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Patronyms and toponyms in Indonesian coral taxonomy, with notes on selected sponge taxa

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Abstract. *Luthfi OM, Wiadnya DGR, Luthfi MAB, Isdianto A, Yamindago A. 2026. Patronyms and toponyms in Indonesian coral taxonomy, with notes on selected sponge taxa. Biodiversitas 27 (4): d270444. https://doi.org/10.13057/biodiv/d270444.* Indonesia is located at the center of the Coral Triangle and has contributed substantially to the discovery and naming of reef-associated taxa. This study aimed to document and analyze patronyms, toponyms, and descriptive epithets in the scientific names of selected scleractinian corals and demosponges associated with Indonesian waters. A focused nomenclatural synthesis was conducted using primary taxonomic literature and biodiversity databases, including WoRMS, GBIF, ZooBank, and the Biodiversity Heritage Library. Twenty-four taxa were analyzed, comprising 16 Acroporidae, five other scleractinian corals, and three Demospongiae. Toponyms were the most frequent epithet type, representing 10 taxa (41.7%), followed by patronyms with eight taxa (33.3%) and descriptive epithets with six taxa (25.0%). Patronyms occurred mainly in Acroporidae, whereas toponyms were more common among other scleractinian corals and demosponges. Several names were associated with Indonesian localities such as Halmahera, Derawan, Bali, Cenderawasih Bay, Bangka, and Maluku, while patronyms recorded the contributions of scientists, collectors, and collaborators involved in Indonesian marine biodiversity studies. These findings show that species names are not only taxonomic labels but also compact records of biogeographic origin, scientific contribution, and taxonomic history. This study highlights Indonesia's importance as a source of type material and as a major setting in coral and sponge taxonomy.

Keywords: Coral taxonomy, Indonesian biodiversity, scleractinian corals, species etymology, type specimens

INTRODUCTION

Indonesia represents the global center of coral biodiversity, particularly for members of the family Acroporidae, which play a crucial role in shaping the structure and ecological functioning of reef ecosystems (Wallace and Wolstenholme 1998; Santodomingo et al. 2015). The taxonomy of Indonesian Acroporidae has advanced substantially since the 1990s, with numerous new species described and a consistently high level of endemism reported from various regions of the archipelago. Despite these advancements, species identification and nomenclature within the group remain challenging due to pronounced morphological variability, the presence of cryptic species, and limitations in historical and molecular datasets (Chow et al. 2025; Rasmussen et al. 2025).

Veron et al. (2025) asserted that coral species boundaries are inherently porous across spatial and temporal scales, primarily driven by reticulate evolution. Under this process, lineages continuously diverge and re-converge through hybridization, meaning that polyphyletic origins may represent a common state within coral complexes rather than an anomaly. This evolutionary intermixing creates extensive "gray zones" in speciation where rigid morphological categories fail, making historical regional descriptions critical for mapping the full evolutionary spectrum.

Parallel to these conceptual changes, high-throughput molecular tools provide unprecedented insights into evolutionary relationships. A comprehensive phylogenomic study by Quek et al. (2023) utilized hybrid-capture approaches to resolve deep evolutionary nodes within Scleractinia, demonstrating that several conventionally defined families remain polyphyletic. Crucially, these molecular frameworks are increasingly unmasking cryptic species complexes—populations that exhibit striking morphological stasis despite profound genetic divergence. The discovery of these hidden lineages underscores the critical value of physical type specimens deposited in natural history museums. When molecular data reveals cryptic complexes, re-evaluating holotypes and precise type localities becomes paramount to linking specific genetic clades with valid historical names, thereby ensuring nomenclatural stability under the International Code of Zoological Nomenclature (ICZN).

In zoological taxonomy, species names often preserve information beyond formal identification. Patronyms honor individuals such as scientists, collectors, or contributors, whereas toponyms refer to geographic localities associated with species discovery, type material, or distribution. These naming traditions not only serve scientific documentation but also reflect the historical context of exploration, the contributions of researchers, and the biological importance of specific regions (Wallace and Wolstenholme 1998). In

Indonesia, the use of patronyms and toponyms is particularly prominent, especially among Acroporidae species that are endemic to specific islands or regions, or that were first recognized through the work of Indonesian researchers.

Although Indonesian reefs have contributed substantially to global coral taxonomy, limited attention has been given to how scientific names themselves preserve information on Indonesian localities, individuals, and taxonomic history. Recent advances in coral systematics have shown that some taxa once considered widespread may represent distinct species with more restricted distributions, making nomenclatural information increasingly relevant for understanding biogeographic patterns (Chow et al. 2025). Therefore, this study documents and analyzes patronyms, toponyms, and descriptive epithets in selected coral and sponge taxa associated with Indonesian waters.

Given these scientific and historical dimensions, the present study aims to provide a focused synthesis that documents and examines the patronyms and toponyms embedded in the scientific names of scleractinian corals—especially within the family Acroporidae and selected Demospongiae from Indonesian waters. By tracing the etymological origins of these taxa, we highlight the individuals, localities, and scientific contributions that have shaped their nomenclature, while underscoring Indonesia's long-standing role as a source of holotypes, centers of endemism, and key reference points in coral systematics. Through this approach, the study offers a clear perspective on how Indonesian people and places are reflected in coral and sponge taxonomy, thereby reinforcing the country's enduring influence on the development of modern marine taxonomy.

MATERIALS AND METHODS

Study design and scope

This study was designed as a focused nomenclatural synthesis rather than an exhaustive inventory of all Indonesian reef-invertebrate taxa. Although many coral and sponge species have been described from Indonesian waters, the etymological information preserved in their scientific names has rarely been analyzed as evidence of Indonesian localities, scientific contributions, and taxonomic history. Therefore, this study aimed to document and analyze patronyms, toponyms, and descriptive epithets in selected Scleractinia and Demospongiae associated with Indonesian waters.

The study followed a structured literature-based approach adapted from review-oriented study designs used to organize, screen, and interpret published scientific information (Montilla et al. 2019). The unit of analysis was a species-level taxon whose scientific epithet could be interpreted as a patronym, toponym, or descriptive epithet, and whose nomenclatural or biogeographic context showed a clear association with Indonesian waters. The overall research workflow used in this study is summarized in Figure 1.

