







Full Length Research Article

Four New Climbing Bamboo Species in the genus *Dinochloa* Buse (Poaceae) from Mount Hamiguitan Range Wildlife Sanctuary, Mindanao, Philippines

Lowell Gazo Aribal^{1,2}, Erika Llagas Noblefranca^{1,2,*}, Jevie Ontejo Polestico², Kean Roe Felipe Mazo³

¹ Department of Forest Biological Sciences, College of Forestry and Environmental Science, Central Mindanao University, Bukidnon, Philippines

² Niche Center for the Regions (NICER) Bamboo, Bamboo Research and Development Center, Central Mindanao University, Bukidnon, Philippines

³ Department of Forest Science, College of Environment and Life Sciences, Mindanao State University at Naawan, Naawan, Misamis Oriental, Philippines

* Corresponding author. E-mail address: f.erika.noblefranca@cmu.edu.ph

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ABSTRACT

The genus *Dinochloa* Buse (Poaceae) comprises a diverse group of climbing bamboos distributed throughout Malesia, yet its diversity in the Philippines remains insufficiently documented. Field surveys conducted in the lowland ultramafic forests of the Mount Hamiguitan Range Wildlife Sanctuary, Mindanao, Philippines, revealed four previously undescribed species of *Dinochloa*. This study formally describes *Dinochloa rubra*, *Dinochloa torretae*, *Dinochloa adonii*, and *Dinochloa hamiguitanensis* based on detailed vegetative morphological analyses of voucher specimens collected from elevations of 340–570 m above sea level. Species delimitation was established through comparative assessment of diagnostic characters, including culm coloration, culm diameter, sheath persistence and indumentum, auricle and ligule morphology, branching patterns, and foliage-leaf characteristics. *D. rubra* is distinguished by bright red young culms turning dark violet, caducous light-purple culm sheaths with narrowly linear caducous blades, and the absence of auricles and oral setae, and possesses glabrous nodes and foliage leaves. *D. torretae* is characterized by almost solid, very slender culms (0.2–0.3 cm diameter), small auricles bearing long hairs, and culm-leaf and foliage-leaf ligules crowned with erect hairs. *D. adonii* differs in having larger culms (1.3–1.8 cm diameter), persistent scabrid sheaths with stiff hairs, and ovate-lanceolate sheath blades with small auricles bearing short hairs. *D. hamiguitanensis* is distinguished by smaller culms (0.8–1.0 cm diameter), pale orange to golden-brown scabrid culm sheaths lacking auricles and oral setae, and the absence of a foliage-leaf ligule combined with glabrous concolorous lanceolate leaves. These discoveries emphasize the ecological and conservation significance of ultramafic ecosystems as centers of bamboo endemism and diversity. Recognition of these four new species increases the number of documented Philippine *Dinochloa* species from eight to twelve and highlights Mount Hamiguitan as an important center of bamboo diversity and conservation.

1. Introduction

Climbing bamboos account for approximately 32% of the bamboo diversity in the Philippines and are currently assigned to three genera, namely *Dinochloa* Buse, *Cyrtochloa* S. Dransf., and *Cephalostachyum* Munro (Bondad et al. 2023). Within this assemblage, species of *Dinochloa* exhibit diverse climbing strategies, including scrambling, trailing, clambering, and scandent growth forms (Escobin et al. 2005). Morphologically, the genus is characterized by its right-twining culms, zigzag growth pattern in the absence of support, solid to nearly solid and often thin-walled internodes, and intravaginal branching, features that distinguish it from other Philippine climbing bamboo genera such as *Schizostachyum* Nees and *Racemobambos* Holttum, which typically possess hollow culms, extravaginally branching, and erect habits (Dransfield 1981, 1998a). Vegetatively, species possess slender and often flexuous culms with several to many branches, usually dominated by a single primary branch that may substitute for the main culm (Liu et al. 2023). Taxonomically, *Dinochloa* exhibits substantial variation in culm sheath texture, auricle development, ligule structure, and leaf pubescence, all of which serve as important diagnostic traits for species delimitation. Reproductive characters are equally diagnostic, with pseudospikelets reduced to a single floret bearing two to three glumes, obtuse to mucronate lemmas, unkeeled paleas when present, and fleshy globose to subglobose fruits enclosed by a thin pericarp (Dransfield 1981; Ervianti et al. 2019; Liu et al. 2023). Although the genus was first described in the mid-nineteenth century, many aspects of its morphology, reproductive biology, and ecological specialization remain insufficiently understood (Zulkifli et al. 2025). Flowering in bamboos is a remarkable yet enigmatic phenomenon, as species often exhibit highly variable and prolonged life cycles. Many species remain in a vegetative state for several decades, or even up to a century, before undergoing gregarious, synchronous flowering, followed by the death of the entire clump, with regeneration through the rhizome system (Janzen 1976; Zheng et al. 2020). Consequently, taxonomic identification in bamboos frequently relies on vegetative characters, substantially increasing the complexity of accurate species delimitation. The availability of complete and well-documented specimens is therefore essential for rigorous morphological assessment and reliable taxonomic resolution (Widjaja et al. 2023).

