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Article

Ethnobotany in Javanese Traditional Wedding Decorations: An Interdisciplinary Study between Culture and Science Education (Biodiversity Conservation) in Madiun

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ABSTRACT

Ethnosocioscience is an approach that bridges between traditional community practices and scientific concepts in science learning. In the context of Javanese culture, many local wisdom-based practices have the potential to be reconstructed into science education, one of which is the use of plants in traditional wedding decorations. This study aims to identify ethnosocioscience practices that are still sustainable in Tulung Village, Madiun Regency, and reconstruct traditional knowledge of the community related to ornamental plants and their symbols into scientific concepts of science. The method used was qualitative with an ethnographic approach, through direct observation, interviews with traditional leaders and the community, and literature study. The results showed that there are various types of plants such as jasmine, kenanga, pandanus, and janur that are used symbolically and ecologically in the wedding procession. Community knowledge about the function and meaning of these plants can be reconstructed into scientific concepts such as morphology, classification, and secondary metabolites. This integration shows the great potential of ethnosocioscience as a science learning approach that is contextual, relevant and full of cultural values.

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INTRODUCTION

Ethnobotany originates from the terms “ethno,” referring to the study of culture, and “botany,” which relates to plants. As an interdisciplinary field, ethnobotany is fundamentally defined as the systematic study of the complex and multidimensional relationships between people and the plant world around them (Anggraini et al., 2018). Ethnobotany does not only focus on the inventory of plant species used but also deeply examines how traditional communities understand, classify, utilize, and manage plant resources in various aspects of life. This study includes local knowledge about plant identification, life cycles, habitats, and ecological interactions, as well as how this knowledge is transmitted between generations and the role of plants in belief systems, cosmology, and the social, economic, and cultural life of communities (Nursita et al., 2020).

The main focus of ethnobotany lies in a comprehensive understanding of knowledge systems that have developed cumulatively within traditional communities through empirical

experience and cultural transmission. The use of plants encompasses basic needs such as food, clothing, and shelter, as well as more specific functions such as traditional medicine, handicrafts, natural dyes, insecticides, and elements of rituals and customary ceremonies. In traditional contexts, plants are not only of practical value but also hold symbolic, spiritual, and historical meanings. The choice of plant species, methods of use, and timing and setting of use are often governed by customary norms believed to influence the success and meaning of the ceremony (Mustakim et al., 2022).

Ethnobotany plays an important role in revealing the connections between biodiversity and the wealth of cultural knowledge and practices. This study not only documents plant use but also reveals the social, cultural, economic, and spiritual dimensions of the human–nature relationship. In traditional societies, knowledge about plants is an integral part of cultural identity, reflected in language, folklore, art, rituals, and systems of natural classification (Suarka & Bawa, 2023). The loss of ethnobotanical knowledge due to social and environmental change can lead to the extinction of parts of a community’s cultural heritage. Specifically, ethnobotany is highly relevant in examining cultural practices involving plants, including traditional wedding ceremonies. Such ceremonies are often rich in symbolism and incorporate plant elements in decorations, offerings, and processions. Through an ethnobotanical approach, one can understand the reasons behind choosing certain plant species, their symbolic meanings, and how this knowledge is passed down through generations. For example, in Javanese traditional weddings, jasmine and cempaka kantil flowers are commonly used because of their fragrance, shape, and spiritual meaning. Ethnobotanical studies can also explore whether these plants are cultivated or taken from the wild, and what customary rules regulate their use (Mustakim et al., 2022).

In Javanese traditional weddings, the use of plants in decoration is not merely an aesthetic element but represents tradition, cultural values, and spirituality. Plants are arranged in distinctive ways to create visually meaningful settings. For instance, janur kuning (young coconut leaves) are often used as symbols of prosperity and protection. Jasmine flowers symbolize purity and the family’s good name, while roses and kenanga flowers represent love and household happiness. Pandan leaves are believed to bring freshness and ward off negative energy. Elements such as puring leaves, andong plants, and various fruits and seeds are also used to add symbolic and visual dimensions to the decoration. Traditional wedding decorations in Javanese culture hold rich ethnobotanical knowledge. The selection of plant species, arrangement techniques, and placement in space reflect people’s understanding of plant morphology, ecology, and symbolic meanings. The Javanese have a distinctive system of plant classification and nomenclature, allowing them to choose plants that align with aesthetic needs and cultural values.

