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Ethnobotany of plant in the mopat asam ritual of dayak limbai tribe, tanjung beringin village

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ABSTRACT

The Dayak Limbai tribe is one of the indigenous communities that still strongly uphold traditions and local wisdom in their daily lives. One such tradition is the *Mopat Asam* ritual, a customary ceremony related to pregnancy and the birth of a first child, which carries deep spiritual and social significance. Plants play an important role in this ritual, as they are believed to have symbolic, spiritual, and functional value. The purpose of this study is to identify the types of plants used and how they are utilized in the *Mopat Asam* ritual. This research was conducted using a descriptive qualitative method through survey techniques and data collection using interview sheets. Data analysis was carried out using a qualitative approach. The results of the study show that there are 18 plant species from 9 families used in the *Mopat Asam* ritual, with the Zingiberaceae family being the most dominant.

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INTRODUCTION

The Dayak tribe is one of the indigenous ethnic groups of Kalimantan. The Dayak people have diverse customs and traditions (Supiandi et al., 2021). They are a large ethnic group consisting of many subgroups with a wide variety of cultures (Indrayana et al., 2019). The Dayak are the native inhabitants of the island of Kalimantan and form the majority population. They are also one of the largest ethnic groups in West Kalimantan and are further divided into smaller sub-tribes (Arisandie, 2021). Thus, the Dayak can be understood as a large and diverse ethnic group. The Dayak people view culture as a way of life (Godensius & Lorensius, 2018; Lio, 2017). Because different Dayak groups possess their own unique cultural characteristics, it can be somewhat difficult to distinguish one from another. For example, they differ in clothing, ritual ceremonies, language, and even customary law. Culture is embedded in values and attitudes, as well as in customs, traditions, and perceptions of life, all of which directly influence socio-economic behavior (Sada et al., 2019). Culture also inspires them in responding to external challenges that may be unfamiliar to them, such as globalization, liberalization, and computerization. The Dayak community strongly preserves its traditions as a form of local wisdom.

Local wisdom is a humanities concept proposed to help restore civilization from the crises of modernity. It encompasses all forms of knowledge, beliefs, understanding, and ideas that continuously emerge and develop within a community, including customs, values, rules or norms, culture, language, beliefs, and daily practices (Pingge, 2017). Local wisdom is often regarded as a form of "true knowledge" in contrast to the standards of modern scientism. Conceptual ideas that live, grow, and develop continuously within a society's collective consciousness—approachable through religious, ethical, aesthetic, intellectual, as well as economic and technological values—are referred to as local wisdom (Wibowo, 2020). It is also understood as the noble values embedded in local cultural assets such as traditions and life philosophies. Thus, local wisdom can be defined as the ability to respond to and harness the potential of these noble cultural values in determining human dignity, which has become ingrained in a particular region (Widjono, 2016). Local wisdom functions in environmental conservation, ecosystem balance, and the sustainability of natural resources, and it also contains ethical values, moral principles, and behavioral guidelines that are important for human development (Nirmala, 2025; Rahayu, 2022). One of the Dayak sub-tribes that continues to preserve and uphold local wisdom is the Dayak Limbai tribe.

The Dayak Limbai tribe is administratively located in Pongga Baru Hamlet, Tanjung Beringin Village, Menukung District, Melawi Regency, West Kalimantan Province. The Dayak Limbai are one of the Dayak sub-tribes that still heavily depend on natural resources to meet their daily needs. Their daily activities are not merely about fulfilling basic needs, but are also an integral part of their cultural values. The Dayak Limbai community possesses a rich and unique cultural heritage. They have inherited extensive traditional knowledge from their ancestors, particularly regarding the various uses of plants. One form of this knowledge is the use of plants in the *Mopat Asam* ritual. The *Mopat Asam* ritual is a customary tradition practiced by the Dayak Limbai community in West Kalimantan, especially in Tanjung Beringin Village, Pongga Baru Hamlet. This ritual holds deep spiritual and social significance, particularly in relation to pregnancy and the birth of a first child. Literally, *Mopat Asam* means "picking sour fruit."

