



Identification of spermatophyte plants at Pelang Beach as material for the creation of an ecotourism poster

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Article	Abstract
<p>Keywords: Ecotourism; Pelang Beach; Poster; Spermatophyta</p> <p>Article History Received: April 24, 2026 Accepted: May 22, 2026 Published: May 29, 2026</p>	<p>Pelang Beach in Trenggalek Regency is a coastal area with a high level of plant diversity, particularly among the Spermatophyta group. However, information regarding plant species in this area remains limited. This study aims to identify Spermatophyta plant species at Pelang Beach and utilize the area's potential as material for developing ecotourism posters. The study employed an exploratory approach focused on species identification and description without experimental treatments. The identification results were used as the basis for designing ecotourism posters. Data collection techniques included direct observation through field surveys, interviews with beach managers, and photographic documentation of the plant species found. Data were analyzed by classifying plants into the Gymnospermae and Angiospermae categories, then presented in the form of species tables accompanied by photographic documentation. The results of the study indicate the presence of 23 Spermatophyta plant species at Pelang Beach, comprising 2 Gymnospermae species <i>Pinus merkusii</i> and <i>Cycas rumphii</i> and 21 Angiospermae species. Some of the species found include <i>Cocos nucifera</i> L., <i>Thespesia populnea</i>, <i>Terminalia catappa</i>, <i>Casuarina equisetifolia</i>, <i>Rhizophora mucronata</i>, <i>Pandanus odorifer</i>, <i>Swietenia macrophylla</i>, <i>Tectona grandis</i>, <i>Samanea saman</i>, and <i>Ipomoea pes-caprae</i>. The results of this identification were used to create an ecotourism poster containing general information about Pelang Beach, the area's attractions, a classification and brief description of the plants, photographic documentation, conclusions, and a bibliography. This medium is considered to have the potential to support learning while raising awareness of coastal ecosystem conservation.</p>

INTRODUCTION

Coastal areas are ecosystems characterized by high plant diversity, particularly seed plants. These plants comprise two groups: the Gymnosperms and the Angiosperms, which play a role in maintaining the ecosystem; these plants are capable of adapting to environments characterized by high salinity, limited freshwater availability, exposure to strong winds, and substrates dominated by sand [1]. The presence of spermatophyte plants in coastal areas helps preserve the environment and provides habitats for other organisms. One such area is Pelang Beach, which boasts a diverse range of spermatophyte plants. This beach, located in Trenggalek Regency, is a tourist destination renowned for its natural beauty, expansive sandy shores, crashing waves, and lush green vegetation, all of which hold significant natural resources [2].

The identification of spermatophyte plants on Pelang Beach was conducted to determine the types present in the area. Identification is the process of recognizing and classifying plants by observing their visible morphology and facilitating the grouping of each living organism [3]. Information on the identification of spermatophyte plants in the Pelang Beach area remains relatively limited, and data specifically cataloging them have not been widely documented in the scientific literature [4]. Based on an interview with Mr. Widodo, the manager of Pelang Beach, no information is currently available on the types of spermatophyte plants found at Pelang Beach; therefore, identifying them is necessary to ensure the conservation of plant diversity in the area.

The results of the identification were then used to create posters. Posters were chosen because they can present information visually, are easy to understand, and convey messages concisely and clearly [5]. Ecotourism showcases ecosystems as tourist destinations, one aspect of which involves plant species and their environmental benefits [6]. The use of posters as a medium to present the results of the identification of spermatophyte plants at Pelang Beach is expected to increase understanding and awareness of the importance of preserving the coastal ecosystem [7]. With the background described above, this study aims to identify the spermatophyte plants at Pelang Beach and to use the identification results as material for creating posters.

RESEARCH METHOD

This study is a qualitative descriptive study using an exploratory approach [8], which involves identifying and describing findings without conducting experiments; the results were used as material for creating a poster. The study was conducted on Tuesday, July 15, 2025, at Pelang Beach, located in Wonocoyo Village, Panggul Subdistrict, Trenggalek Regency. Figure 1. shows the study location.



