



Ethnobotany of Bamboo in Sangirese, North Celebes

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Abstract

Technology advancement has encouraged development of processing method variation and enhanced utilization of natural resources widely. Ethnobotany can be used to document the local customs involving the practical uses of bamboo for many aspects of life. The aim of study was to describe utilization of bamboo by Sangirese. A total of 30 respondents were interviewed using a semi-structured questionnaire and personal interviews. Data were descriptively analyzed based on exploration results and interviews with respondents. The result showed 12 species of bamboo had been founded and correlated with the local community in Sangirese, consist of six species of *Bambusa*, three species of *Schizostachyum*, and each one species of *Dendrocalamus Gigantochloa*, and *Neololeba*. The uses of bamboos were grouped into nine categories, namely construction and materials, handicraft, furniture, ceremonial, musical instruments, transportation, medicine, ornamental plants, and food. Several species had been used more than one purpose and *B. maculata* was the most commonly used. Bamboo ethnobotany in Sangirese was firstly recorded and expected could enrich bamboo ethnobotany data from Celebes as well as to introduce Sangirese culture.

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INTRODUCTION

Bamboo is very close to the Indonesian people's lives. For example, in the fulfillment of housing facilities, bamboo is a priority as the construction material and wood substitute. In addition to construction material, bamboo also has an important economic value. Bamboo can serve as a source of renewable energy, fuel, industrial fabrics and paper, furniture (Chele, 2012), pharmaceuticals (Senthilkumar et al., 2011), and foodstuff (Satya et al., 2012). Currently, bamboo is also being developed as a material for making bicycles and computer case (Chele, 2012).

People use bamboo as musical instruments and various traditional ceremonies. *Angklung* musical instrument from West Java is one example of Indonesian musical instruments made of bamboo. On the other hand, *Ma'dio Tomate* ceremony in Tana Toraja, South Celebes (Widjaja, 1988) uses bamboo as one of the equipment. In the other culture, *Massolo* ceremony held by indigenous people in Rongkong, North Luwu, South Celebes also used bamboo (Wartika et al., 2013). It is important to learn that information on traditional uses of bamboos varies between and within regions.

Ethnobotany is the scientific study of the traditional knowledge and customs of a people concerning plant and their medical, religious, and other uses. Ethnobotanical studies provide a valuable insight into the potential utilization of plant resources. Such information may be used to identify particular species worthy of further investigation, and improvement which contribute towards the local and national development (Johnston & Colquhoun, 1996). Ethnobotany status as a science does not problems, but the status of the object of research is very vulnerable due to the rapid erosion of natural resources, particularly flora and utilization of traditional knowledge of plants from certain ethnic groups. Documentation of ethnobotany such as photographs, magazines, movies, or specimens are required to support sustainability of culture (Soekarman & Riswan, 1992). Bamboo ethnobotany studies have been conducted in some areas in Indonesia such as Sumatera, Java, Bali, Celebes, as well as Lesser Sunda Island (Yani, 2012; Widjaja, 2001; Arinasa, 2005; Widjaja, 2009; Widjaja & Karsono, 2005).

Sangihe Island is an island located in the transition zone between the Sunda Shelf and Sahul Shelf. Various types of flora and fauna are found to have rather different character than in the two other lands (Moss & Wilson, 1998). Sangihe Island located in the north of Celebes, and

also bordered by Mollucas in the north. It is possible a diversity of biodiversity is affected by the activities of inter-island trade.

Bamboo exploration has been conducted in Sangihe. Based on data from specimens at Herbarium Bogoriense recorded at the end of 2013, the type of bamboo in Sangihe island has been known includes 10 species, divided into five genera, namely *Bambusa*, *Dendrocalamus*, *Gigantochloa*, *Neololeba*, and *Schizostachyum*.

The use of bamboo by local community fairly influences the fulfillment of everyday necessity to the community. However, until recently the bamboo craftsmen have maintained poor status and products are considered cheap and low quality items. There is a need to develop new livelihood opportunities through bamboo by improving the quality of products and targeting high value markets (Nath & Das, 2008). For this purpose it is important to learn the concern of bamboo craftsmen in different region so that appropriate actions may be taken for development of bamboo trade in diverse areas.