The genus is widely distributed from West to Central Malesia, with its center of species richness in Southeast Asia, where 33 of the 38 currently recognized species have been documented (Ervianti et al. 2019; Vorontsova et al. 2016). Current assessments indicate that the genus may include up to 46 species, reflecting ongoing taxonomic revisions and the discovery of previously undocumented taxa. According to Zulkifli et al. (2025), *Dinochloa* is largely concentrated in Borneo, while its overall distribution extends from northeastern India and Bangladesh across the Indo-China Peninsula to Indonesia, eastward to Sulawesi, and into the Philippines (Liu et al. 2023). Recent discoveries, including *Dinochloa malayana* from Central Sumatra, further reinforce the view that the genus remains incompletely documented and that poorly explored regions of Malesia continue to harbor undescribed species (Ritonga et al. 2024). Moreover, recent taxonomic revisions that reassign several Hainan species to *Melocalamus* Benth. have refined the circumscription and distribution of *Dinochloa*, underscoring the dynamic and evolving nature of bamboo systematics (Liu et al. 2023; Ritonga et al. 2024). Recent regional studies also highlight the importance of island systems in revealing hidden bamboo diversity. Widjaja et al. (2025), in their assessment of the bamboo flora of Flores Island in the eastern Lesser Sunda archipelago, emphasized the region's remarkable bamboo richness, ecological heterogeneity, and strong

association between species diversity, habitat specialization, and long-term human use. This evidence underscores that underexplored islands within the Malesian region remain important reservoirs of undocumented bamboo diversity.

In the Philippines, eight species of *Dinochloa* have been recorded based on the works of Dransfield (1981, 1992, 1995, 1998a) and Rojo (1996), namely *Dinochloa acutiflora* (Munro) S. Dransf., *Dinochloa dielsiana* Pilg., *Dinochloa elmeri* Gamble, *Dinochloa luconiae* (Munro) Merr., *Dinochloa oblonga* S. Dransf., *Dinochloa palawanensis* (Gamble) S. Dransf., *Dinochloa pubiramea* Gamble, and *Dinochloa robusta* S. Dransf., although much of the country's climbing bamboo diversity remains insufficiently explored, particularly within the Mindanao biogeographic region. Philippine species are generally associated with primary forests and are often restricted to specialized habitats such as karst and ultramafic ecosystems, reflecting high ecological specificity and sensitivity to habitat disturbance. Distinguishing *Dinochloa* from morphologically similar paleotropical climbing bamboo genera, particularly *Melocalamus* and *Maclurochloa* K.M. Wong, remains taxonomically challenging because these taxa frequently share overlapping vegetative traits, including scrambling habits and dominant primary branches comparable in thickness to the main culm (Chen et al. 2025; Liu et al. 2023; Wong 1993). Such similarities often result in taxonomic ambiguity during field identification, especially because many bamboo species undergo prolonged vegetative phases and reproductive structures are rarely encountered during collection (Clark 2023; Nath et al. 2024). Consequently, species delimitation in *Dinochloa* frequently depends on careful evaluation of vegetative morphology, signifying the importance of detailed field documentation and comparative taxonomic assessment.

The Mount Hamiguitan Range Wildlife Sanctuary, a UNESCO World Heritage Site and one of Mindanao's key biodiversity areas, represents an important center of endemism and ecological heterogeneity. Recent studies have emphasized the significance of long-term refugial landscapes in shaping present-day biodiversity and sustaining localized evolutionary diversification (Kalema et al. 2026). However, the bamboo flora of Mount Hamiguitan remains poorly documented, particularly within ultramafic forest ecosystems. The discovery of four previously undocumented *Dinochloa* species from this protected area provides new insights into the taxonomic boundaries, ecological preferences, and biogeographic patterns of Philippine climbing bamboos. This study aims to formally describe four novel climbing bamboo species of the genus *Dinochloa*, to establish their diagnostic morphological features, and to provide a comparative overview of previously documented Philippine *Dinochloa* species to facilitate accurate identification. Recognition of these taxa increases the total number of documented Philippine *Dinochloa* species from eight to 12 and demonstrates the conservation significance of Mount Hamiguitan as a refuge for rare and endemic bamboo lineages.

2. Materials and Methods

A preliminary survey was conducted on November 18, 2022, in the lowland primary forests of the Mount Hamiguitan Range Wildlife Sanctuary (MHRWS), Davao Oriental Province, Mindanao, Philippines, to initially assess the presence and distribution of climbing bamboos within the study area (Fig. 1). However, specimen collection was deferred pending the issuance of the necessary Wildlife Gratuitous Permit (GP). The sanctuary, which forms part of the Eastern Mindanao Biodiversity Corridor and was designated as a UNESCO World Heritage Site in 2014, is characterized by a tropical climate with an average annual temperature ranging from 24–27°C

and mean annual precipitation of approximately 2,000–2,500 mm, influenced by the Amihan and Habagat monsoon systems (Ramos et al. 2026). The study sites were located within dipterocarp-dominated lowland primary forests on ultramafic substrates at elevations of 340–600 m asl. These ultramafic soils are typically enriched in nickel, iron, and cobalt, conditions known to support specialized, highly endemic vegetation while limiting the establishment of many non-adapted plant taxa (Ramos et al. 2026).