Figure 1. Research Location Map

This study was conducted to identify the spermatophyte plants found on Pelang Beach. Data collection was carried out through interviews and observations (Figure 2). Interviews were conducted with the Pelang Beach management, and observations focused on the spermatophyte plants present at the research site (Table 1). The collected research data were then analyzed descriptively. The research results were utilized as material for creating an ecotourism poster.

Table 1. List of Interview Questions

No.	Questions
1.	Are there currently informational materials (e.g., information boards, brochures) available at Pelang Beach in Trenggalek that explain the types of plants (specifically spermatophytes) found there for visitors?
2.	What is your perspective on the role of Pelang Beach in Trenggalek as an environmental education site, particularly regarding flora?
3.	What are the types of spermatophyte plant diversity at Pelang Beach, Trenggalek?
4.	Are there any unique or rare species found at Pelang Beach?
5.	Are there any threats to the conservation of plants at Pelang Beach (e.g., erosion, trash, development, or lack of public awareness)?
6.	In your opinion, what are the potential benefits that can be derived from the plant diversity at Pelang Beach?
7.	In your opinion, have there been changes in the types or numbers of plants at Pelang Beach in recent times?
8.	In your opinion, can information about plant diversity conveyed through posters attract the public's interest?

No.	Questions
9.	In your opinion, if the public becomes more familiar with the plants at Pelang Beach, will they become more concerned about maintaining the cleanliness of the surrounding environment and, consequently, more committed to preserving those coastal plants?
10.	What roles do local communities play in the conservation of plant diversity at Pelang Beach?

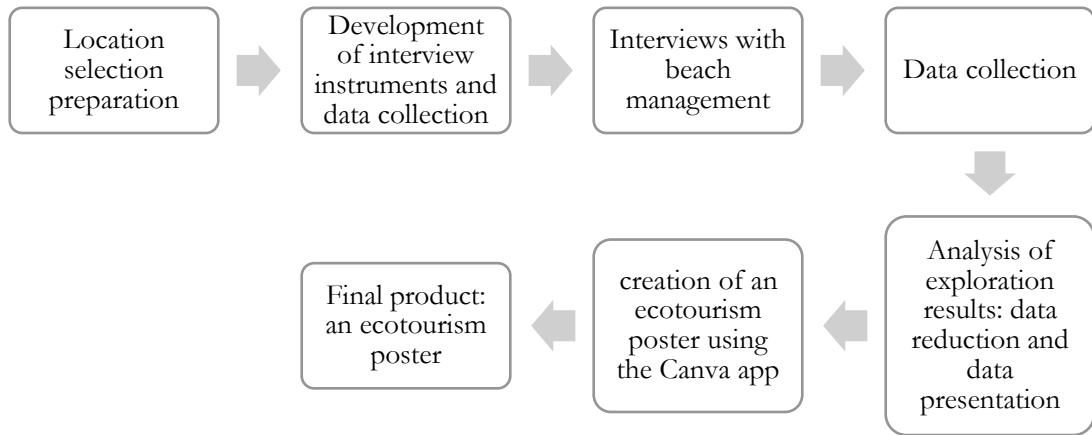


Figure 2. Data Collecting Process

The data analysis techniques used in this study were data reduction and data presentation. Data reduction was performed by classifying plants into the angiosperm and gymnosperm groups. Data presentation took the form of narrative text, a table of plant species at Pelang Beach, and photographs of the plants.

RESULTS AND DISCUSSION

Based on the results of a study on the identification of spermatophyte plants at Pelang Beach. The results of the study indicate the presence of 23 species of spermatophyte plants, comprising 2 species in the Gymnospermae group and 21 species in the Angiosperm group. The data from the study on the identification of the spermatophyte plants are shown in [Table 2](#).

