

Perception and Appreciation of the Tumpang Village Community towards the Representation of Flora Diversity in the Relief of the Jago Temple

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Abstract

Flora in reliefs is a unique form of biodiversity. This study aims to identify the flora reliefs found on the Jago Temple, examine the symbolic meaning of the flora reliefs, and measure perception and appreciation ratio of flora reliefs by the local community at Tumpang Village. The method used is exploratory descriptive through initial exploration, observation of flora reliefs at Jago Temple, species inventory and symbolic meanings, identification of plant species using plant descriptor and verification with digital tools, as well as semi-structured interviews with 30 respondents divided into three groups, young (17-30), adults (31-45), and elderly (46-60) to determine perceived values and appreciation. A total of 15 plant species were identified, while some remain unidentified. Areaceae was the dominant family, and not all of the species have a specific meaning in Javanese culture or Buddhism. The public's perception and appreciation of the representation of flora diversity in the reliefs of Jago Temple range from 73.33%-89.58%. The highest levels of perception and appreciation were found among the younger age group.

Keywords: Biological Diversity; Species Diversity; Indigenous; Ecosystem; Resource Footprint

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INTRODUCTION

Cultural and historical wealth of the past including that of the Hindu-Buddhist kingdoms, has a great historical, artistic, and functional value. Temples in Indonesia represent significant cultural heritage, serving as architectural representations of ancient civilization (Yatno, 2022). According to Aji (2018), temples are categorized as religious buildings or places of worship that serve as representations of the deities' abodes. Temples are found throughout various regions, including Sumatra and Java; the Muara Takus Temple is one of the temples located in the Sumatra region (Ayeris and Herwindo, 2023). In the Java region, there are at least hundreds of temples scattered from West Java to East Java (Sedyawati *et al.*, 2013).

Jago Temple is one of the temples located in East Java, a relic of the Singosari Kingdom associated with Tantrayana Buddhism. According to Soelistyanto (2024), based on the *Sang Hyang Kamahayanikan* text, evidence dating back to the 10th century indicates that the religious background of Jago Temple was not purely Mahayana Buddhism, but rather Tantrayana Buddhism, which aligns with the strong influence of Tantrayana, which flourished in the Singosari Kingdom (Soedirman, 1997). Jago Temple, which follows Tantrayana Buddhism has ties to the Shaivite (Hindu) community. Adhitama (2023) stated that Buddhists held Shaivites in such high regard that the temple's reliefs depict Buddhists and Shaivites living side by side.

The temple reliefs consist of panels, with each telling a different story. In addition to depicting stories related to past lives, they are adorned with various decorative motifs, including flora and fauna. Setyawan (2022) said that floral relief motifs, such as mangoes, bananas, and coconuts often adorn temple reliefs. However, each temple has flora reliefs with distinct characteristics and meanings tied to the depiction of each floral relief. These meanings are categorized into symbolic and non-symbolic interpretations, reflecting the actual natural surroundings of the past (Setyawan and Kasatriyanto, 2019). Some depictions are based on Old Javanese texts that carry symbolic meanings (Lutfiani *et al.*,

2024), while others can only be interpreted as decorative or non-symbolic elements influenced by the environment (Istari, 2012), to enhance the beauty of the structure (Atmosudiro *et al.*, 2018).

Floral reliefs, whether carved with symbolic or non-symbolic meanings, have been used by people both in the past and present. The utilization of plants is defined as the use of plants by communities (Karina, 2022). Research by Khoir and Adiani (2025) demonstrates that vine-like floral motifs from the Majapahit era were utilized for the development of batik patterns. This is supported by Mulyanto *et al.*, (2024) observation that Old Javanese texts mention vine-like plants, such as betel, being used by local communities to treat fever. All uses of plants by local communities fall under the field of ethnobotany, which studies the relationship between humans and plants.

Ethnobotanical research examining the relationship between humans and plants through local knowledge systems has gained importance in cultural preservation efforts (Hakim, 2014). Local knowledge, defined as accumulated experiences passed down through generations (Pilgrim *et al.*, 2018), plays a crucial role in environmental conservation. However, research by Yofani (2010) identified 81 floral reliefs at Jago Temple that remain unidentified, and previous studies have primarily focused on species identification without exploring the ethnobotanical dimensions of reliefs flora and community perceptions (Lestari *et al.*, 2026).

