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NEW RECORDS OF *MICONIA DEPENDENS* (MELASTOMATACEAE) IN PENINSULAR MALAYSIA

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Miconia dependens (Pav. ex D. Don) Judd & Majure is reported as a new record for Peninsular Malaysia, with documented occurrences in the states of Pahang, Johor, and Selangor. This species has likely been overlooked in the region due to its morphological similarity to *Miconia crenata* (Vahl) Michelang. (syn. *Clidemia hirta* (L.) D. Don), a widespread invasive weed in Malaysia. A comprehensive review of herbarium collections at KEP revealed no specimens matching *M. dependens*, and searches of online databases similarly yielded no records of the species in Malaysia, suggesting its recent introduction. This finding aligns with its first documented occurrence in Singapore in 2018. To aid in accurate identification, this study provides detailed morphological descriptions, diagnostic photographs, and comparative analyses with closely related taxa, emphasizing key distinguishing characteristics. These contributions aim to enhance taxonomic clarity and support future efforts in species identification and management.

Keyword: *Miconia crenata*, morphological comparison, naturalized plants, plant taxonomy, weeds

INTRODUCTION

The genus *Miconia* Ruiz & Pav., the seventh-largest genus of flowering plants, comprises approximately 1900 species distributed across the Neotropics (Michelangeli et al. 2022). Native to warm temperate and tropical regions of the Americas, some *Miconia* species have become invasive in warmer climates, including Southern Asia, East Africa, Hawaii, and Australia (Ibanez et al. 2020, Ulloa Ulloa et al. 2022). Most species are shrubs or small to medium-sized trees, reaching up to 15 meters in height.

In Peninsular Malaysia, *Miconia crenata* (Vahl) Michelang. (syn. *Clidemia hirta* (L.) D. Don) is a well-known invasive alien plant species (IAPS) (Peter 2001, Loke et al. 2023). Due to its invasive nature, research on *M. crenata* has largely focused on eradication efforts, particularly in plantation areas and along forest edges, rather than on taxonomic studies or conservation initiatives (Le et al. 2018, Seng et al. 2024).

However, recent sample collections from Rompin State Park (Pahang), Panti Forest Reserve (Johor), and Bangi Botanic Garden (Selangor) have revealed distinct morphological characteristics in plants resembling *M. crenata*. These plants exhibit noticeably hairier, thicker leaves and variations in inflorescence structure, leading to their identification as *Miconia dependens* (Pav. ex D. Don) Judd & Majure (syn. *Clidemia capitellata* (Bonpl.) D. Don). This discovery marks the first recorded occurrence of *M. dependens* in Malaysia. Previously, Chen et al. (2018) reported the naturalisation of *M. dependens* in Singapore, documenting its first occurrence outside the Americas.

Similar to other invasive species, *M. dependens* exhibits traits that facilitate its rapid spread. Hartemink (2022) highlighted that the proliferation of *Piper aduncum*, another invasive species, is driven by factors such as prolific seed

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production (small and abundant seeds), rapid growth, and both accidental and intentional dispersal. These characteristics are also evident in *M. dependens*, indicating its potential to spread aggressively.

Understanding *Miconia* species is crucial due to their high invasive potential and ecological impact. Many species, including *M. crenata* and *M. calvescens*, have demonstrated the ability to spread rapidly and outcompete native vegetation. Proper species identification is essential for effective plant management, as misidentification could result in inadequate control measures or the unnecessary eradication of non-invasive species. By accurately distinguishing between species, researchers and conservationists can develop targeted management strategies to mitigate the spread of invasive *Miconia*.

MATERIALS AND METHODS

During a botanical survey at Panti Forest Reserve (Johor), *M. dependens* was collected as part of the ongoing effort to assess plant diversity in the area. In Rompin State Park (Pahang), the species was identified while studying the diversity of Melastomataceae (with permission from the Forest Department Peninsular Malaysia, Ref. No: CR20240514004, and Majlis Biodiversiti Pahang). Meanwhile, in Bangi Botanic Garden (Selangor), *M. dependens* was unexpectedly encountered during a visit. Despite not being deliberately planted, the species was found naturally occurring within the garden, highlighting its potential for establishment beyond its known range.

