



## Kayu Kacang in KHDTK ULM (Indonesia) is *Radermachera quadripinnata* (Bignoniaceae), Not *Strombosia javanica* (Olacaceae)

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Received: February 2026; Revised: April 2026; Published: April 2026

### Abstract

The Special Purpose Forest Area for Education and Training of Lambung Mangkurat University (KHDTK ULM) is a forest area managed by ULM. As an education and training forest, data and information should be obtained in accordance with scientific principles so that they are categorized as valid and accurate. Kayu kacang is a woody plant abundant in this area. The botanical name that is currently consistently used is *Strombosia javanica* (Olacaceae), even though this name is suspected to be inaccurate. To prove this inaccuracy, this research was conducted in two stages. The first stage was to compare the morphology (physical characteristics) of the leaves, flowers, and fruits of real kayu kacang in the field with that of the kayu kacang botanically named *S. javanica*. The morphology of the main organs of the latter kayu kacang was obtained from reference searches. If the results were the same, the name could be retained. If not, the name should be changed. The second stage is to obtain an accurate name by comparing the morphological description with a valid identification key. The comparison confirmed that the morphology of the main organs of the real kayu kacang and the reference source was very different. The correct name for the kayu kacang is *Radermachera quadripinnata* (Bignoniaceae). This botanical name is recommended instead of *S. javanica*.

**Keywords:** Kayu kacang; Comparison; Morphology; *Radermachera*; *Strombosia*

**How to Cite:** Nurrachman, M. A., Soendjoto, M. A., & Riefani, M. K. (2026). Kayu kacang in KHDTK ULM (Indonesia) is *Radermachera quadripinnata* (Bignoniaceae), not *Strombosia javanica* (Olacaceae). *Prisma Sains: Jurnal Pengkajian Ilmu Dan Pembelajaran Matematika Dan IPA IKIP Mataram*, 14(2), 436–447. <https://doi.org/10.33394/j-ps.v14i2.19790>



<https://doi.org/10.33394/j-ps.v14i2.19790>

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## INTRODUCTION

The Special Purpose Forest Area for Education and Training of Lambung Mangkurat University (KHDTK ULM) is a 1,617 ha forest area that includes Mount Waringin (74 ha) and the Babaris Mountains (1,543 ha) and is located in South Kalimantan Province (Humas ULM, 2018). This tropical forest area is managed by ULM after the handover from the Minister of Environment and Forestry based on Decree Number 900/MENLHK/SETJEN/PLA.0/2016, dated December 6, 2016. With this special purpose, the forest area is not only a training or practice site such as field work practices or the like (Humas ULM, 2024), but also a natural laboratory that provides opportunities for lecturers, students, or anyone interested in science to study biological resources and physical resources in more depth (Hendra and Soendjoto, 2024; Humas ULM, 2025).

In this natural laboratory, various research themes have been carried out. Fungi, organisms that are neither classified as plants nor animals, for example, were studied by

Ayunisa et al. (2020) and Lefi et al. (2024), herbs by Syaifuddin et al. (2023), woody plants by Ariefianti et al. (2022) and Saputri et al. (2024), medicinal plants by Novryanti et al. (2022) and Nugroho et al. (2022), and animals by Elis et al. (2025), Purbaya et al. (2020), and Saputra et al. (2021). This research was conducted in accordance with scientific principles, ensuring that the resulting data can be categorized as valid and accurate. Scientific principles are the ideal standard for enriching knowledge, broadening horizons, and achieving quality education.

Scientific principles are also used as a guide to address doubts about kayu kacang (English: nut wood, peanut tree), the vernacular name for the plant botanically named *Strombosia javanica* (family Olacaceae). This name is consistently cited in both practical reports and scientific papers (e.g., Ariefianti et al., 2022; Rahman et al., 2022; Rizkon et al., 2021; Saputri et al., 2024), although a cursory examination suggests that the botanical name is dubious and appears inaccurate. The first organ observed to prove this inaccuracy was the leaf. Leaves (structure, texture, shape, size) are easily observable plant organs because they are present throughout the plant's life. The next important organs are flowers and fruit. Unlike leaves, these organs are not always present. Their appearance depends on the season, for example, in certain months, at the beginning of the rainy season, or at the end of the dry season. According to Lebrand (2023), plant organs such as leaves, flowers, and fruit can be used to identify plant species.