The gap in this research exists in understanding the relationship between temple floral reliefs and local community knowledge, particularly regarding how communities perceive and utilize plants depicted in ancient temple reliefs. Previous research conducted on Borobudur Temple and Mendut Temple, documented floral species with varying results 18 species at Borobudur temple (Setyawan and Kasatriyanto, 2019); 40 species at Mendut temple (Fahrurrozi *et al.*, 2024); and 63 species in Borobudur's Lalitavistara panel (Metusala *et al.*, 2020). Research has shown that floral reliefs encompass both symbolic meanings related to Hindu-Buddhist cosmology, such as lotus flowers representing cosmic creation (Nizam *et al.*, 2018) and non-symbolic decorative functions (Istari, 2015).

Previous research has focused solely on identifying the flora depicted in temple reliefs. Data on the identification of flora in temple reliefs is readily available, but very little has been documented regarding the public's perceptions and appreciation of the flora depicted. Furthermore, the data collected can provide insights into the availability of flora in the local community, especially the local community living near the temple and the floral reliefs. This study aims to identify the flora reliefs found on the Jago Temple, examine the symbolic meaning of the flora relief, and measure perception and appreciation ratio of flora reliefs by the local community at Tumpang Village.

MATERIALS AND METHODS

This was descriptive exploratory research with a quantitative approach. The descriptive method is used for the identification of plant relief using plant descriptors, followed by verification using *Plants of the World Online* (POWO) and *Tropicos*. Analysis of symbolic and non-symbolic meanings was obtained based on relevant journals and interview results with local communities, while the quantitative approach is used to measure the percentage value of people's perceptions and appreciation of flora species carved on the reliefs of Jago Temple.

The research was conducted in Jago Temple and Tumpang Village, Malang Regency. The village selection was based on the location of Jago Temple. The research was conducted in September 2024-July 2025. The map of the research area was drawn using *ArcGIS 10.8*. The Jago Temple building measures 23x14 meters. The area of Tumpang Village based on data from the Central Bureau of Statistics is 72.09 km² with population of 12.000 (Figure 1) the red area represents the Tumpang Village area. The picture of Jago Temple from three sides with information about reliefs (Figure 2).

This study focuses on the research findings regarding the diversity of floral reliefs at Jago Temple, the symbolic meaning of the floral reliefs, and the knowledge of the local community around Jago Temple. Flora reliefs can be observed on the walls of Jago Temple, Tumpang Village, while local knowledge, namely appreciation and perception, is obtained from open and semi-structured interviews with three key informants consisting of temple caretakers with background work experience on different historical sites also respondents from community consisting of 30 people.

Research participants were selected using *purposive sampling* method, this is intended so that the research gets informants who match the predetermined criteria. There are two categories of informants in the interviews conducted, namely key informants and non-key informants. Key informants were selected based on criteria, knowing the history and utilization of flora carved on the reliefs of Jago Temple. Non-key informants include the people of Tumpang Village with age criteria divided into three

age classes 17-30 years (young); 31-45 years (adults); and 46-60 years (elderly). Age limits were applied to compare the knowledge of one age class with another age class.

Referring to the research by Indah *et al.* (2021), it is assumed that 17 years old is the minimum age and 60 years old is the maximum age for someone to have local knowledge about diversity of plant species depicted on the reliefs of Jago Temple. The key informants determined in this study are the three caretakers of Jago Temple, village officials, and community leaders who can provide information on how the diversity of flora on the reliefs on the walls of Jago Temple.

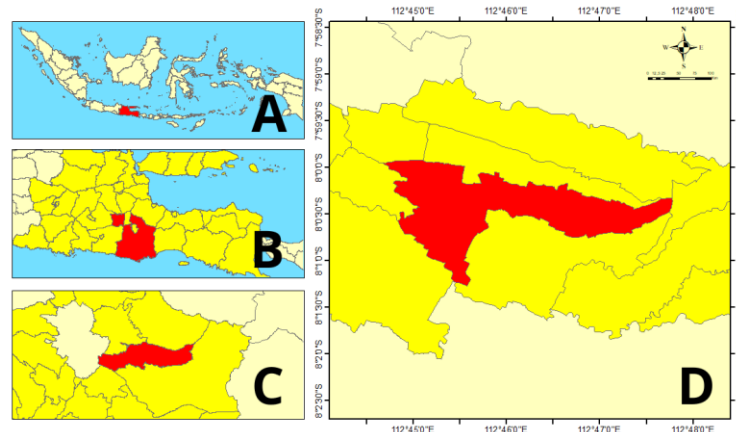


Figure 1. Research Map of Tumpang Village A) Tumpang Village from Indonesia Map; B) Tumpang Village from East Java Map; C) Tumpang Village from Malang Map; D) Tumpang Village from Sub-District Map