Knowledge of plants in this context can also be integrated into science (IPA) education. Ethnobotanical studies provide opportunities to connect abstract scientific concepts with concrete and locally relevant cultural contexts. For example, plants used in traditional decorations can serve as tangible examples for learning about living-organism classification, plant morphology, ecology, and utility. Learning activities can involve direct observation, identification of scientific and local names, chemical analysis, and understanding the relationship between plant structure and function.

Studying plants in traditional wedding decorations also opens insights into biodiversity conservation issues. It is necessary to identify the conservation status of the plants used and to understand whether they are cultivated, harvested from the wild, or purchased from markets. If

harvested from the wild, it is important to assess whether the practice is sustainable and non-destructive to habitats. This ethnobotanical study can also serve as an effective medium for conservation education, using culture as an entry point for conveying environmental preservation messages. In this way, communities can become aware that the sustainability of cultural practices depends on the preservation of nature. This approach can also rediscover local wisdom in managing natural resources, which can serve as inspiration for modern conservation strategies (Suarka & Bawa, 2023).

The purpose of this article is to comprehensively examine ethnobotanical practices in Javanese traditional wedding decorations as a manifestation of local wisdom that holds educational and conservation values. This study aims to document the types of plants used, understand their symbolic meanings, and explore the potential for integrating ethnobotanical knowledge into science and conservation education. Thus, the results of this study are expected to make a real contribution to cultural preservation, the strengthening of local wisdom-based education, and the contextual development of biodiversity conservation strategies.

METHOD

This study is a qualitative research employing an ethnographic approach, conducted in Tulung Village, Saradan District, Madiun Regency. The ethnographic approach is used to describe the cultural characteristics of individuals or groups within a community (Hanurawan, 2016:88; Johnson & Christensen, 2004). This methodology, rooted in anthropology, aims to understand the complexity of society and its culture, particularly in relation to the use of plants in Javanese traditional wedding decorations and the values of biodiversity conservation. The techniques used include interviews with local traditional leaders, observations, and literature studies related to ethnobotany, biological conservation, and science education (IPA). The study also adopts an interdisciplinary approach to integrate cultural aspects with science learning in a holistic manner.

The selection of Tulung Village, Saradan District, Madiun Regency as the research site was based on its distinctive local culture, which still strongly preserves the tradition of using local plants as decorations in Javanese traditional wedding ceremonies. The village is located at coordinates -7.598755, 111.707642.



Geographically, the village lies in a hilly area with a humid tropical climate, fertile soil, and diverse vegetation, supporting the growth of various plant species used in local traditional practices. Socially, the people of Tulung Village continue to uphold ancestral traditions and maintain a strong social structure, particularly in cultural preservation, such as the use of plants in Javanese wedding ceremonies. The combination of supportive ecological conditions and deeply rooted social values makes this village a tangible example of the integration between local wisdom and the potential application of scientific knowledge, especially in the context of conservation and environment-based education.

The research process began with observations of traditional wedding decorations, followed by data collection through observation, interviews, and literature review. Data were analyzed using Spradley's ethnographic approach, which includes four stages: domain analysis, taxonomic analysis, componential analysis, and cultural theme analysis. The results were then interpreted to understand the symbolic meanings, conservation values, and their relevance to science education (IPA), which were subsequently formulated into conclusions and recommendations for cultural preservation and contextual education.

RESULT AND DISCUSSION

This research was conducted in Tulung Village, Dagangan District, Madiun Regency, over a period of two months (March 21 – April 4, 2024). The selection of Tulung Village as the research site was based on two main considerations. First, this village is one of the few areas that still preserves traditional Javanese wedding customs in their authentic form, including the use of local plant elements in decorations such as young coconut leaves (janur), jasmine (melati), ylang-ylang (kenanga), plantain (pisang raja), and pandan leaves (pandan). Second, the local community has an active cultural organization that continues to preserve traditions through rituals, communal activities, and youth training programs, making the village a representative site for studying ethnobotany-based local wisdom and its relevance to biodiversity conservation education.

Interviews with the village elder (Mr. Suyud, 72 years old) revealed that traditional wedding decorations in Tulung Village have been maintained through generations. He explained that the use of tarub, kembar mayang, blarak sempal, and kembang setaman is not merely for aesthetic purposes but also holds symbolic and spiritual meanings. For instance, tarub made from young coconut leaves (janur) symbolizes prayers for a peaceful and harmonious household. Kembang setaman, composed of jasmine, rose, and ylang-ylang flowers, represents purity, sincerity, and affection. Meanwhile, kembar mayang symbolizes the balance between male and female elements, representing harmony within family life. This view aligns with Prawiroatmodjo (1986) and Lestari (2012), who argue that each plant used in Javanese traditional ceremonies carries profound philosophical and spiritual meanings and functions as a symbolic medium reinforcing social and religious values.

