. & Moritzi	*Ganda rukem*	Fruits	Tree	Wild	Fruits
Icacinaceae	*Platea latifolia* Blume.	*Sitopu*	Vegetable	Herb	Wild	Leaves
Lauraceae	*Cinnamomum verum* J.Presl	*Hulim*	Spices	Tree	Wild	Bark
	Cinnamomum burmanni (Nees & T.Nees) Blume	*Hulim*	Spices	Tree	Cultivated	Bark
Malvaceae	*Theobroma cacao* L.	*Coklat*	Fruits	Shrubs	Cultivated	Fruits
	Durio zibethinus L.	*Durian*	Fruits	Tree	Cultivated	Fruits
Melastomaceae	*Clidemia hirta* (L.) D. Don	*Tapodak-tapodak*	Spices	Shrubs	Wild	Leaves
Meliaceae	*Lansium parasiticum* (Osbeck) K.C.Sahni & Bennet	*Laccat*	Fruits	Tree	Semi Cultivated	Fruits
Moraceae	*Ficus drupacea* Thunb.	*Dong-dong*	Vegetable	Tree	Semi Cultivated	Leaves
	Artocarpus heterophyllus Lam.	*Cibodak*	Fruits	Tree	Semi Cultivated	Fruits
	Artocarpus integer (Thunb.) Merr.	*Cempedak*	Fruits	Tree	Semi Cultivated	Fruits

Musaceae	*Musa acuminata* Colla	*Pisang*	Fruits	Herb	Cultivated	Fruits
	Musa balbisiana Colla	*Pisang sitambatu*	Fruits	Herb	Cultivated	Fruits
	Musa × *paradisiaca* L.	*Pisang raja*	Fruits	Herb	Cultivated	Fruits
Myristicaceae	*Myristica fragrans* Houtt.	*Pala*	Spices	Herb	Cultivated	Fruits; Seeds
Myrtaceae	*Syzygium polyanthum* (Wight) Walp.	*Leaves salam*	Spices	Tree	Semi Cultivated	Leaves
	Psidium guajava L.	*Jambu horsik*	Fruits	Tree	Semi Cultivated	Fruits
Oxalidaceae	*Averrhoa bilimbi* L.	*Belimbing Vegetable*	Fruits	Tree	Cultivated	Fruits
Phyllanthaceae	*Bischofia javanica* Blume	*Sikam*	Vegetable	Tree	Wild	Bark
	Saorobus androgynus	*Leaves nasi-nasi*	Vegetable	Shrubs	Semi Cultivated	Leaves
Piperaceae	*Piper nigrum* L.	*Lada*	Spices	Herb	Cultivated	Seeds
Poaceae	*Cymbopogon citratus* (DC.) Stapf	*Sanggar-sanggar*	Spices	Herb	Cultivated	Stem
	Bambuusa spp.	*Bulu*	Vegetable	Herb	Wild	Stem
	Oryza sativa L.	*Eme*	Staple food (Carbohydrate resources)	Herb	Cultivated	Seeds
	Saccharum spontaneum var. edulis (Hassk.) K.Schum.	*Tobu pirak*	Vegetable	Herb	Cultivated	Stem
	Zea mays L.	*Jagung*	Carbohydrate resources	Herb	Cultivated	Seeds
	Saccharum officinarum L.	*Tobu*		Herb	Cultivated	Fruits
Rosaceae	*Rubus reflexus* Ker Gawl.	*Sanggirgir*	Fruits	Herb	Wild	Fruits
	Fragraria vesca	*Stroberi*	Fruits	Herb	Cultivated	Fruits
Rutaceae	*Citrus aurantiifolia* (Christm.) Swingle	*Unte rudang*	Spices	Tree	Cultivated	Fruits
	Citrus limon (L.) Osbeck	*Ute asom*	Spices	Tree	Cultivated	Seeds
	Zanthoxylum acanthopodium DC.	*Sinyarnyar*	Spices	Shrubs	Semi Cultivated	Fruits
Sapindaceae	*Pometia pinnata*	*Rambutan hutan*	Fruits	Tree	Wild	Fruits
Solanaceae	*Capsicum annuum* L.	*Lasiak godang*	Spices	Herb	Cultivated	Fruits
	Capsicum frutescens L.	*Lasiak lamot*	Spices	Herb	Cultivated	Fruits
	Solanum torvum Sw.	*Takokak*	Vegetable	Shrubs	Semi Cultivated	Fruits
	Solanum lycopersicum L.	*Torung asom*	Fruits	Shrubs	Cultivated	Fruits

