

MANGROVE SCIENCE

Vol.17 2026



日本マングローブ学会
Japan Society for Mangroves

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MANGROVE SCIENCE

日本マングローブ学会 Japan Society for Mangroves

第17巻
2026年3月

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Mangroves are forests: woody trees characterize mangroves

Gordon S. MAXWELL¹⁾, Sanit AKSORNKOAE²⁾

Abstract: The recent surprising claim that mangroves are wetlands not forests is challenged in this paper. Two main arguments were advanced to support the claim that mangroves should be looked upon as wetlands rather than forests. The first was that “confusion” still exists over what mangroves are. The second argued that mangroves, like most other wetlands have a low diversity of plants. Both contentions appeared to downplay the idea that woody plants, ‘trees and bushes’ characterize mangroves. We present a discussion here which aims to confirm the wisdom of treating, researching and managing mangroves as forest ecosystems. The long-established place of this perspective is presented along with reasons why the word mangrove may have been subject to some uncertainty, as when the ‘associate’ vs ‘true’ mangrove status of a tree or fern in a mangrove forest attracts debate. Other forest issues also emerge. These include the ecophysiological requirements of mangrove status; the process of succession in mangrove forest change over time; the nature of biodiversity within mangrove ecosystems as it may be revealed by mangrove biogeography and the fact that mangrove trees, as woody plants, are replaced by herbaceous salt marsh plants at latitudes where freezing incidents occur.

Keywords: mangroves, woody trees, forests, tidal saline water, wetlands, standing water, mangrove fern, ‘associate’ and ‘true’ mangroves, succession, biodiversity, freezing, xylem embolism

1. Introduction and overview

Recently and surprisingly a claim was made that confusion continues over the basic nature of mangroves: Gopal (2014), who clearly stated in the title to his paper that “mangroves are wetlands, not forests: some implications for their management”. Here we critically review this attempt to redefine mangrove vegetation as wetlands rather than forests and show that both the foundations of mangrove science and its discussion over the past two centuries are based on thinking of mangroves as forests and woody trees characterize forests.

Mangrove wood has a deep history in ancient Arab culture as evidenced by the use of *Sonneratia*, *Bru-guiera* and *Rhizophora* timber in *dhow* construction (MacNae, 1968). When stationed in Brunei, I witnessed local fisherfolk making use of the natural curvature of *Rhizophora* stilt roots and trunk-supporting buttresses as ideal, ready-made construction components

for small boats (Maxwell, personal observation, 1990). This suggests that the Islamic dimension associated with boat building is embedded within the cultural traditions of Malay civilization. The most comprehensive account of this historical setting comes from Chapman (1976) where even the origin of the term’s mangrove the tree and mangrove the forest is outlined. Following MacNae (1968), Chapman uses the term mangrove for the trees and mangal for the forest community. Clearly, to view mangroves as woody trees has a very long history in a number of human cultures. In section 2 of our paper, we look at some of the arguments used by Gopal (2014) to support his submission that mangroves are wetlands and then comment on these arguments.

For ease of cross referencing the questions, claims or issues addressed will be shown in italics.

2. Opinions and discussion

2.1 The term mangrove

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Gopal (2014) claims that there continues to be “confusion” over the basic nature of mangroves or what are mangroves, as evidenced by the fact that some use the term mangroves to mean woody trees and bushes while others call ground ferns and other plants [in mangroves] mangrove associates.

The word “confusion” as used here does not fully reflect the disagreements which have sometimes come when mangroves are discussed. To place the word in quotation marks is a sensible move. At international conferences over the past 30 years or so, when a debate or disagreement has surfaced it has often come with the term “mangrove associate”. This issue was evident at the international transboundary Diagnostic Analysis of Mangrove Ecosystems (Macintosh et al., 2013) and worth commenting upon in a recent survey of gaps in mangrove science (Maxwell, 2015). While it may be useful to mention that some inconsistency and disagreement exist in the mangrove literature with the way mangroves are defined, let it be clear that ferns, be they tree ferns, ground ferns or epiphytes where present (like the mangrove fern, *Acrostichum*) are part of any forest ecosystem. This important point was recently highlighted in a discussion of the outstanding place of tree ferns in a major study of New Zealand rainforests (Brock et al., 2016).

2.2 The mangrove fern (*Acrostichum*) story

In the context of mangrove forests, the fern genus *Acrostichum* is an essential part of the story. Indeed, *Acrostichum* has a long history in mangrove forest science. This large fern attracted attention 120 years ago in studies of mangroves in Sri Lanka (once called Ceylon) where *Acrostichum* was described as a “handsome plant of bush-like growth forming a marked feature of the mangrove flora” (Thomas, 1905). *Acrostichum* can display dense frond clusters which protrude bush-like well above the forest floor and it would be misleading to designate them as ground ferns, because the term ground fern does not easily fit *Acrostichum* as this fern with a bush-like morphology and life span which can, on occasions, replace woody trees with dense thickets reaching a height of 3-4 m (Chan, 1989). *Acrostichum*, can handle tidal immersion (the only fern known to be capable of this). In terms of ecological anatomy, the fern displays features which demonstrate its adaptations to the challenges of survival in a mangrove habitat. These include sclerenchyma fibers in frond tissue (Hon, 2004; de Arruda et al., 2021): an attribute relat-

ed to water retention in an environment where salinity is a major ecological factor. The *Acrostichum* root system also exhibits a noteworthy mangrove attribute: a well-developed aerenchyma (Youssef and Saenger, 1996). Perhaps the importance of the anatomical features of the mangrove fern *Acrostichum* lies in their similarity to those displayed by woody trees. These coupled with a gametophyte which can survive salinity (Nakamura, personal comment, 2000) stamp huge interest on the mangrove fern. It may be misleading to talk of ‘ground ferns’ in a mangrove forest when there is but one fern genus currently known for this niche and this fern exhibits the above ground morphology rather unlike that of typical ferns. Furthermore, it would seem inappropriate to look upon *Acrostichum* as a “mangrove associate”. The fern has size, mangrove attributes and ecological influence at a level which may be as notable as that of the mud lobster.

Acrostichum has featured in discussions of mangrove forest fossil history: the presence of fronds of *Acrostichum* from the English Tertiary *1 (Chapman, 1976) is a good example and an important reminder of notable changes in global climate as it moved towards an Ice Age at least 2.6 million years ago. In the context of mangrove biogeography, the presence of mangrove fern deposits in the London clay reminds us that as the world distances itself from the last Ice Age, even a location as far north as London once experienced a climate conducive to mangroves (Maxwell, 2019). It also helps those who tend to emphasize that the only issue worth our attention in climate change is mean temperature increase may be overlooking climate cooling and the long-term mega patterns of global temperature dynamics (Maxwell, 2016). Recently, He et al. (2025) neatly restated this warning when they reminded us that “Early Cretaceous greenhouse Earth was like a symphony – its warm melodies occasionally punctuated by brief glacial notes”. In terms of mangrove biogeographics, this could mean changes in species composition from region to region, especially at the present northern and southern distributions of mangrove species.

