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Assessing the taxonomic identity and distribution of endemic and critically endangered *Cynometra cebuensis* F. Seid. (Fabaceae) in Cebu Island, Philippines

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Abstract. *Lillo EP, Malaki AB, Alcazar SMT, Chavez MLM, Cañarijo III DM, Pantinople EM, Redoblado BR, Margate MA, Diaz JL, Flores KMC, Lillo JMP, Gonzaga CFO, Rosales R, Almirante A, Tomol CJ. 2023. Assessing the taxonomic identity and distribution of endemic and critically endangered* Cynometra cebuensis *F. Seid. (Fabaceae) in Cebu Island, Philippines. Biodiversitas 24: 4854-4861. Cynometra cebuensis* F. Seid. is a newly discovered species and considered endemic to Cebu Island, Philippines. Yet, it faces extinction threats, making it a critically endangered species. Information on the taxonomical certainty and geographical ranges is important to facilitate its protection and conservation. Therefore, this study focuses on the identification and distribution of *C. cebuensis* in Cebu Island, Philippines. Field surveys were conducted across various Key Biodiversity Areas and the Cebu Central Protected Landscape, specifically the Tabunan forest, to ascertain the distribution of these species. The Leaf Architectural Working Group Manual was employed to meticulously describe leaf characteristics, supplemented by information from published literature. Contrary to previous assumptions that *C. cebuensis* F. Seid. exclusively inhabited the Tabunan forest within Cebu Central Protected Landscape, this study reveals its presence in multiple areas outside Tabunan. Notably, *C. cebuensis* F. Seid. displays several distinct characteristics that differentiate it from other congeners, encompassing leaf structure, shape, fruit dimensions, growth patterns, and a unique identification key. Given its confinement to Cebu Island, *C. cebuensis* F. Seid. is acknowledged as an endemic species. Accurate identification of this species assumes pivotal importance in steering effective conservation endeavors. However, its distribution is observed to be confined to a few remaining forested patches. This emphasizes the urgency of safeguarding the Key Biodiversity Areas within Cebu Island, Philippines, where the exclusive presence of *C. cebuensis* F. Seid. has been ascertained.

Keywords: Growth habit, key biodiversity areas, leaf architecture, leaf characteristics, nomenclature

INTRODUCTION

The genus *Cynometra* L. is a diverse genus within the Fabaceae family, first described by Linnaeus in 1741 and included in the first edition of Species Plantarum published in 1753 (Seidenschwarz 2013). This botanical genus has a wide distribution and high diversity, with species categorized into regional groups such as the Neotropics, Tropical Africa, Madagascar, the Comoros Islands, and the Indo-Pacific groups (Radosavljevic 2017). However, it is important to note that the *Cynometra* genus is considered polyphyletic, meaning its members share certain characteristics but do not share a recent common ancestor (Mackinder et al. 2013; Radosavljevic 2017). This polyphyly poses challenges to taxonomy, as it can lead to misunderstandings of evolutionary relationships and misrepresent the true diversity and history of these organisms (Radosavljevic 2017).

Cynometra L. encompasses around 85 species found in tropical regions worldwide, with 10 species documented in the Philippines. Among these, *Cynometra cebuensis* F. Seid., *Cynometra warburgii* Harms, and *Cynometra ramiflora* L. are found in Cebu Island. *Cynometra cebuensis* F. Seid, locally called "*Nipot-nipot*", is a newly discovered species of Cynometra first described by Seidenschwarz (2013) and was found in the Tabunan forest, Cebu Island, Philippines. This species is considered endemic to Cebu Island and categorized as critically endangered by DENR (DENR-DAO 2017-11). Nonetheless, the taxonomic identity and distribution of *C. cebuensis* have been a subject of debate, with conflicting reports of its occurrence across Cebu Island. This discrepancy underscores the need for a comprehensive and systematic characterization of its taxonomic identity and distribution.

Understanding the distribution and characteristics of endemic species, such as *C. cebuensis*, is vital for their

conservation, given their significant roles in ecosystem functioning and their ecological and evolutionary importance (Meyer et al. 2016). Conserving these unique species and their habitats is essential for promoting ecosystem resilience, maintaining biodiversity, and safeguarding ecosystem services. Previous research by Seidenschwarz (2013) identified *C. cebuensis* exclusively in the Tabunan forest of Central Cebu Protected Landscape (CCPL). However, Pelser and Barcelona (2017) and Lillo et al. (2019) recorded *C. cebuensis* in Mount Lantoy Key Biodiversity Areas of the Municipality of Argao, Cebu, Philippines.