Accurate taxonomic identification is fundamental in biodiversity studies because species names function as the primary units for recording, comparing, and interpreting biological data. In forest ecosystems, an inaccurate species name can influence floristic inventories, ecological assessment, conservation planning, ethnobotanical documentation, and the evaluation of plant uses. This issue becomes especially important in an education and research forest, where every species record may later be used as a reference for field practice, scientific publication, management planning, or long-term biodiversity monitoring. Accurate plant naming through proper identification is therefore a solid foundation for education, research, and various biological, ecological, and forestry studies. Wäldchen et al. (2022) also emphasized that reliable plant identification is a key element in ecological monitoring and biodiversity conservation. Therefore, species identification should not depend only on previous reports or repeated local usage, but must be supported by observable morphological evidence and authoritative botanical references.

The use of vernacular names may further complicate species identification. Vernacular names are important in local communication and often reflect cultural knowledge, plant use, taste, morphology, or ecological familiarity. However, they are not always equivalent to botanical names. A single vernacular name may be used for different species in different regions, while one species may also have several local names depending on language, ethnic group, or community tradition. In this context, kayu kacang should not automatically be treated as identical to *S. javanica* simply because the same vernacular name appears in previous references. The name may have been assigned through an indirect association between local terminology and published plant names, rather than through direct taxonomic verification. This possibility is important because the kayu kacang observed in KHDTK ULM shows morphological features that need to be tested against the diagnostic characters of *S. javanica*.

The consequences of such a misidentification are not trivial. If kayu kacang in KHDTK ULM has been incorrectly recorded as *S. javanica*, then previous data concerning its distribution, abundance, ecological role, host relationships, wood properties, or other biological attributes may need to be reconsidered. The problem is not limited to the name itself, but extends to the interpretation of research findings that rely on that name. For example, records of woody plant composition, regeneration, or plant association may be misleading if the species identity is inaccurate. In applied contexts, incorrect identification may also affect information related to timber characteristics, utilization, or conservation value. Conversely, the continued use of inaccurate species names may lead to erroneous research results and may misdirect

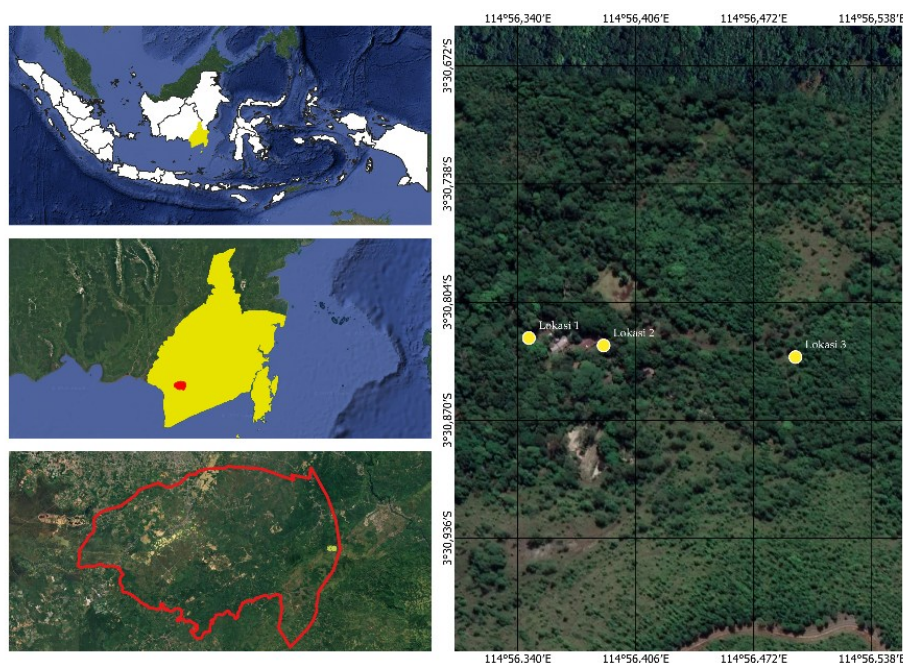
future studies. Therefore, resolving the identity of kayu kacang is not merely a nomenclatural correction, but a necessary step to ensure that biological records from KHDTK ULM are scientifically reliable.