Live specimens were examined and photographed for species identification and documentation. Information on habits and localities were also recorded. Complete specimens were collected and processed using standard herbarium preparation technique for deposition in the Universiti Kebangsaan Malaysia Herbarium (UKMB) and the International Islamic University Malaysia Herbarium (IIUM). Species identification, distribution status, and comparison of morphological similarities between close species were assessed based on previous records from digital specimens and other online databases such as Kew Herbarium Catalogue (http://apps.kew.org/herbcat/gotoSearchPage.do), Herbarium of Singapore Botanic Gardens (SING) accessed through BRAHMS Online managed by University of Oxford (http://herbaria.plants.ox.ac.uk/bol/sing), Plants of the World Online (POWO) (http://www.plantsoftheworldonline.org/), Global Plant JSTOR (https://plants.jstor.org/), World Flora Online (2024) and a visit to the Herbarium of Forest Research Institute Malaysia (KEP).

RESULTS

New Record for Peninsular Malaysia
Specimens examined: UKMB- UKMB40548, IIUM Herbarium – IIUM481 and IIUM482
Miconia dependens (Pav. ex D.Don) Judd & Majure J. Bot. Res. Inst. Texas 12: 526 (2018)

Description: Shrub (Figure 1A), 1–3 m tall; stems, petiole, inflorescences and leaf surfaces densely pubescent with conspicuous bristle hairs, in addition to glandular-setulose trichomes, glandular head usually caducous. Leaves: opposite, coriaceous, with petioles 1–5 cm long; blades elliptical, acuminate, obtuse to rounded at base, 6–15 (20) cm long, 3–7 (9) cm wide, margin crenulate, ciliolate (minutely toothed with marginal hairs 1–1.5 mm), Long, simple trichomes with swollen, rounded bases (bulla-based hairs) on the upper surface create corresponding depressions on the lower surface, veins 5–7 nerved from base with white or green long hairs, lateral veins distinct, about 20–35 pairs, both surfaces hispid, upper surfaces sunken, lower surface elevated; (Figure 1 B, C, D, E, F & G). Flowers: sessile, 5-parted, clustered and well-spaced on a strong central axis and at the ends of short branches; hypanthium and calyx tube together 3–4 mm long, campanulate, covered with long hairs ca. 1–3 mm, calyx lobes 5, 1–1.5 mm long, the exterior teeth slender, ca 1 mm longer than calyx lobes; petals white, obtuse, 4.5–5 mm long, spreading at anthesis and later closing: stamens isomorphic without pedoconnectives, 10, white, equal, glabrous, folded in bud, all directed to one side at anthesis, the terminal pore of the anthers held somewhat beneath style; style erect or held to one side; stigma held just above the closed petals after stamens shrivel (Figure 1H & 1I). Fruits: subglobuse berries, purple, densely pubescent, ca 6 mm diam, with 5 persistent calyx lobes;