2.3 Interactions: trees, ferns and mud lobsters

The interactions between mangrove trees and shrubs, mangrove ferns and mud lobsters were themes of a whole Ph D thesis (Havanond, 2000). The fern dimension does not stop here. If we consider epiphytic ferns on mangrove trees, we can find that key rep-



Fig. 1 *Xylocarpus moluccensis*: indicator of mature, old-growth inner mangrove forest.

representatives of this largely overlooked niche/ group displaying a strong association with some iconic trees of the mangrove forest. *Xylocarpus moluccensis* (Fig. 1) is an example of the later and the fern, *Neprolepis acutifolia*, an example of the former (Hayasaka et al., 2012). Importantly, these epiphytic ferns are correlated with what Hayasaka et al. (2012) describe as ‘microenvironments’ of mature woody mangrove trees; as such they demonstrate how old growth mangrove can enhance forest biodiversity. These mature host trees deserve protection. Epiphytes were also observed in good number in the huge *Avicennia marina* mega mangroves (Fig 2) of Ranong (Maxwell, 2019). Although appealing, full and further discussion of the mangrove fern question is beyond the scope of the present paper. However, it is important to note that the designation ‘mangrove associate’ is often used unscientifically; this is a point that Gopal (2014) may well have had in mind. Many if not most so-called ‘mangrove associates’ have not yet been received adequate attention in their ecophysiology and ecological anatomy. The mangrove fern is a good example of this situation. Nor have all the trees which have been described as ‘true’ or ‘exclusive’ mangroves received a complete eco-physiological profile. The need for attention such as this was shown by Gray et al. (2010) when they showed that mangroves may not put excess salt into old leaves and then shed them as a sort of sacrificial leaf. More case studies are needed on the sacrificial leaf hypothesis. This point was highlighted again recently with *Aglaia cucullata* (Meepol et al., 2020): a tree with some outstanding mangrove attributes that is typically but not exclusively found in a ‘back man-

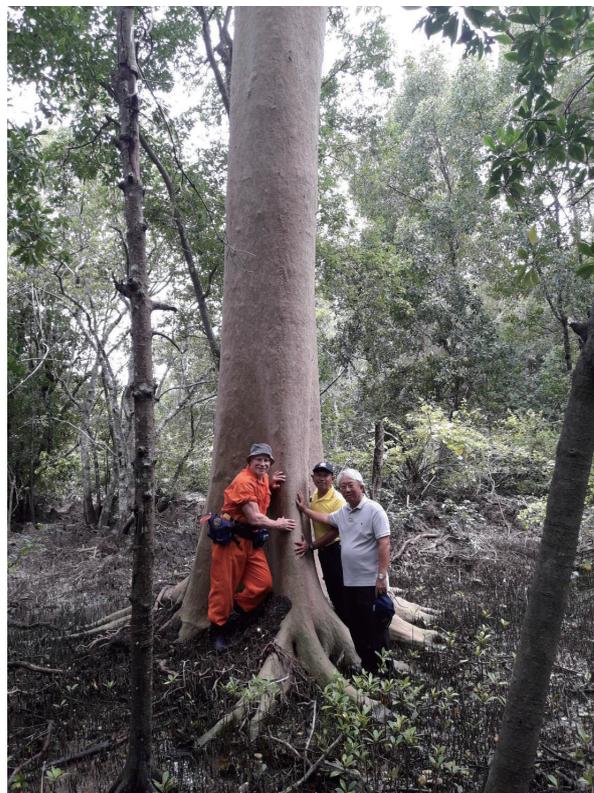


Fig. 2 Huge *Avicennia marina* tree near seaward zone of the Ranong mangrove forest, southern Thailand.

grove’ ecotonal position in the outstanding 48,000 ha mangrove forest of the Ranong Province in southern Thailand. Its presence here has been used as evidence of a status in the forest of mangrove associate but mature *A. cucullata* trees display prominent buttresses (up to 1 m tall), conspicuous pneumatophores (5-70 cm in height) (Fig 3) and, notably, a very wide salinity tolerance (from 0.5 ppt to 29 ppt *2) has been reported with this tree from Myanmar (Win, 2019). The prominent pneumatophores and broad salinity tolerances are important mangrove attributes. Havanond (2000) demonstrated from extensive field research in the huge Ranong mangrove forest, that at least some *A. cucullata* trees could cope with the impact of the mound-building mud lobster that can inhabit the inner (‘back’) mangrove zone of this forest. At Phang-nga bay, the mud lobster (*Thalassina anomala*) could create forest floor disturbances which gave any succession that may exist a look of the shifting mosaic pattern (Maxwell, 2015). Thus, both *A. cucullata* and the mud lobster are part of the processes of ecological succession which occur in the Ranong largely natural stand of ‘old growth’ mangrove forest and the disturbed forest of



Fig. 3 *Aglaia cucullata* displaying prominent buttresses and conspicuous pneumatophores in its 'back mangrove' position in the Ranong mangrove forest.

Phang-nga bay.

2.4 Succession as a core topic in forest development

Chapman (1976) includes *Acrostichum* as a stage in succession in some west African mangroves, where this fern follows *Rhizophora racemosa* in open lagoons and may itself be replaced by *Avicennia africana*. We should emphasize that forest succession is very much a point of interest in forest ecology and is deeply ingrained in the ecological literature, even though some prefer the term vegetation dynamics (Kimmins, 1997). However, due to the complexities of and time required for studies of succession in mangrove forests, conclusions are hard to obtain (Havanond et al., 1999). Zonation patterns have provided some clues as to how a succession of belts of different dominant mangroves may develop (Snedaker, 1982 cited in Saenger, 2002). Field studies in the mangrove forests of Phang-nga bay, southern Thailand (Minagawa and Nakamura, 1996) showed that while two zonation patterns were evident (Fig 4), these were readily subject to change. The changes involved zone replacement, species invasion, retrogression and recolonization as both natural events such as tree fall and extreme tidal episodes brought out-of-zone propagules into spaces in a given zone. Minagawa and Nakamura (1996) cleverly linked the distribu-

tion of the main mangrove species to propagule size and their flotation in sea water to distribution along the intertidal gradient with largest vertically floating propagules (*Rhizophora mucronata*) tending to strand in the outer seaward zone. Of course, with storms and extreme tides the water depth and penetration into the forest would change a pattern based on average tidal events. Chance events such a small habitat vacancy can provide changes to these observed patterns and typical distributions. This was the case in a survey of a relatively rare pristine mangrove forest in the Tutong River (an estuarine environment exposed to the south China sea) in central Brunei, when a mature and firmly established *Xylocarpus granatum* tree was doing well on the seaward or estuarine edge of this mangrove forest (Maxwell and Havanond, 1991; Aksornkoae et al. (1992). At this undisturbed site in the Brunei mangrove forest a 2-3 m wide belt of river edge *Kandelia candel* trees dominated (Maxwell, 1993; Maxwell, 1995). To record *X. granatum* here contrasted with the observations of *X. granatum* characteristic of the inner mangrove of the La-un and KraBuri rivers in this Ranong Province on the west coast of southern Thailand (Havanond et al., 1999).

The mixed forest referred to in Fig 4 included isolated specimens of the seaward tree species, like *Avicennia marina*, but these were outnumbered by *Brugiera-*

		Sea ward	Land ward
	Lower littoral	Mid littoral	Upper littoral
			Supralittoral (Above mean high tide)
Zonation Pattern 1	<i>Rhizophora mucronata</i>	<i>Rhizophora apiculata</i>	Mixed forest
Zonation Pattern 2	<i>Sonneratia alba</i> <i>Avicennia officinalis</i> or <i>Avicennia alba</i>		Mixed forest
			Back mangrove

Fig 4. Two zonation patterns characterizing the mangrove forest of Phanga-nga Bay, southern Thailand (Synthesized from Miyawaki & Suzuki,1980; Minagawa & Nakamura,1996; Aksornkoae,1993 and Hayasaka et al,2012). *Melaleuca* is likely to mark the back mangrove.

