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PUBLIC AWARENESS AND SUPPORT FOR ENDANGERED TREE SPECIES PROTECTION-A FOCUS ON DIPTEROCARPUS SEMIVESTITUS IN UITM SERI ISKANDAR PERAK MALAYSIA

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ABSTRACT

The critically endangered status of Dipterocarpus semivestitus as identified by the International Union for Conservation of Nature (IUCN) highlights the urgent need for conservation efforts. Despite its critical status, public awareness and support for the preservation of this species remain unclear. This study investigates the level of public awareness and support for the conservation of Dipterocarpus semivestitus, focusing on the communities of Seri Iskandar, Perak. The research aims to provide insights into the public awareness and support in its conservation efforts. The study adopted a quantitative approach, analyzing 120 responses from the Seri Iskandar, Perak community, covering multiple residential areas.The results reveal that biodiversity importance garnered the highest level of awareness, while cultural significance and conservation efforts received the lowest awareness among the Seri Iskandar community. These insights could guide stakeholders and policymakers in developing effective strategies to promote the protection of Dipterocarpus semivestitus and other endangered tree species.

Keyword: *Dipterocarpus semivestitus, Endangered, Awareness*

INTRODUCTION

Research on endangered tree species has been widely acknowledged as

crucial by scholars, as it provides valuable insights necessary for preserving biodiversity and protecting ecosystems that rely on these species. In this context, Dipterocarpus semivestitus, a tree species native to Southeast Asia, holds particular significance. Classified as critically endangered by the International Union for Conservation of Nature (IUCN). Dipterocarpus semivestitus faces a high risk of extinction, prompting calls for immediate conservation efforts. This classification highlights the urgent need for targeted research and protective actions to prevent the loss of this essential species, which plays an important role in the health and stability of its ecosystem.

Several studies have emphasized the importance of conserving Dipterocarpus semivestitus. For instance, research by Liliwirianis et al. (2013) recorded a total of 53 Dipterocarpus semivestitus trees in the UiTM Forest at Seri Iskandar Campus, Perak, Malaysia, highligting the pressing need for conservation interventions to ensure the species' survival. However, a key challenge in conservation lies in generating awareness and support among all stakeholders, particularly the public. Despite the urgency of conservation efforts, limited public awareness of the importance of Dipterocarpus semivestitus hampers these initiatives, as widespread understanding and engagement are vital for the success of any conservation strategy. While existing research has contributed valuable knowledge about the physical and ecological characteristics of Dipterocarpus semivestitus (e.g., Ahmad, 2006; Tan, 2003; Lim & Wong, 2000), studies focusing on the social dimensions of conservation, such as public awareness and support, remain scarce. This research gap raises questions about the influence of public awareness on conservation efforts and the need for strategies to foster greater community involvement. Therefore, this study aims to address this gap by investigating the level of public awareness and support for Dipterocarpus semivestitus conservation. Using a quantitative approach, this report analyzes data collected from local communities. and is structured as follows: an introduction to endangered tree species and Dipterocarpus semivestitus, a literature review on the species, a description of the methodology, and finally, a discussion of the findings.