Table 2. Data on Spermatophyte Species

Scientific	Local name	Classification
<i>Cycas rumphii</i>	Pakis haji	Kingdom : Plante Divisio : Spermatophyta Subdivisio: Gymnospermae Kelas : Cycadopsida Ordo : Cycadales Famili : Cycadaceae Genus : <i>Cycas</i> Species : <i>Cycas rumphii</i> .
<i>Pinus merkusii</i>	Pinus	Kingdom : Plantae Divisio : Spermatophyta Subdivisio :Gymnospermae Kelas : Coniferopsida Ordo : Pinales Famili : Pinaceae Genus : <i>Pinus</i>

Scientific	Local name	Classification
<i>Cocos nucifera</i> L.	Kelapa	Species : <i>Pinus merkusii</i> [9] Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Monokotil Ordo : Arecales Famili : Arecaceae Genus : <i>Cocos</i>
<i>Thespesia populnea</i>	Waru Laut	Species : <i>Cocos nucifera</i> L [10] Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Dikotil Ordo : Malvales Famili : Malvaceae Genus : <i>Thespesia</i>
<i>Terminalia catappa</i>	Ketapang	Species : <i>Thespesia populnea</i> . Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Dikotil Ordo : Myrtales Famili : Combretaceae Genus : <i>Terminalia</i>
<i>Casuarina equisetifolia</i>	Cemara	Species : <i>Terminalia catappa</i> . Kingdom : Plantae Divisio : Spermatophyta Kelas: Magnoliopsida Ordo : Casuarinales Famili : Casuarinaceae Genus : <i>Casuarina</i>
<i>Rhizophora mucronata</i>	Bakau	Species : <i>Casuarina equisetifolia</i> Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Dikotil Ordo : Malpighiales Famili : Rhizophoraceae Genus : <i>Rhizophora</i>
<i>Pandanus odorifer</i>	Pandan Laut	Species : <i>Rhizophora mucronata</i> . [11] Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Monokotil Ordo : Pandanales Famili : Pandanaceae Genus : <i>Pandanus</i>

Scientific	Local name	Classification
<i>Swietenia macrophylla</i>	Mahoni	Species : <i>Pandanus odorifer</i> . [12] Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Dikotil Ordo : Sapindales Famili : Meliaceae Genus : <i>Swietenia</i>
<i>Tectona grandis</i>	Jati	Species : <i>Swietenia macrophylla</i> . Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Dikotil Ordo : Lamiales Famili : Lamiaceae Genus : <i>Tectona</i>
<i>Samanea saman</i>	Trembesi	Species : <i>Tectona grandis</i> . [13] Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Dikotil Ordo : Fabales Famili : Fabaceae Genus : <i>Samanea</i>
<i>Syzygium aqueum</i>	Jambu air	Species : <i>Samanea saman</i> . Kingdom : Plantae Divisio : Spermatophyta Subdivisi : Angiospermae Kelas : Dikotil Ordo : Myrtales Famili : Myrtaceae Genus : <i>Syzygium</i>
<i>Durio zibethinus</i>	Durian	Species : <i>Syzygium aqueum</i> . Kingdom : Plantae Divisio : Spermatophyta Subdivisi : Angiospermae Kelas : Dikotil Ordo : Malvales Famili : Malvaceae Genus : <i>Durio</i>
<i>Sindora siamensis</i>	Sindora	Species : <i>Durio zibethinus</i> . [14] Kingdom : Plantae Divisi : Magnoliophyta Kelas : Magnoliopsida Ordo : Fabales Famili : Fabaceae Genus : <i>Sindora</i>