R.apiculata associations with *Ceriops*, *Xylocarpus*, *Excoecaria* and *Phoenix* communities taking over as the forest moved further landward. At other locations on the west coast of southern Thailand, we may find further communities of which the *Aegiceras/Kandelia* combination near Ranong is a good example (Aksornkoae, 1993; Maxwell, 1993). The presence of *Kandelia candel* at densities which enable this tree to characterize an association is relatively unusual in the tropics. To find *K. candel* in dominant numbers we usually need to visit the subtropical sites of Hong Kong and Japan (Maxwell, 1995). In Hong Kong, *K. candel* is one of only 8 mangroves, all of which display some cold tolerance. None of these mangroves express their biological potential in growth as they can do in tropical habitats like Thailand’s Ranong mangrove forest. In Hong Kong they resemble shrubs rather than trees. Further north (31° N) at the southern end of Japan’s Kyushu Island, the only mangrove that can survive here is *K. candel* (Maxwell, 1995; Suzuki and Saenger, 1996).

Importantly, in the context of this paper, while the discussion and uncertainty (we prefer this word to ‘confusion’) about *Acrostichum* is important, it is useful to emphasize that uncertainty about a particular mangroves status has typically arisen over its major vs minor status. Often a mangrove with what may appear to have a relatively minor status in a forest relates to its apparent ‘back’ mangrove position; an ecotonal

location in or near the landward fringe of a mangrove forest (Tomlinson, 1986; Aksornkoae et al. (1992); Saenger, 2002; Maxwell, 2015).

As an inspection of the abovementioned literature reveals, mangroves be they tropical or at their biogeographic limits are best studied and described as forests characterized by woody trees and shrubs co-existing with a very competitive, large, rather special fern in their unique intertidal habitat.

2.5 A second notable claim made in Gopal’s (2014) chapter was: “Like most other wetlands, mangroves also have, in general, a very low diversity of plants (often with only one or two tree species being dominant)”.

This claim is reminiscent of a theme expressed by a reporter who had been tasked with summarizing country reports at an international conference organized by ISME in the late 1990’s. He exclaimed: “mangrove forests from the Asia Pacific are a vast collection of special cases!” A similar response was experienced at an international conference in 2016 (Maxwell, 2016). So here there is difficulty in accepting the generalization that mangroves have, in general, a very low diversity of plants (often with only one or two tree species being dominant).

Even studies of the world’s biggest mangrove forest system, the Sundarbans of both India and Bangladesh, which some forest ecologists (notably, Karim, 1994

and Chaudhuri and Choudhury, 1994) have based on 8 dominant trees, hide an impressive forest diversity. The dominant trees namely, *Heritiera fomes*, *Excoecaria agallocha*, *X. granatum*, *Xylocarpus mekongensis*, *Bruguiera gymnorhiza*, *Sonneratia apetala*, *Avicennia officinalis* and *Ceriops decandra* (1994) has estimated that most of the Bangladesh mangrove can be classified into some 10 forest types with *H. fomes* / *E. agallocha* forest type covering around 30 % of the forest. Changes associated with typhoons (tree fall and saltwater intrusion), tree harvest for fuel or timber and thatching (Hussain and Ahmed, 1994) and oil spills (Bhuiyan, 2015) has contributed to what Hussain and Acharya (1994) have described “the heterogeneity evident in the Sundarbans on a finer scale”. Some of this less obvious heterogeneity is expressed in the way various tree species may occur in variable proportions and combinations throughout the Sundarbans. In addition to diversity in combinations, the dominant tree species tend to deflect one’s observation of a mangrove species biodiversity made up of what Chaudhuri and Choudhury (1994) have called 36 true mangrove species, 28 mangrove associates and seven obligatory species. It is unclear how these categories of ‘true’ ‘associate’ and ‘obligatory’ are determined. While just one or two tree species may be dominant at a given site, the diversity or heterogeneity within the Indian and Bangladesh mangrove forest is impressive. As indicated in an ambitious effort to handle the complexities of salinity ranges and variations, soil or sediment types and zonation patterns of the Sundarbans Forest, Chaudhuri and Choudhury (1994) remind us that clear and consistent correlations with soil or substratum are often hard to find in the Sundarbans. Saenger (2002) devotes some detailed discussion to the mangroves of the Sundarbans and comments on their high species diversity. The UNESCO World Heritage Centre (WHC) (2023), estimates that the approximate 133,000 to 140,000 ha of the Sundarbans consists of forest and wetland (canals, creeks, and treeless sediments), with the forest covering ~ 55 % of this 133,000 – 140,000 ha. It is noteworthy that the WHC distinguishes forest from wetland and wise, I believe, to mention this estimated range in ha because the region is subject to dynamic factors of eco-geographic change and it is unsurprising to read that these forests may cover an area of approximately one million ha (Hussain and Acharya, 1994).

If we venture to the latitudinal biogeographic limits

of mangrove distribution and describe mangrove tree biodiversity, it is easier to find support for Gopal’s (2014) claim that only one or two tree species characterize mangrove forest vegetation. In the New Zealand case, where the global southern limits (at present) of mangroves exist, just one robust, chill tolerant mangrove tree survives. This is *A. marina*. (Chapman and Ronaldson, 1958, Chapman, 1976; Allen, 1961; Maxwell, 1971, 1976, 2002, 2015; Crisp et al., 1990; Saenger, 2002). The *A. marina* forests of New Zealand range in height from 3-4 m in the far north (35° 12’S) of New Zealand’s North Island to squat shrubs struggling to exceed 1 m in height in the intertidal zone of the Ohiwa harbour on the east coast at 38° 03’S. In the Thames Estuarine Harbour, south of Auckland and equidistant between the northern location and current southernmost extent of mangrove forest distribution (37° S), the trees of this unispecific *A. marina* forest are very dense (~3 tree trunks/ sq m) and may reach 2-2.5 m in height. In this region of New Zealand’s North Island, the mangroves function as a protective barrier to man-made stop banks adjacent to the Piako estuarine river. The architecture of this mangrove helps to defuse the erosive power of storm-driven or normal tidal inundations. Research by the Mazda group in Vietnam demonstrated that a mangrove barrier of around 1000m could reduce 1 m high sea waves to 0.05m and protect mud crab ponds based on associated with a managed mangrove ecosystem (Mazda et al., 1997). In the New Zealand case, the stop banks and mangroves help to protect valuable, low-lying dairy farmland from storm-driven tidal invasions (Maxwell, 2023). For some 50 years the mangrove forest on the seaward side of the stop banks beside the estuarine reaches of the Piako River has functioned as an eco-engineer. In Vietnam the mangrove barrier has been described as a ‘green wall’ (Hong et al., 2004). In both cases the mangrove forest functions as an eco-engineer. This is sustainability in action (Fig 5). Salt meadow or salt flat herbaceous plants such as the ground hugging glasswort, *Salicornia quinqueflora* with their creeping mat-like form cannot provide the wave energy diffusion role afforded by mangrove trees.

If we go north to the Japanese Islands, we find that *K. candel* replaces *A. marina* as the mangrove marking the most northern geographic limit of mangrove vegetation. At both southern and northern mangrove distribution limits only one species exists. Both species have an unusual attribute for mangroves: *A. ma-*



Fig. 5 A: Mangroves as eco-engineers: a dense belt of unispecific *Avicennia marina* forest protects the stop bank, protecting farmland from tidal invasion (Piako River, Hauraki Plainses), B: Piako River and estuary adjacent to mangrove.

rina and *K. candel* are chill shock tolerant. (Maxwell, 1995). A batch of studies reveal that another species of *Avicennia*, *A. germinans*, of the Americas also displays some cold temperature tolerance (Saengar, 2002). Additionally, some strong ecospecific variation in chill tolerance was identified with studies of *A. marina* ecotypes from Hong Kong and Thailand (Maxwell, 2002). Indeed, this question is quite a big topic on its own and is beyond the confines of the present paper.