LITERATURE REVIEW

Understanding Endangered Species: The significance of Dipterocarpus semivestitus

Endangered tree species are those facing a high risk of extinction due to habitat loss, environmental changes, and human activities. These species contribute to biodiversity and ecosystem stability, underscoring the importance of their conservation (Nawi et al., 2024) The International Union for Conservation of Nature (IUCN) Red List is a critical tool, identifying species that need immediate conservation action to prevent further population decline (Alvarez de Román et al., 2021). The IUCN Red List categorizes numerous Dipterocarp species, such as Dipterocarpus semivestitus, Dipterocarpus grandiflorus, Dipterocarpus chartaceus, Dipterocarpus tempehes, Dipterocarpus kerrii, and Dipterocarpus alatus, as endangered or critically endangered due to threats like deforestation and habitat fragmentation. These species are found across Southeast Asia, including locations such as Malaysia, Thailand, the Philippines, Indonesia, Laos, Cambodia, and Vietnam. They are essential to Southeast Asian forests, offering ecological and economic value. Research by Liliwirianis & Suratman (2015) and Liliwirianis et al. (2013) emphasizes the urgency of protecting these species to avoid negative impacts on forest biodiversity, soil health, and ecosystem resilience. Dipterocarpus semivestitus is critically endangered with a limited range in freshwater swamp forests in Perak, Malaysia. Liliwirianis et al. (2013) identified approximately 53 individual trees within the UiTM Forest in Seri Iskandar, highlighting the species' rarity and the need for conservation. Its ecological role includes supporting soil structure, promoting biodiversity, and contributing to the tropical forest ecosystem. Maisarah et al. (2016) also emphasize its importance for ecosystem services and as a symbol of local biodiversity, adding scientific and cultural significance to its conservation.

Public Awareness toward Endangered Tree Species

Preservation efforts are activities intended to protect endangered species and their habitats from further decline. Mustaffa et al. (2012) describe these actions as involving habitat conservation, controlled forestry,

and reforestation. Additionally, Alvarez de Román et al. (2021) emphasize that conservation is a global challenge requiring collaboration, legal protections, and environmental policies to secure the future of species like Dipterocarpus semivestitus and support biodiversity.

Public awareness and support are essential for sustainable conservation efforts, as they empower communities to actively participate in preserving endangered species. Taherdoost (2016) highlights that community engagement fosters a sense of responsibility, transforming passive observers into active contributors to conservation initiatives. By educating the public on the ecological and cultural significance of endangered species, such as Dipterocarpus semivestitus, communities are better equipped to understand the urgency of their protection. This understanding encourages individuals to take actions aligned with conservation goals, such as supporting local initiatives or adopting sustainable practices.

Wong et al. (2018) emphasize that public awareness, when coupled with educational programs, significantly enhances proactive conservation efforts. Educational initiatives help bridge the gap between scientific research and community understanding, making complex conservation issues more relatable and actionable. Awareness campaigns highlight specific threats to endangered species and showcase tangible benefits of conservation, inspiring public involvement. By aligning conservation goals with community support, awareness efforts ensure that conservation programs are impactful and sustainable, fostering a collaborative approach to protecting biodiversity.

RESEARCH METHODOLOGY

This study uses a quantitative approach to examine community awareness of endangered tree species at UiTM Perak. Data was collected over a period of two weeks in November 2024 through a QR code connected to a google form. The primary data collection tool was a survey designed with a closed questionnaire format, which allowed for wide dissemination of the collected data.

Site Selection

The Keruing Padi Forest is located within the UiTM Perak Branch area, with geographical coordinates approximately 4.35830667°N and 100.95336500°E (Figure 1). Spanning an area of 17 hectares, this forest houses 30 Keruing Padi trees, making it a significant natural asset (Berita RTM, 2024). Seri Iskandar, the surrounding township with a land area of 12.14 km² and a population of 14,827, provides a supportive community and context for the study.

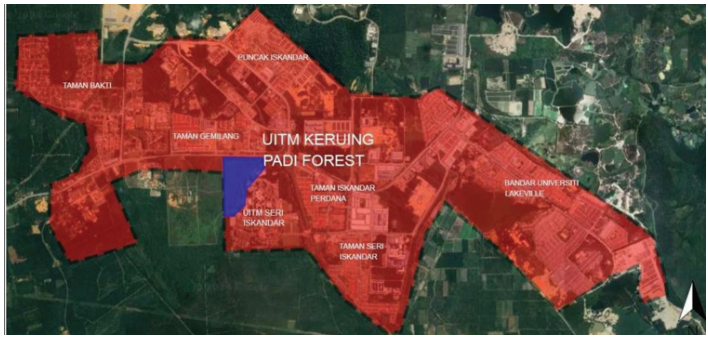

Figure 1. UiTM *Dipterocarpus semivestitus* Forest & the Seri Iskandar Communities

Data Collection and Analysis

This study employed a quantitative approach, using a closed-ended questionnaire survey conducted among selected residential communities in Seri Iskandar. The survey targeted residents from several housing areas, including Taman Maju, Taman Seri Iskandar Perdana, Taman Gemilang, and Taman Universiti. Data analysis was performed using descriptive analysis with SPSS statistical 25 software. This approach provided insights into the public's awareness and attitudes toward endangered tree species conservation.