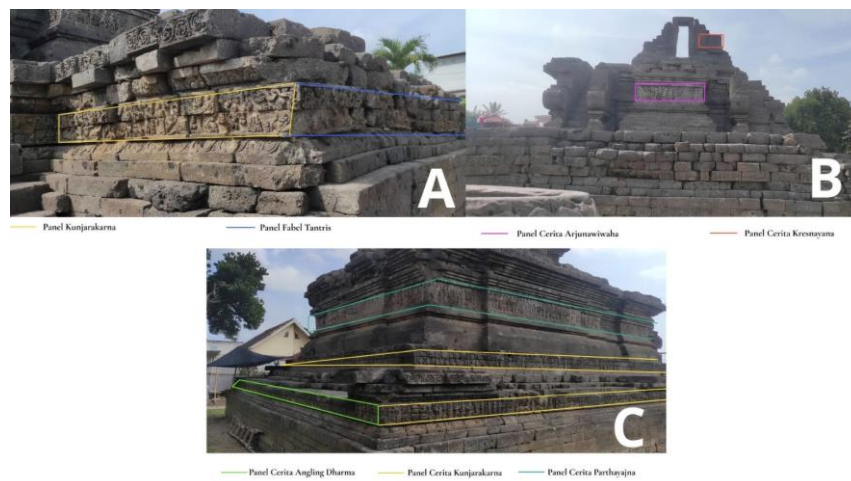


Figure 2. Views of Jago Temple from Various Angles A) Front; B) Back; C) Side.

The results of the questionnaire were processed into percentage data with the lowest answer value being 1 and the highest answer value being 3. Then the weighting is calculated using formula (1) (Witjoro *et al.*, 2016). Perception and appreciations scores were categorized in percentage form after being calculated using formula (1), as shown in (Table 1)

$$\sum_i^n \frac{x \cdot k}{n \cdot k^{max}} \quad (1)$$

In which:

- x : Number of respondents in one answer choice
- k : Weight of answer
- n : Total number of respondents
- k^{max} : Highest answer weight

The scale of response given by respondents can be categorized as follows:

1. Agree/ Neutral/ Disagree → 3/2/1
2. Responses in the form of percentages

Table 1. Categories of Perception and Appreciation Values in Percentage Form

Percentage (%)	Description
80-100%	Very Good
65-79%	Good
51-64%	Neutral
40-50%	Bad
< 40%	Very Bad

RESULTS

Based on interviews conducted with 30 local residents of Tumpang Village regarding the floral reliefs carved on the walls of Jago Temple, the respondents can be summarized into several categories based on the demographic data presented in (Table 2).

Table 2 Local Community Demographic Data

	Categories	Frequency	Percentage (%)
Gender	Male	21	70.0
	Female	9	30.0
Age (years)	Young (17-30)	12	40.0
	Adult (31-45)	10	33.3
	Elderly (46-60)	8	26.7



Figure 3. Plant species successfully identified on the reliefs of Jago Temple A) *Areca* sp.; B) *Pandanus tectorius*; C) *Musa* sp.; D) *Nymphaea*; E) *Pandanus* sp.; F) *Zamia* sp.; G) *Myristica*; H) *Artocarpus heterophyllus*; I) *Arenga pinnata*; J) *Durio* sp.; K) *Pinus* sp.; L) *Anacardium occidentale*; M) *Cocos nucifera*; N) *Ficus* sp.; O) *Ceiba pentandra*

Based on demographic data (Table 2), it was found that there were younger respondents than older respondents. This may be due to the fact that younger generations are easier to find. The flora diversity on Jago Temple reliefs was identified by several characteristics or character markers that can be found on plants, consisting of plant organs such as leaves, fruits, and stems. Photographs of the inventoried plants are presented (Figure 3), and the identified species are listed (Table 3). The inventory of flora reliefs at Jago Temple, recorded 20 species of which only 15 could be identified through distinctive characters or character markers, such as fruit, leaves, and flowers (Table 3). The other 5 species plants could not be identified, because the reliefs have been worn by age, leaving the flora unclearly depicted.