Similar unispecific stands of mangrove forest can be found in the Persian Gulf and Egypt, where both northern temperatures and especially desert fringe conditions (Amiri, 2014) limit mangrove tree survival to just the hardiest of species, *A. marina*.

While these cases of very low species diversity and unispecific mangrove stands which can be found at the extremes of global mangrove distribution could be cited as support for Gopal's (2014) claim, when we focus on tropical Asia this idea vanishes. The claim is also hard to reconcile with the situation in subtropical Hong Kong SAR which has eight mangrove trees, all designated as 'true' mangroves. The luxuriance of mangrove forest as can be experienced in Indo-

nesia's Borneo, in Brunei, Malaysia, Thailand and Bangladesh challenge the idea that mangroves are like "most other wetlands" and have a "very low diversity of plants". Certainly, it is possible to encounter some small and isolated and unusual stands of mangrove forest. This was the case in Brunei with the almost unispecific *A. marina* forest within the Sunghai Pemburonguan, an isolated and remote embayment (lat 4.6° N). This *A. marina* (Api-Api) forest contrasted with Brunei's biodiverse mangrove forest associated with the Brunei River and the 55,000 ha mangroves of Ulu Temburong National Park. Both offer observation opportunities to see the Proboscis monkey (*Nasalis larvatus*); the presence of this primate endemic to Borneo being an indicator of mature forest development. Here the mangrove trees provide food, shelter and home. It is likely that the Proboscis monkey's dietary choices contribute to enhancing tree biodiversity within the mangrove forest (Tangah and Bernard, 2000) inhabited by the proboscis monkey. The frequency or keystone mangrove tree species such as *Rhizophora apiculata* may tend to hide the presence of other trees of which *X. molucensis*, *Sonneratia caseolaris*, *Avicennia alba* and *Ceriops spp* are examples (Hamid, 2000).

2.6 Mangroves as wetlands not forest?

Clearly, the theme of Gopal's paper was that mangroves are wetlands not forests. To simply seek a linguistic solution and argue that mangroves are wetland forests may not help or result in improvements in how those with management power over natural resources conduct their work. This is not the aim here. An exhaustive study of ecology or biogeography which looks at both forests and wetlands will reveal imprecision with the use of both terms. The issue was reviewed by the Federal Geographic Data Committee, (FGDC) (2013). This Committee pointed out that wetlands feature hydrophytes, undrained hydric soil and may be covered with water during the growing season of each year or year-round, as is the case with marshes and bogs. FGDC based their statement on Cowardin et al. (1979).

Of course, those in mangrove science may wish to debate or challenge one of more of the FGDC's statements. The term hydrophyte rather than halophyte may be one. The concept of undrained invites discussion. Mangrove forests, be they species limited or species rich, typically have drainage channels. Indeed, the drainage systems of mangrove forests are con-

spicuous features and ensure that shallow water does not linger when the tidal water retreats. Importantly, with intense sunlight that can dry the mangrove forest floor surface exposed after tidal retreat, this habitat becomes the opposite of a wetland. Interestingly and we feel usefully, the FGDC (2013) offered a definition for mangrove which stated, “tidally-influenced, tropical or subtropical shrub or forest dominated by true mangroves and associates”. Perhaps contrasting mangroves with swamps, the FGDC stated that swamps are characterized by their saturated soils and slow-moving waters. A mangrove “swamp” under daily tidal dynamics is hardly a slow-moving water habitat like the *Typha* (*T. latifolia*) or bull rush habitats, where typically lake-like freshwater depth is close to 1 m and permanent (Stace, 2010).

In a recent FAO forest resource assessment paper, a forest was defined as “an area dominated by trees usually having a single stem” (MacDiken, 2013). Further discussion embraced specifying what degree of tree crown cover was needed to distinguish woodland from forest. This led to considerations of the differences between % crown cover in woodland vs forest. However, the most relevant point here is that forests are dominated by trees.

Perhaps going above and beyond all these issues discussed so far is the finding by Stuart et al. (2007) that mangrove trees, as woody plants, dominate coastal vegetation in tropical and subtropical regions but are replaced by herbaceous salt marshes above 32° N and below 40° S. At these latitudes freezing incidents cause xylem embolism: trees are faced with water deficits and cannot survive. Mangroves as woody trees are excluded from these wetlands; mangroves be they ‘true’ or ‘associate’ members of this life form are not herbaceous halophytes. A salt marsh or salt flat is characterized by squat, semi-prostrate or prostrate carpet-like, mat-forming halophytes such as *Halocnemum strobilaceum* growing mostly landward of *A. marina* forests belts in Iran (Amiri, 2014) or as extensive creeping mats of *Sarcocornia quinqueflora* in New Zealand (Crowe, 1995) again occupying sites landward of *A. marina* (Maxwell, 1971). Both the Iranian and New Zealand halophytes belong to the glasswort subfamily, salicornioideae. Clearly, a salt marsh or salt flat has a rather different ecological structure from a forest; carpet-like halophytes contrast with the biological and ecological diversity provided by erect forest trees and bushes.

3. Concluding thoughts

Can we conclude? The claim in Gopal’s book chapter that “mangroves are wetlands not forests” tended to deflect one from what had the potential to be some useful ideas about mangrove forest management. Outstanding in this context was the wisdom of applying stronger attention to hydrology when managing mangrove forests for the many sustainable uses they provide. To disrespect the natural drainage systems which exist within mangrove formations can easily result in these systems becoming wetlands with standing water, as can be seen in *T. latifolia* (bull rush) habitats. Under regimes like this, mangrove trees face waterlogging and ecophysiological stress. Drainage or hydrological challenges like these may apply especially to the world’s biggest and most ecologically complex mangrove forest, that of the Sundarbans. Here the land-based freshwater mega systems based on continental scales, massive river estuarine deltas and tidal influences interact on a scale that warrants UNO inputs. The issue is huge as it touches on mega transboundary matters that go as far as the massive mountain and water resources and supply system based on the Himalayan mountains. The long-term survival of the planet’s biggest and best mangrove forest system deserves global attention.

If this discussion of mangroves as forests induces any such attention, we will be delighted. A related recommendation, too, is that the evocative title of Gopal’s stimulating chapter be reconsidered to acknowledge that many who have embraced mangrove forest ecosystems have been mindful of how tides and rivers stamp unique character on mangrove forests.

Acknowledgements

Gordon S. Maxwell would like to record his thanks to the Hauraki Catchment Board (now incorporated into the Waikato Regional Council, N.Z.) for providing a scholarship and funding to support the pioneering work on solving mangrove mortality associated with *Phytophthora* and with mangrove expansion issues due to excessive sedimentation in recent years. He also records his sincere thanks to Tokyo University of Agriculture, the University of Ryukyus, and the International Society of Mangrove Ecosystems (ISME), Okinawa for help and support while a visiting

Professor. In Thailand, over many years, numerous people and agencies have provided sustaining support, including Kasetsart University through Professor Sani Aksornkoae and his colleagues within the Faculty of Forestry, the Royal Forest Department, Marine and Coastal Affairs Department (DMCR), Mangrove Forest Research Centre, Ranong and the Sirindhorn International Environment Park, Cha-am. Dr Sonjai Havanond, mangrove forest expert of DMCR has been a companion in mangrove work for decades and took me to see and admire the world's biggest *Avicennia marina* tree near the seaward edge of the outstanding Ranong mangrove forest.