Literature search and source selection

Taxonomic information was compiled from original species descriptions, formal taxonomic revisions, monographs, and peer-reviewed articles. Literature searches were conducted in Web of Science, Scopus, and Google Scholar, and were supplemented by nomenclatural and biodiversity databases including the World Register of Marine Species (WoRMS), ZooBank, the Global Biodiversity Information Facility (GBIF), and the Biodiversity Heritage Library (BHL). The search and screening strategy followed a structured evidence-gathering approach commonly applied in literature-based review studies, in which multiple databases are searched systematically and records are subsequently screened for relevance and data extraction (Montilla et al. 2019). Search terms were used in multiple combinations, including "Indonesian coral taxonomy", "coral species etymology", "*Acropora* new species", "holotype Indonesia", "patronym in taxonomy", "toponym in taxonomy", and equivalent combinations for sponge taxa. Reference lists of key taxonomic papers were also screened manually to recover older literature not consistently indexed in modern databases.

Screening was conducted in two stages. First, titles, abstracts, and database records were screened to identify candidate taxa potentially linked to Indonesian localities, Indonesian individuals, or Indonesian-language descriptive terms. Second, full texts of original descriptions or subsequent revisions were examined to confirm etymology, authorship, year of description, and type-locality information.

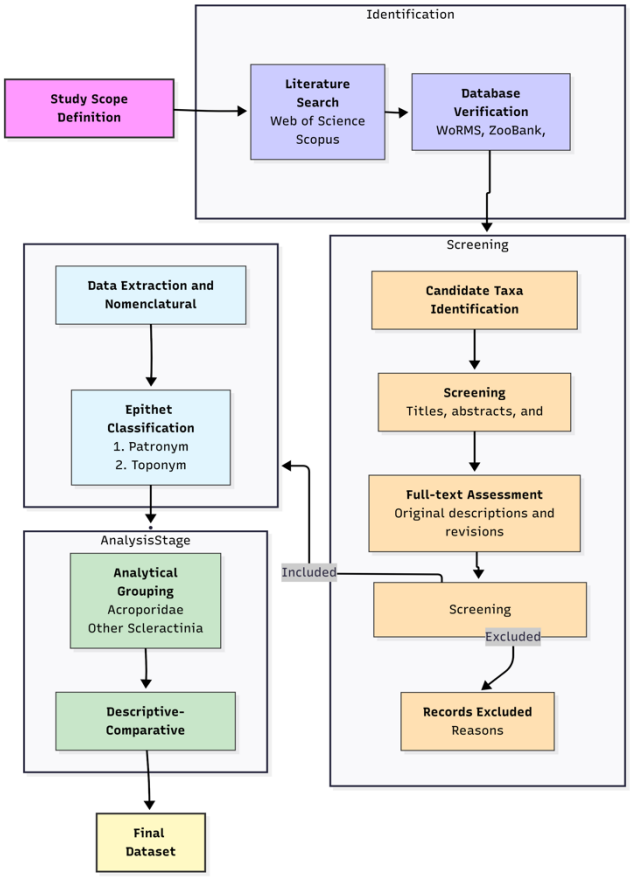

Figure 1. Flow chart of the study design, literature search, screening process, nomenclatural verification, epithet classification, and analytical grouping used in this study.

Inclusion and exclusion criteria

Taxa were included in the analysis when they met all of the following criteria: (i) they represented valid species-rank names within Scleractinia or Demospongiae; (ii) their original descriptions or authoritative taxonomic revisions were accessible; (iii) their scientific epithets could be clearly classified as patronyms, toponyms, or descriptive epithets; (iv) they showed a verifiable association with Indonesian waters through type locality, type material, distribution record, or explicit etymological reference; and (v) their current taxonomic status could be cross-checked using major taxonomic or biodiversity databases, including WoRMS, ZooBank, GBIF, or the Biodiversity Heritage Library.

Taxa were excluded when their original descriptions or authoritative revisions were unavailable, their etymological origin was ambiguous, their association with Indonesia could not be verified, or their current taxonomic status was uncertain. Synonyms, invalid names, and duplicated records resulting from subsequent genus transfer were not treated as separate taxa. When a taxon had undergone taxonomic revision or generic reassignment, the currently accepted name was used in the main dataset, while previous combinations were retained only as nomenclatural notes. This procedure was applied to minimize selection and classification bias and to ensure that the final dataset included only taxa with verifiable nomenclatural, etymological, and taxonomic information.

Data extraction and nomenclatural verification

For each included taxon, the following variables were extracted: accepted name, original combination (when different), authorship, year of description, higher classification, type locality, etymological origin of the specific epithet, and relevant taxonomic notes such as synonymy or genus transfer. Accepted names and higher taxonomy were checked against WoRMS whenever available and then cross-verified using ZooBank, GBIF, and primary taxonomic sources.

When discrepancies occurred among sources, the following order of priority was applied: original description and subsequent formal revision, then ZooBank for nomenclatural acts, then WoRMS for currently accepted usage, and finally GBIF for additional occurrence and locality context. Where synonymy or revised generic placement was relevant, the currently accepted name was used in the main dataset, while the basionym or earlier combination was retained in the notes to preserve nomenclatural history without duplicating counts.

Operational interpretation of epithet categories under ICZN

Interpretation of species epithets followed the principles of the International Code of Zoological Nomenclature (ICZN, 4th edition). Epithets were classified as patronyms when they were explicitly stated by the original author to honor a person or when their Latinized genitive construction clearly derived from a personal name. They were classified as toponyms when they were derived from Indonesian geographic names, including islands, bays, provinces, regions, or historical place names associated with the type locality or species discovery. Descriptive epithets were defined as names referring to morphology, growth form, skeletal texture, coloration, or other biological attributes not based on persons or places.