Cebu Island, situated in the central part of the Philippines, is recognized as a biodiversity hotspot, serving as a habitat for several endemic species at risk of extinction (Lillo et al. 2021). Information about the critically endangered *C. cebuensis*, as one of Cebu Island's endemic species, is a fundamental requirement for its sustainable conservation program, protection, and policy formulation. Unfortunately, the available information on the composition and distribution of native trees, especially endemic species, remains inadequate to support biodiversity and habitat conservation efforts in the Philippines, including Cebu Island. Scientific knowledge about species and their habitats is essential for effective conservation and reforestation programs (Soejono et al. 2013; Castro-Díez et al. 2019). Updating and evaluating information on native tree species are crucial for supporting conservation plans and programs, as demonstrated by the success of reforestation programs that utilize native species under community forestry initiatives in the Philippines (Schneider et al. 2014).

The conflicting reports regarding the occurrence and distribution of *C. cebuensis* emphasize the urgent need for a comprehensive and systematic study to ascertain its taxonomic identity and geographic range. The pursuit of stable taxonomic traits has captivated the attention of taxonomists and systematists (Buot 2020). Various investigations have employed methods like overall structure, internal anatomy, biochemical analysis, and molecular biology to confront or partially tackle taxonomic issues. However, these approaches often rely on the resources available to specific institutions. According to Buot (2020), leaf architecture, specifically patterns of venation in leaves, is genetically fixed and can be a valuable taxonomic trait.

Therefore, this paper aims to assess the precise identification and distribution of *C. cebuensis* F. Seid in Cebu Island. In doing so, we use leaf architecture as a potential tool in taxonomy (Baltazar and Buot 2019a, 2019b, 2019c), particularly in the interest of the protection and conservation of the species. We expected the results of this study to address the crucial aspects of taxonomy and occurrences of *C. cebuensis*, thereby contributing to the conservation of Cebu Island's invaluable biodiversity.

MATERIALS AND METHODS

Study area and period

The study area (Figure 1) included 5 study sites from north to south of Cebu Island, Philippines being the largest of the 11 remaining forest patches in the island, namely: (i) Tabunan Forest (10°26'17"N 123°49'34"E), as the only primary forest patch in Cebu Island, found within the Central Cebu Protected Landscape (CCPL) ; (ii) Dalaguete Forest (9°82N 123°49E) or Palinpinon Range of the Municipality of Dalaguete, Secondary forest with a total area of 500 ha, serving as the corridor between Nug-as forest and Mount Lantoy KBA; (iii) Boljoon Forest (9°65N 123°45E) of the Municipality of Boljoon, consisting of five fragments of Secondary forest at 50-400 m in elevation, with a total area of 160 ha, the forest is found to be adjacent to Nug-as of the Municipality of Alcoy; (iv) Mt Lantoy KBA (Ambal et al. 2012) (9°71'30"N 123°45'3"E), a secondary forest with 100-800 m in elevation, and covering a total of 60 ha, of the Municipality of Argao; and (v) Nug-as Forest KBA (Ambal et al. 2012) of the Municipality of Alcoy (9°71'N 123°44'E), an intact secondary forest with 0-960 m in elevation, and covering a total area of 1,600 ha. The study was conducted in the whole year of 2022, to have enough time to discover the distribution of *Cynometra* species.

Collection of data

Nine 20m x 20m quadrats were strategically positioned along the transect line at an interval of 250 meters (Willoughby et al. 2018). The selection of the transect line was based on forest accessibility, ensuring a length between 1000 and 2000 meters and incorporating a minimum of 3 transect lines with 100-meter intervals across all study sites. Within these quadrats, a comprehensive survey of all *Cynometra* species was conducted, involving identification, coordinate reading for mapping purposes, as well as thorough and precise record-keeping. However, *Cynometra* species found outside the quadrat, as well as those from the transect line, have a high possibility of not being recorded.

To achieve accurate specimen identification, a rigorous process was employed. This process included referencing authoritative floras and manuals, cross-referencing with herbarium vouchers stored at the Philippine National Museum, utilizing the extensive digital database provided by Co's Digital Flora of the Philippines (accessible at https://www.philippineplants.org), and consulting relevant online literature available at http://www.theplantlist.org This multifaceted approach ensured the utmost precision and reliability in the species identification process.