Despite the repeated use of *S. javanica* for kayu kacang in KHDTK ULM, detailed morphological verification has not yet been clearly presented. This leaves a taxonomic gap that must be addressed through direct comparison between field specimens and published descriptions of the species concerned. Preliminary observations indicate that the kayu kacang found in the area differs from *S. javanica* in several visible characters. These differences are especially important when they involve both vegetative and reproductive organs. Leaves can provide an initial basis for identification because they are generally available throughout the year, but flowers and fruits often provide stronger diagnostic evidence. A reliable identification should therefore combine characters of leaves, flowers, and fruits rather than relying on a single organ or on the vernacular name alone. Such an approach allows the suspected error to be tested more objectively.

This study was conducted to verify the botanical identity of kayu kacang in KHDTK ULM. Specifically, it aimed to compare the morphology of kayu kacang observed in the field with the published morphological description of *S. javanica* and to determine whether the current botanical name should be retained or revised. If the observed characters correspond to *S. javanica*, then the existing name can be maintained. If they differ substantially, the plant must be identified using relevant diagnostic characters and a valid identification key to obtain a more accurate botanical name. Through this process, the study is expected to provide a stronger taxonomic basis for correcting previous records, improving the reliability of biodiversity data, and supporting future biological, ecological, forestry, and educational studies in KHDTK ULM.

## METHOD

This research was conducted in the Babaris Mountains of the KHDTK ULM. The entire forest area is essentially a tropical forest area administratively located in Karang Intan District, Banjar Regency, South Kalimantan Province (Figure 1). The area directly borders the intensive zone of the Sultan Adam Grand Forest Park (Humas ULM, 2018). This grand forest park is a natural conservation area of 112,000 ha which was established through Presidential Decree Number 52 of 1989. The forest area is then managed by the South Kalimantan Provincial Forestry Service (Dinas Kehutanan Provinsi Kalimantan Selatan, 2026).



**Figure 1.** Research location map (KHDTK ULM)

Primary data were collected from April to July 2025. Leaves, flowers, and fruit, were randomly collected from seven individual kayu kacang whose growth stage was categorized as poles (diameter at breast height 10-20 cm). Tree-level plants (diameter at breast height > 20 cm) were not selected because the leaves, flowers, or fruit are generally high above the ground surface and therefore difficult to reach. Individual plants were used as organ sources if: intact leaves and flowers or fruit were present, and the fruit was either unripe (green) or ripe (brown). At the time of data collection, the botanical name of the kayu kacang had not been accurately identified.

Plant organs were subjected to appropriate treatment: unnecessary parts were removed, and the organs were cut radially or split longitudinally. The organs were then placed on a black background, aligned with a measuring tool (ruler), before finally being documented with a cellphone camera. Mobile devices are the result of technological advances that can be used to process images and recognize patterns (Wäldchen et al., 2018). The resulting photographs are used for comparison or utilized in morphological descriptions. This morphological descriptions include various notes from direct field observations, such as plant habitus, stems (branching, texture, color), leaves (shape, leaf veins, position on the main branch/stem), flowers (shape, color), and fruit (shape, color).

Not only primary data, but also secondary data is required. This data is obtained through online searches of relevant references. Very little secondary data exists on the kayu kacang whose botanical name has not been accurately identified. In contrast, all data on *S. javanica* is categorized as secondary data. There are no records or reports of the presence of other *S. javanica* in this forest area, except as the botanical name for the kayu kacang.

Primary data on kayu kacang, whose botanical name has not yet been identified, and secondary data on *S. javanica* were compared. The comparison aimed to determine whether the morphology of the two data sets was similar. If the comparison results were the same or similar, the scientific name of *S. javanica* was retained. If not, the scientific name should be revised. The revision was carried out scientifically. Then the morphological descriptions of the kayu kacang was compared with the morphological descriptions of the species listed in the identification key. The identification key which is still considered valid today is van Steenis (1976).