In addition, utilities of bamboo and cultural wealth needs to be explored as to preserve traditional knowledge. In order to support the protection and conservation of the species of bamboo and local wisdom, it is necessary to study bamboo ethnobotany in the life of local community in Sangirese.

METHODS

The surveys were conducted during October-December 2014 in the bamboo distribution center in Sangihe Island. Information on bamboo distribution center was partially obtained from the Forestry Research Institute of Makassar, previous research data, and some information was obtained from the local community, especially bamboo craftsmen. Fields were selected from five villages in Tabukan Utara district i.e.: Kalekube, Naha, Kalurue, Likuang, and Bowongkulu. The outline of study area is shown in Figure 1.

The sampling was done by purposive sampling (Tiro & Arbianingsih, 2011). Ethnobotany data was obtained through direct observation supported by interviews. A total of 30 respondents were interviewed. Two of them were traditional leaders, four were bamboo craftsmen, and 24 were a local community. Interviews were conducted in a semi-structured questionnaire guide (questionnaire were validation using content validity by expert judgment). The information collected includes the type of bamboo growing in Sangihe (local names of bamboo), type of bam-

boo used by the community, where the bamboo taken, usefulness in everyday life, parts of the plant used, how to use them, and where the indigenous knowledge come from.

The data were descriptively analyzed based on exploration results and interviews with the people.



Figure 1. Research site, Sangihe Island. Tabukan Utara district marked with a red border

RESULTS AND DISCUSSION

Ecologically, bamboo in Sangihe Island may be found in the forest floor (e.g. *Neololeba atra*, *Bambusa blumeana*), river banks (e.g. *Bambusa* sp.1, *Schizostachyum blumei*) or planted in garden (e.g. *Bambusa striata*, *Schizostachyum brachycladum*). From the results of field observations, it was found 12 species of bamboo that are associated with the people in Sangirese (Table 1). It is known from the bamboo plants grown in the garden or house yard. Generally, the local communities take the bamboo plants from the forest and replant them so that the bamboo plants can be harvested when they are in need. In addition, some residents do bamboo cultivation for commercial purposes. Bamboo species being grown by society in Sangirese include *Bambusa maculata*, *B. striata*, *B. vulgaris*, *Bambusa* sp. 2, *Dendrocalamus asper*, *Gigantochloa atter*, *Schizostachyum blumei*, and *S. Brachycladum*. The bamboo species are materials to building construction and crafts. Other species planted by the community are based on the interests of individuals. For example, *Neololeba atra* is only be used by traditional healers as a treatment medium.

Although bamboos are generally thought of as erect, in fact they vary in habit (Figure 2). Some of these may be large and erect (*G. atter* and *D. asper*), small and erect (*Bambusa* sp.1, *N.*

atra, *S. brachycladum*), erect with slightly zigzag (*B. blumeana*, *B. maculata*, *B. striata*, *B. vulgaris*, *Bambusa* sp.2), or erect with drooping (*S. blumei*). Most culms have cylindrical and hollow internodes, may be with thick (*B. blumeana*, *D. Asper*, *G. Atter*) or thin walls (other species observed). The internodes are usually glabrous and smooth with various colors including dark green (*B. blumeana*, *B. maculata*, *B. vulgaris*, *Bambusa* sp.1, *D. Asper*, *S. blumei*), dark green with pale rings on the nodes (*G. Atter*), light green (*Bambusa* sp.2, *N. atra*) light green with pale rings on the nodes (*S. brachycladum*), or yellow with green stripes (*B. striata*, *S. brachycladum*). Culm characters determine the utilization of bamboo.

Bamboo ethnobotany research in Indonesia has been done on mainland, such as Sumatra, Java and Bali as well as Celebes (Dransfield & Widjaja, 1995; Arinasa, 2005; Widjaja, 1988). Although the bamboo ethnobotany is a very old phenomenon, yet the potential of the bamboo in Sangihe unexplained. Ethnobotany research in Sangihe is very important because it has a lot of different cultures with the mainland. In this island, the interrelationship between the culture of the people and bamboo is very strong. Many cultural, social and economic factors, including beliefs, customs, habits, religions and values have been mixed together along with various uses of bamboos. Many of them are centuries old reflecting the vast experience and knowledge accumulated both about quality of bamboo species and the environment they grow.