ICZN principles were applied operationally by examining Latinized suffixes and grammatical form. For example, patronyms were recognized from genitive endings such as -i, -ii, or -ae when supported by original descriptions or etymological context, whereas toponyms were commonly associated with adjectival forms such as -ensis or direct derivation from place names. When an etymology was not explicitly provided in the original source, interpretation was made conservatively using the original description, type locality, Latin form of the epithet, and subsequent authoritative taxonomic literature. Ambiguous cases were excluded from the analytical dataset.

Analytical grouping and data analysis

To avoid overly broad grouping, included taxa were analyzed in three analytical categories: (i) Acroporidae, (ii) other scleractinian corals, and (iii) Demospongiae. This grouping was used because these taxa differ in taxonomic history, descriptive traditions, and intensity of previous revisionary work. Within each analytical category, species were tabulated according to epithet type, type locality, year of description, and taxonomic status.

The analysis was primarily descriptive. Frequencies and proportions of patronyms, toponyms, and descriptive epithets were calculated for the complete dataset and for each analytical group. The results were then summarized by taxonomic group, namely Acroporidae, other scleractinian corals, and Demospongiae, to describe simple differences in the distribution of epithet types among groups. Type-locality information was also summarized to identify Indonesian localities most frequently represented in the selected species names. Years of description were compiled only to provide historical context for the naming of the selected taxa. Because the dataset was intentionally curated and limited in scope, no inferential statistical analysis was applied. The study therefore emphasizes descriptive synthesis and transparent interpretation of nomenclatural patterns rather than formal comparative or trend testing.

RESULTS AND DISCUSSION

Coral species nomenclature and taxonomic principles

The scientific naming of coral species follows the binomial nomenclature system introduced by Linnaeus in *Systema Naturae* (1758). Under this system, each species name consists of two parts: the genus name, which denotes the broader taxonomic grouping, and the specific epithet, which provides the unique designation for that species. For example, in *Acropora azurea* Veron & Wallace, 1984, the genus *Acropora* derives from the Latinized combination *acro-* (“high, tip”) and *pora* (“pore”), reflecting a generic morphological concept, while *azurea* refers to the blue coloration of the colony.

Coral names must comply with the rules of the International Code of Zoological Nomenclature (ICZN),

which require the use of Latin or Latinized forms. Specific epithets should be concise, pronounceable, and grammatically correct. Epithets may be adjectives, nouns in the genitive case, or names derived from people (patronyms) or places (toponyms). Latin grammatical gender is essential: masculine, feminine, and neuter forms often require different endings, such as -us, -a, or -um. Genitive forms associated with patronyms follow conventions such as -i or -ii (masculine singular), -ae (feminine singular), or -orum / -arum (plural). For example, the epithet in *Acropora suharsonoi* carries the suffix -i to indicate a masculine genitive honoring Dr. Suharsono. These principles ensure that each species name remains consistent, traceable, and compliant with international taxonomic standards.

Patronyms and toponyms in coral taxonomy

In coral taxonomy, naming a new species after an individual—referred to as a patronym—is often used to acknowledge contributions to science, fieldwork, or specimen collection. Patronyms may honor taxonomists, biologists, local experts, or individuals who played an important role in facilitating research. This convention reflects a long-standing tradition of recognizing scientific collaboration and contribution within the taxonomic community.

In contrast, toponyms designate species according to their geographic origin, typically referring to the locality where the holotype was collected or where the species is especially abundant or endemic. For example, *Acropora halmaherae* was named after Halmahera in North Maluku, acknowledging the region where the species was first discovered. Such names highlight not only the geographical context of the species but also, often subtle aspects of its biology or morphology observed by the describing authors.

Beyond patronyms and toponyms, some coral names derive directly from distinctive morphological features. A classic example is *Galaxea fascicularis* (Linnaeus, 1767), named for its star-like appearance when colonies are viewed from a distance. The genus *Galaxea* originates from the Latin *galaxias*, meaning “galaxy,” while the epithet *fascicularis* means “bundled” or “banded.” The long septa and radiant polyp formations create a galaxy-like pattern, which inspired the descriptive naming. These examples demonstrate how etymology in coral taxonomy can reflect geography, honor individuals, and capture key biological traits, thereby connecting scientific nomenclature with both natural history and observable morphology.

Overall distribution of epithet types

A total of 24 taxa were included in the analysis, comprising 16 Acroporidae species (Figure 2), five non-*Acropora* scleractinian corals (Figure 3), and three Demospongiae (Figure 4). Based on epithet type, toponyms represented the largest category with 10 species (41.7%), followed by patronyms with eight species (33.3%), and descriptive names with six species (25.0%). The prevalence of toponyms indicates that many coral and sponge species associated with Indonesian waters were named after geographic localities, reflecting the importance of specific regions such as Halmahera, Derawan, Bali, and Cenderawasih Bay as sites of species discovery and holotype collection (Table 1).

When examined by taxonomic group, Acroporidae showed a higher proportion of patronyms compared to other coral groups, suggesting that newly described species within this genus were frequently named in honor of researchers and contributors to coral taxonomy. In contrast, non-*Acropora* corals and Demospongiae more commonly exhibited toponyms, highlighting the strong geographic association between species discovery and Indonesian reef localities. These patterns demonstrate how species nomenclature reflects both scientific contributions and the biogeographic significance of Indonesia in coral reef research.

Historical clustering of names

A temporal concentration of names was observed in the dataset. Thirteen of the 24 selected taxa (54.2%) were described between 1994 and 2000, corresponding to a period of intensive taxonomic work on Indonesian reef corals, particularly within Acroporidae. Seven of the eight patronyms in the dataset were introduced during this period, including *Acropora suharsonoi*, *Acropora sukarnoi*, *Acropora awi*, *Acropora batunai*, *Acropora desalwii*, *Acropora hoeksemai*, and *Halomitra meierae*. These names record the role of scientists, collectors, and contributors associated with Indonesian coral research during a major phase of taxonomic revision.

Names published after 2000 were more frequently represented by toponyms or descriptive epithets, such as *Astreopora cenderawasih*, *Euphyllia baliensis*, *Dercitus bangkae*, and *Acanthotetilla celebensis*. These names are linked to Indonesian localities or diagnostic features and provide additional information on the geographic and biological context of species discovery. Conceptually, this pattern shows that species names can function not only as formal taxonomic labels but also as nomenclatural records of scientific contribution, type-locality history, and biodiversity exploration in Indonesia. In this sense, patronyms and toponyms in Indonesian Acroporidae and selected reef-invertebrate taxa provide a concise historical archive of how Indonesian people, places, and reef systems have been represented in taxonomic practice.