The questionnaire used in this study consists of two parts: demographic information and the level of awareness about the conservation of Dipterocarpus semivestitus. The survey was conducted by distributing printed QR codes placed in residents' mailboxes around the area, allowing participants to scan and complete the questionnaire online. Simple random sampling techniques are used to ensure that every household has an equal

chance of being selected, thus minimizing selection bias. According to previous studies, a sample size of at least 100 respondents is considered sufficient to generalize survey results and conduct statistical analysis (Taherdoost, 2016). This approach provides reliable insights into community awareness while optimizing the use of resources for data collection.

The questionnaire focuses on assessing awareness and support for endangered tree species protection through ten attributes: biodiversity importance, ecological benefits, threat presence, cultural significance, conservation efforts, legislation, community engagement, educational programs, sustainable practices, and research and monitoring. To determine the levels of awareness, the survey responses were scored on a Likert scale 1-5, with higher scores “5” indicating greater awareness. The total awareness score was calculated for each respondent by summing their responses across all relevant questions. A mean score was derived from the entire dataset to establish an average awareness level. Scores above the mean were categorized as "high awareness," while scores below the mean were classified as "low awareness." This method ensured an objective differentiation between varying levels of public awareness. More so, the reliability of the instrument was also used to calculate the Cronbach's Alpha value for the entire questionnaires.

RESULTS

Respondent Profile

A total of 120 responses were collected from the local community. The output shown in table 1 is the summarization of the demographic characteristics of the study participants. The majority of respondents (66.7%) belong to Generation Z, followed by Generation Y (92%), with smaller proportions from Generation X (3.3%) and Boomers (0.8%). Gender distribution is balanced, with 50% male and 50% female participants. Most respondents hold a degree or diploma (87.5%), while 8.3% have a high school qualification, and 4.2% have a postgraduate. In terms of occupation, 77.5% are students, 15% work in the public sector, 4.2% are employed in the private sector, and 3.3% are unemployed. Additionally, 59.2% of

respondents reside outside Seri Iskandar, while 40.8% live within the local community.

This respondent profile highlights a predominantly young and educated demographic, which may influence the study's findings on public awareness of conservation efforts. To ensure the reliability of the data collected, Cronbach's Alpha analysis was performed on the survey instrument, resulting in a value of (0.876). This shows a high level of internal consistency, confirming that this instrument can measure respondents' awareness and perceptions of conservation initiatives.

Table 1. Respondent Profile

Attribute	Frequency	%
Year Of Birth		
Boomer (Birth 1946-1961)	1	0.8
Gen X (Birth 1965-1980)	4	3.3
Gen Y (Birth 1981-1986)	11	92
Gen Z (Birth 1997-2012)	80	66.7
Gender		
Male	60	50
Female	60	50
Level Of Education		
Postgraduate	5	4.2
Undergraduate	105	87.5
School	10	8.3
Residence		
Seri Iskandar Communities	49	40.8
Non-Seri Iskandar Communities	71	59.2
Job		
Private sector	5	4.2
Public sector	18	15.0
Student	93	77.5
Not working	4	3.3

*N = 120
Source: Author

Public Awareness Towards Dipterocarpus semivestitus At UiTM Seri Iskandar, Perak

Cronbach's alpha coefficient for assessing public awareness of Dipterocarpus semivestitus is 0.88, indicating that the collected data is highly reliable. The awareness levels regarding the conservation of Dipterocarpus semivestitus significantly differ across demographic groups. This can be explained by specific conservation attributes within the awareness context, which include Biodiversity Importance, Ecological Benefits, Threat Presence, Cultural Significance, Conservation Efforts, Legislation, Community Engagement, Educational Programs, Sustainable Practices, and Research and Monitoring.