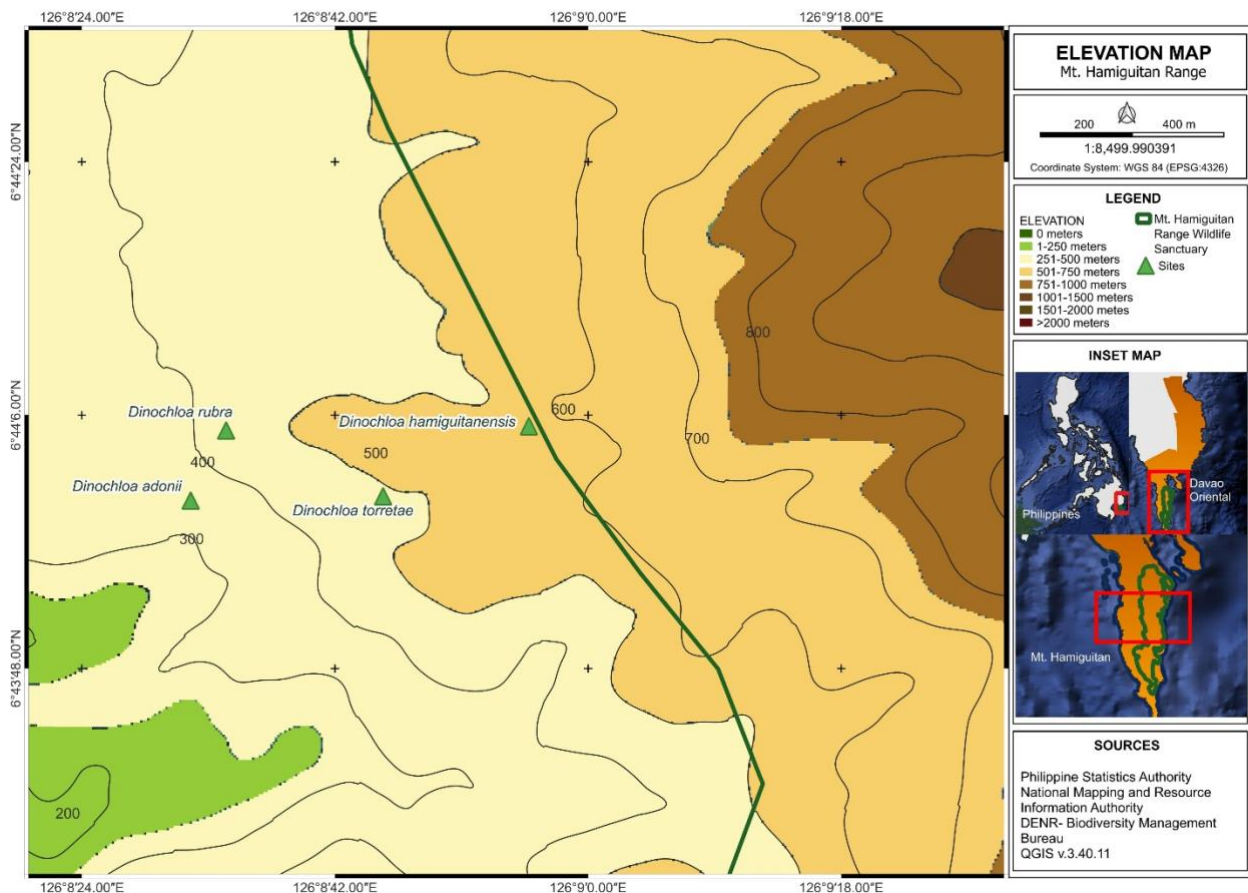


Fig. 1. Map showing the geographic distribution of the four newly described *Dinochloa* species within the Mount Hamiguitan Range Wildlife Sanctuary (MHRWS), Davao Oriental, Mindanao, Philippines.

The field surveys included habitat assessment, photographic documentation using Canon DSLR EOS 1500 (Canon, Japan), and opportunistic searches for climbing bamboo populations across accessible forest trails and adjacent vegetation zones. Preliminary reconnaissance surveys identified and documented the locations of the putative new *Dinochloa* species through field observations and photographic records. Formal specimen collection was conducted on November 25, 2022, after the issuance of Wildlife Gratuitous Permit No. XI-2022-19 by the Department of Environment and Natural Resources (DENR) Region XI, during a focused taxonomic expedition to obtain complete vegetative materials suitable for herbarium deposition. All four holotype specimens share the same collection date and consecutive collection numbers as they were collected during a single expedition. At present, no paratype specimens are available because only a limited number of individuals of these putative new climbing bamboo species were encountered in the study area, thereby limiting further collection.

The collected specimens were documented by preparing voucher specimens and taking detailed field photographs. Morphological observations focused on diagnostic characters of taxonomic significance, including the habit, culm and branch features, culm leaf (i.e., sheath, blade, ligule, and auricle), and foliage leaf (i.e., sheath, blade, ligule, and auricle). Measurements were taken from fresh and dried materials, and terminology follows Dransfield (1998b). The protologues and published taxonomic treatments describing Philippine climbing bamboos were reviewed, particularly those of Dransfield (1981, 1992, 1995, 1998b) and Rojo (1996). The morphological attributes of the collected specimens were critically compared with those described in existing literature to establish diagnostic distinctions among the species. No inflorescences were encountered during the fieldwork. Holotype specimens were deposited at the Philippine National Herbarium (PNH).

3. Results and Discussion

3.1. Taxonomy

Dinochloa rubra Polestico et Aribal sp. nov. (Figs. 2 and 3).

Type: Philippines, Mindanao, Davao Oriental Province, Municipality of San Isidro, Barangay La Union, primary lowland forest, Aribal et al. LGA 001, N 06°44.082 E 126°08.571. 25 November 2022. 433 masl. (Holotype PNH).