Table 3 Inventory Results of Flora Reliefs in Jago Temple that can be identified

Scientific Name/ Family	Local Name	Description	Place on Panel of Relief
<i>Areca</i> sp./ Arecaceae	Jambe	Stem is erect and hairy, fruit is located at the apical part of the stem, fruit is arranged in bunches, leaf shape is fingered	Kunjarakarna, Parthayajna, Arjunawiwaha, Angling Dharma
<i>Pandanus tectorius</i> / Pandanaceae	Pandan Hutan	Stem erect without branches, wavy leaf shape, round shape fruit	Kunjarakarna
<i>Musa</i> sp. / Musaceae	Pisang	Upright stem shape, lanceolate oval leaf shape, banana flower shape like a heart, banana fruit arranged in bunches or combs	Kunjarakarna, Parthayajna, Arjunawiwaha, Angling Dharma
<i>Nymphaea</i> sp. / Nymphaeaceae	Lotus	The flower crown is composed of layers.	Kunjarakarna, Angling Dharma
<i>Pandanus</i> sp. /Pandanaceae	Pandan	Erect stems, stems with nodes, lanceolate leaf shape with opposite phyllotaxis, leaf tips tend to be pointed	Kunjarakarna, Parthayajna., Arjunawiwaha
<i>Zamia</i> sp./ Zamiaceae	Zamia	Erect stems, hairy stems, oval leaf shape, upright leaves towards the top, there is a reproductive structure namely the strobilus, which has microsporophylls	Parthayajna
<i>Myristica fragrans</i> / Myristicaceae	Pala	Upright stem, oval leaf shape, round fruit shape located on the left and right sides, open fruit like Nutmeg plant	Parthayajna
<i>Artocarpus heterophyllus</i> / Moraceae	Nangka	Upright stem shape, oval leaf shape, elongated fruit shape with few thorns	Parthayajna
<i>Arenga pinnata</i> / Arecaceae	Aren	Stem shape is upright, leaf shape is oval, fruit is located apically, fruit arrangement is the form of bunches and looks downwards	Parthayajna
<i>Durio</i> sp./ Malvaceae	Durian	Upright stem, oval leaf shape with tapered tip and pinnate leaf venation, round fruit shape with spines	Parthayajna
<i>Pinus</i> sp./ Pinaceae	Pinus	The trunk is straight, leaves are needle-shape. This species may be reidentified and reclassified. Not as pine, but as a plant with pine-like characteristics.	Parthayajna
<i>Anacardium occidentale</i> / Anacardiaceae	Jambu Mete	Leaf shape oval to ovate, there are two fruits on one stalk, round fruit shape	Parthayajna
<i>Cocos nucifera</i> / Arecaceae	Kelapa	Erect stems, stems with nodes, elongated lanceolate leaf shape, round fruit shape	Kunjarakarna, Parthayajna, Angling Dharma
<i>Ficus</i> sp. / Moraceae	Beringin	Upright stem, oval to ovate leaf shape	Parthayajna
<i>Ceiba pentandra</i> / Malvaceae	Kapuk	The stem is straight and woody, with oval-shaped fruit containing white cotton.	Kunjarakarna

According to the inventory data of 15 species could be identified based on distinctive characters or character markers, and the plants were categorized by the panel on which they are found, followed by determination of the species and family name of each plant. The most flora reliefs were inventoried from the *Parthayajna* story panel, with a total of 12 plant species from 9 different families, the second highest number is found in the *Kunjarakarna* panel with 7 plant species from 5 different families, followed by *Angling Dharma* with 4 species from 3 families. The fewest flora reliefs are found on the *Arjunawiwaha* panel with 3 species from 3 different families (Table 3).