Leaf Architectural Working Group Manual (Ash et al. 1999; Lillo et al. 2020) was used to describe the diagnostic characteristics of the identified *Cynometra* species based on leaf architecture characteristics. Additional information about the species, such as taxonomic history, characteristics, and distribution, was taken from a review of literature, including taxonomic publications, herbarium records, and online databases (https://www.philippineplants.org; http://www.ipni.org and https://powo.science.kew.org/; http://www.theplantlist.org/; http://www.worldfloraonline.org).

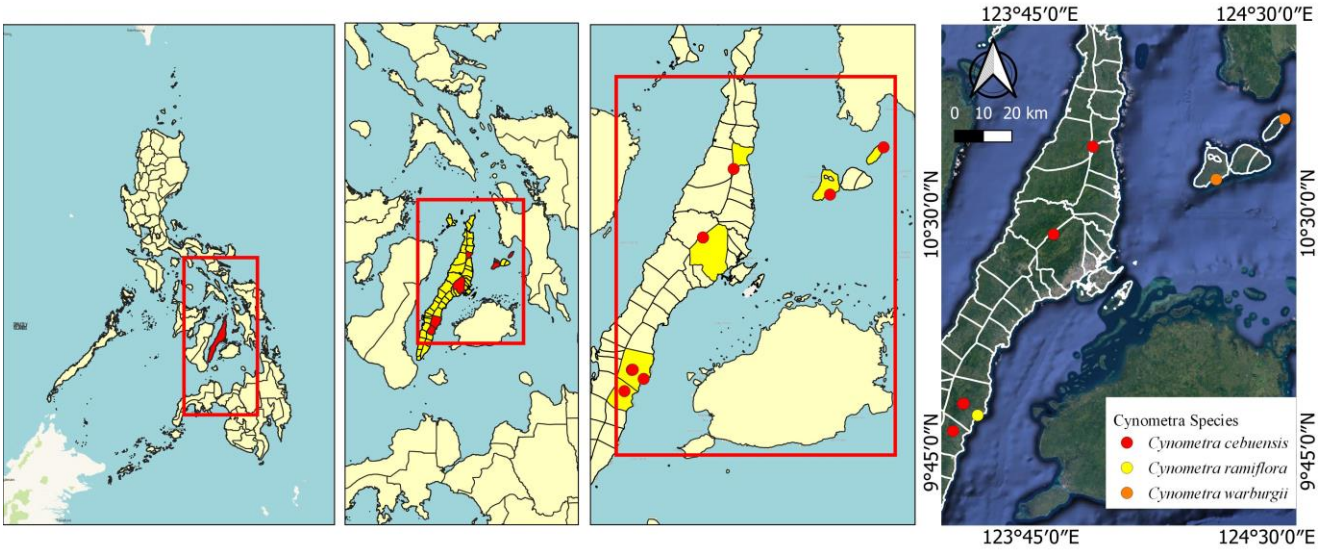

Figure 1. Location of the study site and distribution of the *Cynometra* species (GIS Generated) in Cebu Island, Philippines

RESULTS AND DISCUSSION

Distribution of *Cynometra* species in Cebu Island

The findings of this study have significant implications for the distribution of *C. cebuensis* F. Seid, shedding light on both its current range and the factors contributing to its distribution patterns. The species was identified in two out of the five study sites: Mount Lantoy Key Biodiversity Area (KBA) of the Municipality of Argao, and in Tabunan Forest within the Central Cebu Protected Landscape (CCPL) of Cebu Island, Philippines. These results challenge the prior assumption that *C. cebuensis* was exclusively confined to Tabunan Forest (Seidenschwarz 2013), as previously supported by Pelser and Barcelona (2017) and Lillo et al. (2019). The discovery of *C. cebuensis* in Mount Lantoy KBA highlights the importance of these areas for biodiversity conservation. It suggests that these regions may serve as critical habitats for this species and potentially others, emphasizing the need for their protection and preservation.

Based on the observation, *C. cebuensis* in Mount Lantoy was smaller in size (maximum of 15 cm in diameter), as compared to that in Tabunan forest (maximum of 70 cm), with few numbers of wildlings on the forest floor. The species were mostly recorded in sloppy areas under dense vegetation in both sites. The result of the study further implies that the fact that *C. cebuensis* is not isolated to a single location, as previously thought, suggests a degree of resilience in its population. This resilience may be attributed to factors such as genetic diversity, adaptability to varying environmental conditions, or effective seed dispersal mechanisms (Aavik and Helm 2018).