	Solanum tuberosum L.	*Kentang*	Carbohydrate resources	Herb	Cultivated	Tuber
Vitaceae	*Cissus hastata* Miq.	*Riang-riang*	Spices	Herb	Wild	Leaves
Zingiberaceae	*Alpinia galanga* (L.) Willd.	*Halas*	Spices	Herb	Cultivated	Rhizome
	Curcuma longa L.	*Hunik*	Spices	Herb	Cultivated	Rhizome
	Etlingera elatior (Jack) R.M.Sm.	*Harias*	Spices	Herb	Semi Cultivated	Rhizome
	Kaempferia galanga L.	*Hasihor*	Spices	Herb	Cultivated	Rhizome
	Zingiber officinale Roscoe	*Pege*	Spices	Herb	Cultivated	Rhizome

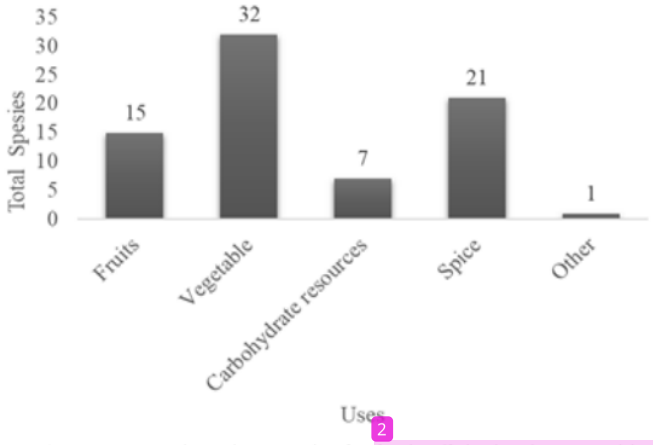

Figure 2. Vary uses and numbers species for foodstuffs by local communities in Bulumario village, North Sumatra.

Figure 3. Traditional cuisine of Bulumario village. A. The process of pounding cassava leaves in mortar; B. The *ikkau lalat* that have been made into "curry".

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Some plants are used as local vegetables such as *sijukat* (*Lactuca indica*), *sitopu* (*Platea latifolia*) and *tobu pirak* (*Saccharum spontaneum*) are wild, which taken from the forest and surrounding environment. The local communities believed that consuming *sijukat* treating hypertension. Chon et al. (2009) stated that *L. sativa* compounds have antihypertensive and antidiabetic activity. *Saccharum spontaneum* var. edulis by local people called *tobu* (sugarcane) *pirak* (egg), because its shape similar to sugarcane whose buds swell and when peeled in the form of fish eggs. *Saccharum spontaneum* contained protein, carbohydrates, minerals, vitamin A and vitamin C (Lim, 2014). When we conducted our research, *S. spontaneum* was already hard to find, even though it is very potential to be developed as a mineral-rich vegetable, therefore it is necessary to do research on its cultivation and sustainability.