Furthermore, an interview with a traditional wedding makeup artist (Mrs. Sarmiani, 54 years old) revealed that although modernization has influenced decoration practices such as the introduction of synthetic materials—the people of Tulung Village continue to use natural materials. She stated, “We still make tarub from janur and use fresh flowers because they are not only beautiful but also carry blessings. If we use plastic, it feels like we lose the spirit of the tradition.” Some residents even cultivate the plants themselves, such as jasmine and ylang-ylang, in their home gardens as a form of community-based plant conservation. This demonstrates a local conservation initiative that not only preserves the existence of traditional plant species but also safeguards indigenous knowledge regarding their symbolic and practical uses.

Additionally, interviews with local residents, such as Mrs. Ratmi (40 years old), reinforced these findings. She explained that replanting traditional plants is carried out collectively before the wedding season or major cultural events. Villagers often use their home gardens to grow traditional plants such as plantain, pandan, and coconut, which serve multiple purposes as ceremonial materials, food sources, and medicinal plants. This reflects a form of ecological and economic conservation, consistent with Haryanto (2020), who noted that

ethnobotany serves not only a symbolic function but also has ecological, social, and economic values that strengthen the cultural resilience of local communities.

From a conservation perspective, the people of Tulung Village practice in-situ conservation, maintaining traditional plants within their natural habitats through continuous replanting in home gardens and communal areas near the village hall, where cultural events are held. In addition, a simple form of ex-situ conservation exists through the creation of a local herbarium by the village youth association (karang taruna) in collaboration with local science teachers at the elementary school. This herbarium serves as an educational tool for children, illustrating the synergy between cultural preservation and contextual science education.

However, modernization has brought changes, such as the use of synthetic materials and practical decoration services, even though the symbolic meanings are still preserved. The younger generation has begun to be involved in these traditions through customary activities and community-based education.



Figure: Ethnobotanical Elements in Javanese Traditional Wedding Decorations, Madiun Regency
Source: Personal Documentation

Interviews also revealed that despite the influence of modernization, the people of Tulung Village continue to preserve traditional elements, particularly in customary events that uphold ancestral heritage, such as wedding ceremonies. Modernization has indeed introduced shifts like the adoption of synthetic materials and practical decoration services yet the symbolic essence remains intact. The involvement of the younger generation through traditional rituals and community-based learning ensures continuity of these practices.

This phenomenon corresponds with Rahayu (2015), who noted that Javanese society engages in “cultural accommodation,” maintaining the substance of tradition while adapting to contemporary times. Based on the theory of cultural constructivism, it is evident that the people of Tulung Village actively construct and sustain traditional meanings through contextual adaptation to modern change. Furthermore, the cultural ecology perspective is also reflected in the community’s efforts to conserve traditional plants that hold symbolic, ecological, and economic significance. The community’s awareness of the sustainability of these traditional

plants demonstrates an integration between culture and the environment that coexist in a functional and harmonious manner.

Tabel 1. Jenis Tumbuhan yang Digunakan pada Upacara Adat Jawa

No.	Nama Ilmiah	Nama Tanaman Lokal	Bagian yang Digunakan	Kegunaan
1.	Jasminum sambac	Jasmine	Flowers 	Bridal hair ornament, jasmine arrangement symbolizing purity and love 
2.	Cananga odorata	Ylang-ylang	Flowers 	Natural fragrance, representing the scent and purity of love 
3.	Musa paradisiaca	Banana / Plantain	Leaves , Fruits , banana blossom , and Trunk 	As a base and decoration for <i>janur</i> (young coconut leaves). Banana plant, symbolizing fertility and steadfastness 
4.	Cocos nucifera	Coconut	Leaves (<i>janur</i>) 	Yellow <i>janur</i> ornament, symbolizing life's struggles and blessings 
5.	Pandanus amaryllifolius	Pandan / Screwpine	Leaves 	As a decoration and natural room fragrance 
6.	Areca catechu	Areca Palm / Betel Nut	Fruits and Leaves	Symbol of loyalty and maturity in marriage

7.	Oryza sativa	Rice Plant	Malai padi 	As a symbol of prosperity and hope for a sufficient life
8.	Michelia champaca	Champaca / Champak Flower	Flowers 	As a room fragrance and a symbol of beauty and nobility
9.	Codiaeum variegatum	Croton	Leaves 	As a decorative element that enhances spirit, color, and visual beauty in flower arrangements, <i>janur</i>, or wedding spatial design. 
10.	Cordyline fruticosa	Ti Plant / Good Luck Plant	Leaves 	As a marker for the ceremony area, decoration for gates or entrances, and a decorative element conveying sacredness, strength, and protection. 