Diagnosis: *Dinochloa rubra* is most similar to *D. luconiae* and *D. palawanensis* in having slender, solid culms with intravaginal branching, but differs markedly by its bright red young culms turning dark violet, caducous light-purple culm sheaths with narrowly linear caducous blades, and absence of auricles and oral setae (coarse hairs), as well as possessing glabrous nodes and foliage leaves.

Description. Habit: climbing bamboo, twining to the right, forming dense clumps. **Culms:** zigzag, solid throughout, very hard, surface smooth with scabrid hairs near the nodes, bright red when young, becoming dark violet when mature, diameter 0.3–0.5 cm, internodes 24–26 cm long. **Node:** widening, nodal line parallel and glabrous. **Branches:** arising 2 nodes above the ground, intravaginal, 1–2 branches per node, originated above, branches arising at an upward angle. **Culm sheaths:** caducous, light purple when young, drying brown, 5–6 cm long, soft-textured, outer surface glabrous, sheath blade caducous, narrowly ovate to linear, 5.5 × 0.1 cm. Auricles absent, oral setae absent. Ligule present, truncate, glabrous, without hairs. **Leaves:** Blade lanceolate, 12–15 × 1–2 cm, base rounded, apex acuminate, margins scabrid, both surfaces concolorous, green, upper surface smooth, lower surface glabrous or with sparse short hairs along midrib. **Foliage ligule:** distinct, short, glabrous, without hairs. Inflorescence not seen.

Etymology. The specific epithet *rubra* is from the Latin word “*rubrum*” (red), referring to the bright red color of the young culm or internode, a feature uncommon among the known species of *Dinochloa*.

Habitat and Ecology. *D. rubra* occurs in the lowland primary forests of Mount Hamiguitan, climbing on surrounding trees and shrubs in the shaded understory. It thrives on ultramafic soils at elevations around 433 m asl, forming dense clumps along slopes and forest edges. This species has not been observed in secondary forests or disturbed sites, indicating a likely association with primary forest microhabitats.

Vernacular name: Bukaweng pula.

Traditional use: Unknown.

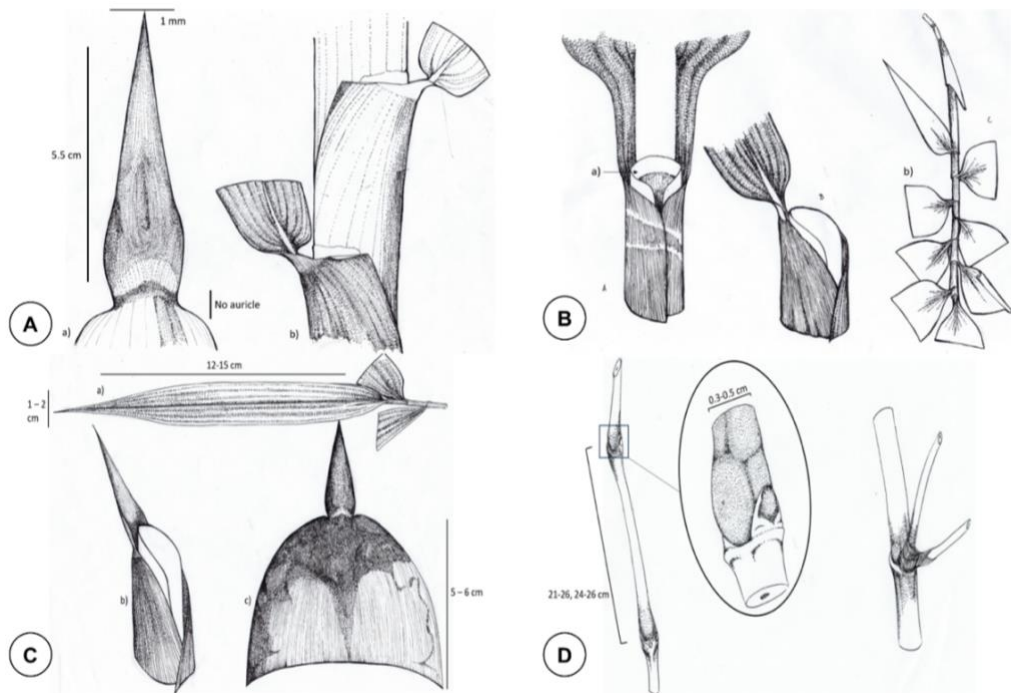


Fig. 2. Botanical illustration of *Dinochloa rubra* Poletstico et Aribal: (A) sheath blade and leaf structure; (B) leaf ligule and simple leaf structure; (C) leaf length, sheath ligule, and sheath structure; and (D) internode and node structure.



Fig. 3. Field photographs of *Dinochloa rubra* Poletstico et Aribal: (A) culm and habit; (B) node; (C) culm sheath; (D) adaxial leaf surface; and (E) abaxial leaf surface.

Dinochloa torretae Noblefranca, R. Aribal et Aribal sp. nov. (Figs. 4 and 5).

Type: Philippines, Mindanao, Davao Oriental Province, Municipality of San Isidro, Barangay La Union, primary lowland forest, *Aribal et al. LGA 002*, N 06°44.004 E 126°08.757. 25 November 2022. 478 masl. (Holotype PNH).