Cynometra ramiflora L. and *C. warburgii* Harms species were observed in the coastal areas of Argao and Camotes Island, which aligns with the findings of Ragavan et al. (2017). The study by Ragavan et al. (2017) reported that both species were predominantly found in the landward margins of mangroves and along the banks of freshwater streams. This distribution pattern can be attributed to several factors. The landward margins of mangroves provide suitable ecological conditions for *C. ramiflora* L. and *C. warburgii* Harms. These areas often have a unique combination of tidal influences, which bring nutrients and sediments and freshwater inflow from nearby streams. The interplay between these factors creates a favorable environment for the growth and establishment of these species.

The result further signifies that *C. cebuensis* F. Seid. has a wider distribution range than *C. ramiflora* and *C. warburgii* Harms. This finding is consistent with previous studies that the species have different distribution patterns, and some may be more localized than others (Salariato et al. 2022). The absence of both *C. ramiflora* and *C. warburgii* Harms species in Nug-as forest KBA, Mount Capayas KBA, and Mount Lanaya KBA could be attributed to various factors such as habitat destruction, climate change, and ecological factors. According to a study by Salariato et al. (2022) habitat fragmentation and destruction are major threats to plant species, which can lead to a decline in their population size and distribution range. According to Castro-Díez et al. (2019) the expansion of the distribution of a certain species was in response to global environmental change. Lenoir et al. (2013) emphasize further that the change in climate contributed to the distribution of plant species, as affected by the change in temperature and rainfall patterns, alter species habitat suitability (Lenoir et al. 2013).

Description of *Cynometra* species

Cynometra cebuensis *F. Seid*

Cynometra cebuensis F. Seid is a treelet that typically grows up to 12 meters in height. The leaves are jugate, with rugose petioles whose length ranges from 5-7 mm, and rachis of 7.5-10 cm long. Both the petioles and rachis are hairy. The leaflets are dark green in color with sessile leaf.

Leaf shape is ovate to oblong and measures 2-5cm length and 0.8-2.2 cm width. The leaf apex is emarginate, and the leaf base is asymmetric, the acroscopic side is cuneate and the basiscopic side is rounded to auriculate. The midrib is located 5-7 mm from the acroscopic margin, and there are 7-9 pairs of nerves with thickened margins (Ash et al. 1999).

The inflorescence rachis is 14-16 mm and laxly hairy, with pedicels that are 8-10 mm in length and also laxly hairy. The hypanthium is 1 mm deep and short hairy on the outside, while the sepals are 5-7 mm long. The petals are plain white and measure 4-8 by 2-4 mm. There are 10 stamens, although sometimes there are only 9, 11, or 12, with the sterile one absent. The filaments are 6-8 mm in length, and the anthers are dorsifix and not cleft at the base. The ovary is 3-5 by 1.5 mm and densely strigose, with a stipe that is 1 mm in length. The style is curved, measures 3-5 mm in length, and is hairy in the lower 1/3, while the upper part is glabrous. The stigma measures 0.4 mm in length (Seidenschwarz 2013).

The fruit is a woody pod that is broadly obovoid to suborbicular and compressed. It is indehiscent and measures 4 by 2.6 cm, with a thickness of 2 cm, and a pedicel that is 12 mm long. The seed measures 2.2 by 1.8 cm and is 1.1 cm thick (Seidenschwarz 2013).

Cynometra ramiflora *L.*

Cynometra ramiflora L., commonly known as the Namnam tree, is an evergreen spreading tree that can grow up to 3-10 meters in height. The bark is smooth, brown-grey, and patchy with numerous lenticels. The leaves are alternate and consist of 1 or 2 jugate leaflets. The leaflets are green in color, characterized as coriaceous and glabrous, with an entire margin, and an off-centered midvein. Leaf shape is elliptical, apex is acute, and leaf base is cuneate to attenuate (Ash et al. 1999)

The lower pair of the leaflets is often smaller than the terminal leaflets, which can reach up to 15 cm in length, and 5.5 cm in width. The petiole is short at a length of 0.5-1.5 cm, with minute pubescent. While the petiolules have a length of 0.2 cm long (Ash et al. 1999). The inflorescence is axillary and capitate, with 3-10 flowers. The mature fruits are one-seeded, woody, and wrinkled, with a sub-terminal beak. They are green when immature, turning brown on maturity (Cooper 2015).