In the cultural context of the Dayak Limbai community, this ritual aims to lift taboos related to pregnancy and childbirth, to seek blessings and protection for the expectant mother and the unborn baby, and to maintain spiritual balance between humans and the universe. The ritual reflects a deep respect for life and emphasizes the importance of maintaining harmonious relationships with nature and ancestral spirits. The *Mopat Asam* tradition has been passed down through generations and continues to be practiced by the Dayak Limbai community. This ritual utilizes various types of local plants that carry symbolic meanings and play important roles in each stage of the ceremony. Knowledge about the use of these local plants is acquired by the community through inheritance from parents, as well as from relatives and others (Supiandi et al., 2019).

Ethnobotany is a field of study that examines the relationship between humans (ethnic groups/communities) and their interactions with plants (Mamahani et al., 2016). It provides an overview of the connection between a particular ethnic group and the use of plants that are beneficial in daily life. Ethnobotany explores how plants are utilized for everyday needs and studies the relationship between communities and their surrounding environment (Helisa et al., 2024). Various ethnic groups in Indonesia have long utilized plants in many aspects of their lives, including religious ceremonies, traditional customary rituals, engagement ceremonies, funeral rites, pregnancy rituals, and birth ceremonies. In addition, plants are used as medicinal ingredients, food sources (both as staple foods and cooking spices), clothing materials, and housing materials (such as building materials, household tools, and ornamental elements of homes), as well as for many other purposes (Aziz et al., 2018).

Ethnobotanical research in Kalimantan, particularly among Dayak communities, has been widely conducted. However, most studies still focus on (1) the use of plants as traditional

medicine, (2) food plants, and (3) their general use in daily life. Studies that specifically address the use of plants in the context of customary rituals especially the Mopat Asam ritual of the Dayak Limbai tribe remain very limited. Moreover, previous research tends to merely identify plant species without examining in depth (1) their symbolic meanings, (2) ritual functions, and (3) the cultural values embedded in their use. Therefore, there is a research gap in the documentation and comprehensive analysis of the relationship between plants and local customary ritual practices.

One of the ethnic groups that utilizes plants in traditional rituals is the Dayak Limbai tribe, located in Pongga Baru Hamlet, Tanjung Beringin Village, Menukung District, Melawi Regency. Ethnobotanical knowledge within Dayak communities is generally passed down from generation to generation through oral traditions. These oral traditions are often limited to specific family or community groups. In addition, each individual's ability to understand and apply the use of plants varies, resulting in differences in the knowledge passed down from one person to another.

In addition, social interaction between local communities and newcomers indirectly influences the customs and traditions brought by migrants from their regions of origin. Therefore, it is necessary to conduct ethnobotanical studies among migrant (transmigrant) communities to identify changes in their customs and traditions in new environments. Plants hold significant importance in local Indonesian ethnic groups, particularly in their use in various religious ceremonies (Hulyati et al., 2014; Helida et al., 2016; Anggraini et al., 2017; Ristanto et al., 2020; Sutrisno et al., 2020). The number and types of plants used in traditional ceremonies vary widely and often carry diverse symbolic meanings (Putri et al., 2014; Fauziah et al., 2017).

Several issues threaten the preservation of local wisdom within the Dayak Limbai community, including: (1) the transmission of local wisdom practices across generations primarily through oral traditions, (2) the influence of technological advancement and foreign cultures, and (3) increasing environmental degradation due to land clearing for industrial forestry, oil palm plantations, illegal logging, and shifting cultivation. These factors place the local wisdom of the Dayak community at risk. This situation contributes to the disruption of generational continuity in preserving Dayak cultural traditions, especially since documentation related to the use of plants in traditional ceremonies remains limited, and knowledge transfer is largely conducted orally (Sari & Cahyanto, 2024). Therefore, efforts are needed to raise awareness and encourage communities to preserve the environment and document existing traditions. Thus, a study is needed to maintain and preserve community knowledge of the *Mopat Asam* ritual among the Dayak Limbai in Pongga Baru Hamlet through the development of an ethnobotanical reference book on ritual plants.