To strengthen the morphological comparison, observations focused on characters that are commonly used in plant identification, particularly those related to vegetative and reproductive organs. Vegetative characters included plant habit, stem appearance, branching pattern, bark texture and color, leaf type, leaflet arrangement, leaflet shape, venation, and the presence or absence of swelling at the petiole base or nodes. Reproductive characters included the position and structure of the inflorescence, flower arrangement, calyx and corolla morphology, stamen and pistil characteristics, fruit shape, fruit dehiscence, and seed morphology. These characters were selected because they provide diagnostic evidence for distinguishing taxa at the genus and species levels, especially when the use of a vernacular name creates uncertainty in botanical identity.

The reference data used for comparison were examined carefully to ensure that the diagnostic characters of *S. javanica* were obtained from sources that provide botanical or morphological descriptions rather than only general information. Particular attention was given to the characters that clearly distinguish *S. javanica* from other woody species, such as leaf type, leaf arrangement, flower position, flower color, fruit form, and family-level characteristics. These characters were then compared with the observed characters of kayu kacang from KHDTK ULM. The comparison was not intended to measure quantitative similarity statistically, but to determine whether the observed plant shared the essential diagnostic characters required to support the use of the name *S. javanica*.

The identification process was carried out as a morphological verification rather than a molecular taxonomic analysis. Therefore, the conclusion of this study was based on the

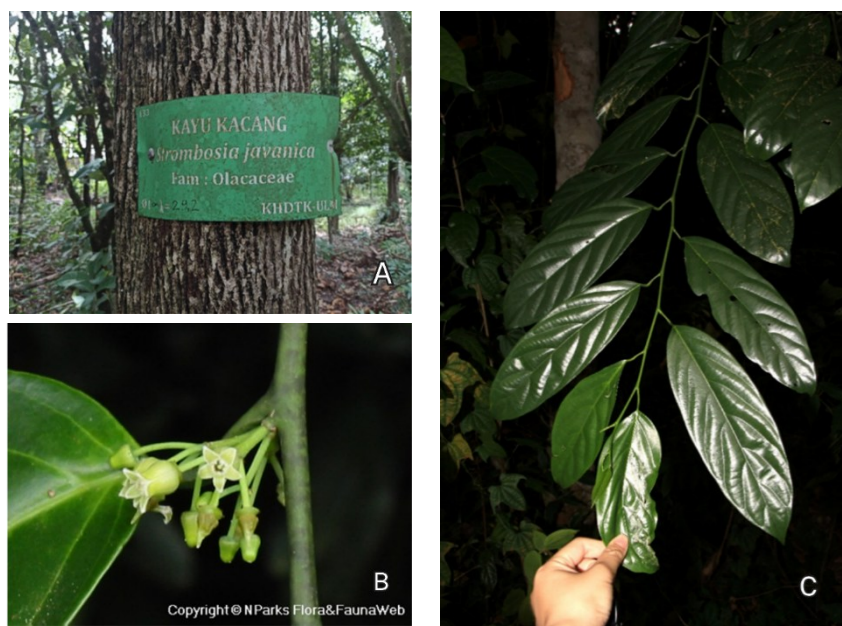
congruence between field-observed characters, published morphological descriptions, and the identification key used. When the observed characters did not correspond to *S. javanica*, the plant was traced through relevant diagnostic features until a more appropriate botanical name was obtained. This approach was considered suitable because the suspected error involved visible differences in major organs, especially leaves, flowers, and fruits. The use of multiple organs also reduced the risk of misidentification that could occur if the comparison relied only on leaf characters or on the vernacular name kayu kacang.

## RESULTS AND DISCUSSION

### *Strombosia javanica* Blume

At the KHDTK ULM, only two signboards bearing the vernacular name of the kayu kacang, along with its botanical name and family, remain (Figure 2A). The signboards are attached to the surface of the tree's trunk at a height of approximately 2 m above the ground. These wooden signboards are obscured by green foliage or hidden among the dense foliage of other trees. The other four signboards are lying on the ground and are in a state of decay (damage) Four other signboards with kayu kacang writing were lying on the ground and were in a rotten (damaged) condition.