Diagnosis: *Dinochloa torretae* is loosely allied to *D. luconiae* and *D. oblonga* in its persistent culm sheaths and intravaginal branching, but differs by its almost solid, very slender culms (0.2–0.3 cm diameter), presence of small auricles bearing long hairs, and distinct culm-leaf and foliage-leaf ligules crowned with erect hairs.

Description. Habit: climbing bamboo, twining to the right, forming dense clumps, culms slender and flexible, unable to support themselves. **Culms:** zigzag, almost solid, moderately hard, surface smooth to scabrid, light green when young, turning dark violet when mature, 0.2–0.3 cm in diameter, internodes 10–12 cm long. **Nodes:** Slightly swollen, nodal line horizontal, distinct, and scabrid, lower nodes sometimes rooting. **Branches:** arising from upper nodes, intravaginal, 1–2 branches per node, branch orientation horizontal or slightly ascending. **Culm sheaths:** persistent, light green when young, drying pale brown, 6–8 cm long, smooth and soft in texture, outer surface glabrous or with sparse scabrid hairs toward the base, inner surface glabrous. Sheath blade persistent, lanceolate, 5–6 × 0.5 cm, deflexed. Auricles small (ca. 2 mm high), bearing hairs up to 0.5 cm long, oral setae present. Ligule distinct, 1–2 mm high, bearing erect hairs up to 1 cm long. **Leaves:** blade elliptic, 15 × 1 cm, base rounded, apex acuminate, margins finely serrulate, both surfaces green and concolorous, upper surface smooth, lower surface sparsely puberulous, especially along the midrib. **Foliage ligule:** short, 1–2 mm high, with hairs up to 3 mm long. Inflorescence not seen.

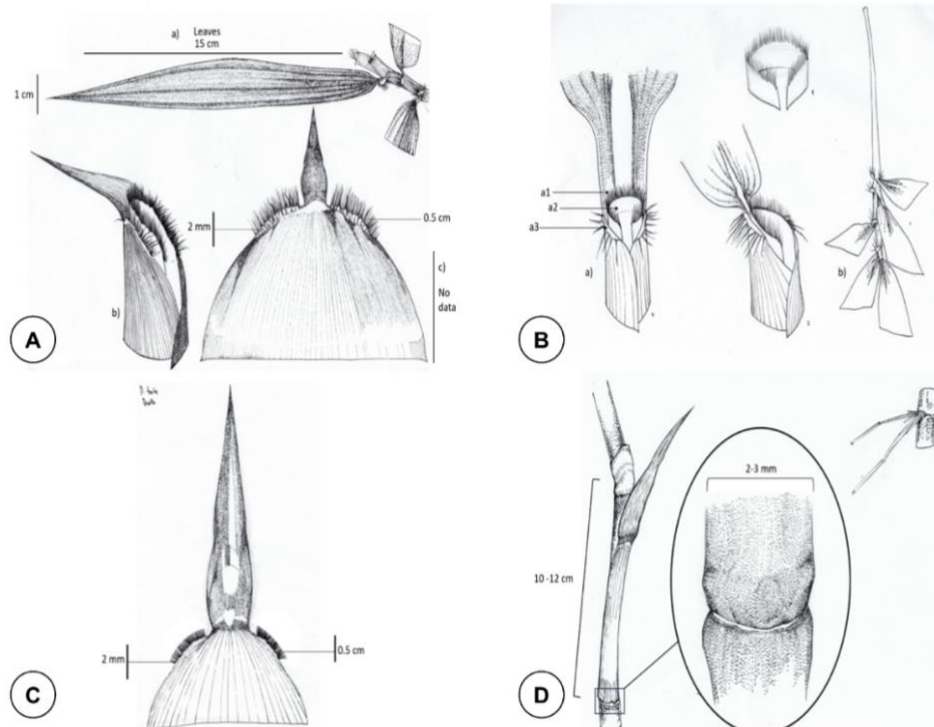


Fig. 4. Botanical illustration of *Dinochloa torretae* Noblefranca, R. Aribal et Aribal: (A) leaf length, sheath auricles, hairs, and ligule, and sheath structure; (B) leaf auricle, ligule, hairs, and simple leaf structure; (C) sheath, auricle, and hairs; and (D) internode structure and length.



Fig. 5. Field photographs of *Dinochloa torretae* Noblefranca, R. Aribal et Aribal: (A) culm; (B) culm sheath; (C) culm sheath blade; (D) leaves; and (E) axillary bud.

Etymology. The specific epithet “*torretae*” honors Dr. Nimfa A. Torreta, former Industry Strategic Science and Technology Program (ISP) manager and current Director of the Forestry and Environment Research Division (FERD) of the Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development of the Department of Science and Technology (DOST-PCAARRD), for her contributions to bamboo research and development in the Philippines.

Habitat and Ecology. *D. torretae* grows in the primary lowland forests of Mount Hamiguitan at an elevation of 478 m asl. It thrives in moist, shaded understory layers. This species depends on nearby plants for mechanical support because of its slender, flexible, nearly solid culms. It forms loosely grouped clumps in areas with moderate light, especially along forest edges and in natural canopy gaps. However, it does not spread into open, disturbed areas.

Vernacular name: Bukaweng buhokon.

Traditional use: Unknown.

Dinochloa adonii Mazo et Aribal sp. nov. (Figs. 6 and 7).