RESEARCH METHODS

Research Design

This study employs a qualitative descriptive approach. A qualitative descriptive approach is used to describe phenomena or issues based on observations or experiences without relying on numerical data. This research focuses on gaining an in-depth understanding of the Dayak Limbai community regarding the plants used in the Mopat Asam ritual. The study was conducted in Pongga Baru Hamlet, Tanjung Beringin Village, using an exploratory descriptive method, which refers to observations where indicators of variables are derived from respondents' answers to questions given directly (Susanti et al., 2024). Primary data are data collected directly at the research location, namely in Pongga Baru Hamlet, Tanjung Beringin Village, in the form of interview results from respondents related to the types of plants used, the plant parts utilized, and the ways these plants are applied in the Mopat Asam ritual by the Dayak Limbai community. Meanwhile, the secondary data collected include information obtained from books or documents related to the research topic, which serve as complementary sources to the primary data.

Population and Samples

The sampling and data collection techniques in this study use the snowball sampling method. This is because the sampling process is based on information obtained from key informants, and from these key informants, additional informants are identified according to their level of knowledge. Snowball sampling is a method in which samples are obtained progressively, moving from one respondent to another. The informants in this study consist of key informants, main informants, and additional informants. Key informants are those who possess comprehensive information about the issues being studied; in this research, the key informant is the traditional leader. Main informants are individuals who have technical or detailed knowledge of the issues being studied and are directly involved in the observed social interactions; in this case, they are community leaders. Additional informants are individuals who provide supplementary information to complete data not obtained from key and main informants; in this study, they are elders who have knowledge of the Mopat Asam ritual.

Instruments

Data collection instruments are the methods or tools used by researchers to gather data. According to Raflin (2019), "research instruments are tools used to measure observed natural or social phenomena in order to obtain the required data." Instruments, as aids in applying data collection methods, can take the form of tangible objects, such as questionnaires, test devices, interview guidelines, observation guidelines, scales, and others. The instruments used in this study include: (1) interview sheets; (2) observation sheets; (3) a voice recording device; and (4) photographic documentation tools. The interview sheet was used to collect data related to the ethnobotany of plants in the Mopat Asam ritual, with research instruments consisting of question points and data recording sheets, in order to obtain the necessary information from informants in a systematic and comprehensive manner. The observation sheet was used to record activities during the research and what was found in the field while conducting the study. The observation notes obtained by the researcher were used to support the data related to the research being conducted. Audio recording devices and photographic documentation were used to support the interview process and field observation activities.

Procedures

This study was conducted from September 15 to October 8, 2025. The research implementation began with conducting interviews with informants who have knowledge about the plants used in the Mopat Asam ritual, starting from the key informant, followed by the main informants, and finally the additional informants over a period of 7 days. The first interview was conducted with the traditional leader, who serves as the community's customary head and the key informant. The second round of interviews involved four community leaders as the main informants. The third round of interviews was carried out with three elders as additional informants who are knowledgeable about the Mopat Asam ritual. In the following 7 days, field observations were conducted along with documentation of the plants used in the Mopat Asam ritual.

Data Analysis

Data analysis in this study uses a qualitative descriptive analysis technique. This analysis is a form of content analysis based on respondents' knowledge of the plants used in the Mopat Asam ritual. The data were obtained from interview results to identify the types of plants, the parts used, and the methods of utilizing these plants in the ritual. The formulas used to calculate the

percentage of plant families, the percentage of plant parts used, and the methods of utilization are as follows:

1. Percentage of plant families
   Ritual plants are grouped based on their families, and their percentages are then calculated using the following formula:

$$\frac{\Sigma \text{species of a particular family}}{\Sigma \text{species of all families}} \times 100\% \quad \text{(Qasrin dkk, 2020)}$$

2. Percentage of plant parts used
   The percentage of plant parts used is calculated using the following formula:

$$\frac{\Sigma \text{specific methods of utilization}}{\Sigma \text{total number of plants}} \times 100\% \text{ (Mulyani dkk, 2020)}$$

3. Percentage of methods of utilization
   The percentage of plant utilization methods is calculated using the following formula:

$$\frac{\Sigma \text{method of utilization}}{\Sigma \text{total number of utilization methodsn}} \times 100\% \text{ (Qasrin dkk, 2020)}$$

RESULTS

The results of interviews conducted with the Dayak Limbai community in Pongga Baru Hamlet, Tanjung Beringin Village, revealed 18 plant species belonging to 9 families that are used in the Mopat Asam ritual. The data on the identified plants can be seen in Table 1.