A total of 15 plant species were used as a source of fruit such as *bacang* (*Mangifera foetida*), *durian* (*Durio zibethinus*), while *laccat* (*Lansium parasiticum*) and *sitambatu* banana (*Musa balbisiana*) are wild plants found in community gardens. *Sitambatu* banana eaten as a snack, like *rujak*, by local commnuties called *rabar*. The *rabar* is made by pounding fruits of sitambatu banana, *Capsicum annuum* and palm sugar, which made as social relations activity, especially women. The pseudostem of *sitambatu* bananas process to be vegetable, by local communities called *uncim*. A total of 21 species by the local community of Bulumario village used spices, its second ranking after vegetables. The spices are used by local communities similar to the other ethnic such as chilies (*Capsicum annuum*), lemongrass (*Cymbopogon citratus*), ginger (*Zingiber officinale*), turmeric (*Curcuma longa*) and galangal (*Alphinia galanga*). *Harias* (*Etlingera elatior*), *sinyarnyar* (*Zanthoxylum acanthopodium*), *Solanum torvum* and *Garcinia atroviridis* are local spices of Bulumario village.

Organ Part of Food Plants

The distribution of plant organs used as food, dominated by fruit (34 species), followed by leaves (21 species) and stems (13 species) (Figure 4). Fruit is the organ most widely used because it is rich in nutrients and minerals. Apart from tubers, several groups of rattan are found as an alternative source of carbohydrates, however, local people mostly use them as vegetables. The *pakkat* is a type of rattan belonging to Arecaceae, which the young shoots used as vegetables. Four types of *pakkat* found in Bulumario Village are *Calamus hookerianus*, *Calamus metzianus*, *Calamus thwaitesii*, and *Plectocomiopsis geminiflora*. The young shoots of pakkat are a traditional food of the Angkola-Mandailing ethnic groups which commercialized, especially during Ramadhan (fasting month). Although to be commercialized, the young shoots of pakkat are harvested from the forest, so they tend to interfere with its conservation. The local communiti's reasons for harvesting pakkat as it still widely found in the forest, it is difficult to cultivate it and is considered less economical because of its slow growth.

The Status Cultivation by Foodstuffs

The foodstuffs plants that have been used by the local community in Bulumario are dominated by cultivated plants (53 species), followed by wild plants (18 species) and semi-cultivated (12 species) (Figure 5). The cultivated plants are plants that cultivated deliberately by the community while semi-cultivated plants are plants that sometimes deliberately planted but then can reproduce wildly. Most sources of carbohydrates such as *Zea*

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mays, *Oryza sativa*, *Manihot uttilissima*, and *Ipomoea batatas* are cultivated.

Some vegetables used by the local community are wild such as *Calamus hookerianus*, *Calamus metzianus*, *Calamus thwaitesii*, *Plectocomiopsis geminiflora*, and *Saccharum spontaneum*, taken directly from the forest or the surrounding environment. Some plants as fruit resources are wild (*Clidemia hirta*, *Ficus drupacea*, *Rubus reflexus*, *Flacourtia rukam*) and semi-cultivated (*Lansium parasiticum*, *Artocarpus heterophyllus*). Spices used by the local people of Bulumario village, which used in traditional Batak cuisines such as *ikkau lalat* (like cassava leaf curry) and *arsik* (like goldfish curry).

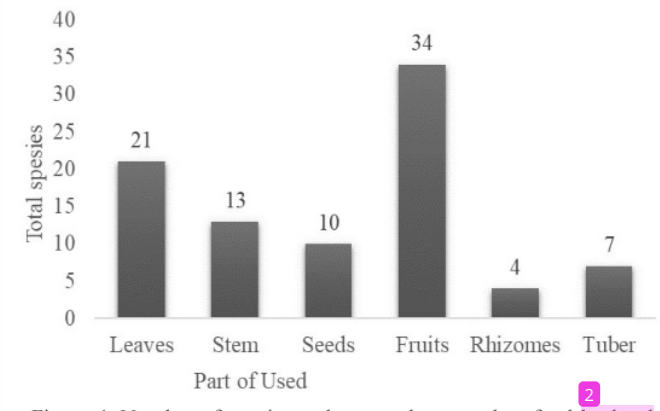

Figure 4. Number of species and organ plants used as food by local communities in Bulumario village, North Sumatra.