Indonesian contributions reflected in coral and sponge species names

A substantial number of coral species have been described from Indonesian waters, many of which have been designated with epithets that honor Indonesian scientists, local experts, or the regions where these species were first discovered. Seminal works—such as Wallace and Wolstenholme’s revision of *Acropora* in Indonesia published in the *Zoological Journal of the Linnean Society*—document numerous species whose holotypes originate from Indonesian reefs, reaffirming the archipelago’s status as a global epicenter of coral diversity. Several non-*Acropora* corals and sponges also exhibit strong geographic or historical associations with Indonesian localities.

This section compiles and highlights species whose names reflect Indonesian heritage through patronyms and

toponyms. Examples include *A. suharsonoi* from Bali and Lombok, honoring the Indonesian coral taxonomist Dr. Suharsono; *Acropora derawanensis* named after Derawan Island in East Kalimantan; and *Astreopora cenderawasih*, referring to Cenderawasih Bay in Papua. Among sponges, species such as *D. bangkae* and *A. celebensis* also carry Indonesian geographic epithets. These naming patterns underscore Indonesia's remarkable contribution—both scientific and biogeographical—to the global understanding of coral reef biodiversity.

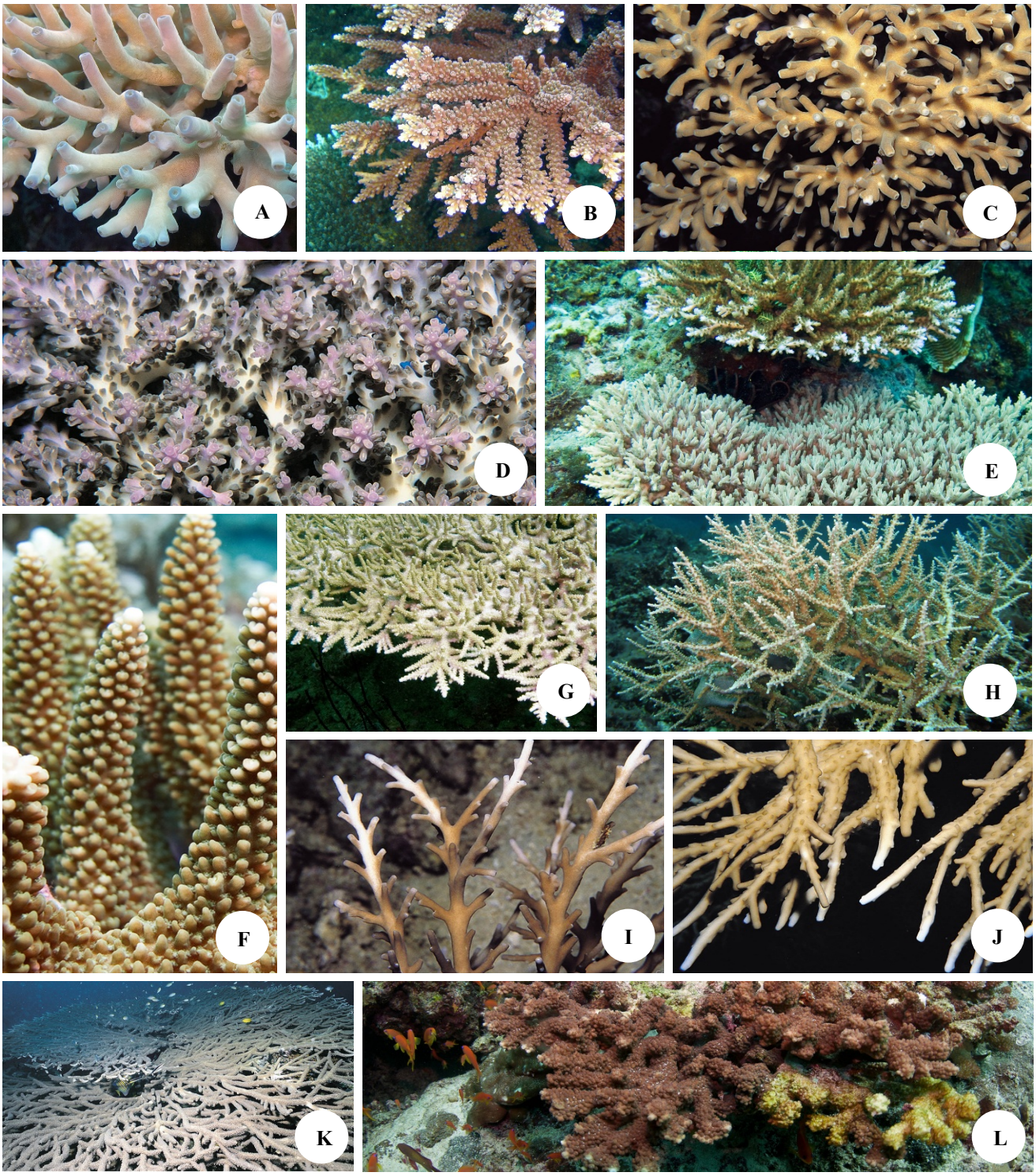

Figure 2. Representative colonies of Indonesian *Acropora* species included in this study, shown sequentially as: A. *Acropora suharsonoi*, B. *Acropora sukarnoi*, C. *Acropora awi*, D. *Acropora batunai*, E. *Acropora desalwii*, F. *Acropora hoeksemai*, G. *Acropora indonesia*, H. *Acropora halmaherae*, I. *Acropora derawanensis*, J. *Acropora simplex*, K. *Acropora plumosa*, and L. *Acropora rudis*. All images reproduced with permission from Corals of the World (COTW), accessed 7 March 2026