The distribution area of *S. javanica* is Southeast Asian countries (Fern, 2014) which includes southern Myanmar, peninsular Thailand, peninsular Malaysia, and Indonesia (Sumatra, West Java, and Borneo) (PROSEA, 2016). According to Argent et al. (1997), its distribution area is Thailand, Malaysia (Peninsular Malaysia, Sarawak), Brunei, and Indonesia (Sumatra, Java, and East, West, and Central Kalimantan).



**Figure 2.** A. The signboard of kayu kacang (*S. javanica*) is attached to the surface of the stem of the plant (Photo: MA Nurrachman, 2025); B. *S. javanica* flower (Source: <https://www.nparks.gov.sg/florafauweb/flora/3/1/3148#gallery-1>); C. *S. javanica* leaves (Source: <https://tropical.theferns.info/image.php?id=Strombosia+javanica>)

Several references review the morphology of *S. javanica*. According to the National Parks Board (2025), this plant has a dense, narrow crown. It can grow up to 40 m tall. The leaves are single; arranged in a spiral or alternate arrangement (Figure 2C); have stems with slightly swollen tips; are elliptical-oblong in shape, measuring 10–24 cm x 4–8 cm and thin. Flowers grow from the leaf axils (Figure 2B); are solitary or with 3–7 flowers; have long stalks; and have greenish-white petals. Fern (2014) states that this tree has a dense crown; is generally 10–25 m tall but can reach 40 m; has a trunk diameter of up to 70 cm and rarely 100 cm; and

the wood is light yellowish-brown and is classified as heavy, hard, and of moderate durability. The trunk can be used for house construction.

However, the brief morphological description of *S. javanica* mentioned above is completely different from that of the kayu kacang whose botanical name has been accurately identified. The morphological description is as follows.

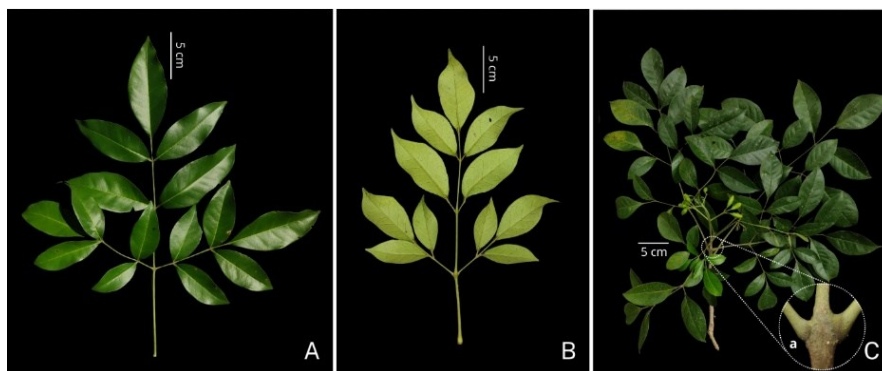
### ***Radermachera quadripinnata* (Blanco) Seem**

Kayu kacang is an evergreen tree. The trunk is generally straight and branchless, reaching a height of 8–12 m. On Pamaton Hill (including the Babaris Mountains), straight-stemmed trees can reach 30 m. Near or across the Meranti camping area (KHDTK ULM), trees reach 6–25 m in height. Some individuals have crooked trunks (Figure 3A) or multiple trunks smaller than the main trunk emerging from the ground surface (Figure 3B). This condition is thought to be the result of cutting or pruning the main trunk. The emerging shoots are then allowed to develop. The average trunk diameter at breast height is 30 cm, but some trees can reach around 60 cm. The base of the trunk sometimes projects like buttresses up to 2 m in height. The bark is grooved or deeply fissured and slightly scaly, light brown to gray (Figure 3C). The inner part of the trunk (when the bark is removed) is layered and soft, whitish to pale yellow (Figure 3D). The sapwood is white. Lenticels are present on both young and old twigs/branches (Figure 3D.a).