Type: Philippines, Mindanao, Davao Oriental Province, Municipality of San Isidro, Barangay La Union, primary lowland forest, Aribal et al. LGA 003, N 06°43.999 E 126°08.529. 25 November 2022. 340 masl. (Holotype PNH).

Diagnosis: *Dinochloa adonii* resembles *D. robusta* and *D. acutiflora* in its solid to narrow-lumen culms and persistent culm-sheath structure, but differs by its greater culm diameter (1.3–

1.8 cm), persistent scabrid sheaths with stiff hairs, and ovate-lanceolate sheath blades bearing small auricles with short hairs.

Description. Habit: Climbing bamboo, twining to the right, forming compact clumps, culms robust and woody, unable to stand erect without support. **Culms:** zigzag, solid or with a very small lumen, surface scabrid, texture very hard, dark green when mature, 1.3–1.8 cm in diameter, internodes 23–32 cm long. **Nodes:** distinct, nodal line horizontal, scabrid, slightly swollen, sometimes with fine hairs around the nodal ridge. **Branches:** arising from upper nodes, intravaginal, 1–2 branches per node, branches ascending or suberect. **Culm sheaths:** persistent, similar throughout the culm, 8–9 cm long, outer surface scabrid with short stiff hairs, inner surface smooth and glabrous, texture soft but firm when dry. Sheath blade persistent, ovate-lanceolate, deflexed, ca. 6–7 × 0.8 cm. Auricles small (ca. 1 mm high), bearing hairs 0.3–0.5 cm long, oral setae present. Ligule distinct, membranous, 1–2 mm high, entire, with short erect hairs. **Leaves:** blade lanceolate, 8.2–9.5 × 1–1.5 cm, base rounded, apex acuminate, margins finely serrulate, upper surface smooth and dark green, lower surface slightly paler, minutely puberulous along the midrib. **Foliage ligule:** 1–2 mm high, with hairs up to 1 cm long, persistent. Inflorescence not seen.

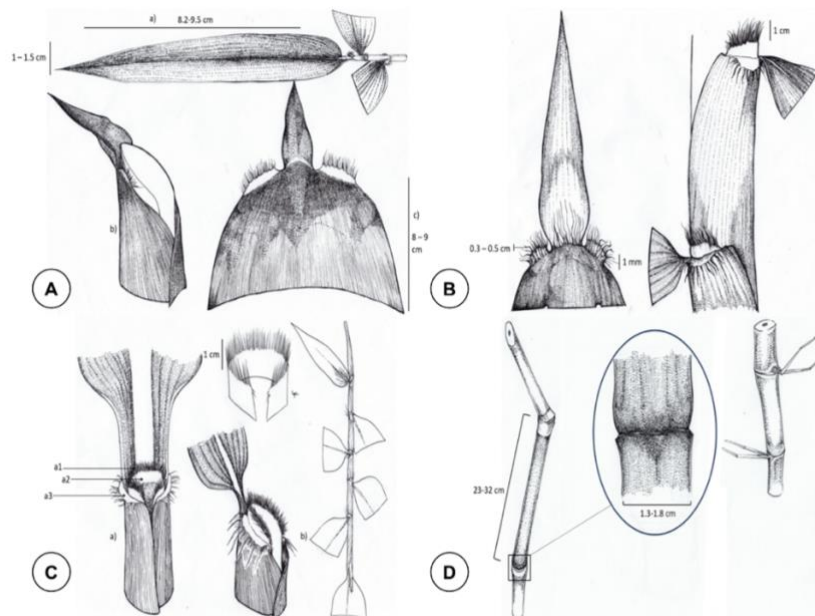


Fig. 6. Botanical illustration of *Dinochloa adonii* Mazo et Aribal: (A) portion of the leaf, sheath, and sheath ligule; (B) sheath auricle (1 mm), oral setae, and leaf structure; (C) leaf auricle, ligule, hairs, and simple leaf structure; and (D) internode and node structure.

Etymology. The specific epithet “*adonii*” is derived from the nickname of Mr. Leonido Clarion, a resident of Barangay La Union, San Isidro, Davao Oriental Province, in recognition of his passion towards plant taxonomy.

Habitat and Ecology. *D. adonii* inhabits lowland primary forests at 340 m asl elevation. It wraps around understory trees and shrubs. It grows on ultramafic soils and often forms tight, woody clumps in places with minimal canopy disturbance. It has not been recorded in degraded or secondary forests.

Vernacular name: Bukaweng dapawon.

Traditional use: Unknown.



Fig. 7. Field photographs of *Dinochloa adonii* Mazo et Aribal: (A) culm sheath; (B) culm sheath bristles; (C) culm sheath blades; (D) cross-section of culm; (E) young culm sheath; (F) node; (G) leaves; and (H) young shoot.

Dinochloa hamiguitanensis Aribal et Parlucha sp. nov. (Figs. 8 and 9).

Type: Philippines, Mindanao, Davao Oriental Province, Municipality of San Isidro, Barangay La Union, primary lowland forest, Aribal et al. LGA 004, N 06°44.087 E 126°08.573. 25 November 2022. 570 masl. (Holotype PNH).

Diagnosis: *Dinochloa hamiguitanensis* is morphologically distinct from *D. oblonga* and *D. palawanensis*, differing by its smaller culm diameter (0.8–1.0 cm), pale orange to golden-brown scabrid culm sheaths lacking auricles and oral setae, and the combined absence of a foliage-leaf ligule with glabrous, concolorous lanceolate leaves.