Scientific	Local name	Classification
<i>Musa paradisiaca</i>	Pisang	Species : <i>Sindora siamensis</i> [15] Kingdom : Plantae Divisio : Spermatophyta Subdivisi : Angiospermae Kelas : Monokotil Ordo : Zingiberales Famili : Musaceae Genus : <i>Musa</i>
<i>Melaleuca leucadendra</i>	Pohon Kayu Putih	Species : <i>Musa paradisiaca</i> . [16] Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Dikotil Ordo : Myrtales Famili : Myrtaceae Genus: <i>Melaleuca</i>
<i>Ruellia tuberosa</i> L.	Tumbuhan Pletekan	Species : <i>Melaleuca leucadendra</i> . Kingdom : Plantae Divisio : Spermatophyta Subdivisi : Angiospermae Kelas : Dikotil Ordo : Lamiales Famili : Acanthaceae Genus : <i>Ruellia</i>
<i>Calotropis gigantea</i>	Widuri	Species : <i>Ruellia tuberosa</i> L. Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Dikotil Ordo : Gentianales Famili : Apocynaceae Genus : <i>Calotropis</i>
<i>Ficus septia</i>	Awar Awar	Species : <i>Calotropis gigantea</i> . Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Dikotil Ordo : Rosales Famili : Moraceae Genus : <i>Ficus</i>
<i>Spinifex littoreus</i>	Rumput angin	Species : <i>Ficus septica</i> . [17] Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Monokotil Ordo : Poales Famili : Poaceae

Scientific	Local name	Classification
<i>Ipomoea pes-caprea</i>	Katang Katang	Genus : <i>Spinifex</i> . Species : <i>Spinifex littoreus</i> Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Dikotil Ordo : Solanales Famili : Convolvulaceae Genus : <i>Ipomoea</i> Species : <i>Ipomoea pes-caprae</i> .
<i>Sphagneticola trilobata</i>	Widelia	Kingdom : Plantae Divisio : Spermatophyta Subdivisio : Angiospermae Kelas : Dikotil Ordo : Asterales Famili : Asteraceae Genus : <i>Sphagneticola</i> Species : <i>Sphagneticola trilobata</i> .
<i>Crinum asiaticum</i> L.	Bakung	Kingdom : Plantae Subkingdom : Tracheobionta Superdivisi : Spermatophyta Divisi : Magnoliophyta Kelas : Liliopsida Ordo : Liliales Famili : Amaryllidaceae Genus : <i>Crinum</i> Species : <i>Crinum asiaticum</i> L. [18]

An identification of spermatophyte plants in the Pelang Beach area was conducted to determine the types present. Pelang Beach is a tourist destination that combines coastal, river, and forest ecosystems. Pelang Beach is known for the large waves characteristic of the southern coast and its waterfalls; the beach's appeal also lies in the rich plant diversity within its area [19]. The plant diversity at Pelang Beach is diverse due to the gradation of ecosystems from the beach to the forest. One such group is the seed plants (Spermatophyta). This group of seed plants includes various types of plants from the Gymnospermae and Angiospermae groups [20]. Based on research conducted at Pelang Beach, Trenggalek Regency, 23 species of Spermatophyta have been recorded, comprising 2 gymnosperms and 21 angiosperms.

The gymnosperm group consists of plants with unprotected ovules; generally, gymnosperms are trees, though some are classified as shrubs [3]. In this study, two plants were identified as gymnosperms: the pine (*Pinus merkusii*) and the cycad (*Cycas rumphii*) on Pelang Beach. Although relatively few in number, gymnosperms help mitigate damage by resisting strong winds and erosion [21].

Meanwhile, the Angiospermae group consists of flowering plants with enclosed seeds, characterized by a body structure comprising roots, stems, leaves, and flowers, and growth habits ranging from shrubs and subshrubs to trees and vines [22]. There are 21 plants identified within the Angiospermae group, namely *Cocos nucifera* L., *Thespesia populnea*, *Terminalia catappa*, *Casuarina equisetifolia*, *Rhizophora mucronata*, *Pandanus odorifer*, *Swietenia macrophylla*, *Tectona grandis*, *Samanea saman*, *Syzygium aqueum*, *Durio zibethinus*, *Sindora siamensis*, *Musa paradisiaca*, *Melaleuca leucadendra*, *Ruellia tuberosa* L., *Calotropis gigantea*,

Ficus septia, *Spinifex littoreus*, *Ipomoea pes-caprea*, *Sphagneticola trilobata*, and *Crinum asiaticum* L. All species of spermatophytes are shown in Figure 3.