He also thanks Connie Lai, cetacean scientist in Hong Kong, for frequent fruitful discussion and incisive consultation on computer finesse and two anonymous reviewers who provided helpful and stimulating feedback during the preparation of our paper.

References

- Aksornkoae, S., Maxwell, G.S., Havanond, S. and Panichsuko, S. (1992): *Plants In Mangroves*. Chalongrat Co. Ltd, Bangkok, Thailand.
- Aksornkoae, S. (1993): *Ecology and Management of Mangroves*. IUCN, Bangkok, Thailand.
- Allen, H.H. (1961): *Flora of New Zealand Vol 1*. P D Hasselberg Government Printer, Wellington, N.Z.
- Amiri, F. (2014): A Nutritive Value of Iranian Mangrove Ecosystems, Northern Part of the Persian Gulf. *Natural Resources Research* 23: 321-330.
- Bhuiyan, M.R. (2015): Catastrophe in the world's largest single tract of mangrove forest – The Sundarbans of Bangladesh. *ISME/ GLOMIS E Jl*. 13 (1): 1-2. https://glomis.com/ej/pdf/EJ_13-1.pdf
- Brock, J.M.R., Perry, G.L.W., Lee, W.G. and Burns, B.R. (2016): Tree fern ecology in New Zealand: A model for southern temperate forests. *For. Ecol. & Mang.* 375: 112-126.
- Chan, H.T. (1989): A note on the eradication of *Acrostichum aureum* ferns in the Matang Mangroves, Perak, Peninsular Malaysia. *Jl of Trop Forest Science* 2:171-173.
- Chapman, V.J. (1976): *Mangrove Vegetation*. Cramer, Vaduz.
- Chapman, V.J. & Ronaldson, J.W. (1958): The mangrove and salt-marsh flats of the Auckland isthmus. *N.Z. Dept. Sci. Indus. Res. Bull.* 125: 1-79.
- Chaudhuri, A.B. & Choudhury, A. (1994): *Mangroves of the Sundarbans Vol. one: India*. IUCN, Bangkok, Thailand.
- Cowardin, L.M., Carter, V., Golet, F.C. and LaRoe, E.T. (1979): *Classification of wetlands and deep-water habitats of the United States*. U.S. Fish & Wildlife Service, Washington D.C.
- Crisp, P., Daniel, L. and Tortell, P. (1990): *Mangroves in New Zealand: trees in the tide*. IGP Books, Auckland.
- Crowe, A. (1995): *Which Coastal Plant*. Penguin Books (NZ) Ltd.
- de Arruda, E.C.P., da Costa Lima, G. and de Paiva Farias, R.P. (2021): Leaf anatomical traits and their ecological significance for *Acrostichum aureum* (Pteridaceae), a remarkable fern species growing in mangroves. *Aq Bot.* 171: Article No. 103379.
- FGDC (Federal Geographic Data Committee). (2013): *Classification of wetlands and deepwater habitats of the United States. Second Edition*. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.
- Gopal, B. (2014): Mangroves are wetlands, not forests: some implications for their management. In Faridah-Hanum, I., Latiff, A., Khalid Rehman Hakeem and Munir Ozturk (Eds). *Mangrove Ecosystems of Asia*. Springer, pp. 439-453.
- Hamid, H.L.H.A. (2000): Brunei Darussalam: mangrove friendly aquaculture. In J.H. Primavera, J.H., Garcia, L.Ma.B., Castaños, M.T. and Surtida, M.B. (eds). *Mangrove-Friendly Aquaculture. Proceedings of the Workshop on Mangrove-Friendly Aquaculture*. SEAFDEC, Iloilo City, Philippines, pp 95-103.
- Hayasaka, D., Kimura, N., Fujiwara, K., Thawatchai, W and Nakamura, T. (2012): Relationship between microenvironment of mangrove forests and epiphytic fern species richness along the Pan Yi River, Thailand. *Jl of Trop. For Sci* 24(2): 265-274.
- Havanond, S. (2000): Effect of mud lobster on mangrove succession in Thailand. *PhD Thesis*, Tokyo University of Agriculture.
- Havanond, S., Aksornkoae, S and Nakamura, T. (1999): Mangrove succession and mud lobster mounds in Ranong, Thailand. *Phuket Marine Biology Center, Special Publication*. 20: 21-36.
- He, S., Wang, T., Spicer, R.A., Farnsworth, A., Andreas Mulch, A., Mike Widdowson, M., Zhang, Q., Cai, F., Valdes, P.J. and Ding, L. (2025): Back

- to an ice-free future: Early Cretaceous seasonal cycles of sea surface temperature and glacier ice. *Sci Adv.* 11(18): Article No. 9417. DOI: 10.1126/sciadv.adr9417
- Hon, E.P.M. (2004): The ecological status of *Acrostichum aureum*, a mangrove fern, in Hong Kong. B Sc (Hons) Thesis, Open University of Hong Kong.
- Hong, P.N., Minh, N.D., Dao, P.N. and Thuy, T.V. (2004): Chap 38 Planning the management of vegetation in the mangrove areas of Giao Thuy District for sustainable development. In Hong, P.N. (Ed). *Mangrove Ecosystem in the Red River Coastal Zone*. Agric. Pub. House, Hanoi.
- Hussain, Z. and Acharya, G. (Eds.) (1994): *Mangroves of the Sundarbans. Volume two: Bangladesh*. IUCN, Bangkok, Thailand.
- Karim, A. (1994): Chapter Three Vegetation. In Hussain, Z. and Acharya, G. (eds) *Mangroves of the Sundarbans, Volume two: Bangladesh*. IUCN, Bangkok, Thailand, pp 43-74,
- Kimmins, J.P. (1997): *Forest Ecology*. Second Edition. Prentice Hall Pub.
- MacDicken, K.G. (2015): Global Forest Resources Assessment 2015: what, why and how? *For. Ecol. & Mang.* 352: 3-8.
- Macintosh, D.J., Ashton, E.C., Clough, B., Hogarth, P., Kjerfve, B., Nielsen, T., Scmitt, K., Foong, S., Ong, J.E., Fortes, M., Young, J., Bamroongrugs, N., Tantichodol, P., Tuan, M., Havanond, S., Apiwan, K. and Maxwell, G.S. (2013): *Transboundary Diagnostic Analysis of Indochina Mangrove Ecosystems*. Project Final Report. Swedish Intl. Coop Agency (SIDA) & Sirindhorn International Envir. Park (SIEP) Foundation, Thailand.
- MacNae, W. (1968): A general account of the Fauna and Flora of mangrove swamps and forests in the Indo-West Pacific Region. *Adv. Mar. Biol.* 6: 73-269.
- Maxwell, G.S. (1971): *A Phytophthora* sp in Mangrove Communities at Piako, New Zealand. MSc (Hons) thesis, Univ of Auckland, New Zealand.
- Maxwell, G.S. (1976): The Economic Importance of New Zealand Mangroves. Nature Conservation Council, Wellington, NZ (Cited in Crisp et al, 1990).
- Maxwell, G.S. (2002): Chill shock differentiates Hong Kong and Thai ecotypes of *Avicennia marina*. *Mangrove Science* 2: 43-45.
- Maxwell, G.S. (1993): Ecogeographic studies of *Avicennia marina* & *Kandelia candel* in Brunei, Hong Kong and Thailand. PhD Thesis, Univ of Hong Kong.
- Maxwell, G.S. (1995): Ecogeographic variation in *Kandelia candel* from Brunei, Hong Kong and Thailand. *Hydrobiologia* 295: 59-65.
- Maxwell, G.S. (2015): Gaps in mangrove science. *ISME/ GLOMIS E. JI.* 13 (5): 18-38.
- Maxwell, G.S. (2016): Perspectives on mangrove biodiversity in an unstable climate. *Proc. Intl. Conf. on Climate Change, Biodiversity and Ecosystem Services for SDGs: Policy and Practice*, June 2016, Cha-am, Phetchaburi, Thailand, pp 70-79.
- Maxwell, G.S. (2018): Mangroves are assets to the many but a curse to the few-polarised perspectives in New Zealand. *ISME/ GLOMIS E.JI.* 16 (4): 19-24.
- Maxwell, G.S. (2019): The Mega Mangrove. *The Biologist* 66 (1): 22-25.
- Maxwell, G.S. and Havanond, S. (1991): Field Inspection and Aquatic Reconnaissance of Sungai Pemburongunan and Sungai Tutong in Brunei Darussalam, March 10-12. *Report for Regional Forest Office*, Royal Forest Dept, Nakhon Si Thammarat, Thailand.
- Mazda, Y., Magi, M., Kogo, M. and Hong, P.N. (1997): Mangroves as a coastal protection from waves in the Tonkin delta, Vietnam. *Mangroves and Salt Marshes* 1: 127-135.
- Meepol, W., Maxwell, G.S. and Havanond, S. (2020): *Aglaiia cucullata*: A little- know mangrove with big potential for research. *ISME/GLOMIS E.JI* 18 (1): 4-9.
- Minagawa, R. and Nakamura, T. (1996): Zonation of Mangrove Vegetation in Thailand and Reasons for its Formation. In *Proceedings of the FORTROP'96 international conference: Tropical forestry in the 21st century: Volume 10 mangrove ecosystems*. Bangkok, Thailand, pp.82-90.
- Miyawaki, A. and Suzuki, K. (1980): Process of Phytosociological Studies & vegetation mapping. *Bull. Inst. Env. Sci. Techn.* Yokohama Natn. Univ. 7: 492-506.
- Saenger, P. (2002): *Mangrove Ecology, Silviculture and Conservation*. Kluwer Academic Pub.
- Snedaker, S. C. (1982): Mangrove species zonation: why? In Sen, D.N. and Rajpurohit, K.S. (Eds.) *Contributions to the ecology of halophytes*. TAVS Vol. 2, Dr W. Junk, The Hague, pp 111-125.