The plants that have been successfully identified not only serve as decorative elements on temple walls, but can also have special meaning or symbolic meanings in Javanese culture or Buddhist teachings. Of the 15 species inventoried on the reliefs of Jago Temple, three have special symbolic meaning in Javanese culture and Buddhism. The first is *Cocos nucifera*, based on the interviews with key informants, coconuts are still used by the local community until today, while in Javanese culture coconut is used in wedding ceremonies. *Areca* sp is a plant whose uses are almost equal to coconut, this plant was used by the Javanese in the past as a tooth strengthener, doing *nginang* (betel chewing). The last is *Nymphaea*, an aquatic plant that is commonly carved on temple reliefs, especially Buddhist temples. Lotus symbolizes of purity and chastity.

Not all plants have specific philosophical meaning in Buddhism, Javanese beliefs, and beliefs that develop in society. This was also conveyed during interviews with key informants, that the plants carved on the reliefs could be just a symbol of the prosperity of a kingdom or are useful plants that are utilized by the community. This statement related to the perception (Figure 4) and appreciation (Figure 5) of the community with the data obtained from the interviews with informants.

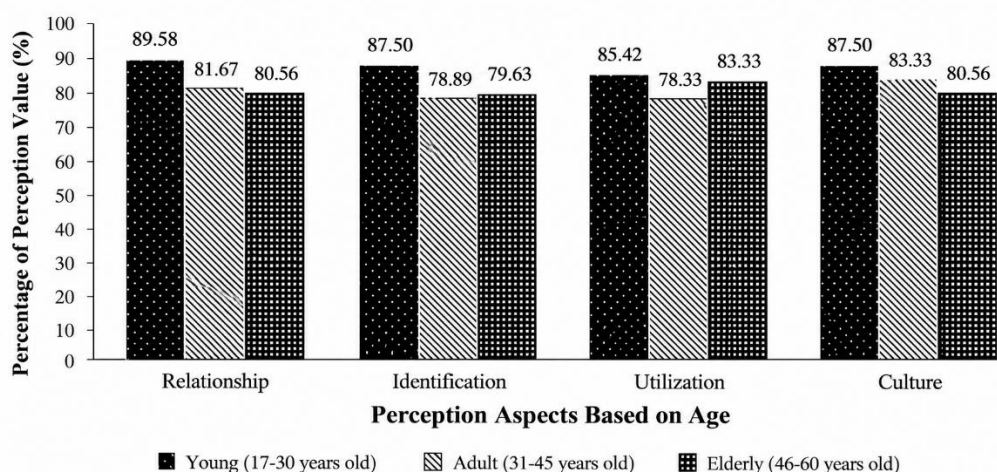


Figure 4. Percentage of Perception Aspects Based on Age

Perception percentages differ by age, from young people to the elderly. Across the four perception aspects, young people had a higher percentage of positive perception than the elderly. Aspect perception of the relationship between Jago Temple and the community, has the highest percentage can be found at young age which range 17-30 years old with a percentage of 89.58%. The lowest percentage is 46-60 years old with a percentage of 80.56%. Second perception aspect is plant identification, the highest percentage can be found at age of 17-30 years old with a percentage 87.50% and the lowest percentage at the age of 31-45 years old with a percentage 78.89%. Third aspect of perception is about the utilization of plants with 17-30 years old of age having the highest percentage of 85.42% and 31-45 years old of age having the lowest percentage of 78.33%. The aspect of culture, how stories about Jago Temple are passed down from previous parents with the highest percentage of 87.50% aged 17-30 years old and the lowest percentage of elderly 46-60 years old with a percentage of 80.56% (Figure 4).

Appreciation is described by three aspects, knowledge, availability, and involvement. The data show differences among the young, adult, and elderly age groups in their appreciation of the flora reliefs of Jago Temple. For the knowledge aspect the highest percentage was found in the young group (17-30 years old) at 85.42% and the lowest in the elderly group (46-60 years old) at 80.56%. For the availability aspect, the adult group (31-45 years old) had the highest percentage (81.67%), while the elderly group had the lowest (76.39%). For the involvement aspect the young group had the highest

percentage (83.33%), whereas adult (73.33%), and elderly (73.61%) group had similar, lower values. (Figure 5).