**Figure 3.** Stem of *R. quadripinnata*: A) tree habitus; B) smaller diameter stems emerging from the ground surface; C) bark surface; D) peeled bark surface with (a) lenticels

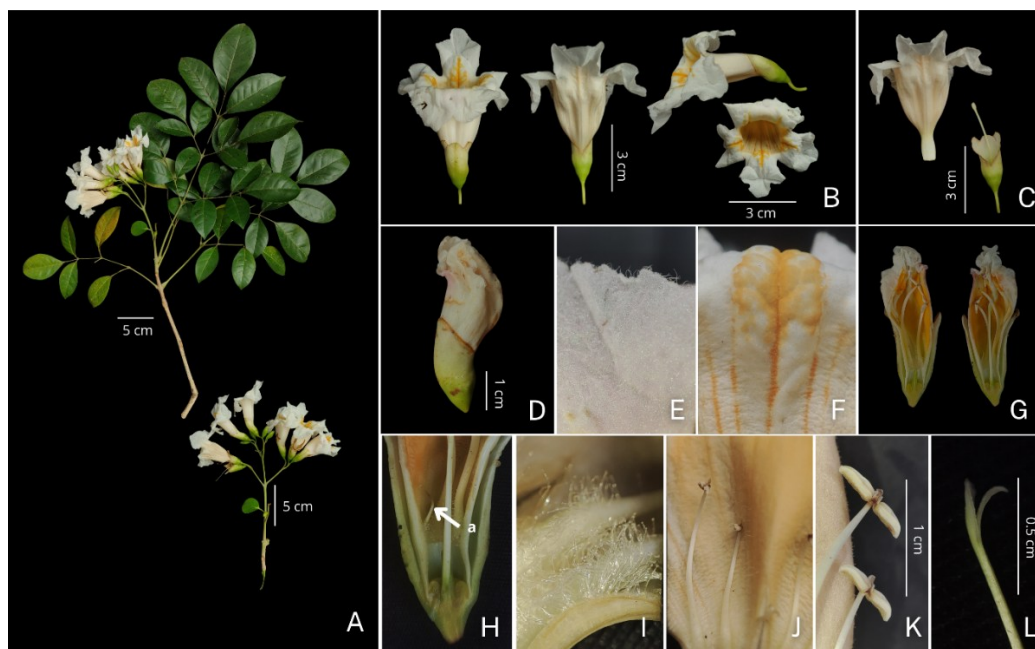
Compound leaves, arranged 1–2 pinnate, consisting of 3–5 leaflets, the 1–2 lowest pairs of which are opposite. The leaflets are glabrous, shiny, dark green above and paler below (Figure 4A-B). Basal and apical glandular spots are dark. The leaflets are elliptic, elliptic-oblong, obovate to obovate-elliptic; the apex is pointed to rounded and stippled; the base is tapering (the base of the leaflet is asymmetrical); 6–13 cm x 2–7 cm; without stipules. The base of the leaflet extends below the main vein; 7–9 pairs of secondary veins are faint and not easily distinguished from the net-like tertiary veins. Nodes and petiole bases are swollen (Figure 4C.a).



**Figure 4.** Leaves of *R. quadripinnata*: A) upper surface; B) lower surface; C) compound leaves on branches and (a) there is a swelling at the junction of the base of the leaf stalk and the twig

The flowering season is concentrated from January to April. Inflorescences are at or near the tips of the branches, 12–24 cm long (Figure 5A). The inflorescences are compound with densely arranged flowers along the main branch, often cylindrical or oval (thyrses terminal, rarely ramiflorous). The calyx is tubular-bell-shaped, closed in bud, 2–3 mm long, yellowish-green, with irregular margins without distinct lobes or truncated or irregularly branched into 2–3 (Figure 5B). One side of the calyx is split at anthesis (Figure 5C). The corolla is 7–11 cm long, with a bell-shaped upper tube and a very short, narrow funnel at the base or base of the tube (Figures 5B–D).

The five corolla lobes are mostly rounded and unequal (wrinkled surface), the upper corolla tube is white to purplish pink, tipped pink, while the throat is yellow to orange (golden) (Figure 5B–G). Fertile stamens are 4 in number, two pairs of unequal lengths or 2 longer than the other 2 (didynamous) (Figure 5G); anthers in each pair are closed; one short staminode is in the tube (the 5th stamen is sterile, rudimentary, and not detached) (Figure 5H.a). The bases of the stamens and staminodes have glandular hairs (Figure 5I). The anthers are attached directly to the basifixed anther and open through a long slit (Figure 5J–K). Each flower is disc-shaped around the ovary. Ovary elongated, superior perigynous (Figure 5G–H), bilocular with many ovules, style height exceeds stamens, stigma 2-lipped (2-lobed) (Figure 5G and 5L).