Description. Habit: climbing bamboo with a scrambling habit. **Culms:** zigzag, surface scabrid, very hard, 0.8–1.0 cm in diameter, internodes solid, dark green, 24–25 cm long, nodes with horizontal nodal line, glabrous, young culm pale green, becoming yellow-green with age. **Nodes:** parallel, horizontal nodal line, glabrous. **Branching:** arising from upper nodes, intravaginal, 1–2 branches per node, originating above the node, branches ascending to slightly spreading. **Culm sheaths:** persistent, similar throughout, scabrid and moderately hard, pale orange when young, becoming golden yellow to brown when mature, sheath blade caducous, sheath 10 cm long × ca. 1.2 cm wide, outer surface rough with sparse hairs, inner surface glabrous. Auricles absent, oral setae lacking. Ligule present, short, entire. **Leaves:** leaf blades lanceolate, drooping, same color on both surfaces, 10–12 cm long × 1.0–1.3 cm wide, upper and lower surfaces glabrous, base cuneate, apex acuminate, midrib slightly raised beneath. **Foliage ligule:** absent. Inflorescence not seen.

Etymology. The specific epithet “*hamiguitanensis*” denotes the endemism of this species, as it has not been observed elsewhere.

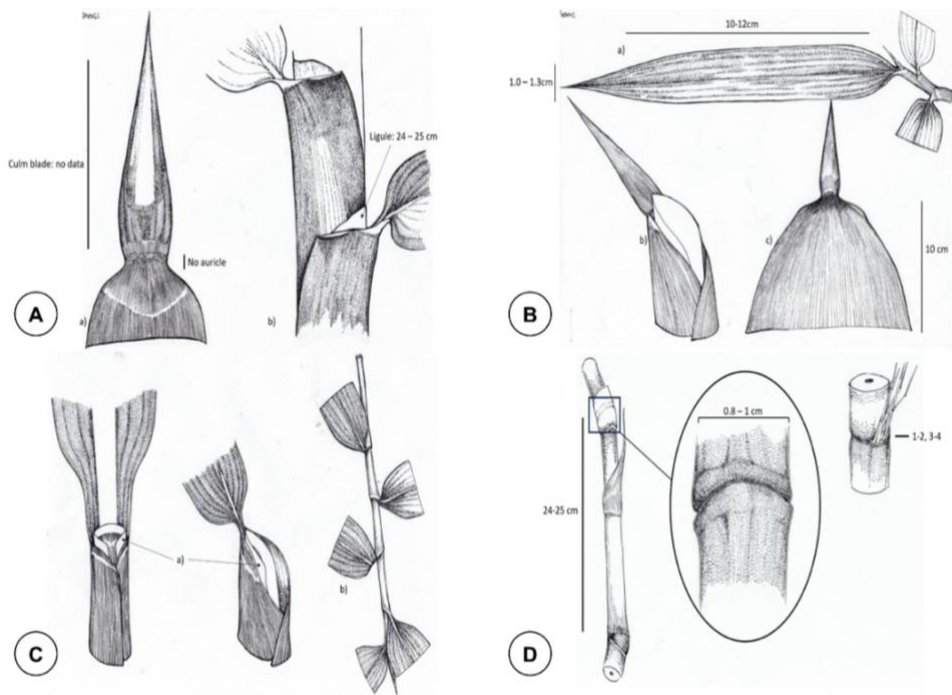


Fig. 8. Botanical illustration of *Dinochloa hamiguitanensis* Aribal et Parlucha: (A) sheath blade and leaf structure; (B) leaf length, sheath ligule, and sheath structure; (C) leaf ligule and simple leaf structure; and (D) internode and node structure.



Fig. 9. Field photographs of *Dinochloa hamiguitanensis* Aribal et Parlucha: (A) culm; (B) mature culm sheath without blade; (C) culm sheath; (D) young culm sheath; and (E) leaves.

Habitat and Ecology. *D. hamiguitanensis* grows in lowland primary forests at 570 m asl. It has a scrambling climbing habit and often spreads over shrubs and small understory trees. This species prefers shadier, more humid areas than other newly described taxa.

Vernacular name: Bukaweng liitan.

Traditional use: Unknown.

3.2. Comparative Morphology and Identification Key of the Four New *Dinochloa* Species

A comparison of the morphological characteristics of the four newly described *Dinochloa* species, showing the observed variations, is presented in **Table 1**. These variations serve as diagnostic features to distinguish *D. rubra*, *D. torretae*, *D. adonii*, and *D. hamiguitanensis* from one another. Distinct differences were observed, particularly in culm color and texture, presence or absence of auricles, type and persistence of culm sheaths, internode structure, and leaf morphology. The combination of these characters provides a reliable basis for taxonomic delimitation.