A number of traditional uses and practices of bamboo in Sangihe described in this paper. Of these, uses for construction and materials, handicrafts, furniture, traditional ceremonies, musical instruments, transportation, medicine, ornaments as well as food.

Construction and materials

According to the Colombian architect Simon Velez, "*Guadua Angustifolia* bamboo is a renewable resource in the areas of construction and infrastructure, which is used structurally in homes and other buildings. With a grade above the normal stress, similar to steel and concrete in compression." (Chele, 2012). Today, construction made from bamboo contested regularly by various communities. In Sangirese, the bamboo culms could be used for home materials such as walls, roofs, floors, doors, windows as well as poles (Figure 3A). In the other hand, the local people used bamboo for bridge and town hall (*Balai-balai*). Straight, thick, and sturdy bamboo culms are used as construction materials or the



Figure 2. Species of Bamboo in Sangihe: A. *Bambusa blumeana*; B. *B. maculata*; C. *B. striata* D. *B. vulgaris*; E. *Bambusa* sp.1; F. *Bambusa* sp.2; G. *Dendrocalamus asper*, H. *Gigantochloa atter*; I. *Neololeba atra*; J. *Schizostachyum blumei*; K. *Schizostachyum brachycladum* (Green); L. *Schizostachyum brachycladum* (Yellow)

main pillars of a building. The bamboo species appropriate for such purposes is *Dendrocalamus asper* or *Gigantochloa atter*. Meanwhile, *Bambusa vulgaris* which has notched culms can only be used as a construction material. To make roof frame, wall and floor matting, thinner bamboo culms from *Schizostachium brachycladum* is used. Another common use of bamboo culms is likewise seen in the local community's hedge; the types of bamboo used include *B. blumeana*, *B.*

striata, *B. vulgaris*, *D. asper*, and *G. atter*. The rural communities also have a water pipe and shower made of *G. atter* culms.

Handicrafts and Furniture

Sangiinese community lives have been fused with bamboo. It can be seen from a variety of daily devices made of bamboo. Variety of the craft stressing the potential of the diversity and abundance of bamboo on Sangihe Island. Various

Table 1. Species of bamboos, local names, and field source in Sangihe

Scientific name	Local name	Plant location
<i>Bambusa blumeana</i>	Kalaeng batu	Naha
<i>Bambusa maculata</i>	Kalaeng ngusina	Bowongkulu
<i>Bambusa striata</i>	Kalaeng garing	Kalekube
<i>Bambusa vulgaris</i>	Kalaeng biasa	Kalekube
<i>Bambusa</i> sp.1	Kalaeng ohose	Naha
<i>Bambusa</i> sp.2	Bayut	Likuang
<i>Dendrocalamus asper</i>	Tabadi	Kalekube
<i>Gigantochloa atter</i>	Patung	Naha
<i>Neololeba atra</i>	Nena	Naha
<i>Schizostachyum blumei</i>	Bulohoro	Naha
<i>Schizostachyum brachycladum</i> (Green)	Timbelang	Naha
<i>Schizostachyum brachycladum</i> (Yellow)	Timbelang garing	Kaluraa

woven arts such as sago container (*Bika humbia*), baskets (*Karanjang*), woven plate (*Nyiru*) (Figure 3B-3D) and other woven arts are created using bamboo culms with long segments that can be easily woven like *Neololeba atra* and *Schizostachyum blumei*. In the other hand, the local community use naturally-carved bamboos, namely *Bambusa maculata* that have natural brown spots to create unique and attractive impression handicrafts. Although bamboo is considered poor quality, cheap, rustic, or neglected, but Sangirese people have different arguments. They feel that bamboo are part of daily life.

Characteristic of the house Sangirese people is their furniture made from culm of *Bambusa maculata*. This bamboo species cultivated for the typical characteristics that have a natural carving. Various forms of tables and chairs are made using *B. maculata* (Figure 3E). Furniture from bamboo material is produced by the community in Sangihe where type of bamboo is ubiquitously found. The furniture is massively produced, even traded between islands.