Table 1. Types of Plants Used in the Mopat Asam Ritual

No	Family	Scientific name	Plant name
1	*Famili Arecaceae*	*Cocos nucifera L.*	Kalok (Kelapa)
2		*Areca catechu* L.	Pinang (Pinang)
3		*Arenga pinnata* (Wurmb) Merr.	Onau (Aren)
4	*Famili Moraceae*	*Artocarpus heterrophyllus* Lam.	Nangkok (Nangka)
5	*Famili Myrtaceae*	*Psidium Guajava* L.	Jambu (Jambu Biji)
6	*Famili Pandanaceae*	*Pandanus tectorius* Parkinson	Same (Pandan Duri)
7	*Famili piperaceae*	*Piper Betle* L.	Sirih (Sirih)
8	*Famili Poaceae*	*Oryza sativa* L.	Boas ulu (Beras)
9		*Oryza sativa* L. *var glutinosa*	Boas Pulot (Beras Ketan)
10	*Famili Solanaceae*	*Capsicum frutescens* L.	Angki (Cabai Rawit)
11	*Famili Uncinata*	*Ficus uncinata* (King) Becc	Timau (Entimau)
12	*Famili Zingiberaceae*	*Etlingera elator* (Jack) R.M.Sm.	Tekalo (Kecombrang)
13		*Zingiber Officinale* Roscoe	Liok (Jahe)
14		*Hornstedtia scyphifera* (J.Koenig) Steud.	Asam Senggang (Senggang)
15		*Hornstedtia conica* Ridl.	Asam Pokih (Pining Bawang)
16	-	-	Lengkan
17	-	-	Asam Tanah
18	-	-	Asam Gintang

The family with the highest diversity identified is Zingiberaceae, consisting of 4 plant species with a percentage of 22.22%. Meanwhile, the Arecaceae family consists of 3 plant species used, accounting for 16.67%. The Moraceae, Myrtaceae, Pandanaceae, Piperaceae, and Uncinata families each consist of 1 plant species. The plant parts utilized based on the interview results can be seen in Table 2.

Table 2. Plant Parts Used

No	Plant name	Parts Used	Plant photo
1	Kalok (Kelapa)	Fruits, flowers, and inflorescences	
2	Pinang (Pinang)	Fruits	
3	Onau (Aren)	Sugar	
4	Nangkok (Nangka)	Fruits	
5	Jambu (Jambu Biji)	Fruits	

No	Plant name	Parts Used	Plant photo
6	Same (Pandan Duri)	Leaves	
7	Sirih (Sirih)	Leaves	
8	Boas ulu (Beras)	Seeds	
No	**Plant name**	**Parts Used**	**Plant photo**
9	Boas Pulot (Beras Ketan)	Seeds	
10	Angki (Cabai Rawit)	Fruits	
11	Timau (Entimau)	Fruits	

No	Plant name	Parts Used	Plant photo
12	Tekalo (Kecombrang)	Fruits	
13	Liok (Jahe)	Fruits	
14	Asam Senggang (Senggang)	Fruits	
15	Asam Pokih (Pining Bawang)	Fruits	
16	Lengkan	Fruits	
17	Asam Tanah	Fruits	

No	Plant name	Parts Used	Plant photo
18	Asam Gintang	Fruits	

The most commonly used plant part is the fruit, with 13 instances accounting for 72.22%. Leaves and seeds are each used in 2 species, with a percentage of 11.11%, while flowers and inflorescences are each used in 1 species, with a percentage of 5.55%. Furthermore, the results of interviews regarding the methods of utilizing spice plants can be seen in Table 3.