- Stace, C.A. (2010): *New Flora of the British Isles* (3rd Ed). Camb U.P.
- Stuart, S.A., Choat, B., Martin, K.C., Holbrook, N.M. and Ball, M.C. (2007). The role of freezing in setting the latitudinal limits of mangrove forest. *New Phytologist* 173: 576-583.
- Suzuki, K. and Saenger, P. (1996): A phytosociological study of mangrove vegetation in Australia with a latitudinal comparison of East Asia. *Mangrove Science* 1: 9-27.
- Tangah, J and Bernard, H. (2010): Feeding behavior of Proboscis monkey (*Nasalis larvatus*) in isolated mangrove habitat of Sabah (North Borneo), Malaysia. *Paper at 23rd Congress of the International Primatological Soc. Conf*, Kyoto Univ., Japan.
- Thomas, E. N. (1905): Some points in the anatomy of *Acrosticum aureum*. *New Phytologist* 4(8): 175-189.
- Win, S., Towprayoon, S. and Chidthaisong, A. (2019): Adaptation of mangrove trees to salinity areas in the Ayeyarwaddy Delta Coastal Zone, Myanmar. *Estuarine, Coastal and Shelf Science* 228: Article No. 106389.
- Youssef, T and Saenger, P. (1996): Anatomical adaptive strategies and rhizosphere oxidation in mangrove seedlings. *Aust J Bot.*44: 297-313.

Dedication & In memoriam

Gordon S. Maxwell wishes to record his ever-lasting respect and thanks to Professor Takehisa Naka-

mura formally of Tokyo University of Agriculture and President of Japanese Association of Mangroves (JAM) who introduced him to the inspirational mangrove forests of the Okinawa archipelago, especially those of Iriomote and brought him into the orbit of the uplifting studies within the Japanese mangrove science community. This became the foundation for sustained interests in mangroves at their northern biogeographic limits in the Japanese islands and southern limits in Maxwell's home country, New Zealand.

Professor Gordon S. Maxwell, FRSB, FLS, May, 2025.

Foot notes

*1 The term Tertiary is used here as this probably obsolete term is better known than its suggested replacements like Miocene and Pliocene which may have replaced Tertiary in some current accounts of geological time. (Ogg, J.G. et al (2004). *A Geological Time Scale*. Camb. U. Press.

*2 The symbol, ppt meaning parts per thousand is widely used in the literature and has been easy to relate to. It is used in this paper in preference to ‰ or ‰. Elaborating, full sea water has a salinity of 3.5 ‰ or 35 ‰.

Received: 16 June 2025, Revised: 19 September 2025, Accepted: 4 October 2025, First Published Online : 21 October 2025

令和7年度(2025年度)日本マングローブ学会総会

日 時：令和7年12月6日(土) 16時30分～
場 所：東京農業大学世田谷キャンパス アカデミアセンター 横井講堂

次第

議 題

- 第1号議題 令和6年度事業および収支決算報告の件
令和6年度事業報告および収支決算報告(監査報告)
- 第2号議題 令和7年度事業計画(案)および収支予算の件(案)
令和7年度事業計画(案)および収支予算(案)
- 第3号議題 役員改選について
- その他

第1号議題 令和6年度事業および収支決算報告の件

1. 令和6年度事業報告
 - 1.1 役員会の開催について
 - 第1回 令和6年9月上旬(メール上にて開催)
 - 第1議事：第30回日本マングローブ学会年次大会の開催について
 - 第2議事：学生奨励賞について
 - 第2回 令和6年12月7日(土)東京農業大学 横井講堂 会議室
 - 第1議事：令和6年度日本マングローブ学会総会提出議案について
 - 第2議事：学会賞の新設について
 - 1.2 第30回年次大会の開催について
 - 令和6年12月7日(土)・8日(日)東京農業大学において開催
 - 一般発表：13題
 - 公開シンポジウム：「包括的な高精度データセットを構築することで開くマングローブ生態系研究の展開可能性」(発表：7題)
 - 1.3 Mangrove Science Vol. 16の発行について
2. 令和6年度収支決算・監査報告(別紙1)

第2号議題 令和7年度事業計画(案)および収支予算(案)の件

1. 会員の移動状況 令和7年11月末
会員数86名(3名増)
2. 令和7年度事業計画(案)
 - 2.1 役員会の開催について
 - 第1回 令和7年7月上旬(メール上にて開催)
 - 第1議事 第31回日本マングローブ学会年次大会について
 - 第2議事 優秀口頭発表賞の審査要領について
 - 第2回 令和7年12月6日(土)東京農業大学 世田谷キャンパス 横井講堂 会議室
議事 令和7年度日本マングローブ学会総会提出議案について
 - 2.2 第31回年次大会の開催について
 - 令和7年12月6日(土)東京農業大学において開催
 - 口頭発表：8件(一般7 中高生1)
 - 特別講演：「知的冒険としてのマングローブ — 半世紀の軌跡」向後元彦(マングローブ植林行動計画)
 - 公開シンポジウム：「ボルネオ島、マレーシア・サバ州のマングローブ林はどうなっているのでしょうか？」(発表：3題)
 - 2.3 Mangrove Science Vol. 17の発行について
3. 令和7年度収支予算案(別紙2)