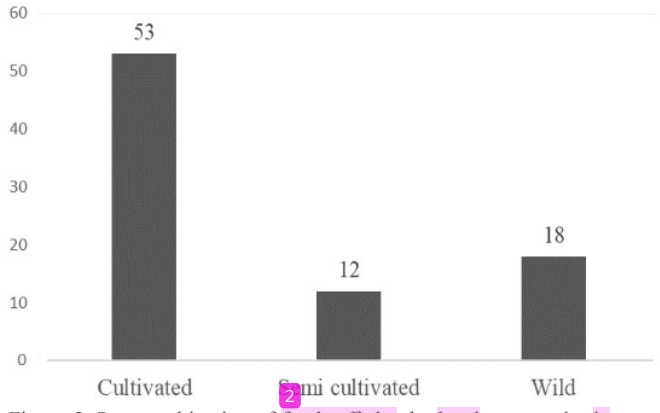

Figure 5. Status cultivation of foodstuffs by the local community in Bulumario village, North Sumatra.

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Harias (*Etlingera elatior*), sinyarnyar (*Zanthoxylum acanthopodium*), takokak (*Solanum torvum*), and asam gelugur (*Garcinia atroviridis*) are the main spices used in traditional food processing. *Etlingera elatior* is a spice with a high frequency of use by local people in Bulumario village (Figure 6A). The young shoots are used to made condiments whereas the flowers and fruits used in the making of arsik and other traditional cuisines. The addition of *E. elatior* will provide a distinctive aroma, thereby enhancing the taste and presentation of food. The aroma *E. elatior* is related to bioactive compounds such as essential oils (Jaafar et al., 2007), which the sesquiterpenoid groups. The bioactive compounds of *E. elatior*), especially flavonoids (Xie et al., 2015) inhibit the bacteria growth (Abdelwahab et al., 2010. The extract of *E. elatior* inhibited growth of the *Staphylococcus aureus*, *Bacillus subtilis*, *Listeria monocytogenes*, *Escherichia coli*, *Salmonella typhimurium*, and *Pseudomonas aeruginosa* (Ghasemzadeh et al., 2015).

The fruits of *Z. acanthopodium* is a spice used to proces various fish and meat by the people of Bulumario village (Figure 6B). *Z. acanthopodium* also used as the main ingredient to made sambal tuktuk (like sauce which is made by tuktuk = pounding process). The ingredients of sambal tuktuk are a *Capsicum frutescens* (green color fruit), *Allium cepa* (bulbs) and *Z. acanthopodium* (fruits). The addition of *Z. acanthopodium* to various foodstuffs gives a distinctive aroma and burning effect on the tongue. *Z. acanthopodium* is a wild herb that has a very sharp aroma similar to that of citrus (*Citrus*) and is very popular in North Sumatra. The volatile compounds found were geranyl acetate (32.04%) and limonene (15.8%). β-myrcene, (z)-beta ocimene, linalool, β-citronellol, mineral, geraniol, geranyl acetate, and sesquiterpenoid also contribute to the aroma of *Z. acanthopodium* resulted in a fresh citrus aroma with a warm sweet-peppery aroma (Wijaya et al., 2002).

The addition of *Z. acanthopodium* to food ingredients will make the food last longer. Those related to bioactivity compounds of *Z. acanthopodium* fruit that inhibit the growth of microbes that cause damage to food. Parhusip et al. (2015) stated that the *Z. acanthopodium* ethyl acetate extract had activity as an anti-bacterial against *Bacillus careus*. Devi et al. (2015) stated that the *Z. acanthopodium* fruit extract using petroleum ether inhibited the growth of *Candida albicans* and *C. krusei*. The bioactivity of the *acanthopodium* fruit as an antimicrobial has the potential to be developed as a natural preservative.

Garcinia atroviridis (Figure 6C) or asam galugur (asam = acid) is a fruit that causes a sour sensation, especially used in fish and meat processing. Empirically it was found that the addition of *G. atroviridis* fruit resulted in longer and fresher food so that the food lasted longer. *G. atroviridis* fruit is a fleshy fruit that contains lots of water. To increase endurance, the people dry the fruit flesh by first making thin slices and then drying them in the sun. The dried fruit is brownish in color and durable.