Table 3. Methods of Utilizing Plants in Ritual Practices

No	Plant name	Plant uses	Method of utilization
1	Kalok (Kelapa)	Coconut fruit is used as decoration for the jar (tempayan) storage area, coconut flowers are used as an ingredient for rujak, and coconut inflorescences are used as a measuring container for sacred palm wine (tuak pemali).	Methods of coconut utilization: • Coconut fruit: First, prepare one bunch of coconuts, then tie the coconuts to a spear. The coconuts are used as decoration for the storage area of the jar (tempayan) containing sacred palm wine (tuak pemali). Next, prepare an adequate amount of young coconut, take the soft flesh, and mix it to be used as an ingredient for rujak. • Coconut flower: Prepare and wash the young coconut flowers thoroughly, then mix them into the rujak ingredients and pound them using a mortar and pestle. • Coconut inflorescence (flower cluster): Cut the inflorescence, take the pointed part, and use it to measure the palm wine after the tuak pemali jar has been opened.
2	Pinang (Pinang)	Its function is as a decoration for the jar (tempayan) storage area.	Harvest a bunch of areca nut (betel nut), tie it, and hang it on a prepared spear. The areca nut is used as decoration for the storage area of the jar (tempayan) during the Mopat Asam ritual. The areca nut is hung close to the coconut.
3	Onau (Aren)	The function of palm sugar is as a mixture ingredient in rujak.	Palm sugar that has been prepared is mixed into the rujak ingredients, which are then ground using a mortar and pestle.
4	Nangkok (Nangka)	The function of young jackfruit is as an ingredient for rujak in the Mopat Asam ritual.	Prepare an adequate amount of young jackfruit, wash it thoroughly, and cut it into several pieces. Then mix it into the rujak ingredients, which will be ground using a mortar and pestle.

5	Jambu (Jambu Biji)	The function of guava fruit is as an ingredient for rujak in the Mopat Asam ritual.	Prepare an adequate amount of guava. Cut the guava into several parts so that it can be easily crushed during the grinding process. Then, wash the prepared guava thoroughly and mix it into the rujak ingredients, which will be crushed using a mortar and pestle.
6	Same (Pandan Duri)	Thorny pandan is processed into mats, and once the mats are made, they are used as wrappers for rujak ingredients in the Mopat Asam ritual.	Prepare an adequate amount of thorny pandan as needed and clean the thorns along the edges of the leaves. After everything is cleaned, dry the pandan leaves under the sun until they turn yellowish-brown. Once they have turned yellowish-brown, use a thumb-sized round stick to soften the leaves so they do not become stiff during weaving. Weave the leaves into a mat, then use the mat as a container for storing *asam* during the Mopat Asam ritual.
7	Sirih (Sirih)	Betel leaves are used as decoration for the jar (tempayan) containing sacred palm wine (tuak pemali).	Harvest an adequate amount of betel leaves, then neatly arrange and combine the harvested leaves. Tie the betel leaves together using a string, and then attach the tied leaves to a spear. The betel leaves are used as decoration for the storage of *asam*. After the ritual is completed, the betel leaves are distributed to those who wish to have them and are consumed together with areca nut and lime, a practice known as *meminang* by the people of Pongga Baru Hamlet.
8	Boas ulu (Beras)	Rice is used as a reward for the person who opens the jar (tempayan) of sacred palm wine (tuak pemali).	One gantang of rice is stored in a medium-sized basin. After the ritual ceremony is completed, the rice is immediately given to the person who opened the sacred palm wine (*tuak pemali*) during the Mopat Asam ritual. The rice is given as a form of reward for the person who opened the *tuak pemali*.
9	Boas Pulot (Beras Ketan)	Glutinous rice is used to make palm wine (tuak) and also as a reward for the person who opens the jar (tempayan) of sacred palm wine (tuak pemali).	The method of utilizing glutinous rice (*pulut/ketan*) in the Mopat Asam ritual is generally as a reward for the person who opens the sacred palm wine (*tuak pemali*), amounting to one gantang, as well as an ingredient for making *tuak pemali*. To make *tuak pemali*, the process is as follows: take a sufficient amount of clean glutinous rice and wash it with water. Dry it until it is completely dry, then boil water and add the glutinous rice into the boiling water. Stir until the rice is cooked. Once cooked, reduce the heat and let it sit for a moment. After that, allow it to cool. Once cooled, sprinkle yeast evenly over the cooked glutinous rice. Next, place it in a covered container and leave it for 2–3 weeks. After it begins to release liquid, separate the liquid from the residue using a filter. Then store the fermented glutinous rice liquid in a jar (*tempayan*).