Traditional Ceremonies

Indonesian society is very popular with their diverse cultures. Each region has typical traditional ceremonies, for birth, marriage, thanksgiving, bad luck prevention, and death (Marzuki, 2015). *Tulude* ceremony is traditional ceremony by Sangirese that held on January 31th every year as the starting reinforcement. *Tulude* is essentially a thanksgiving ceremony to *Mawu Ruata Ghenggona Langi* (Almighty God) for His blessings to mankind for a year ago. Various known ritual instruments made of bamboo. Culm of *Bambusa vulgaris* used for supplies of *Kue Tamo*

(custom cakes on *Tulude* ceremony – Figure 3F). Unsplit internodes of *Schizostachyum brachycladum* is used to make pots for cooking glutinous rice (*nasi bulu*). *Nasi bulu* also present on *Tulude* ceremony.

Musical Instruments

Lives of the local people that are attached to bamboo can also be seen from musical instruments. Sangirese people in particular have a set of bamboo musical instruments consist of flute (small, medium, and large), korno (sol-la, mi-fa, si-do), middle bamboo (mi-fa, sol-la), trombone (sol-la, mi-fa), clarinet, saxophone, trumpet, bass, and drums, made entirely of *Kalaeng ngusina* (*Bambusa maculate* – Figure 3G). This musical instrument can accompany all the songs with different rhythms. Each musical group consists of 45 people. This musical group usually displayed on *Tulude* ceremony, wedding ceremony as well as independence day ceremony.

According to Agustinus Sasundu in a personal interview, bamboo music has accompanied independence day ceremony since the 1960s. He was one of the creators of bamboo musical instruments today. Previously bamboo instruments in Sangihe consist of flute and only can accompany certain musical scale. In 2016 Agustinus Sasundu get an Anugerah Kebudayaan Award from the Ministry of education and culture on Maestro Seni Tradisi category as a maker, coach, arranger and conductor bamboo musical instrument in the Sangihe Island.

Medicine

Species of bamboo in Sangirese known to be useful for the treatment are *Neololeba atra*,