Tabel 2. Rekonstruksi Ilmiah Etnobotani Upacara Adat Jawa

No.	Pengetahuan Masyarakat	Pengetahuan Ilmiah
1.	Highly respected in Javanese tradition, symbolizing purity, elegance, and fragrance. Often used in bridal flower arrangements and traditional ceremonies. Its distinctive aroma is believed to be calming and uplifting..	In jasmine plants, the part used is the flower. The flower is a reproductive organ that produces nectar and fragrance to attract pollinating insects. In the context of Javanese traditional wedding decorations, jasmine flowers are used in bridal arrangements and ceremonies because they provide a distinctive calming aroma. The fragrance comes from volatile compounds such as linalool. The white petals reflect light, enhancing visual appeal to pollinators.
2.	The community believes that ylang-ylang flowers in traditional wedding decorations can radiate the fragrance of the soul, gentleness of heart, and affection for the couple.	Ylang-ylang flowers produce essential oils containing terpenoid compounds that attract insects for pollination. The strong fragrance aids the pollination process by drawing insects. Its compound flower structure increases efficiency in attracting pollinators. Due to its distinctive scent, ylang-ylang flowers are also used as natural fragrance in traditional wedding <i>siraman</i> ceremonies.
3.	In traditional wedding processions, the community believes that using banana leaves and stems as part of the decorations symbolizes fertility and steadfastness in the couple's married life.	The broad and large banana leaves enhance photosynthetic efficiency. Its stem is not a true stem but a pseudostem composed of leaf sheaths, functioning as a storage for water and nutrients.

4.	Considered by the community as a symbol of hope, luck, and prosperity in marriage. The yellow color represents happiness and success. Its flexible and easily shaped form symbolizes adaptability and resilience in married life.	<i>Janur</i> refers to young leaves that have not undergone lignification (cell wall hardening). Their flexible structure makes them easy to shape and suitable for weaving into wedding decorations (<i>umbul-umbul</i>). Coconut is also a monocotyledonous plant with parallel leaf structure and primary growth. 
5.	Used for its fragrant aroma and fresh impression. In some traditional contexts, pandan is also associated with good fortune and positive energy. It is often woven into various decorative forms.	Pandan leaves contain aromatic compounds, which also give a distinctive scent to rice. Physiologically, pandan leaves have stomata and chloroplasts for photosynthesis, as well as vascular tissues (xylem and phloem).
6.	Areca nuts and their leaves hold symbolic meaning in various Javanese traditional ceremonies, including weddings. Areca nuts are believed to symbolize unity and prosperity, while the areca leaf (<i>janur</i>) represents hope and goodness.	Areca nuts contain alkaloid compounds that stimulate the nervous system. Its leaves function in photosynthesis. This plant has a tall single stem, showing primary growth with apical meristem tissue.
7.	Rice panicles are believed to symbolize fertility, prosperity, and abundant sustenance for the newlyweds. The abundance of rice grains represents hope for many offspring and a life of continuous prosperity.	A rice panicle is a structure that carries rice grains (true fruits), resulting from pollination and fertilization. Rice is a monocotyledonous plant that uses photosynthesis to produce energy (glucose) stored in the seeds (rice grains).
8.	The community believes that champaca flowers symbolize beauty and sincerity and are often used as bridal hair ornaments.	Champaca flowers produce essential oils from secretory cells in the petals and corolla, which can aid plant pollination. The flower's color and fragrance play an important role in plant reproduction.
9.	Known for its colorful and attractive leaves (red, green, yellow). In decorations, croton (<i>puring</i>) is often used to enhance energy and visual beauty. Symbolically, it is believed to represent diversity in life.	The rhizome plant (<i>puring</i>) is a dicotyledon. Its colorful leaves are caused by various pigments such as chlorophyll (green), carotenoids (yellow, orange), and anthocyanins (red, purple). Color intensity can be influenced by environmental factors such as sunlight. The leaf structure consists of epidermis, mesophyll, and vascular bundles like other dicots. The sap of some <i>puring</i> species contains chemical compounds that serve as a defense mechanism.
10.	Ti plant leaves (<i>andong</i>) are often used as markers or boundaries in traditional ceremonies. Some communities believe that the red color of <i>andong</i> leaves carries strong symbolic meaning, often associated with courage and protection.	Ti plant (<i>andong</i>) belongs to monocotyledons. Its leaves have an elongated structure with parallel veins. The red color in some varieties is caused by anthocyanin pigments contained in the leaf cells. This plant has good adaptability to various environmental conditions. Due to its attractive and diverse colors, <i>andong</i> leaves are often used as decorative plants for the bridal stage or wedding entrance decorations.