**Figure 5.** *R. quadripinnata* inflorescence: A) located at the tip of the branch and the number of flowers is more than one; B) view of the flower from various angles; C) corolla and calyx; D) flower bud; E) corolla surface (outer); F) corolla surface (inner) with a pattern similar to yellow to orange lines; G) flower bud split longitudinally; H) ovary, base of corolla tube, and (a) rudimentary staminode; I) hairs at the base; J) stamen; K) anther; L) pistil

The fruit is straight and elongated (forming a capsule), green, tapering at the tip, hanging in clusters at the ends of twigs, the capsule is 11–50 cm long and 0.5–1 cm wide, with a thin valve (6 mm wide) (Figure 6A). The capsule still has a calyx attached (persistent) at the base. The ripe fruit is brown. When dry, the fruit splits from tip to base into separate segments (Figure 6B). Lenticels are present on the surface of the fruit (Figure 6C.a–b). The corky septum is rounded and numerous small, flat seeds with thin, hyaline wings, the seeds are in 2 chambers, the seeds are 2–3 mm long and 3–4 mm wide, and the wing length is 3.5–4.5 mm (Figure 6D). The cotyledons are kidney-shaped and grooved with an elongated hypocotyl. Seedlings germinate epigeally, with the first few leaves being single, but subsequent leaves becoming increasingly compound.



**Figure 6.** Fruiting of *R. quadripinnata*: A) young, green, hanging fruit; B) ripe fruit is brown; when dry, it splits and the fruit skin is still hanging; C) fruit resembles a pod with (a-b) lenticels on the surface of the fruit skin; D) seeds

## Discussion

The research results above are actually about a single plant species with the same vernacular name, kayu kacang, but different botanical names. The plant grows in KHDTK ULM. Kayu kacang is the vernacular name given by the Minang people (Sumatra) or Minang language speakers for a plant whose scientific name is *S. javanica* Blume (PROSEA, 2016). The name refers to the taste of its young leaves. According to Alonzo (1998), the young leaves are edible, both raw and cooked, and taste similar to peanuts (*Arachis hypogaea* L.).

Kayu kacang is a vernacular name also given but by the Banjar ethnic group or Banjar language speakers for a plant that is physically similar to the plant called *S. javanica*. However, this name refers to its long, slender fruit, resembling a pea or long bean (*Vigna unguiculata* subsp. *sesquipedalis* (L.) Verdc.) (Figure 6). After comparing the main organs, describing the morphology, and comparing it with the species identification key, the plant was accurately identified as *R. quadripinnata*. The vernacular names listed in references for this species are binutan, singamba (Batak), or ririh (Sulawesi) (Plantamor, NDa), not kayu kacang which is not yet widely known in Indonesia.

The explanation above reveals the cause of the inaccuracy of the name *S. javanica*. The vernacular name kayu kacang was used as a key during the search for the botanical name through references, without further examination of the physical characteristics of its main organs.

*R. quadripinnata* is the corrected name of *R. pinnata*, after Turner (2012) published his rationale. If so, the distribution area of this plant is the Thai Peninsula, the Malay Peninsula, Sumatra, Java, Kalimantan, Sulawesi, western Maluku, and the Philippines. This distribution area was stated by Sasmitamihardja (2016) for the species whose name is still called *R. pinnata*. Sasmitamihardja (1998) further detailed that the Philippines, Sulawesi, and Maluku is the distribution area of *R. pinnata* subsp. *pinnata*, while Thailand, Sumatra, Kalimantan, and the southwestern Philippines is the distribution area of *R. pinnata* subsp. *acuminata*. According to the National Parks Board (2026), the Thai Peninsula, the Malay Peninsula, Singapore, Sumatra, Borneo, and the Philippines are the distribution areas of *R. quadripinnata* subsp. *lobbii*. This species name replaces the name *R. lobbii* subsp. *lobbii*, *R. lobbii* subsp. *acuminata*, *R. pinnata* subsp. *acuminata*, or *R. quadripinnata* subsp. *acuminata* (Turner, 2017).