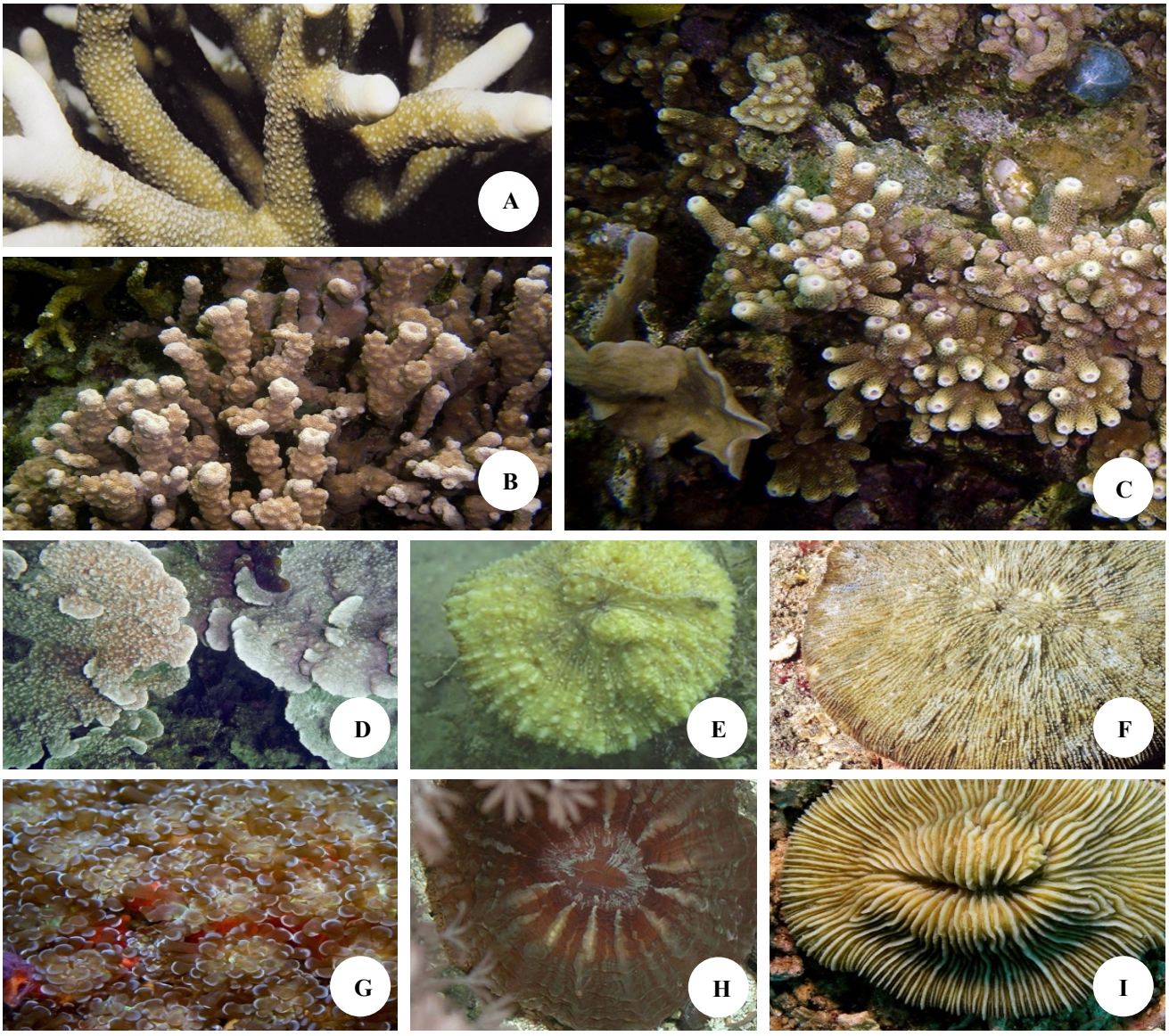

Figure 3. Representative non-*Acropora* coral species included in this study, shown sequentially as: A. *Isopora togianensis*, B. *Astreopora cenderawasih*, C. *Astreopora acroporina*, D. *Astreopora montiporina*, E. *Podabacia kunzmanni*, F. *Halomitra meierae*, G. *Euphyllia baliensis*, H. *Cynarina macassarensis*, and I. *Pleuractis moluccensis*. All images reproduced with permission from Corals of the World (COTW), accessed 7 March 2026

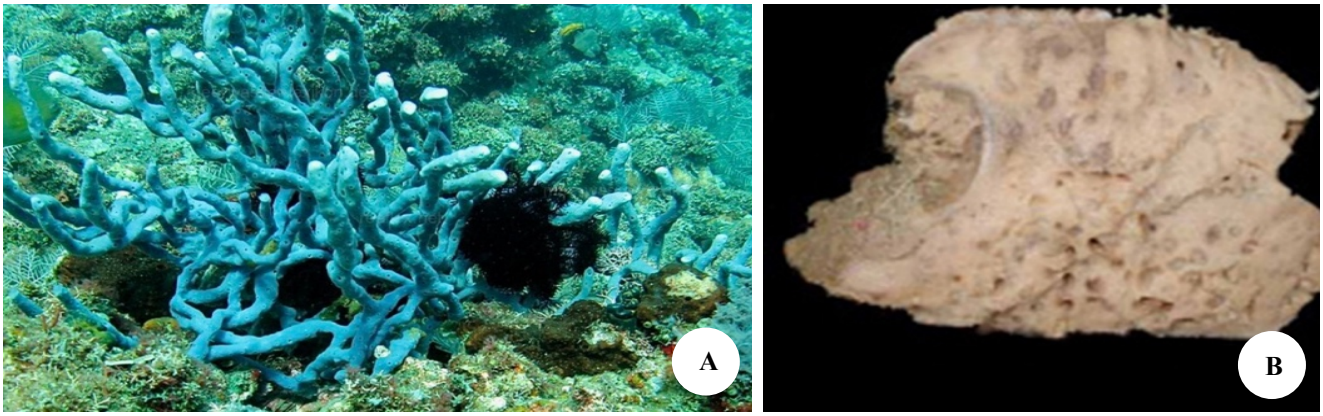

Figure 4. Representative sponge species included in this study. A. *Callyspongia (Euplacella) biru* and B. *Acanthotetilla celebensis*

Group *Acropora*

Acropora suharsonoi *(Wallace, 1994) (Figure 2.A)*

The holotype of *Acropora suharsonoi* was collected from Pemuteran, Bali, and Gili Trawangan, Lombok, with additional paratypes originating from Gili Meno and Telak Nare in Lombok. This species is considered endemic to Bali and Lombok, with potential distribution extending to the Lesser Sunda Islands. The epithet *suharsonoi* is a patronym honoring Prof. Dr. Suharsono, a pioneering Indonesian coral researcher whose contributions have significantly advanced the nation's coral taxonomy.