第3号議題 役員改選について(別紙3)

その他

- ・学会賞について
- ・MMM 7について

令和6年度 収支決算報告 (令和6年4月1日～令和7年3月31日)

I 収入の部

単位: 円

科目	6年度予算額	決算額	増減▲	摘要
前年度繰越金	1,417,181	1,417,181	0	
1. 年会費	250,000	131,000	▲ 119,000	正会員5,000円(22人)、学生会員3,000円(7人)
2. 事業収入(計)	90,000	138,000	48,000	
大会開催	90,000	138,000	48,000	大会参加費(一般 3,000円 × 27人、学生 1,000円 × 9人)、懇親会費(3,000円×14人、1,500円×4人)
受託事業	0	0	0	
3. 寄付金	50,000	20,000	▲ 30,000	東京農業大学 大会補助
4. 雑収入	10,000	698	▲ 9,302	普通預金利息
合計	1,817,181	1,706,879	▲ 110,302	

II 支出の部

単位: 円

科目	6年度予算額	決算額	増減△	摘要
1. 事業費(計)	280,000	192,950	▲ 87,050	
大会開催費	180,000	115,950	▲ 64,050	令和6年度(第30回) 年次大会開催費 (日時: 2024年12月7日)
学会誌刊行費	100,000	77,000	▲ 23,000	Mangrove Science Vol.16 刊行費
受託事業費	0	0	0	
その他	0	0	0	
2. 管理費(計)	76,000	21,075	▲ 54,925	
会議費	5,000	0	▲ 5,000	
旅費・交通費	5,000	0	▲ 5,000	
通信費	10,000	0	▲ 10,000	
印刷・製本費	0	0	0	
消耗品費	6,000	0	▲ 6,000	
賃借料	0	0	0	
委託管理費	20,000	20,000		学会HPの委託管理費
雑費	30,000	1,075	▲ 28,925	振込手数料
3. 予備費	30,000	0	▲ 30,000	
小計(1.+2.+3.)	386,000	214,025	▲ 171,975	
次年度繰越金	1,431,181	1,492,854	61,673	
合計	1,817,181	1,706,879	▲ 110,302	

令和6年度 貸借対照表 (令和6年4月1日から令和7年3月31日まで)

収支決算 収入総額 1,706,879円

(令和7年3月31日現在) 支出総額 214,025円

差引残高 1,492,854円

単位: 円

借方 (資産の部)			貸方 (負債・資本の部)		
科目	金額	摘要	科目	金額	摘要
1. 現金	206,881		負債		
2. 普通預金	1,285,973		1. 未払金	0	
3. 郵便振替口座	0		2. 預り金	0	
4. 損益	0		資本		
			次年度繰越金	1,492,854	
資産合計	1,492,854		負債・資本合計	1,492,854	

会計監査報告

令和6年度会計監査の結果、適法であり正確であることを認めます。

令和7年4月1日

監事 今井伸夫

監事 桃井尊夫



令和7年度（令和7年4月1日～令和8年3月31日）予算案

I 収入の部

単位：円

科目	6年度決算額	7年度予算額	増減▲	摘要
前年度繰越金	1,492,854	1,492,854	0	
1. 年会費	131,000	250,000	119,000	5,000円×50人
2. 事業収入(計)	138,000	90,000	▲48,000	
大会開催	138,000	90,000	▲48,000	第31回大会参加費(3,000円×30人)
受託事業	0	0	0	
3. 寄付金	20,000	50,000	30,000	
4. 雑収入	698	10,000	9,302	普通預金利息
合計	1,706,879	1,892,854	185,975	

II 支出の部

単位：円

科目	6年度決算額	7年度予算額	増減△	摘要
1. 事業費(計)	192,950	280,000	87,050	
大会開催費	115,950	180,000	64,050	第31回大会(含、シンポジウム)開催費
学会誌刊行費	77,000	100,000	23,000	Mangrove Science Vol.17刊行費
受託事業費	0	0	0	
その他	0	0	0	
2. 管理費(計)	21,075	76,000	54,925	
会議費	0	5,000	5,000	
旅費・交通費	0	5,000	5,000	
通信費	0	10,000	10,000	
印刷・製本費	0	0	0	
消耗品費	0	6,000	6,000	
賃借料	0	0	0	
委託管理費	20,000	20,000		学会HPの委託管理費
雑費	1,075	30,000	28,925	
3. 予備費	0	30,000	30,000	
小計(1.+2.+3.)	214,025	386,000	171,975	
次年度繰越金	1,492,854	1,506,854	14,000	
合計	1,706,879	1,892,854	185,975	

別紙 3

学会役員一覧（現行）

顧問	大田克洋、鈴木邦雄、馬場繁幸、松田義弘（50音順）
会長	中西康博
副会長	田淵隆一、藤本潔（編集担当）、宮城豊彦
理事	井上智美、入江憲治、梶田忠、北宅善昭、瀬山智子（会計担当）、豊原秀和、皆川礼子、檜谷昂（総務担当）、古川恵太、持田幸良、渡辺信（企画担当）
監事	今井伸夫、桃井尊央

任期：令和 6 年（2024 年）4 月 1 日～令和 8 年（2026 年）3 月 31 日

編集委員会

委員長	藤本 潔
委員	飯島倫明、井上智美、今井伸夫、瀬山智子、皆川礼子、持田幸良、Gordon S. Maxwell、Sanit Aksornkoae

学会役員一覧（改正案）

顧問	大田克洋、鈴木邦雄、中西康博、馬場繁幸、松田義弘（50音順）
会長	藤本潔
副会長	田淵隆一、宮城豊彦
理事	井上智美（編集担当）、入江憲治、梶田忠、北宅善昭、瀬山智子（会計担当）、豊原秀和、皆川礼子、檜谷昂（総務担当）、古川恵太、持田幸良、柳澤英明（広報担当）、渡辺信（企画担当）
監事	今井伸夫、桃井尊央

任期：令和 8 年（2026 年）4 月 1 日～令和 10 年（2028 年）3 月 31 日

編集委員会

委員長	井上智美
委員	飯島倫明、今井伸夫、瀬山智子、皆川礼子、持田幸良、Gordon S. Maxwell、Sanit Aksornkoae

2025 (令和 7) 年度 第 31 回日本マングローブ学会大会プログラム

令和 7 年 12 月 6 日 (土)