This study reveals that the traditional Javanese wedding decorations in Tulung Village are not merely an expression of cultural aesthetics but also serve as a medium for transmitting social values, collective identity, and a harmonious relationship between humans and nature. Amid the tide of modernization, the local community has been able to preserve traditional

elements through a process of selective adaptation, demonstrating that tradition is dynamic and capable of transformation without losing its essence (Lestari & Sutarno, 2019).

In the educational domain, ethnobotany-based local wisdom holds great potential to be integrated into Science (IPA) learning, particularly in topics related to ecosystems, biodiversity, and ethnoscience. This interdisciplinary approach enables students to understand the biological functions of plants within their cultural context, fostering both ecological awareness and pride in their traditional heritage (Pranata & Aryani, 2018; Hidayat, 2017). Through the Merdeka Curriculum, the strengthening of local values can be implemented through various activities such as collaborative projects, herbarium development, and direct observation of plants used in cultural practices (Suwondo et al., 2018).

The preservation of deeply rooted regional culture is a collective responsibility that requires innovative approaches without eroding its essential values. One strategic step is to integrate this local wisdom into the education of younger generations. In this context, strengthening the concept of biodiversity can be achieved by introducing traditional plant species such as janur kelapa (young coconut leaves), jasmine, kenanga, betel leaves, and pisang raja and linking them to topics on biological classification and ecosystems. Environmental-based learning with a contextual approach is also crucial, allowing students to directly observe plants used in traditional ceremonies, thereby making science learning more meaningful.

Furthermore, the conservation of traditional plants can be implemented through simple science projects such as herbarium creation, school gardens, or local seed banks, as well as the compilation of traditional flora catalogues to preserve indigenous knowledge. Scientific experiments can also be conducted to explore the chemical properties and benefits of traditional plants, such as testing the antibacterial properties of betel leaves or extracting essential oils from kenanga flowers, which are relevant to lessons on secondary metabolites and natural food technology. In addition, character education can be developed by instilling environmental awareness and cultural appreciation through the philosophy embedded in traditional plant use.

From an interdisciplinary perspective, integration between Science, Social Studies, and Local Language can be achieved by connecting the biological functions of plants with their symbolic and social meanings. For instance, jasmine may not only be studied morphologically as a flower but also understood as a symbol of purity in cultural tradition. Learning can also be developed through thematic projects under the Merdeka Curriculum (P5) with themes of local wisdom and sustainable living, such as documenting traditional plants or creating educational videos. Collaboration between schools and local communities is vital to strengthen contextual learning, for example by inviting traditional leaders as guest speakers or organizing field visits to customary ceremonies. Ultimately, the integration of modern scientific knowledge with local traditions will enhance students' understanding of the importance of simultaneously preserving both culture and the environment.

CONCLUSION

Based on the findings of this ethnosocioscientific study, it was revealed that the ethnobotanical practices in Javanese traditional wedding decorations in Tulung Village not only reflect cultural expression but also play an important role in biodiversity conservation and the transmission of social and spiritual values. Plants such as jasmine, ylang-ylang, coconut leaves, and pandan carry both symbolic meanings and real ecological functions, which continue to be preserved despite the influence of modernization.

The integration of this ethnobotanical knowledge is highly relevant to science education (IPA) through contextual and interdisciplinary approaches such as direct observation, herbarium creation, and local plant conservation projects that connect scientific concepts with cultural values.

As an implementative suggestion, teachers can utilize this local wisdom within the Kurikulum Merdeka through community-based collaborative projects, enabling students not only to understand scientific concepts but also to develop a sense of love and responsibility toward their culture and environment.

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