For the phenology of the species, it is flowering from December to January and fruiting from January to February. The result of the study was not similar to the findings of Cooper (2015), wherein the *C. ramiflora* L. in Australia flowers in cultivation during the month of August and October, and the fruit was recorded in October and in cultivation in May.

For the distribution and habitat of the species, it occurs in India, Sri Lanka, Southeast Asia (including Thailand), Malesia (including Indonesia, Malaysia, the Philippines, New Guinea), Melanesia (Solomon Islands, New Caledonia) and Australia (Co digital flora of the Philippines https://www.philippineplants.org/FamsAlph.html). In this study, the species was recorded near a river and along the mangrove forest of the Municipality of Argao, Cebu, Philippines.

Cynometra warburgii *Harms*

Cynometra warburgii Harms is an evergreen spreading tree that can grow up to 10 meters in height. Leaves characterize as one-jugate, petiole is short with 2-4 mm in length, the leaflets range from ovate-oblong and glabrous, apex is obtuse and the venation is pinnate with 7 pairs (Ash et al. 1999). Inflorescences are short, rachis 5-6 mm long; bracts 3 by 2 mm, glabrous on the back, ciliate on the margin; bracteoles caducous, their scars visible on the pedicel just above its base; pedicels 3-4 mm, glabrous (Ragavan et al. 2017).

Flower is hypanthium minute, sepals are 3.5 mm long, petals are 4.5 mm long, stamens are 5-6 mm long and anthers are not apiculate. Ovary is glabrous, obliquely inserted in the receptacle; stipe 0.8 mm; style 3.5 mm (Ragavan et al. 2017). It has distribution in Malesia (Luzon, Philippines). Habitat is in forests, chiefly near streams at low and medium altitudes (Co digital flora of the Philippines https://www.philippineplants.org/FamsAlph.html), but in this study, it was recorded as associate species in mangrove forests, particularly in Camotes Island, Cebu, Philippines.

Distinguishing characteristics between *Cynometra cebuensis, C. ramiflora,* and *C. warburgii*

Based on Table 1, there are several distinguishing characteristics between *Cynometra* species in Cebu Island. Distinguishing characteristics play a crucial role in identifying and conserving plant species, as they enable researchers and conservationists to differentiate between closely related species. In the case of the three *Cynometra* species found on Cebu Island (*C. cebuensis* F. Seid, *C. ramiflora* L, and *C. warburgii* Harms), several key characteristics can be used for their proper identification and subsequent conservation efforts. These characteristics include size, and growth habit, leaf structure, leaflet shape, and fruit size and shape.

In terms of species size and growth habit, *C. cebuensis* is described as a treelet that grows up to 12 meters tall, while *C. ramiflora* is a spreading tree that can reach heights of 3-10 meters. In contrast, *C. warburgii* is a tree that can grow up to 10 meters tall (Table 1 and Ash et al. 1999). The variation in size and growth habits provides an initial clue for differentiation among these species.

Leaf structure is an important distinguishing characteristic for plant identification. *Cynometra cebuensis* has leaves that are (3-)4-6-jugate with rugose petioles measuring 5-7 mm in length, whereas *C. ramiflora* has leaves consisting of 1 or 2 jugate leaflets with a petiole that is 0.5 0.5-1.5 cm1.5 cm long. *Cynometra warburgii* has one-jugate leaves with a petiole measuring 2-4 mm. These differences in leaf structure can aid in the accurate identification of the species (Table 1 and Ash et al. 1999).

The shape of the leaflets is also a distinguishing feature of the three *Cynometra* species. *Cynometra cebuensis* has ovate to oblong leaflets measuring 2-5(-6) by 0.8-1.5(-2.2) cm. *Cynometra ramiflora* has elliptic leaflets that can reach

up to 15 cm in length and 5.5 cm in width. While *C. warburgii's* leaflets are ovate-oblong, oblong, or lanceolate leaflets measuring 3.2-6.5 by 0.8-2.7 cm. These differences in leaflet shape can help to accurately identify each species (Table 1 and Ash et al. 1999).

The size and shape of the fruit can also serve as important distinguishing characteristics. *Cynometra cebuensis* has a woody pod that measures 4 by 2.6 cm and is broadly obovoid to suborbicular and compressed. *Cynometra ramiflora* produces one-seeded, woody, and wrinkled fruits with a sub-terminal beak. The fruit characteristics of *C. warburgii* were not provided in this study because during the period of collection, the fruit was not available.