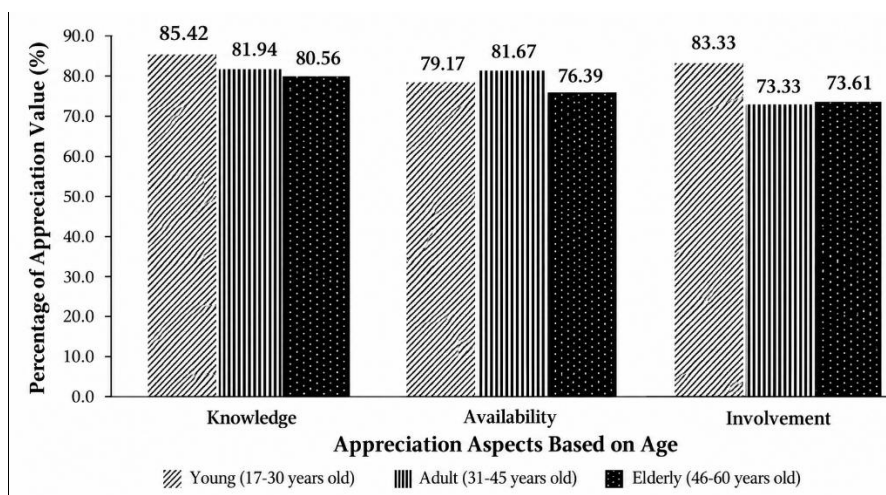


Figure 5. Percentage of appreciation aspects based on age range

DISCUSSION

Based on the results of research conducted at Jago Temple and Tumpang Village, Malang Regency, the relief flora carved on Jago Temple was successfully inventoried with a total of 20 plant species belonging to 10 families. The diversity of flora carved on the reliefs of Jago Temple shows the condition of the surrounding environment at that time. Evidence that the relief is a representation of the surrounding environment can be seen if the coconut and areca nut tree carvings on the reliefs are still found around the temple or Tumpang Village. This is reinforced by Kieven's (2022) research that temple reliefs depict natural elements not only as a background, but also reflection of the biodiversity and ecosystems that existed around the temple at that time.

Temple reliefs also represent the utilization carried out by the previous community. Suripto and Pranowo (2001) stated the existence of flora and fauna reliefs carved on the temple's walls can implicitly describe that some types of plants or animals have been utilized before as human's needs. So, both flora and fauna carved on temple reliefs are useful plants to be utilized by the community.

The results showed that the Arecaceae family became the most commonly found family, in addition *Areca* sp (areca nut) and *Cocos nucifera* (coconut) became the dominant plant species in each panel contained in the Jago Temple reliefs. Silvia *et al.* (2017) mentioned that since a long time ago people have used the Arecaceae family as food, medicine, building materials, and are involved in customs and rituals. The Arecaceae family is a family where all plant organs can be utilized, such as coconut which is called a *thousand-use tree* because of the trunk to the fruit can be utilized. Wardah (2003) expressed the same thing if the community utilizes the Arecaceae family starting from the roots, stems, leaves, flowers, to fruit.

Temple reliefs are related closely to the beliefs of the community, both those that developed from the community or those that became spiritual teachings at that time. It is not uncommon for carvings on temple reliefs to have their own meaning, such as the character Arjuna or the flora reliefs found. In line with Lelono (2004) the symbolic meaning carved on the relief can be in the form of plants, animals or humans, such as rice carved on the relief is intended to symbolize fertility and prosperity. Based on the research results, the depiction of many plants on the *Angling Dharma* panel when entering the initial story is intended to show a kingdom that is *gemah ripah loh jinawi* or a prosperous kingdom and its people live in peace.

Areca nut plants are plants that were used by the previous community to eat and are believed to maintain the strength of teeth, besides that in Javanese culture areca nuts are plants used in traditional ceremonies as a symbol of acceptance and unity (Nayuf, 2022). Coconut or what the community calls a thousand-use tree whose entire plant organs can be utilized by the community. Coconut also has a deep meaning in Javanese culture and Buddhism. Coconut in Javanese culture is generally used in wedding ceremonies, has a philosophy of attachment and respect (Mayastuti *et al.*, 2024). Until present people still use coconut for cooking or medicinal purpose, according to research from Ediriweera (2003) the

leaves from coconut can be used as medicine for allergies. Also in Buddhism coconut is a symbol of sacred rituals (Giambelli, 2021).