Biodiversity Importance

The results show that respondents from Generation X and male respondents exhibit a low level of awareness regarding the importance of biodiversity in preserving endangered tree species, whereas other groups show a high level of awareness.

Ecological Benefits

The findings highlight that respondents from Boomer, Generation Y, and Generation Z exhibit a high level of awareness of ecological benefits. However, Generation X and some respondents with lower education levels demonstrated low awareness.

Threat Presence

The responses show that Generation Y and Generation Z are particularly aware of threats to trees. In contrast, Boomer and Generation X respondents display a lower level of awareness regarding these issues.

Cultural Significance

The results show a low awareness of cultural significance across all generations, except for Generation X respondents who recognize the role of trees in local traditions.

Conservation Efforts

The findings reveal that Boomer and Generation X respondents exhibit a high level of awareness about the importance of conservation efforts, while Generation Z shows a relatively low level of engagement.

Legislation

The results show that Generation Z respondents demonstrate a high level of understanding of legislation to protect endangered species, while awareness remains low among older generations, particularly Boomer respondents.

Community Engagement

Respondents from Generation Y and Generation Z show a high level of interest in community engagement for conservation efforts. However, Boomer and male respondents exhibit a low level of awareness.

Educational Programs

The results highlight that respondents from Generation Y and Generation Z express a high level of support for educational programs, while boomer and Gen X respondents show a lower level of interest.

Sustainable Practices

The responses show that awareness of sustainable practices is high among Generation Y, while Boomer and Generation X respondents demonstrate a low level of awareness.

Table 2 presents a comparison of the 10 awareness attributes and 15 respondent attributes. The biodiversity importance attribute demonstrates the highest level of awareness, with 13 out of 15 respondent attributes indicating high awareness. In contrast, cultural significance and conservation efforts show the lowest levels of awareness, with only 8 out of 15 respondent attributes reflecting high awareness.

Table 2. Awareness Level among Respondents towards Endangered Tree Species

No	Gender				Education					Living Area		Occupation			
Awareness Attribute $\bar{x}$ **= (Mean Value)**	**Boomer**	**Gen X**	**Gen Y**	**Gen Z**	**Male**	**Female**	**Postgraduate**	**Undergraduate**	**School**	**Around Seri Iskandar**	**Outside Seri Iskandar**	**Public sector**	**Private sector**	**Student**	**Not working**
1.Importance of Biodiversity $\bar{x}$ **= (4.69)**	High	Low	High	High	Low	High	High	High	High	High	High	High	High	High	High
2.Ecologiccal benefit $\bar{x}$ **= (4.72)**	High	Low	High	High	Low	Low	High	High	High	High	High	High	High	High	High
3.Threats $\bar{x}$ **= (4.72)**	Low	Low	High	High	Low	Low	High	High	High	High	High	High	High	High	High
4.Cultural significant $\bar{x}$ **= (4.59)**	Low	High	Low	Low	Low	Low	Low	High	Low	High	High	High	High	High	High
5.Conservation effort $\bar{x}$ **= (4.63)**	High	High	Low	Low	Low	Low	Low	High	Low	High	High	Low	High	High	High
6.Legislation $\bar{x}$ **= (4.68)**	Low	Low	Low	High	Low	Low	Low	High	High	High	High	High	High	High	High
7.Community engagement $\bar{x}$ **= (4.64)**	Low	Low	High	High	Low	Low	High	High	High	High	High	High	Low	High	High
8.Educational program $\bar{x}$ **= (4.68)**	Low	Low	High	High	Low	Low	High	High	High	High	High	High	Low	High	High
9.Sustainable practices $\bar{x}$ **= (4.62)**	Low	Low	High	Low	Low	Low	High	High	High	High	High	High	Low	High	High
10. Research and monitoring $\bar{x}$ **= (4.72)**	Low	High	High	High	Low	Low	High	High	High	High	High	High	High	High	High