Consumption of *G. atroviridis* is believed to improve health because it has antioxidant, antimicrobial, antifungal, anti-obesity and lipid metabolism, cytotoxicity, anti-inflammatory, and antimalarial activity (Hamidon et al., 2017). Lumbantobing et al. (2017a) stated that consuming *G. atroviridis* fruit can reduce obesity because it can reduce triglyceride levels in obese subjects. The fruit *G. atroviridis* contains hydroxy-citric acid (HCA or (-) - HCA) as the main acid which has a strong ATP-citrate lyase inhibitor activity. Inhibition of this enzyme limits the availability of acetyl-CoA units required for fatty acid syn-

thesis and lipogenesis (Lumbantobing et al., 2017b). Mackeen et al. (2012) reported that *G. atroviridis* fruit contains 2-(butoxycarbonyl-methyl)-3-butoxycarbonyl-2-hydroxy-3-propanolida and 1, 1 -dibutyl methyl hydroxy-citrate compounds having antifungal activity.

A total of 83 species belonging to 66 genera and 36 families have been used by local communities in Bulumario village as foodstuffs. Those used as a source of carbohydrates (7 species), fruit sources (15 species), vegetables (32 species), and spices (21 species). Based on the plant part used, the foodstuffs are fruit (34 species), leaves (21 species) and stems (13 species). The composition of food plants are cultivated (53 species), wild (18 species) and semi-cultivated (12 species). The foodstuffs especially wild and semi-cultivated species such as pakkat (*Calamus hookerianus*, *Calamus metzianus*, *Calamus thwaitesii*, and *Plectocomiopsis geminiflora*) have the potential to be developed as a vegetable or carbohydrate source.

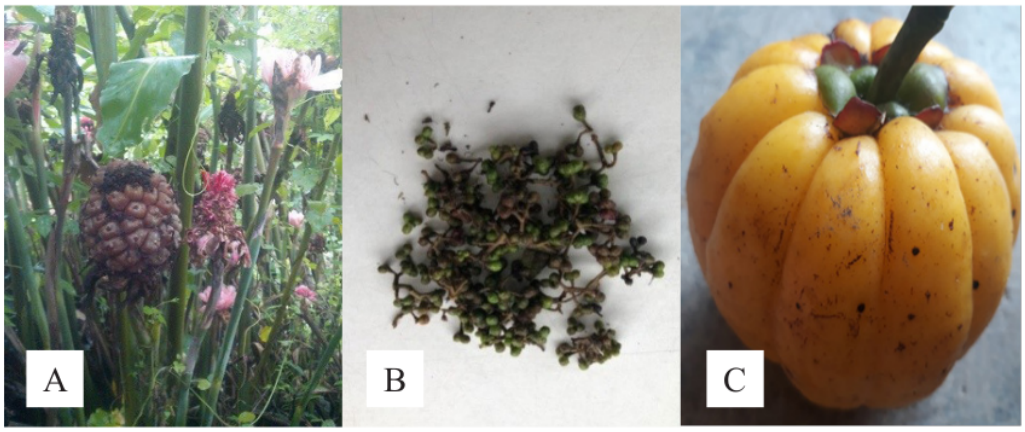

Figure 6. Spices used by local communities in Bulumario village, North Sumatra. A. *Etlingera elatior*; B. *Solanum torvum*; C. *Zanthoxylum acanthopodium*.

ACKNOWLEDGEMENTS

We would like to thank the local people of Bulumario Village for providing information so that this research can be carried out.

REFERENCES

Abbasi, A. M., Khan, M. A., Shah, M. H., Shah, M. M., Pervez, A. & Ahmad, M. (2013). Ethnobotanical Appraisal and Cultural Values of Medicinally Important Wild Edible Vegetables of Lesser Himalayas-Pakistan. *Journal of Ethnobiology and Ethnomedicine*, 9(66), 1–13.