By understanding the distinguishing characteristics between *C. cebuensis*, *C. ramiflora*, and *C. warburgii*, conservationists can better assess the distribution, abundance, and ecological requirements of each species. Accurate identification of species ensures that the conservation efforts targeted would be successful and prevent misallocation of resources.

Key to identification of the existing species of *Cynometra* in Cebu Island

Cynometra cebuensis is characterized by its specific leaflet morphology and arrangement. While *C. ramiflora* is distinct from the other species due to its unique leaflet shape and size. Then *C. warburgii* can be distinguished by its single-jugate leaves and specific leaflet dimensions and shape (Figure 2). Identifying this species is crucial for conservation efforts, as it may have unique ecological roles or adaptations within its habitat. Conservationists can focus on preserving areas where this species is found, ensuring that its habitat remains intact and undisturbed. Additionally, understanding its distribution can help in determining its conservation status and implementing appropriate measures for protection. Below is the Dichotomous Key of the Species of *Cynometra* in Cebu Island:

Leaves (3-)4-6-jugate; petioles rugose, 5-7 mm, rachis 7.5-10 cm, both hairy, leaflets dark green, sessile, ovate to oblong, 2-5(-6) by 0.8-1.5(-2.2) cm, apex deeply emarginate; base asymmetric, acroscopic side cuneate, basiscopic side rounded to auriculate; midrib 5-7 mm from the acroscopic margin; nerves 7-9 pairs, margin thickened……..……***Cynometra cebuensis* F. Seid**.

Leaves 1- or 2-jugate; leaflets are elliptic in shape and can reach up to 15 cm in length and 5.5 cm in width, upper leaflets much larger than lower …… ***Cynometra ramiflora* L.**

Leaves 1-jugate with a petiole measuring 2-4 mm. leaf shape ovate-oblong, oblong, or lanceolate leaflets measuring 3.2-6.5 by 0.8-2.7 cm …… ***Cynometra warburgii* Harms.**

Discussion

Cynometra cebuensis is a newly discovered species that is mostly similar to *Cynometra copelandii* of Sibuyan Island, Philippines (Seidenschwarz 2013), but totally different or distinct from *C. ramiflora* and *C. warburgii* Harms of Cebu Island, Philippines (Ragavan et al. 2017). *Cynometra cebuensis* and *C. copelandii* both have 4-6 jugate leaves and emarginate leaflets. The significant differences between them include the leaf size, stamen, flower and anther (Ash et al. 1999; Ragavan et al. 2017). *C. cebuensis* are much larger in leaf size as compared to *C. copelandii*. The flowers of *C. cebuensis* are purely white, whereas those of *C. copelandii* are creamy white. Additionally, the rachis of the inflorescence of *C. cebuensis* is much longer as compared to *C. copelandii*, and the anthers of *C. cebuensis* are not cleft at the base (Seidenschwarz 2013; Ragavan et al. 2017).

Another distinguishing characteristic is that *C. copelandii* has one sterile stamen, which is an exception in *Cynometra*, whereas *C. cebuensis* has no sterile stamen. The ovary of *C. cebuensis* is densely strigose hairy, while in *C. copelandii* it is laxly long-hairy (Seidenschwarz 2013; Ragavan et al. 2017). The habitat of *C. cebuensis* F. Seid. is also different from that of *C. copelandii*. *Cynometra cebuensis* grows in dry forests on limestone without any flowing water, while *C. copelandii* of Sibuyan Island (Seidenschwarz 2013), is found in moist, fertile wooded flats along the river. Cebu has a distinct dry season of about 3 months, from the middle of March to early June, as the preferred climatic condition for *Cynometra* (Seidenschwarz 2013; Ragavan et al. 2017).