We hope that the name *R. quadripinnata* will be further considered to update previous research data. For example, the research results of Syaifuddin et al. (2023) stated that *S. javanica* is a host plant for two orchid species (*Aerides odorata*, *Dendrobium secundum*). This host plant should be *R. quadripinnata*. This plant is useful as an ornament and for landscaping

(Buhay et al., 2025). The same consideration applies to the research results of Fadhil et al. (2020) on the physical and mechanical properties of *S. javanica*. The fast-growing plant categorized in Strength Class III, has a water content of 58.19%, a compressive strength of 44.2 MPa, and a flexural strength of 44.05 kg/cm<sup>2</sup>. A plant with these characteristics is certainly *R. quadripinnata*.

## CONCLUSION

The morphological evidence obtained in this study confirms that the plant locally known as kayu kacang in KHDTK ULM does not correspond to the diagnostic characters of *Strombosia javanica* Blume. The differences are evident in the main vegetative and reproductive organs. *S. javanica* is characterized by simple leaves, axillary flowers, and morphological traits consistent with Olacaceae, whereas the kayu kacang observed in KHDTK ULM has compound leaves, terminal inflorescences, large tubular-bell-shaped flowers, elongated capsule fruits, and winged seeds. These characters are consistent with *Radermachera quadripinnata* (Blanco) Seem. of Bignoniaceae. Therefore, the botanical name *R. quadripinnata* should be used for kayu kacang in KHDTK ULM instead of *S. javanica*.

This finding also indicates that previous records using the name *S. javanica* for kayu kacang in KHDTK ULM need to be reconsidered, especially those related to floristic inventories, host-plant relationships, wood properties, and other ecological or forestry studies. The case demonstrates that vernacular names should not be used as the sole basis for assigning botanical names, because the same local name may refer to different species in different cultural or geographic contexts. Accurate identification based on diagnostic morphological characters is therefore essential for maintaining the reliability of biodiversity data, ecological interpretation, and scientific communication.

## RECOMMENDATION

Future studies and biodiversity records in KHDTK ULM should use *Radermachera quadripinnata* (Blanco) Seem. as the botanical name for the plant locally known as kayu kacang, replacing the previous use of *Strombosia javanica* Blume where it refers to the same field-observed plant. Previous reports, inventories, ecological studies, orchid host records, and wood-property studies that used the name *S. javanica* for kayu kacang in this area should be reviewed carefully to determine whether the species identity needs correction. Further verification is also recommended through herbarium voucher preparation, comparison with authenticated specimens, and, if possible, molecular analysis to complement the morphological evidence. More broadly, researchers working in KHDTK ULM and other forest areas should avoid assigning botanical names based only on vernacular names, because the same local name may refer to different species across regions or ethnic communities. Accurate identification using diagnostic morphological characters and reliable taxonomic references should become a standard procedure in biodiversity documentation.

## ACKNOWLEDGMENTS

We extend our sincere gratitude to the Head of the KHDTK ULM for allowing us to enter and collect data in the forest area. We also express our appreciation to Muhammad Farhan Azhari and Hendra for their time and advice in handling and documenting the specimens.

## FUNDING INFORMATION

This research received no external funding.

## AUTHOR CONTRIBUTIONS STATEMENT

| Name of Author           | C | M | So | Va | Fo | I | R | D | O | E | Vi | Su | P | Fu |
|--------------------------|---|---|----|----|----|---|---|---|---|---|----|----|---|----|
| Muhammad Aldy Nurrochman | ✓ | ✓ | ✓  |    | ✓  | ✓ |   | ✓ | ✓ | ✓ |    |    | ✓ |    |
| Mochamad Arief Soendjoto |   | ✓ |    |    |    | ✓ |   | ✓ | ✓ | ✓ | ✓  | ✓  |   | ✓  |
| Maulana Khalid Riefani   | ✓ |   | ✓  | ✓  |    |   | ✓ | ✓ |   | ✓ | ✓  |    | ✓ |    |

**CONFLICT OF INTEREST STATEMENT**

Authors state no conflict of interest.

**DATA AVAILABILITY**

The data that support the findings of this study are available on request from the corresponding author.

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