Acropora sukarnoi *(Wallace, 1997) (Figure 2.B)*

Acropora sukarnoi was first described from Nusa Lembongan, Bali, where its holotype was collected, while paratypes originated from Alor and Reta Islands. The species name honors Dr. Sukarno from LIPI (now BRIN). Taxonomic notes indicate that *Acropora irregularis* (Brook, 1892), previously described by Veron, has since been synonymized under *A. sukarnoi*, reaffirming the validity of Wallace's classification.

Acropora awi *(Wallace and Wolstenholme, 1998) (Figure 2.C)*

The type material of *Acropora awi* was obtained from the Togian Islands, Central Sulawesi, with paratypes sourced from Lombok, West Timor, and East Kalimantan, Indonesia. The species name commemorates Michael Aw, a Singaporean underwater photographer renowned for documenting Indonesian marine biodiversity through numerous publications, including *Beneath Bunaken* and *Indonesia's Global Treasures*.

Acropora batunai *(Wallace, 1997) (Figure 2.D)*

Collected primarily from the Togian Islands, this species appears to have a restricted distribution in Central Sulawesi, with possible occurrences in North Sulawesi. The epithet *batunai* honors Dr. Hanny Batuna, a conservation advocate and SCUBA diving pioneer from North Sulawesi, recognized for his contributions to marine conservation and underwater exploration.

Acropora desalwii *(Wallace, 1994) (Figure 2.E)*

Described nearly 30 years ago, *Acropora desalwii* is based on holotype and paratype specimens from the Banda Sea. The name commemorates Des Alwi Abubakar, a notable historian, diplomat, and adopted son of Indonesia's first vice president, Mohammad Hatta. Although not a marine biologist, his historical and cultural influence in the Banda region inspired the patronym.

Acropora hoeksemai *(Wallace, 1997) (Figure 2.F)*

This species was originally collected from Bunaken in North Sulawesi, with paratype material originating from multiple Indonesian regions including Maumere, Kupang Bay, Alor, and Sangilaki. The epithet honors Prof. Bert W. Hoeksema, a leading coral taxonomist specializing in Fungiidae, whose extensive work on Indonesian corals continues to shape modern scleractinian systematics.

Acropora indonesia *(Wallace, 1997) (Figure 2.G)*

Acropora indonesia exhibits a table-like colony morphology characteristic of the *A. hyacinthus* group. The holotype was collected from North Sulawesi and Bangka Island, with paratypes from Sangihe, Mahangetang, and Biaro. As reflected in its epithet, the species is distributed widely across the Indonesian archipelago, making it a representative coral of the region's exceptional biodiversity.

Acropora halmaherae *(Wallace & Wolstenholme, 1998) (Figure 2.H)*

Named after Halmahera in North Maluku, this species is endemic to the region, located within the biodiversity core of the Coral Triangle. Holotype material was obtained from Halmahera, Loloda, and Sidanga at approximately 15 m depth. The toponym not only marks its geographic origin but also highlights Halmahera's importance as a reservoir of unique coral lineages.

Acropora derawanensis *(Wallace, 1997) (Figure 2.I)*

The holotype and paratypes of *A. derawanensis* originate from Tababinga Reef near Derawan Island, East Kalimantan. This species appears to be restricted to the Derawan reef complex, where it typically occurs alongside *Anacropora* and *Leptoseris*. The epithet reflects the island's significance as the site of initial discovery.

Acropora simplex *(Wallace & Wolstenholme, 1998) (Figure 2.J)*

This species, described from the Togian Islands, possesses unusually few radial corallites, giving the colony a notably simple appearance. The epithet *simplex* is descriptive, referring directly to this morphological trait.

Acropora plumosa *(Wallace & Wolstenholme, 1998) (Figure 2.K)*

Collected from the Togian Islands with paratypes from East Kalimantan, *Acropora plumosa* features delicate, feather-like branching patterns. The Latin epithet *plumosa* ("feathered") describes the species' distinctive morphology.

Acropora rudis *(Rehberg, 1892) (Figure 2.L)*

Examined from Nias Island, *Acropora rudis* occurs in the Indian Ocean but not the Pacific. The epithet *rudis* ("rough, coarse") refers to the rounded, somewhat rugged appearance of its radial corallites.

Isopora togianensis *(Wallace, 1997) (Figure 3.A)*

Initially described as *Acropora togianensis* due to morphological uncertainty, this species was later reclassified under *Isopora* following morphological and genetic evidence (Wallace et al. 2007). Endemic to the Togian Islands, its epithet reinforces the locality's significance as the sole known habitat.

Table 1. List of coral and sponge species included in this study, showing their taxonomic classification, authorship, reference sources, holotype localities, and epithet types (patronym, toponym, or descriptive)