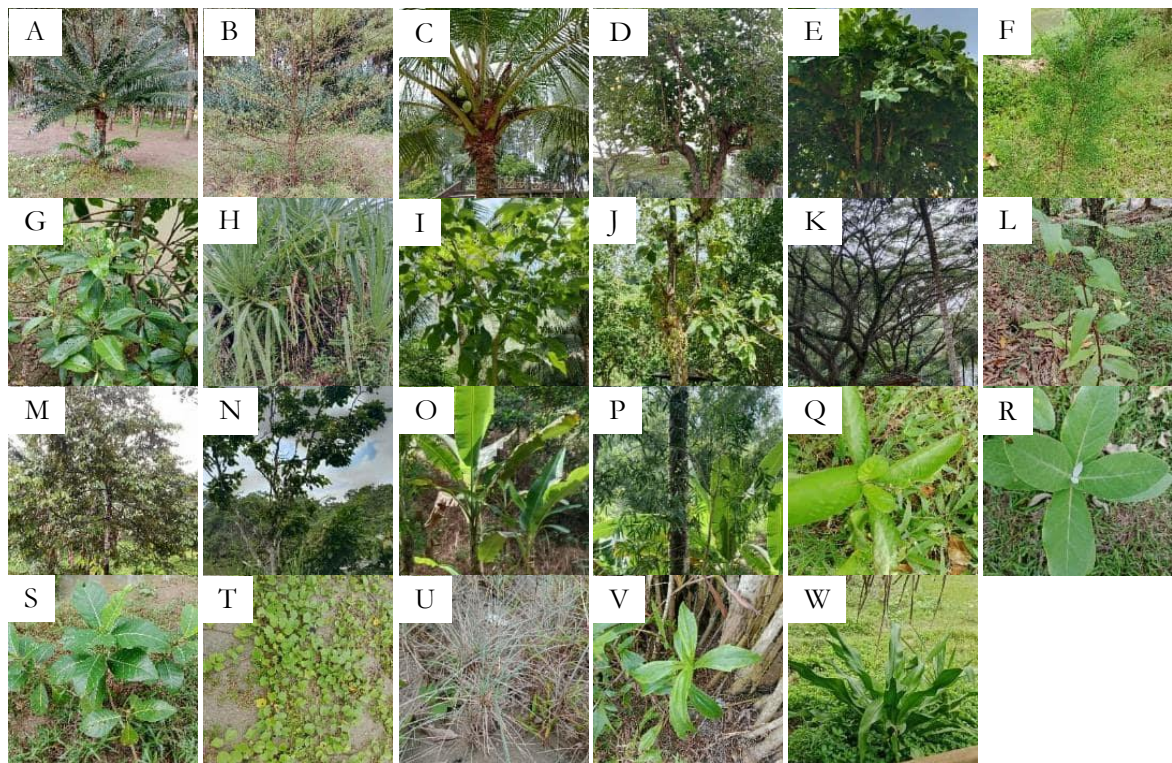


Figure 3. Collection of Plant Species at Pelang Beach, Trenggalek. **A.** *Pinus* (*Pinus pinaster*), **B.** *Pakis Haji* (*Cycas rumphii*), **C.** Coconut (*Cocos nucifera* L.), **D.** Sea Waru (*Thespesia populnea*), **E.** Ketapang (*Terminalia catappa*), **F.** Casuarina (*Casuarina equisetifolia*), **G.** Mangrove (*Rhizophora mucronata*), **H.** Sea Pandan (*Pandanus odorifer*), **I.** Mahogany (*Swietenia macrophylla*), **J.** Teak (*Tectona grandis*), **K.** Saman Tree (*Samanea saman*), **L.** Water Apple (*Syzygium aqueum*), **M.** Durian (*Durio zibethinus*), **N.** Siamese Rosewood (*Sindora siamensis*), **O.** Banana (*Musa paradisiaca*), **P.** White Gum Tree (*Melaleuca leucadendra*), **Q.** Pletekan (*Ruellia tuberosa* L.), **R.** Calotropis (*Calotropis gigantea*), **S.** Awar Awar (*Ficus septia*), **T.** Spinifex (*Spinifex littoreus*), **U.** Katang Katang (*Ipomoea pes-caprea*), **V.** Widelia (*Sphagneticola trilobata*), **W.** Crinum (*Crinum asiaticum* L.)