Lotus flowers are one of the aquatic plants commonly found in Buddhist temple sculptures or reliefs, even though they grow in mud. Lotus flowers are sacred in Buddhism, because they have virtues that are not possessed by other plant flowers in general (Paramadhyaksa, 2016). Not just have beautiful meaning behind that, in summary Lotus have natural antioxidants that can be potential for bioproduct into economically valuable product (Huang *et al.*, 2025)

In the perception statement, there are points regarding the utilization of plants that have been identified from the flora relief of Jago Temple. It was not significant difference between three age classes, young, adult, and elderly age. The young age group has a positive response compared to the older group consistently in the four aspects of perception that have been answered, including the relationship between Jago Temple and the community, plant identification, plant utilization, and culture. Differences in perception can be caused by both internal and external factors, such as changes in lifestyle, modernization, knowledge, and experience (Pangestu and Indah, 2024). The high perception value of young people is also based on the fact that older people are quite difficult to find in Tumpang Village. In addition, communicating with older people and providing them with new information is considered quite challenging (Dwiyanti and Rinanto, 2022). Older people will refuse to be interviewed because they consider the new information provided is incomprehensible.

The difference of perception looks sharp in the aspect of the relationship between Jago Temple and the community where this aspect includes knowledge, the 17-30 years old age group reached 89.58% while the age of 46-60 years old only ranged 80.56%. This can be influenced by the knowledge gained by the younger generation, not only from parents or schools but also other media considering the rapid development of information. The statement is supported by Chen (2021) that social media is one of the vital platform for information disseminating related to temples, reliefs, and plants so that young people are more likely to access and share this info.

The community appreciation aspect is not that much different from the perception aspect, there is no significant difference between young and old age. The young age group tends to have a higher appreciation than the old age group in the three main aspects of appreciation that have been described, such as the relationship between Jago Temple and the community, the relationship between plants and the community, and community involvement in preservation. This can occur when the younger generation is accustomed to living in an environment that maintain traditional knowledge, in line with explanation that traditional knowledge is passed down through generations (Ludwinsky *et al.*, 2020).

The difference of appreciation is seen in the aspect of community involvement in the involvement of maintaining Jago Temple, including the preservation of plant species carved on the story panel at three levels of knowledge, care, and processing. The research data obtained by the 46-60 years old age group mostly answered only at the knowledge level, while the 17-30 years old age group mostly answered the processing level. Knowledge points are only limited to telling about related plants, if processing widens to plant utilization. This can occur because the spread of information of the younger generation is faster, but does not eliminate hereditary knowledge compared to the spread of information of the older generation (Prakofjewa *et al.*, 2024). The development of local knowledge by the younger generation and the older generation also has differences. Older generation focuses on basic uses. Then, the younger generation puts the focus point on innovation, so that the young generation's processing appreciation graph is higher than the older generation (Kunwar *et al.*, 2018).

The difference in perception and appreciation between the younger generation and the older generation towards Jago Temple and its carved flora reliefs can be a challenge as well as a way to preserve knowledge to the younger generation. The challenges faced such as the oblivion of traditional values and more visible modern values because the younger generation sometimes forgets the deep values in traditional knowledge, in line with the statement (Makarov and Shalin, 2024) that the younger generation may not understand the symbolic and spiritual meaning of traditional values. The younger generation may also consider traditional values as limiting and irrelevant to today's modern world (Fahrudin, 2021), even though the younger generation has higher local knowledge than the older generation (Cao and Kong, 2004).

Tumpang Village is not only a village where Jago Temple is located, but a village that has local knowledge, namely the perception and appreciation of the younger generation. Moreover, Jago Temple has diverse flora reliefs. This must continue to be preserved, because local knowledge could be experiencing erosion and become a global phenomenon caused by modernization (Wardah and Emma,

2020). Thus, the preservation of local knowledge is not only important from a cultural perspective but also in relation to plants that are utilized by the community.

CONCLUSION

Based on research that has been conducted, an inventory at Jago Temple identified 20 plant species depicted in reliefs, belonging to 10 families; of these, 15 species could be identified and 5 species are unidentified. The Arecaceae family was the most commonly found, with the species *Areca* sp. An analysis of the symbolic meaning of the floral reliefs at Jago Temple shows that not all floral reliefs have specific symbolic meaning, some are merely decorative. The research findings show that the level of perception and appreciation amongst the residents of Tumpang Village ranges from 73.33%- 89.58%, with the highest levels of perception and appreciation found among the young group (17-30 years old).

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CONFLICT OF INTEREST

There is no conflict interest

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