Phylum	Class	Order	Family	Species	Reference	Holotype Locality	Epithet type
Cnidaria	Anthozoa	Scleractinia	Acroporidae	*Acropora suharsonoi* Wallace, 1994	Wallace and Willis 1994	Pemuteran and Gili Trawangan	Patronym
				Acropora sukarnoi Wallace, 1997	Wallace 1997	Nusa Lembongan	Patronym
				Acropora awi Wallace & Wolstenholme, 1998	Wallace and Wolstenholme 1998	Togian Islands	Patronym
				Acropora batunai Wallace, 1997	Wallace 1997	Togian Islands	Patronym
				Acropora desalwii Wallace, 1994	Wallace 1997	Banda Sea	Patronym
				Acropora hoeksemai Wallace, 1997	Wallace 1997	Bunaken	Patronym
				Acropora indonesia Wallace, 1997	Wallace 1997	North Sulawesi and Bangka	Toponym
				Acropora halmaherae Wallace & Wolstenholme, 1998	Wallace and Wolstenholme 1998	Halmahera	Toponym
				Acropora derawanensis Wallace, 1997	Wallace 1997	Derawan	Toponym
				Acropora simplex Wallace & Wolstenholme, 1998	Wallace and Wolstenholme 1998	Togian Islands	Descriptive
				Acropora plumosa Wallace & Wolstenholme, 1998	Wallace and Wolstenholme 1998	Togian Islands	Descriptive
				Acropora rudis Rehberg, 1892	Rehberg 1892	Nias, Sumatra	Descriptive
				Isopora togianensis Wallace, 1997	Wallace 1997	Togian Islands	Toponym
				Astreopora cenderawasih Wallace, Turak & DeVantier, 2011	Wallace et al. 2011	Cenderawasih Bay	Toponym
				Astreopora acroporina Wallace, Turak & DeVantier, 2011	Wallace et al. 2011	Papua	Descriptive
				Astreopora montiporina Wallace, Turak & DeVantier, 2011	Wallace et al. 2011	Nabire	Descriptive
			Fungiidae	*Podabacia kunzmanni* Hoeksema, 2009	Hoeksema 2009	Padang and Seribu	Patronym
				Halomitra meierae Veron & Maragos, 2000	Veron and Maragos 2000	Bali	Patronym
				Pleuractis moluccensis Van der Horst, 1919	van der Horst 1919	Maluku	Toponym
			Euphylliidae	*Euphyllia baliensis* Turak, Devantier & Erdmann, 2012	Turak et al. 2012	Padang Bai	Toponym
			Lobophylliidae	*Cynarina macassarensis* Best & Hoeksema, 1987	Best and Hoeksema 1987	Spermonde/Makassar	Toponym
Porifera	Demospongiae	Haplosclerida	Callyspongiidae	*Callyspongia (Euplacella) biru* de Voogd, 2004	de Voogd 2004	Bali, Sulawesi, Kalimantan	Descriptive
		Tetractinellida	Pachastrellidae	*Dercitus (Stoeba) bangkae* Calcinai, Bastari, Makapedua & Cerrano, 2017	Calcinai et al. 2017b	Bangka Island	Toponym
			Tetillidae	*Acanthotetilla celebensis* de Voogd & van Soest, 2007	de Voogd 2007	Bunaken	Toponym

Astreopora cenderawasih *(Wallace, Turak & DeVantier, 2011) (Figure 3.B)*

Astreopora cenderawasih was described from Papua's Cenderawasih Bay, a region increasingly recognized as a center of coral endemism within the Coral Triangle. Holotype material was collected from shallow habitats around 4 m depth in Cenderawasih Bay, with additional records from Nurage Island and the Manu Laut area. The species epithet *cenderawasih* is a toponym referring to the bay, named after the iconic "bird of paradise." This naming underscores both the species' strong geographic association and the biological uniqueness of Cenderawasih Bay as a repository of undescribed coral lineages.

Astreopora acroporina *(Wallace, Turak & DeVantier, 2011) (Figure 3.C)*

Described from multiple locations in Papua—including Cenderawasih Bay, Womosisore Cape, and southern Yapen —*Astreopora acroporina* is distinguished by axial corallites that closely resemble those found in *Acropora*. This morphological similarity is reflected in the epithet *acroporina*, which denotes its *Acropora*-like corallite structure. The species demonstrates how convergent or overlapping skeletal traits may occur between genera within Acroporidae, emphasizing the need for integrated morphological and molecular data in species delimitation.

Astreopora montiporina *(Wallace, Turak & DeVantier, 2011) (Figure 3.D)*

Holotype specimens of *Astreopora montiporina* were taken from Nabire at 12 m depth, with paratype material collected from Tridacna Atoll in West Papua. The species is characterized by laminar colony growth resembling that of *montipora*, coupled with small, cerioid corallites embedded within the coenosteum. The epithet *montiporina* highlights this similarity. The species' discovery within Papua's reef systems further reinforces the region's role in generating novel coral diversity, particularly within genera exhibiting morphological plasticity.

Group non-*Acropora*

Podabacia kunzmanni *(Hoeksema, 2009) (Figure 3.E)*

Podabacia kunzmanni was described by Hoeksema (2009) based on material from Padang (West Sumatra) and the Kepulauan Seribu (Jakarta Bay). The species may have a distribution restricted to Indonesia and Singapore. The epithet *kunzmanni* is a patronym dedicated to Dr. Andreas Kunzmann, who conducted research in Padang and made significant contributions to marine science in the region. This naming reflects the influential role of regional researchers in advancing coral taxonomy.

Halomitra meierae (Veron & Maragos, 2000) (Figure 3.F)

Described from Bali, *Halomitra meierae* is considered locally restricted within Indonesian waters. The epithet *meierae* honors Karin Meier, a biologist who first observed and collected this species from Bali. The naming represents a patronym acknowledging her contribution to documenting Indonesia's coral diversity.

Euphyllia baliensis *(Turak, Devantier and Erdmann, 2012) (Figure 3.G)*

Discovered in Padang Bai, Bali, at approximately 37 m depth, *Euphyllia baliensis* was formally described by Turak, DeVantier, and Erdmann (2012). Paratype material was obtained from the Indonesian Institute of Sciences (LIPI), the Natural History Museum (London), and the Smithsonian Institution (Washington D.C.). Commonly found on sloping reef habitats with moderate to strong currents, the species is often observed living alongside *Halimeda*, soft corals, and hydroids. The epithet *baliensis* is a toponym referencing Bali, the locality of its discovery.

Cynarina macassarensis *basionym* Indophyllia macassarensis *(Best & Hoeksema, 1987) (Figure 3.H)*

Originally described by Best and Hoeksema (1987) from the Spermonde Archipelago, with paratypes from Samalona, Barang Caddi, and Bone Batang, this species is commonly found on sandy substrates of the reef slope at depths >20 m. The epithet *macassarensis* honors Makassar and the broader Makassar Strait region, where the holotype was collected. The species has since been re-evaluated and is currently recognized as *Cynarina macassarensis* following taxonomic revision. The toponym emphasizes the prominent role of the Makassar region in coral systematics.