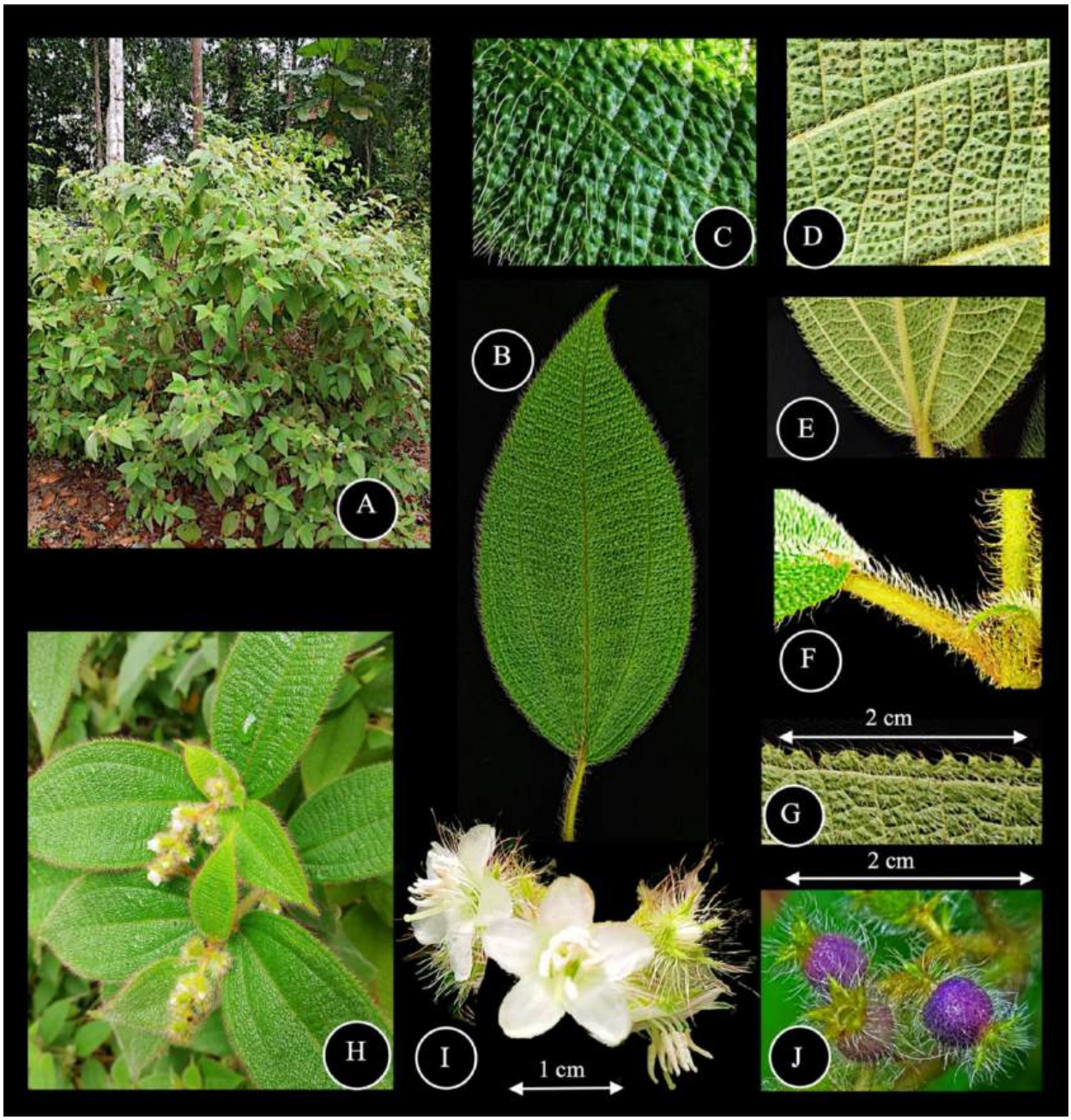

Figure 1 *Miconia dependens* (A) Habit, (B) Leaves, (C) Upper leaves surface: swollen rounded based hairs (bulla-based hairs), (D) Lower leaves surface: associated depressions, (E) Elevated veins, (F) Trichomes on petiole, (G) Leaf margin crenulate and long marginal hairs, (H) Inflorescences with sessile flower, (I) Flowers- five white petals, (J) Fruits- purple berries lobes and oval to oblong shape of immature fruits

seeds minute and numerous (Figure 1J).

Distribution: In Peninsular Malaysia, it is newly recorded in Johor, Selangor and Pahang (Figure 2).

Habitat and Ecology: *Miconia dependens* was found in the forest gap of primary lowland dipterocarp forest in Johor, Selangor and Pahang.

Conservation status: *Miconia dependens* is assessed as *Least Concern* by the IUCN (2019) based on its wide distribution, large population, and lack of major threats in its native range - the Neotropics. However, in Peninsular Malaysia, where it is an introduced species, its presence raises ecological concerns due to its potential invasiveness.