Abdelwahab, K. S. I., Zaman F. Q., Mariod A. A., Yaacob M., Abdelmageed A. H. A. & Khamis, S. (2010). Chemical Composition, Antioxidant and Antibacterial Properties of the Essential Oils of *Etlingera elatior* and *Cinnamomum pubescens*. *J. Sci. Food. Agric*., 90(1), 2682–2668.

Anggraeni, R. (2013). Etnobotani Masyarakat Subetnis Batak Toba di Desa Peadungdung, Sumatera Utara. *Skripsi*. Departemen Biologi, Fakultas Matematika

dan Ilmu Pengetahuan Alam, Universitas Indonesia, Depok.

Amusa, T. O., Jimoh, S. O., Aridanzi, P. & Haruna, M. (2010). Ethnobotany and Conservation of Plant Resources of Kainji Lake National Park, Nigeria. *Ethnobotany Research & Applications*, 8(1), 181–194.

Asmara, K. H. (2020). Pengetahuan Etnobotani Masyarakat Desa Bulumario, Kecamatan Sipirok, Sumatera Utara dan Perspektif Pengembangan *Arenga pinnata* oleh Masyarakatnya. *Tesis*. Program Studi Pascasarjana Biologi, Fakultas Matematika dan Ilmu Pengetahuan Alam. Universitas Indonesia.

Balemie, K. & Kebebew, F. (2006). Ethnobotanical Study of Wild Edible Plants in Derashe and Kucha Districts, South Ethiopia. *Journal of Ethnobiology and Ethnomedicine*, 2(53), 1–9.

Chon, S. U., Heo, B. G., Park, Y. S., Kim, D. K. & Gorinstein, S. (2009). Total Phenolics Level, Antioxidant Activities and Cytotoxicity of Young Sprouts of Some Traditional Korean Salad Plants. *Plant Foods for Human Nutrition*, 64(1), 25–51.

Devi O. Z., Rao, K. S., Bidalia, A., Wangkheirakpam, R. & Singh. O.M. (2015). GC-MS Analysis of Phytocomponents and Antifungal Activities of *Zanthoxylum acanthopodium* DC. Collected from Manipur, India. *European Journal of Medicinal Plants*, 10(1), 1–9.

Franco, F. M., Chaw, L. L., Bakar, N. & Abas, S. N. H. (2020). Socializing Over Fruits and Vegetables: the Biocultural Importance of an Open-Air Market in Bandar Seri Begawan, Brunei Darussalam. *Journal of Ethnobiology and Ethnomedicine*, 16(6), 1–19.

Ghasemzadeh, A., Jaafar, H. Z. E., Rahmat, A. & Ashkani, S. (2015). Secondary Metabolites Constituents and Antioxidant, Anticancer and Antibacterial activities of *Etlingera elatior* (Jack) R.M.Sm Grown in Different Locations of Malaysia. *BMC Complementary and Alternative Medicine*, 15(335), 1–10.

Hamidon, H., Susanti, D., Taher, M. & Zakaria, Z. A. (2017). *Garcinia atroviridis* - a Review on Phyto-chemicals and Pharmacological Properties. *Marmara Pharmace-utical Journal*, 21(1), 38–47.

Lumbantobing, C., Yerizel, E., Syukur, S. & Purwati, E. (2017a). Decreased of Levels of Triglyceride in Subjects Drinking *Garcinia atroviridis* Leaf Tea from Sijunjung - West Sumatra, Indonesia. *American Scientific Research Journal for Engineering, Technology, and Sciences*, 33(1), 296–304.

Lumbantobing, C., Syukur, S., Yerizel, E. & Purwati, E. (2107b). Benefits of Asam Gelugur (*Garcinia atroviridis*) Tea as a Source of Antioxidant Compounds on Malondialdehyde Levels in Adults with Obesity. *American Scientific Research Journal for Engineering*, *Technology, and Sciences*, 34(1), 198–204.