			The people of Pongga Baru Hamlet call this product *tuak pemali*. *Tuak pemali* is one of the most important components that must be present in the Mopat Asam ritual process.
10	Angki (Cabai Rawit)	Bird's eye chili is used as an ingredient mixed into rujak to give it a spicy taste.	Prepare an adequate amount of bird's eye chili, remove the stems, and wash the chilies with clean water. Then mix them with all the rujak ingredients, which will be ground using a mortar and pestle.
11	Timau (Entimau)	The fruit *timau* is used as an ingredient for rujak in the Mopat Asam ritual.	Prepare an adequate amount of *entimau* fruit. The quantity is not specifically determined. Wash the prepared *entimau* fruit thoroughly, then add and grind it together with the other ingredients. The number of *entimau* fruits also depends on how many are obtained by the person assigned to collect the materials used in the ritual ceremony.
12	Tekalo (Kecombrang)	Torch ginger flower (*kecombrang*) is used as an ingredient for rujak in the Mopat Asam ritual.	Prepare an adequate amount of torch ginger (*kecombrang*) fruit. Peel the skin of the prepared torch ginger, then wash it thoroughly. Mix it with the other rujak ingredients and grind it using a mortar and pestle. The amount of torch ginger used usually depends on how many fruits are obtained by the person assigned to collect the rujak ingredients for the Mopat Asam ritual.
13	Liok (Jahe)	Ginger is used as a mixed ingredient in rujak in the Mopat Asam ritual.	The method of utilizing ginger in the Mopat Asam ritual is as follows: prepare a small amount of ginger. The prepared ginger is then added in small quantities and mixed into the rujak ingredients, which will be ground using a mortar and pestle.
14	Asam Senggang (Senggang)	The fruit of *asam senggang* is used as an ingredient for rujak in the Mopat Asam ritual.	The method of utilizing *senggang* fruit in the Mopat Asam ritual is as follows: prepare an adequate amount of *senggang* fruit. Peel and wash the fruit thoroughly, then mix it with the other prepared rujak ingredients and grind it using a mortar and pestle.
15	Asam Pokih (Pining Bawang)	The fruit *pining bawang* is used as an ingredient for rujak in the Mopat Asam ritual.	The method of utilizing *pining bawang* fruit in the Mopat Asam ritual is as follows: prepare an adequate amount of *pining bawang* fruit. Peel and wash the fruit thoroughly, then mix it with the other prepared rujak ingredients and grind it using a mortar and pestle.
16	Lengkan	The fruit *lengkan* is used as an ingredient for rujak in the Mopat Asam ritual.	The method of utilizing *lengkan* fruit is as follows: pick the fruit from the tree, wash it thoroughly to remove its sap, then mix and grind it together with the other rujak ingredients using a mortar and pestle.
17	Asam Tanah	The fruit *asam tanah* is used as an ingredient for rujak in	The method of utilizing *asam tanah* fruit in the Mopat Asam ritual is as follows: prepare an adequate amount of *asam tanah* fruit. Peel and wash

		the Mopat Asam ritual.	the fruit thoroughly, then mix it with the other prepared rujak ingredients and grind it using a mortar and pestle.
18	Asam Gintang	The fruit *asam gintang* is used as an ingredient for rujak in the Mopat Asam ritual.	The method of utilizing *asam gintang* fruit in the Mopat Asam ritual is as follows: prepare an adequate amount of *asam gintang* fruit. Peel and wash the fruit thoroughly, then mix it with the other prepared rujak ingredients and grind it using a mortar and pestle.

Based on Table 3, the most common method of use is by pounding, applied to 11 plant species (61.11%). Other methods include being consumed directly, fermented into beverages, eaten as *rujak*, and hung on spears as decorative elements in the ritual.