Table 1. Distinguishing characteristics between *Cynometra cebuensis* F. Seid, *C. ramiflora* L. and *C. warburgii* Harms

Characters (Ash et al. 1999)	***Cynometra cebuensis* F. Seid.**	***Cynometra ramiflora* L.**	***Cynometra warburgii* Harms**
Size and growth habit	Treelet that grows up to 12 meters tall	Spreading tree that can grow up to 3-10 meters tall	Tree that can grow up to 10 meters tall
Leaf structure	Leaves are (3-)4-6-jugate with rugose petioles that are 5-7 mm in length	Leaves consist of 1 or 2 jugate leaflets with a petiole that is 0.5-1.5 cm long	Leaves are 1-jugate; petiole 2-4 mm. apex obtuse (tip not emarginate); nerves 7 pairs
Leaflet shape	Leaflets are ovate to oblong in shape and measure 2-5(-6) by 0.8-1.5(-2.2) cm	Leaflets are elliptic in shape and can reach up to 15 cm in length and 5.5 cm in width	Leaflets ovate-oblong, oblong, or lanceolate, 3.2-6.5 by 0.8-2.7 cm, glabrous
Fruit size and shape	Fruit is a woody pod that measures 4 by 2.6 cm and is broadly obovoid to suborbicular and compressed	Fruit is 1-seeded, woody, and wrinkled, with a sub-terminal beak	Fruit not seen

Figure 2. A. *Cynometra cebuensis* F.Seid, B. *Cynometra ramiflora* L., C. *Cynometra warburgii* Harms

In addition, *C. ramiflora* is distinct from *C. cebuensis* because the appearance of its style is straight, the ovary is curly hairy outside and glabrous inside, calyx lobes erect, and fruits with a sub-terminal beak (Seidenschwarz 2013; Ragavan et al. 2017). *Cynometra ramiflora* are closely related to *Cynometra iripa* of India, but they differ in the number and size of their leaflets (Ragavan et al. 2017). Then *C. warburgii* also differs from *C. cebuensis* because of its single-jugate leaves and specific leaflet dimensions and shape (Figure 2).

Taxonomy and species conservation go hand in hand, with each relying on the other for effective outcomes. However, challenges arise for conservationists due to limited taxonomic information and uncertainties about species distribution (Jetz et al. 2019), a similar situation with *C. cebuensis*. Fortunately, the advent of global-scale bioinformatic databases has opened up new possibilities for conservation efforts by enabling the analysis of species occurrence data (Jetz et al. 2019). The scarcity of comprehensive species occurrence information is a global reality that has hindered informed decisions about biodiversity conservation (Beier and Albuquerque 2015; Nelson and Ellis 2019). In addition, Meyer et al. (2016), also emphasize that gaps and uncertainties in plant occurrence information remain a central problem in ecology and conservation. Addressing this crucial information gap is vital for making well-informed conservation management decisions. As a result, it is essential to invest more efforts and resources into field inventories to gather systematic information and species distribution data (Meyer et al. 2015).

Loss of habitat on Cebu Island is the biggest threat to *C. cebuensis* due to expanding urbanization and agricultural encroachment (Seidenschwarz 2013). This Cebu endemic species needs to be conserved and protected as populations were already endangered in the wild. To effectively protect and conserve *C. cebuensis*, it is essential to foster robust collaborations with various stakeholders, including the Department of Environment and Natural Resources (DENR), Local Government Units (LGUs), and local communities, who play pivotal roles in the implementation of ambitious conservation initiatives, particularly those focused on community-based forest and wildlife preservation and enhancing conservation awareness. Such collaborative endeavors will not only empower our local community partners but also fortify their capacity to execute biodiversity conservation projects successfully.

Promoting the protection and conservation of *C. cebuensis* in the area or forest where it could be found could result in a possible ecotourism destination. By doing so, we can bridge the knowledge gaps, leading to more effective conservation strategies and better protection of our planet's precious biodiversity.

In conclusion, based on the findings of this study, it can be concluded that the newly discovered *C. cebuensis* F. Seid. exhibits several unique characteristics that differentiate it from other species of the genus. The differences in size, color, and other floral characteristics, as well as the distinct habitat in which it grows, make this species a fascinating subject for further research and exploration. The study provides a comprehensive description of the distinguishing features of each species, including leaf structure, leaf shape, fruit size and shape, and growth habit, as well as a key to identifying the species.

In addition, the study highlights the importance of protecting the Key Biodiversity Areas (KBA) of Cebu Island, particularly where *C. cebuensis* F. Seid. is exclusively found. This species is considered endemic to the island, and its distribution is limited to a few forested areas. Therefore, conservation efforts should focus on protecting these areas and preventing further habitat loss and degradation. Furthermore, this study provides important information on the identity and distribution of *Cynometra* species in Cebu Island, highlighting the need for conservation efforts to protect the unique and endangered ecosystems of the island.

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