Table 1. Morphological variations distinguishing *Dinochloa rubra*, *D. torretae*, *D. adonii*, and *D. hamiguitanensis*

Characteristics	<i>D. rubra</i>	<i>D. torretae</i>	<i>D. adonii</i>	<i>D. hamiguitanensis</i>
Habit	Climbing	Climbing	Climbing	Climbing
Culm texture	Smooth with scabrid hairs near nodes; very hard	Smooth to scabrid; moderately hard	Scabrid; very hard	Scabrid; very hard
Culm diameter	0.3–0.5 cm	0.2–0.3 cm	1.3–1.8 cm	0.8–1.0 cm
Culm color (young/mature)	Bright red to dark violet	Light green to dark violet	Dark green	Pale orange to golden yellow/brown
Auricles	Absent	Present (0.2 cm)	Present (0.1 cm)	Absent
Hairs on the auricles	None	Up to 0.5 cm	0.3–0.5 cm	None
Culm leaf ligule	Present, without hair	Present, with hairs up to 1 cm	Present, with short erect hairs	Present, short, entire
Internodes	Solid, 24–26 cm	Almost solid, 10–12 cm	Solid or with lumen, 23–32 cm	Solid, 24–25 cm
Node characteristics	Widening, parallel nodal line, glabrous	Parallel, horizontal nodal line, scabrid	Parallel, horizontal nodal line, scabrid	Parallel, horizontal nodal line, glabrous
Culm sheath	Caducous, light purple to brown	Persistent, smooth, soft texture	Persistent, scabrid, soft texture	Persistent, scabrid, moderately hard
Culm sheath blade	Caducous	Persistent	Persistent	Caducous
Branching	2 nodes above ground, 1–2 branches per node, upward	Upper nodes, 1–2 branches per node, horizontal	Upper nodes, 1–2 branches per node, upward	Upper nodes, 1–2 branches per node, upward
Leaf posture	Curved horizontally	Hanging down	Hanging down	Hanging down
Leaf blade	Lanceolate	Elliptic	Lanceolate	Lanceolate
Leaf size (cm)	12–15 × 1–2	15 × 1	8.2–9.5 × 1–1.5	10–12 × 1.0–1.3
Foliage ligule	No hairs	With hairs up to 3 mm	With hairs up to 1 cm	Absent

Key to the Philippine *Dinochloa* Species (Adapted from Dransfield 1981, 1998b; Escobin et al. 2005; Widjaja 2016)

1a. Culms hollow.....	2
1b. Culms solid or with small lumen.....	3
2a. Culm leaf blades deflexed	<i>D. robusta</i>
2b. Culm leaf blades erect	<i>D. acutiflora</i>
3a. Culm sheath auricles absent	4
3b. Culm sheath auricles present.....	7
4a. Young culms bright red turning dark violet; culm sheaths light purple, caducous; oral setae absent; foliage leaves glabrous.....	<i>D. rubra</i>
4b. Culms green, orange, brown, or yellowish; culm sheaths persistent or caducous, not as above	5
5a. Culm pale orange to golden brown; culm sheath auricles and oral setae absent; foliage-leaf ligule absent; culms 0.8–1.0 cm diameter	<i>D. hamiguitanensis</i>
5b. Culms green to brown; foliage-leaf ligule present	6
6a. Culm glabrous and smooth; culm leaf blade broadly ovate	<i>D. palawanensis</i>
6b. Culm scabrid or hairy; culm leaf blade narrowly ovate to linear.....	<i>D. luconiae</i>
7a. Auricles with long oral setae or hairs exceeding 0.5 cm	8
7b. Auricles with short hairs less than 0.5 cm long, or hairs absent	9
8a. Culms very slender, 0.2–0.3 cm diameter; internodes almost solid, 10–12 cm long; culm sheath persistent, smooth to scabrid; ligules crowned with erect hairs.....	<i>D. torretae</i>
8b. Culms more rigid, usually more than 1 cm in diameter; branches densely pubescent	<i>D. pubiramea</i>
9a. Culms 1.3–1.8 cm diameter; culm sheath persistent, scabrid, soft-textured; sheath blades ovate-lanceolate with small auricles bearing short hairs.....	<i>D. adonii</i>
9b. Culms less than 1.3 cm in diameter; culm sheath texture variable	10
10a. Culm leaf sheaths up to 12 cm long; auricles conspicuous and large	<i>D. oblonga</i>
10b. Culm leaf sheaths usually more than 12 cm long; auricles small or moderately developed	11
11a. Culm sheaths leathery and persistent; culms broader; oral setae well-developed.....	<i>D. dielsiana</i>
11b. Culm sheaths thinner, glabrous to sparsely hairy; foliage leaves narrow; culms slender.....	<i>D. elmeri</i>

4. Conclusions

The present study addresses a significant gap in the taxonomic knowledge of Philippine climbing bamboos by formally describing four new *Dinochloa* species from the Mount Hamiguitan Range Wildlife Sanctuary: *Dinochloa rubra*, *D. torretae*, *D. adonii*, and *D. hamiguitanensis*. These species are morphologically distinct from previously documented Philippine *Dinochloa* taxa based on diagnostic vegetative characters, including differences in culm coloration, culm diameter, sheath persistence and indumentum, auricle and ligule development, and foliage leaf morphology. The occurrence of these species within ultramafic lowland forests further emphasizes the ecological specialization and habitat specificity of climbing bamboos associated with metal-rich substrates in Mount Hamiguitan. Recognition of these four new species increases the total number of documented Philippine *Dinochloa* species from eight to 12 and

contributes important baseline information for species delimitation, biogeography, and conservation assessment within the genus. These findings further underscore the importance of Mount Hamiguitan as a refuge for rare and endemic bamboo lineages and highlight the need for continued taxonomic exploration in poorly studied forest ecosystems of Mindanao and the broader Philippine archipelago.

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Author Contributions

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Conflict of Interest

The authors declare no conflict of interest.

Declaration of Generative AI and AI-Assisted Technologies in the Manuscript Preparation

Not applicable.

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