DISCUSSION

The results of interviews and field observations with respondents from the Dayak Limbai community in Pongga Baru Hamlet, Tanjung Beringin Village, Melawi Regency, identified 18 ritual plant species from 9 families. The most commonly found families are Arecaceae and Zingiberaceae. The Arecaceae family consists of 3 plant species, while the Zingiberaceae family consists of 4 plant species. The Arecaceae family is widely utilized by the community because these plants can grow well in various habitats, thus having high availability (Silvia et al., 2017).

The Dayak Limbai community utilizes these plant species because almost all of them can be used as materials in rituals. The sources of plants used in the Mopat Asam traditional ritual ceremonies among the Dayak Limbai community are obtained from home gardens, while some grow wild in forests and are also cultivated. This indicates that the local community and customary leaders have cultivated plants used in the Mopat Asam ritual ceremony. Most community members cultivate these ritual plants around their residences to make them easier to obtain. Many plants can be used as traditional medicine and are easily accessible, as they are usually found in the surrounding environment, cultivated, or grow wild in forests (Radam et al., 2016). Some plants are obtained from around the house, through cultivation, or from wild growth in forests (Purwanti, 2017; Helida, 2016).

The Dayak Limbai community, during the Mopat Asam traditional ceremony, utilizes plant parts such as leaves, fruits, flowers, inflorescences, and seeds. The most widely used plant part in the Mopat Asam ritual is the fruit. In traditional ceremonies, plant parts used include roots, stems, leaves, fruits, flowers, seeds, tubers, and leaf sheaths (Rahyuni et al., 2013). Previous studies have explained various reasons why communities use plant parts such as stems, leaves, fruits, and seeds. These uses are based on several factors, including knowledge passed down from ancestors or elders, the easy availability of these plant parts, and their presence in forests, although not in large quantities. In addition, harvesting these plant parts does not cause the plant to die. Stems function to transport water and nutrients and serve as storage for food substances, thus containing beneficial compounds for the body (Sofiah, 2014). Sukmawati et al. (2013) and Sujarwo et al. (2016) also stated that leaves are easily obtained, serve as sites for photosynthate accumulation that can help treat diseases, and have a soft structure that makes them easy to process (Lestaridewi et al., 2017).

Each plant used in the Mopat Asam traditional ceremony has different methods of utilization. For *Kalok* (Cocos nucifera L.), one bunch of coconuts is prepared and tied to a spear. The coconuts are used as decoration for the storage area of the jar containing *tuak pemali*. Young coconuts are then prepared; their soft flesh is taken and mixed to make rujak (*semparik*). Coconut flowers are washed thoroughly, mixed into the rujak ingredients, and pounded using a mortar and

pestle. The coconut inflorescence is cut, and its pointed part is used to measure *tuak* after the *tuak pemali* jar is opened.

For *Onau* (Arenga pinnata), palm sugar is mixed into the rujak ingredients before being ground using a mortar and pestle. For *Nangkok* (Artocarpus heterophyllus Lam.), young jackfruit is prepared, washed, cut into pieces, and mixed into the rujak before grinding. For guava (*Psidium guajava L.*), an adequate amount is prepared, cut into pieces to make it easier to crush, washed thoroughly, and then mixed into the rujak ingredients for grinding. Betel leaf (Piper betle L.) is utilized by harvesting an adequate amount of leaves. The leaves are then neatly arranged and combined, tied using a string, and attached to a spear. The betel leaves are used as decoration for the storage area of *asam*. After the ritual is completed, the leaves are distributed to those who wish to have them and are consumed together with areca nut and lime, a practice known as *meminang* by the people of Pongga Baru Hamlet.

Boas ulu (Oryza sativa L.), one gantang of rice is stored in a medium-sized basin. After the ritual is completed, the rice is directly given to the person who opened the sacred palm wine (*tuak pemali*) during the Mopat Asam ritual. The rice serves as a reward for opening the *tuak pemali*. Boas pulot (Oryza sativa L. var. glutinosa) is used in two ways. First, it is given as a reward of one gantang to the person who opens the *tuak pemali* jar. Second, it is used as an ingredient for making *tuak pemali*. The preparation process involves cooking the glutinous rice until done, cooling it, then sprinkling yeast evenly over the cooked rice. The mixture is placed in a covered container and left for 2–3 weeks. After fermentation produces liquid, it is separated from the residue using a filter. The fermented liquid is stored in a jar (*tempayan*) and is called *tuak pemali* by the people of Pongga Baru Hamlet. This beverage is one of the most important components required in the Mopat Asam ritual.