Angiosperm plants commonly found in the Pelang Beach area include coconut palms, casuarina trees, sea pandanus, and waru trees. The local coastal community widely utilizes the plants found at Pelang Beach; for instance, coconut palms are used for daily needs, while ketapang trees are employed to stabilize water pH for shrimp farming. Meanwhile, vegetation such as mangroves, pines, and casuarinas helps prevent coastal erosion, reduce wind impacts, and protect water sources [23]. Overall, based on the results of the identification of spermatophyte plants at Pelang Beach, the diversity is quite high.

The results of the identification of spermatophyte plants on Pelang Beach were then used to create posters. This poster contains brief information regarding the local name, scientific name, and image of each identified plant. The concise, engaging, and informative presentation attracts visitors' attention because it is practical, easy to read, and can be displayed at strategic points within the tourist area [24]. This poster also helps raise environmental awareness and familiarize people with plant species; thus, it is hoped that it will foster concern for the conservation of coastal vegetation [25]. Figure 4 shows an ecotourism poster created based on the results of the identification of spermatophyte plants at Pelang Beach, Trenggalek. The creation of this ecotourism poster is intended to serve as an engaging, easily

understandable information medium for the identification results, to introduce the tourism potential of Pelang Beach, and to raise public awareness about environmental preservation.



Figure 4. Results of the Spermatophyta Plant Poster

CONCLUSION

Based on the discussion above, it can be concluded that the results of the identification of Spermatophyta plants at Pelang Beach, Trenggalek, indicate the presence of 23 species of seed plants (Spermatophyta), consisting of 2 species of Gymnospermae, namely *Pinus pinaster* and *Cycas rumphii*, as well as 21 species of Angiospermae, These species include the coconut (*Cocos nucifera* L.), sea waru (*Thespesia populnea*), ketapang (*Terminalia catappa*), casuarina (*Casuarina equisetifolia*), mangrove (*Rhizophora mucronata*), sea pandan (*Pandanus odorifer*), mahogany (*Swietenia macrophylla*), Teak (*Tectona grandis*), Saman

Tree (*Samanea saman*), Water Apple (*Syzygium aqueum*), Durian (*Durio zibethinus*), Siamese Rosewood (*Sindora siamensis*), Banana (*Musa paradisiaca*), White Gum Tree (*Melaleuca leucadendra*), Pletekan (*Ruellia tuberosa* L.), Calotropis (*Calotropis gigantea*), Awar Awar (*Ficus septia*), Spinifex (*Spinifex littoreus*), Katang Katang (*Ipomoea pes-caprea*), Widelia (*Sphagneticola trilobata*), Crinum (*Crinum asiaticum* L.).

The identification data, including local names, scientific names, and images of the plants, were used to create the poster. These identification results were then used to create an ecotourism poster. The resulting ecotourism poster consists of general information about Pelang Beach, its unique features, identification results presented as brief descriptions and classifications, photos of the identified plants, conclusions, and a bibliography. This medium is expected to raise awareness of the importance of conserving coastal ecosystems.

AUTHOR CONTRIBUTIONS

The first author is a biology education student who is about to complete his bachelor's degree. The second and third authors are advisors who assisted the first author in developing the research design and provided feedback on the research findings to ensure the manuscript was ready for publication. The second author provided input regarding the concept, design, and results of the poster. The third author provided input regarding the scientific aspects of spermatophytes.

CONFLICTS OF INTEREST

None of the authors has any conflicts of interest. All research activities (preparation, data collection, and analysis of research results) as well as the preparation of this article were conducted voluntarily and without coercion.

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