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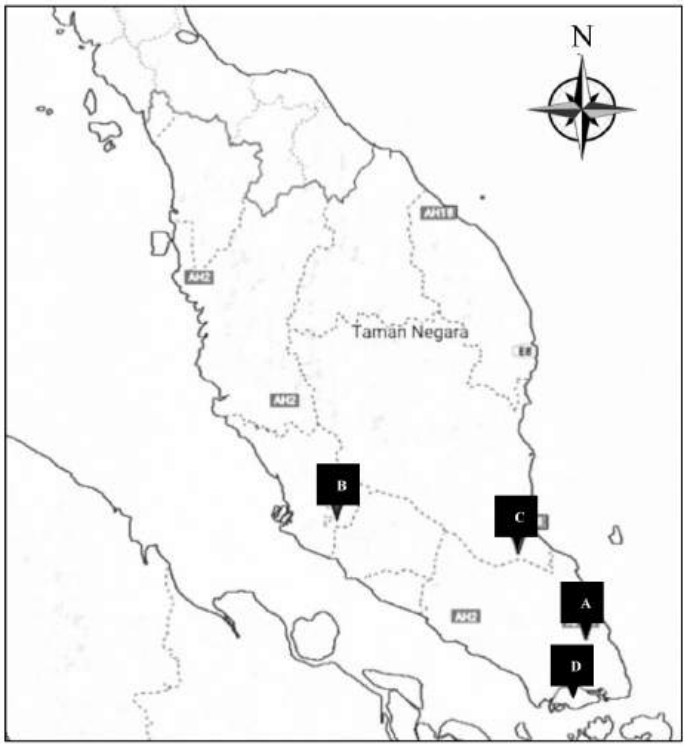

Figure 2 A map of the surveyed area showing the distribution of newly recorded *M. dependens* in Peninsular Malaysia, including (A) Panti Forest Reserve in Johor, (B) Bangi Botanic Garden in Selangor, and (C) Rompin State Park in Pahang. Additionally, a map indicating the general locality of *M. dependens* in (D) Singapore

DISCUSSION

In order to confirm this new record, we examined the herbarium collections through both online databases and by visiting the KEP herbarium. We reviewed two boxes of herbarium specimens labeled *C. hirta* and found that all specimens were correctly identified as *M. crenata* (syn. *C. hirta*). This verification supports the discovery of *M. dependens* as a new addition to the flora of Peninsular Malaysia.

The most obvious characters in distinguishing these two species are as follows: The flowers of *M. dependens* are characterized by their long, clustered, sessile arrangement, while those of *M. crenata* are pedicellate and form short, terminal, or axillary panicles. The fruits of *M. dependens* subglobose shape and have persistent triangular calyx lobes, whereas the fruits of *M. crenata* feature oval to oblong shape and have persistent linear or needle-shaped calyx lobes. Additionally, the leaves of *M. dependens* are thick and velvety due to dense pubescence, with long simple trichomes that have swollen, rounded bases (bulla-based hairs) on the upper surface. In contrast, *M. crenata* has thin, papery leaves with a smooth, glossy upper surface and scattered long simple trichomes, lacking the dense pubescence seen in *M. dependens* (Figure 3).

CONCLUSION

The recent discovery of *M. dependens* in Panti Forest Reserve (Johor), Bangi Botanic Garden (Selangor), and Rompin State Park (Pahang) represents a significant addition to the botanical records of Peninsular Malaysia. Accurate identification and continuous monitoring of *M. dependens* are crucial for maintaining precise botanical documentation and effectively managing *Miconia* species in the region.

Future research should investigate not only the mechanism responsible for seed dispersal but also the potential risks associated with *M. dependens* as an alien species. Studies on its ecological impact, competitive interactions with native flora, and possible invasive tendencies in different habitats would provide valuable insights. Understanding these dispersal mechanisms and ecological dynamics will aid in

Figure 3 Flower of (A) *M. dependens* - long clustered sessile flowers,(B) *M. crenata* - pedicellate (short, terminal or axillary panicles), Fruits of (C) *M. dependens* - persistent triangular calyx lobes and subglobose shape of immature fruits and (D) *M. crenata* - persistent linear or needle-shaped calyx

developing better plant management strategies and conservation efforts, particularly since shared characteristics among tropical forests may facilitate the naturalisation and spread of species across continents.

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