Angki (Capsicum frutescens L.) is prepared in small amounts. The chilies are separated from their stems, washed with clean water, and then mixed into the rujak ingredients to be ground using a mortar and pestle. Timau (Ficus uncinata (King) Becc.) is prepared in an unspecified quantity. The fruits are washed thoroughly and then added and ground together with other rujak ingredients. The amount depends on how many are collected by the assigned gatherer for the ritual materials. Tekalo (Etlingera elatior (Jack) R.M.Sm.) is prepared by peeling the skin of the torch ginger, washing it thoroughly, and mixing it into the rujak ingredients before grinding with a mortar and pestle. Its use depends on the amount collected by the person assigned to gather ingredients. Liok (Zingiber officinale Roscoe) is used in small quantities and mixed into the rujak ingredients before being ground. Asam senggang (Hornstedtia reticulata (K. Schum.) K. Schum.) is peeled, washed, and then mixed into other rujak ingredients before grinding. Asam pokih (Hornstedtia conica Ridl.) is prepared in sufficient quantity, peeled, washed, and mixed with other rujak ingredients before being ground using a mortar and pestle. Lengkan is harvested from the tree, washed to remove its sap, and then mixed and ground together with other rujak ingredients. Asam tanah is prepared in sufficient quantity, peeled, washed, and mixed into other rujak ingredients before being ground. Asam gintang is prepared in sufficient quantity, peeled, washed, and then mixed into other rujak ingredients before grinding.

The utilization of plants by pounding them in the Mopat Asam ritual has symbolic, practical, and spiritual meanings that are important in the culture of the Dayak Limbai people. Fruits in the Mopat Asam ritual are not merely crushed for practical use but also symbolize purification, sacrifice, self-transformation, and respect toward spiritual powers, ancestral spirits, and fellow community members. The most common processing method used by the people of Pongga Baru Hamlet is pounding. Based on previous research conducted on the Dayak Limbai community, this is supported by Purwanti (2017), who states that plants used in traditional rituals

are processed by boiling, grinding, consuming directly, made into containers, or placed directly on trays according to the needs of each ritual ceremony.

CONCLUSION

The plants used in the Mopat Asam ritual among the Dayak Limbai community consist of 18 species from 9 families, namely coconut (*Cocos nucifera* L.), areca nut (*Areca catechu* L.), sugar palm (*Arenga pinnata*), jackfruit (*Artocarpus heterophyllus* Lam.), guava (*Psidium guajava* L.), thorny pandan (*Pandanus tectorius* Parkinson), betel leaf (*Piper betle* L.), rice (*Oryza sativa* L.), glutinous rice (*Oryza sativa* L. var. glutinosa), bird's eye chili (*Capsicum frutescens* L.), entimau (*Ficus uncinata* (King) Becc.), torch ginger (*Etlingera elatior* (Jack) R.M. Sm.), ginger (*Zingiber officinale* Roscoe), asam senggang (*Hornstedtia scyphifera* (J. Koenig) Steud.), pining bawang (*Hornstedtia conica* Ridl.), lengkan, asam tanah, and asam gintang. The use of these plants is based on several reasons, including knowledge that has been passed down through generations from elders or ancestors, the easy availability of these plant species, and the fact that although some are found in forests, they are not abundant. In addition, harvesting these plant parts does not cause the plant to die. The Dayak Limbai community utilizes plant parts such as leaves, flowers, fruits, and inflorescences in the Mopat Asam ritual. The most commonly used plant part is the fruit. Plants used in the ritual are generally processed by pounding. This research has direct benefits for both society and education. In terms of local preservation, the Mopat Asam ritual and the use of plants can continue to be maintained as cultural heritage. With regard to natural resource conservation, knowledge about plants encourages the community to preserve the plants used in the ritual. Ultimately, it is hoped that people will become more aware of the important value of plants in their surrounding environment. This is in line with findings that the Limbai Dayak community still utilizes plants as part of their daily life and traditions.

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