Pleuractis moluccensis *(Van der Horst, 1919) basionym* Fungia moluccensis *(Figure 3.I)*

Originally described as *Fungia moluccensis* by van der Horst (1919), this free-living coral belongs to the family Fungiidae and is characterized by its oval morphology. The holotype originated from the Maluku region, and the species has since been reported throughout multiple Indonesian seas, including northern Java, Sulawesi, Komodo, and Banda. The epithet *moluccensis* is a toponym commemorating the Moluccas, a historically important site in Indonesian natural history.

Porifera

Callyspongia (Euplacella) biru *de Voogd 2004 (Figure 4.A)*

Callyspongia (Euplacella) biru was described by de Voogd (2004) based on specimens collected from Bali, Sulawesi, and Kalimantan. Belonging to the subgenus *Euplacella* within *Callyspongia*, this species is characterized by its distinctive double spicule arrangement and striking blue coloration. The epithet *biru*, which means "blue" in Indonesian, is a descriptive reference to the sponge's vivid pigmentation. This species highlights the unique morphological traits found within Indonesian Demospongiae and the region's capacity to yield visually and structurally distinctive taxa.

Dercitus (Stoeba) bangkae *Calcinai, Bastari, Makapedua and Cerrano, 2017 (Figure 4.C)*

The thin, encrusting sponge *Dercitus (Stoeba) bangkae* was described from mangrove-associated shallow habitats (~1 m) around Bangka Island, North Sulawesi. Morphologically, it possesses a microhispid surface with sediment inclusions, inconspicuous oscules, and a skeleton composed of calthrops and irregular dichocalthrops,

accompanied by distinctive sanidasters—including a unique curved-tip microsclere. The epithet *bangkae* is a toponym referring to Bangka Island, the only known locality for this species. Its restricted habitat and specialized morphology underscore the ecological uniqueness of North Sulawesi's mangrove-reef interface (Calcinai et al 2017a).

Acanthotetilla celebensis *de Voogd & van Soest, 2007 (Figure 4.B)*

Described from Likuan, Bunaken Islands, North Sulawesi, the holotype of *Acanthotetilla celebensis* is semiglobular to hemispherical in shape with a cavernous interior, measuring approximately 10 × 12 cm. The species inhabits reef walls at around 14 m depth and is so far known only from its type locality. The epithet *celebensis* refers to Celebes, the historical name for Sulawesi, marking both a geographic and cultural connection to the region. This species exemplifies the distinctive Tetillidae fauna associated with Sulawesi's diverse reef environments.

The analysis of species epithets associated with Indonesian coral and sponge taxa reveals clear patterns in taxonomic naming practices linked to both geographic discovery and scientific contribution. Among the 24 taxa examined in this study, toponyms represent the most common category, accounting for approximately 41.7% of species names, followed by patronyms (33.3%) and descriptive epithets (25.0%). This pattern indicates that geographic references play a major role in species nomenclature for organisms discovered within Indonesian waters. The dominance of toponyms reflects the strong association between species discovery and specific localities within the Indonesian archipelago. Many species analyzed in this study were named after regions such as Halmahera, Derawan, Bali, and Cenderawasih Bay, all of which are recognized as biodiversity-rich reef systems within the Coral Triangle. The frequent use of geographic epithets highlights the role of Indonesia not only as a center of coral diversity but also as an important source of holotypes used in global coral taxonomy. Similar patterns have been reported in other taxonomic groups, where species discovered in biodiversity hotspots are often named after their type locality to emphasize their geographic origin and biogeographic significance (Crosbie et al. 2026).

Patronyms also constitute a substantial proportion of the taxa analyzed, particularly within the genus *Acropora*. Several species were named in honor of researchers and contributors to coral reef science, reflecting the collaborative nature of marine biodiversity exploration (Aksholakov 2014). These patronyms recognize both Indonesian scientists and international taxonomists who have played key roles in documenting coral diversity in the region. Such naming practices not only acknowledge individual contributions but also provide a historical record of scientific discovery and collaboration in coral reef research. Descriptive epithets, although less common, typically refer to distinctive morphological characteristics of the coral colonies or skeletal structures. Examples include species names derived from Latin terms describing colony shape, corallite structure, or skeletal texture. These descriptive names remain important in taxonomic practice because they highlight diagnostic features used in species identification, particularly in groups with high morphological variability such as Acroporidae.

When examined by taxonomic group, Acroporidae species exhibit a higher proportion of patronyms compared to other coral groups. This pattern likely reflects the intensive taxonomic work conducted on *Acropora* during the late twentieth century, particularly by researchers such as Wallace and colleagues (Wallace et al. 1994), who described numerous species from Indonesian reef systems. In contrast, non-*Acropora* corals and Demospongiae more frequently display toponyms, emphasizing the strong geographic linkage between species discovery and specific reef habitats. Beyond nomenclatural conventions, these naming patterns also provide insight into the broader scientific history of coral exploration in Indonesia. The frequent appearance of Indonesian geographic names and individuals within species epithets underscores the archipelago's long-standing importance in marine biodiversity research.

In conclusion, this study shows that the scientific names of selected coral and sponge taxa associated with Indonesian waters preserve taxonomic, biogeographic, and historical information. Among the 24 taxa examined, toponyms were the most frequent epithet type, followed by patronyms and descriptive epithets, with patronyms mainly represented in Acroporidae and toponyms more common in other scleractinian corals and demosponges. These patterns indicate that Indonesian localities, researchers, and reef systems are embedded in species nomenclature, highlighting Indonesia's role as a source of type material and a major setting in coral and sponge taxonomy. Beyond summarizing naming patterns, this study emphasizes the value of species epithets as concise records of biodiversity discovery and scientific contribution. Future studies should expand this approach to broader Indonesian marine taxa to better understand how nomenclature reflects biodiversity history and biogeographic knowledge.

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