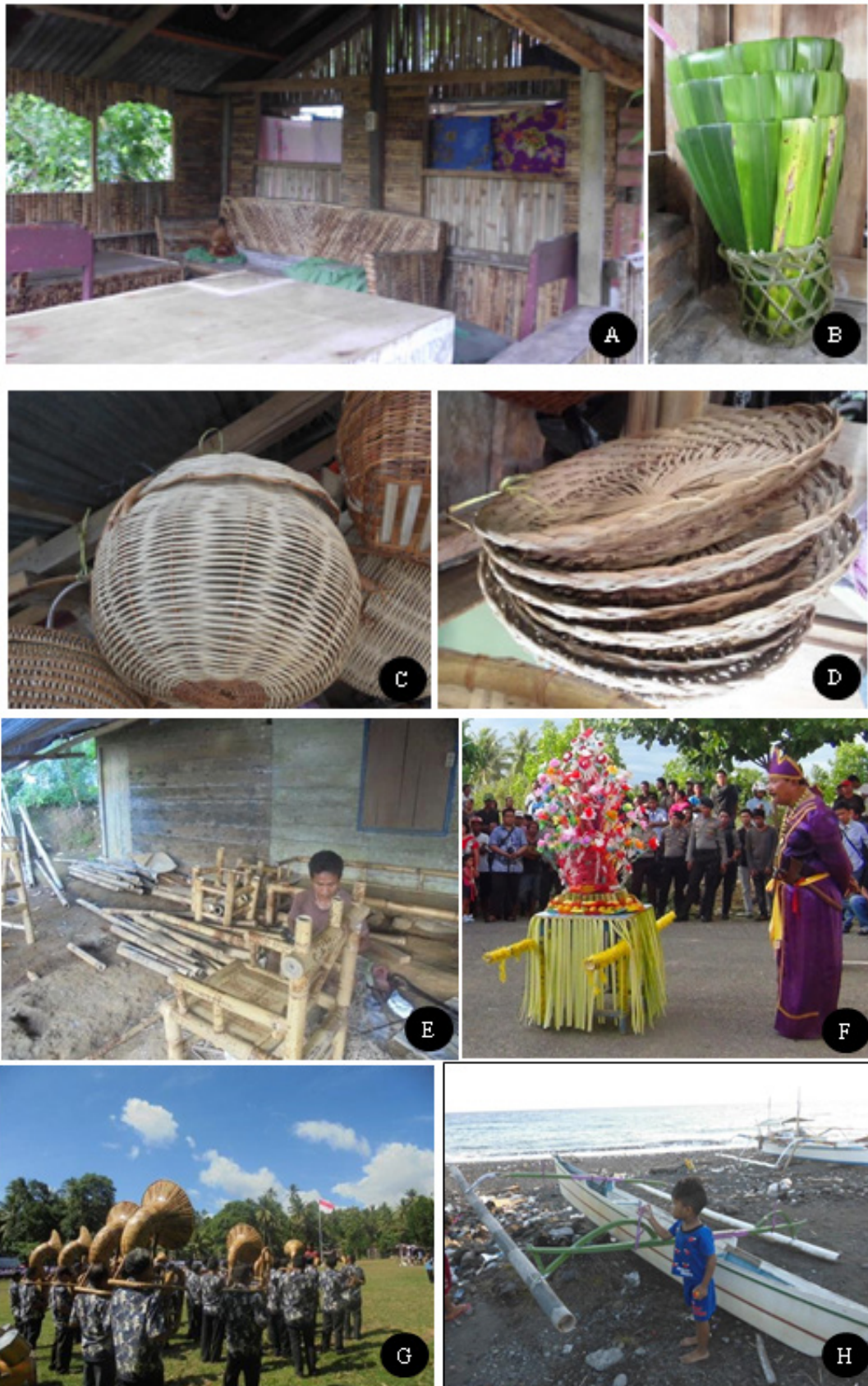


Figure 3. Utilization of Bamboo by Sangirese. A. Bamboo house; B. Sago container; C. basket; D. woven plate; E. Furniture material; F. *Tamo* cake carrier; G. The bamboo musical group displayed on independence day ceremony; H. culms as a counterweight to boats

Bambusa striata, and *Schizostacyum brachycladum* (yellow). In the past, Sangirese people use culms of *Nena* (*Neololeba atra*) as a medicinal herb container. Concoction of drugs is incorporated into the bamboo culms, then burned to then applied to the patient. Types of diseases that can be cured are unknown, since the authors did not manage to see any healer directly. In line with these findings, Shanti et al. (2014) in Surakarta find the declining trend level knowledge and use of traditional medicine by the people of a young age. Sangirese people also utilize *Bambusa striata* and *Schizostacyum brachycladum* (yellow) shoots for treatment of jaundice. In other regions such as Bali and West Java *Bambusa striata* is also used for the same purposes (Sujarwo et al., 2010; Handayani, 2015).

Food

Since ancient times, bamboo has been a food for the peoples of East and for animals. Bamboo leaves have a high nutritional value and is also food for grazing, favorite food of elephants. In the human diet, the young shoots (*Rebung*) are used in certain species and seeds (Chele, 2012). In Sangirese, young shoots of certain species of bamboo can also be processed into a vegetable. These include the types of *Bambusa striata* and *Gigantochloa atter*. Young bamboo shoots are cleared from the sheaths that cover its surface, the young white shoots are thinly sliced and boiled in boiling water. This vegetable is usually mixed with other vegetables, such as spinach, moringa, or sweet potato leaves. Today, Bamboo shoots are increasingly popular, not only in Asia but other markets around the world (Hunter, 2003).

Other uses

Sangirese people use *Bayut* (*Bambusa* sp.2) culms as a counterweight to boats owing to its strong, sea water resistant, and malleable characteristics called *Bahateng* (Figure 3H). They also utilize *Bambusa vulgaris* as fish aggregating device (FAD). FAD is amongst types of fishing tools installed in the sea, both shallow and deep sea. Installation of FAD is intended to attract schools of fish that gather around, so the fish can be easily caught. Several species such as *Bambusa striata* and *Schizostachyum brachycladum* yellow varieties are planted as ornamental. Both of these have shiny yellow culm. Result of research conducted by Arinasa (2005) in Bali also mentioned that people use both types of bamboo as an ornamental plant. Generally people take bamboo from the forest and replant in the house yard. The small diameter bamboos (e.g. *Bambusa* sp.1) are used as

bamboo toy gun.

CONCLUSION

There are nine groups of bamboo use obtained from 12 species of bamboo grown and cultivated by local community in Sangihe Island. Exploration results are expected to complement the data of bamboo ethnobotany in Indonesia. In application, this research is expected to be a reference in the national strategy of bamboo germplasm resource conservation. In further studies, we suggest to explore the potential of bamboo trade and future prospects as promotion tools of Indonesian cultures.

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