Source: Author

DISCUSSION

The findings indicate varying levels of awareness regarding the conservation of Dipterocarpus semivestitus among different demographic groups. The majority of respondents, particularly from Generation Z (66.7%), students (77.5%), and individuals holding undergraduate qualifications (87.5%), demonstrated higher levels of awareness about the importance

of biodiversity, ecological benefits, and conservation threats. These results align with previous studies that emphasize the role of younger, well-educated individuals in fostering environmental awareness and advocacy (Chawla, 2020; Olsson et al., 2020). Education, particularly higher levels of formal education, is recognized as a key factor in promoting environmental literacy and support for conservation (Ardoin et al., 2020). Conversely, low awareness was observed among older generations (Boomers and Generation X), males, and respondents with lower education levels, such as those with high school qualifications (8.3%). Similar trends have been reported in previous studies, where older populations exhibit less awareness of emerging conservation issues due to limited exposure to environmental education programs (Collado et al., 2019).

Support for research and monitoring efforts, which are vital for developing effective conservation strategies, was notably higher among younger demographics, particularly Generation Z and students (Smith et al., 2020; Tan & Rahman, 2021). These groups demonstrated an understanding of the need for studying population dynamics, ecological functions, and adaptive capacities. However, awareness of research initiatives was significantly lower among older generations, particularly Boomers, emphasizing the need for improved communication to highlight the importance of scientific research in conservation (Lee et al., 2019). Similarly, awareness of sustainable practices, such as responsible land use and sustainable forestry, was higher among Generation Y and Z respondents, reflecting their understanding of human impacts on biodiversity (Nguyen et al., 2020). In contrast, Boomers and Generation X displayed lower awareness, indicating a need for education programs targeting older populations to promote sustainability (Harris & Kumar, 2021).

Awareness of threats to Dipterocarpus semivestitus, such as habitat destruction, deforestation, and climate change, was highest among Generation Z and Y respondents (Smith et al., 2020; Tan & Rahman, 2021). These groups recognized the urgency of addressing these threats, whereas older generations exhibited lower awareness, reinforcing the need for targeted outreach to educate them on the critical factors driving species endangerment (Lee et al., 2019).

Despite its ecological and cultural importance, Dipterocarpus

semivestitus's cultural significance remains underappreciated across all demographic groups. Integrating cultural narratives into conservation campaigns could enhance public engagement, as culturally relevant issues have been shown to increase participation in environmental initiatives (Riemer et al., 2014). Additionally, the difference in awareness between respondents residing near Seri Iskandar (40.8%) and those outside the area (59.2%) suggests that proximity to conservation sites does not necessarily correlate with higher awareness. This phenomenon has been similarly noted in prior studies (Wals & Brody, 2020).

These results mentioned the importance of integrating environmental education into formal and informal learning spaces to address awareness gaps across age groups and education levels. Improved public engagement strategies and fostering a sense of community responsibility could further enhance conservation efforts for endangered species like Dipterocarpus semivestitus. Addressing the value-action gap through initiatives such as community-based conservation programs and financial incentives remains critical to achieving meaningful and sustainable outcomes (Gifford & Nilsson, 2014).

Figure 2 illustrates the relationship between the 10 awareness attributes and the 15 respondent attributes. It highlights how these attributes interact and vary among respondents. The figure provides a detailed visualization, showcasing patterns and trends in awareness levels. This analysis offers valuable insights into factors influencing awareness and support for tree species protection.