Lim, T. K. (2014). *Saccharum spontaneum* var. edulis. *Edible Medicinal and Non Medicinal Plants*, 8(1), 640–641.

Martin, G. J. (1995). *Ethnobotany: a Methods Manual*. London: Chapman & Hall.

Mackeen, M. M., Mooi, L. Y. Amran, M., Mat, N., Lajis, N. H. & Ali, A. M. (2012). Noncytotoxic and Antitumour-promoting Activities of Garcinia Acid Esters from *Garcinia atroviridis* Griff. ex T. Anders (Guttiferae). *Hindawi Publishing Corporation Evidence-Based Complementary and Alternative Medicine*, 1–5.

Pawera, L., Khomsan, A., Zuhud, E. A. M.,

Hunter, D., Ickowitz, A. & Polesny, Z. (2020). Wild Food Plants and Trends in their Use: from Knowledge and Perceptions to Drivers of Change in West Sumatra, Indonesia. *Foods*, 9(1240), 1–22.

Parhusip, A. J. N., Jenie, B. S. L, Ahayu, W. P. & Yasni, S. (2015). Pengaruh Ekstrak Andaliman (*Zanthoxylum acanthopodium* DC) terhadap Permiabilitas dan Hidrofobisitas *Bacillus careus*. *Jurnal Teknologi Dan Industri Pangan*, 16(1), 155–168.

Purba, E. C. (2015). Etnobotani masyarakat etnis Karo di Kecamatan Merdeka, Sumatera Utara. *Tesis*. Program Studi Biologi, Program Pascasarjana, Universitas Indonesia, Depok.

Purba, E. C., Silalahi, M. & Nisyawati. (2018). Gastronomic Ethnobiology of "terites"-a Tradisional Batak Karo Medicinal Food: A Ruminant's Stomach Contet as a Human Food Resources. *Journal of Ethnic Food*, 5(2), 1–7.

Silalahi, M., Nisyawati, Walujo, E. B. & Supriatna, J. (2015). Local Knowledge of Medicinal Plants in Sub-ethnic Batak Simalungun of North Sumatra, Indonesia. *Biodiversitas*, 16(1), 44–54.

Silalahi, M., Anggraeni, R. & Nisyawati. (2018). Studi Etnobotani Tumbuhan Pangan yang Tidak Dibudidayakan oleh Masyarakat Lokal Sub-Etnis Batak Toba, Di Desa Peadungdung Sumatera Utara, Indonesia. *Jurnal Pengelolaan Sumberdaya Alam dan Lingkungan*, 8(2), 241–250.

Silalahi M. (2020). *Diktat Etnobotani*. Jakarta: Prodi Pendidikan Biologi, FKIP, Universitas Kristen Indonesia.

Sujarwo, W., Arinasa, I. B. K., Salomone, F., Caneva, G. & Fattorini, S. (2014). Cultural Erosion of Balinese Indigenous Knowledge of Food and Nutraceutical Plants. *Economic Botany*, 68(4), 426–437.

Tardío, J., Pardo-De-Santayana, M. & Morales, R. (2006). Ethnobotanical Review of Wild Edible Plants in Spain. *Botanical Journal of the Linnean Society*, 152(1), 27–71.

Teklehaymanot, T. & Giday, M. (2010). Ethnobotanical Study of Wild Edible Plants of Kara and Kwego Semi-pastoralist people in Lower Omo River Valley, Debub Omo Zone, SNNPR, Ethiopia. *Journal of Ethnobiology and Ethnomedicine*, 6(23), 1–8.

Wijaya, C. H., Hadiprodjo, I. T. & Apriyantono, A. (2002). Identification of Volatile Compound and Key Arome Compounds of Andaliman Fruit (*Zanthoxylum acanthopodium* DC.) *Food Science*, 11(6), 680–683.

Xie, Y., Yang, W., Tang, F., Chen, X. & Ren, L. (2015). Antibacterial Activities of Flavonoids: Structure-Activity Relationship and Mechanism. *Curr. Med. Chem.*, 22(1), 132–49.

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