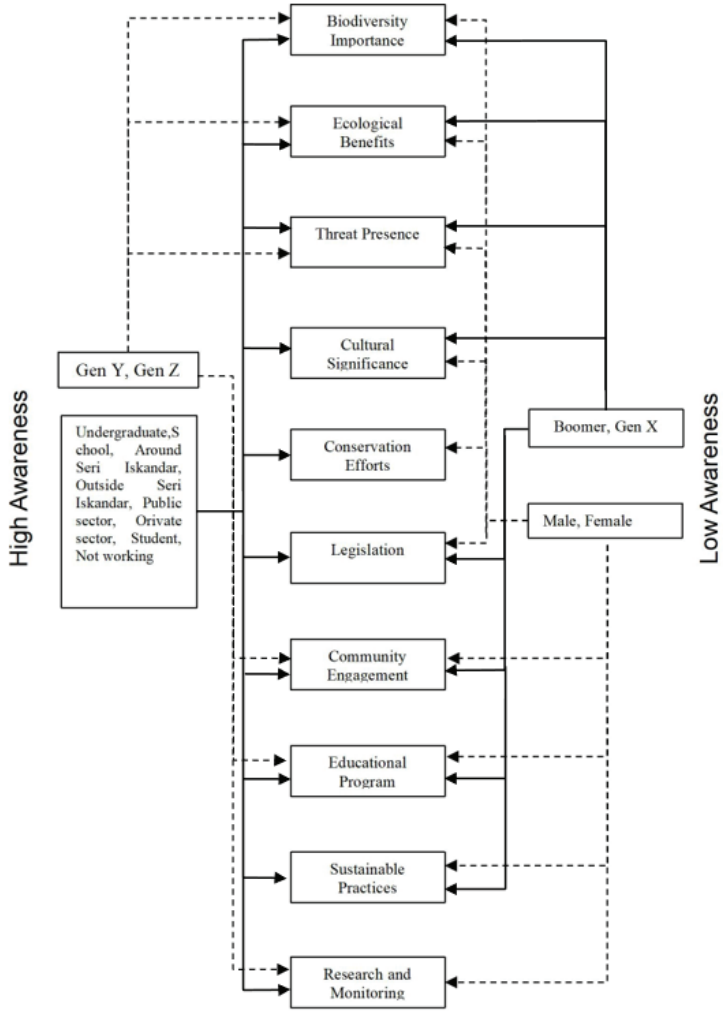

Figure 2. Summarization of Public Awareness Level towards Endangered Tree Species (*Dipterocarpus semivestitus*)

CONCLUSION AND RECOMMENDATION

This research emphasizes the critical importance of conserving Dipterocarpus semivestitus, a critically endangered species found in the area of UiTM Seri Iskandar, Perak. It holds cultural and ecological importance in its local community. Despite its importance, the species faces severe threats,

including habitat destruction, deforestation, climate change, pollution and invasive species, which are accelerating their decline. Immediate conservation efforts are essential to reduce the risk of these occurrences.

By shedding light on the function of public awareness in biodiversity conservation, this study advances conservation theory. In practice, it offers policymakers and conservation professionals direction on how to create focused interventions, such as educational initiatives and community projects, to bridge awareness gaps and encourage proactive conservation behavior. Future research can ensure the survival of Dipterocarpus semivestitus, improve conservation tactics, and support broader biodiversity conservation initiatives by moving in this direction.

The findings indicated significant differences in awareness levels across demographic groups. Younger, educated individuals demonstrated higher awareness of the species' ecological and environmental importance, whereas older generations and individuals with lower education levels exhibited lower awareness, particularly regarding cultural significance and conservation legislation. These results reveal the need for focused public education campaigns and community engagement to improve awareness and promote active conservation support.

This research faces several limitations. It focuses solely on the Seri Iskandar community and limits the generalizability of its findings to other areas. In addition, this study mainly assesses public awareness and does not fully examine the behavior or actions taken by the community to support the conservation efforts of this endangered tree species

To overcome the limitations of this study, future research should broaden its geographic focus to include diverse communities with diverse sociodemographic characteristics. A more thorough understanding of public participation in conservation initiatives will also be possible by analyzing actual community behavior and identifying barriers to participation to investigate value-action gaps. Qualitative methods such as focus groups and interviews can also provide a deeper understanding of community attitudes and motives.

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