8 : 30 受付開始 (東京農業大学世田谷キャンパス 農大アカデミアセンター地下1階 横井講堂)	
口頭発表 / 一般の部 (発表 15 分間, 質疑応答 4 分間)	
9 : 30	ベトナム南部カンザー地区放棄塩田植林地の <i>Sonneratia alba</i> に立ち枯れ被害をもたらした気象場の解析 ○有坂早央 (立正大学・学生)・藤本潔 (南山大学・南遊の会)・石原修一 (駒場東邦中高・南遊の会)・横山一郎 (関東学院大学)・渡来靖 (立正大学)・Huynh Duc Hoan (Can Gio Mangrove Protection Forest Management Board)
9 : 50	亜熱帯島嶼マングローブ湿地における炭素の埋没・大気排出・海洋輸送の統合的評価 ○中村航 (滋賀県琵琶湖環境科学研究センター・東京大学)・渡辺謙太 (港湾空港技術研究所)・中島壽視 (東京大学)・杉本亮 (福井県立大学)・宮島 利宏 (東京大学)・所立樹 (国立環境研究所)・山口保彦 (滋賀県琵琶湖環境科学研究センター)・桑江朝比呂 (港湾空港技術研究所)・佐々木淳 (東京大学)
10 : 10	モーリシャス南東・東沿岸の塩分濃度分布とマングローブ林の生育状況 ○垣本 英臣・濱田誠一・小野文健・木本 弘之・森田 裕理 (一般財団法人海上災害防止センター)
10 : 30	集水域からの土砂流出量の変化がマングローブ立地の動態に及ぼす影響 一年 2.5 mm 前後の海面上昇が進む西表島と種子島の事例— ○小田原泰志 (南山大学・院)・藤本 潔 (南山大学)
10 : 50	多視点画像と LiDAR を統合した <i>Rhizophora</i> 林地上部バイオマス推定手法の検討 ○笠井 克己 (東京大学)・藤本潔 (南山大学)・後藤和久 (東京大学)・古川恵太 (海辺つくり研究会)・小野賢二 (森林総合研究所)・渡辺信 (琉球大学)・羽佐田紘大 (奈良大学)・神野空音・後川耕太郎 (京都大学)
11 : 10	Changes in carbon stock and stand structure along a salinity gradient in the Sundarbans mangrove forest, Bangladesh ○Islam Md Minarul (Kyoto University)・Sakib Anjum(Khulna University), Md Kamruzzaman, Shinichi Tatsumi (Kyoto University)
口頭発表 / 中高生の部 (発表 15 分間, 質疑応答 4 分間)	
11 : 30	都立国立高校の探究活動における、マングローブの根の模型による水流のエネルギー減衰量の検証 ○浅川浩平 (東京都立国立高等学校 2 学年)
11 : 50	昼食
	役員会 (12 : 00 ~) 場所：横井講堂 会議室
特別講演	

13:30	講師：向後 元彦（マングローブ植林行動計画） 「知的冒険としてのマングローブ — 半世紀の軌跡」
公開シンポジウム 「ボルネオ島、マレーシア・サバ州のマングローブ林はどうなっているのでしょうか？」	
15:00	趣旨説明 馬場 繁幸（国際マングローブ生態系協会）
15:10	講演 I 「The SFD-ISME mangrove collaboration project in Sabah」 ○ Joseph Tangah (Forest Research Center, Sabah Forestry Department)
15:25	講演 II 「サバ州のマングローブ生態系修復プログラムとこれに基づく生態系理解・修復戦略の標準化 - SFD・ISME による長期企画 - 」 ○宮城豊彦（国際マングローブ生態系協会）
15:40	講演 III 「3D スキャナによるマレーシア・サバ州におけるマングローブ支柱根の体積特性」 ○柳澤英明（東北学院大学）
15:55	質疑応答・総合討論
16:20	公開シンポジウム終了
小休憩（10分）	
16:30	総会（会場：横井講堂）
18:00	情報交換会（会場：NODAI Science Port 5F）

20:00 終了予定

第1回優秀口頭発表賞選考結果

2025年12月6日に開催されました2025（令和7）年度第31回日本マングローブ学会大会において、優秀口頭発表賞選考委員会は下記発表を優秀口頭発表賞に選出しました。

受賞者：笠井 克己

東京大学大学院理学系研究科地球惑星科学専攻博士課程1年

受賞演題：多視点画像とLiDARを統合したRhizophora林地上部バイオマス推定手法の検討

日本マングローブ学会会則

第1章 総則

(名称)

第1条 本会は日本マングローブ学会
(Japan Society for Mangroves) と称する。
(事務局)

第2条 本会の事務局は、本会則第7条3で定める総務を担当する役員が所属する研究室等におく。

第2章 目的および事業

(目的)

第3条 本会はマングローブに関する学理について、研究成果の発表、情報・知識の提供・交換を行う場となることにより、マングローブに関する研究の普及を図り、わが国の学術と関連産業の発展に寄与することを目的とする。

(事業)

第4条 本会は、前条の目的を達成するために次の事業を行う。

- (1) 年次大会の開催
- (2) 会誌「Mangrove Science」の発行
- (3) その他本会の目的を達成するために必要な事業

第3章 会員の種別および年会費

(種別)

第5条 本会の会員種別は次のとおりとする。

- (1) 正会員（一般会員と称する。） 本会の目的に賛同して入会した個人
- (2) 学生会員 本会の目的に賛同して入会した院生、学生の身分を有する個人
- (3) 賛助会員 本会の目的に賛同して入会し、規定の賛助会費を納めた団体または個人

(入会)

2. 本会に入会しようとする者は、所定の入会申込書に必要事項を記入し会長に申し込む。
3. 会員が退会しようとする時は、退会届を会長に提出する。

(年会費)

第6条 本会の年会費は次のとおりとする。

- (1) 正会員 5,000 円
- (2) 学生会員 3,000 円
- (3) 賛助会員 1口10,000 円以上
- (4) 年会費の改定は総会の決議による。

2. 納入した年会費はいかなる理由があっても返却しない。

第4章 役員等

(役員等)

第7条 本会には次の役員をおく。

- (1) 会長 1名
- (2) 副会長 3名以内
- (3) 理事 20名以内
- (4) 監事
- (5) 顧問

2. 役員は総会で選出する。

3. 役員は、会長の指示に従い、本会の事業が円滑に行われるように審議する。

4. 役員から本会の会計、総務、企画および編集を担当する責任者を定める。

5. 役員の任期は4月1日よりの2年間とし再任は妨げない。

第5章 会議

(会議)

第8条 本会に総会、役員会、編集委員会をおく。

(総会)

第9条 総会は正会員、学生会員によって構成し、年1回会長が招集する。なお、必要に応じて、臨時総会を開催する。

2. 総会の議長は会長とし、総会の議事は出席会員の過半数で決する。

3. 総会は次の事項を決議する。

- (1) 事業計画および収支予算
- (2) 事業報告および収支決算
- (3) 役員の変更
- (4) 会則の変更
- (5) その他、会長、役員会が必要と認めた事項

(役員会)

第10条 役員会は役員によって構成し、会長が招集する。

2. 役員会は次の事項を審議する。

- (1) 総会に提案する事項
- (2) 年次大会の実行・運営に関する事項
- (3) 会誌「Mangrove Science」の発行に関する事項
- (4) その他、会長が必要と認めた事項

3. 役員会の決議は、決議について特別の利害関係を有する役員と顧問を除く役員の過半数が出席し、その過半数をもって行う。

4. 役員が役員会の審議事項について提案した場合において、その提案について審議に加わることのできる役員の全員が、書面又は電磁的方法により同意の意思表示をしたときは、その提案を可決する旨の委員会の決議があったものとみなすものとする。

(Mangrove Science 編集委員会)

第11条 本会に会誌「Mangrove Science」編集委員会をおく。

2. 委員は編集委員長の推薦により、会長が委嘱する。
3. 編集委員会は投稿原稿の審査、編集、発行を担当する。
4. Mangrove Science の投稿規定、執筆要領は別に定める。

第6章 会計

(会計)

第12条 本会の収支決算は会計年度終了後すみやかに監査を受け、役員会の審議を経て、総会の承認を受けなければならない。

第13条 本会の会計年度は毎年4月1日に始まり、翌年の3月31日に終わるものとする。

第7章 その他

第14条 年次大会、総会、編集委員会、会計等に関する細則は別にそれを定める。

付則

1) 平成元年12月、日本マングローブ協会会則として制定。

2) 平成6年から、日本マングローブ協会学術部会は日本マングローブ学会と称する。

3) 平成23年11月5日改正。

4) 2019年4月1日から、一部改正施行。

5) 2023年12月4日から、一部改正施行。

学会賞表彰規則

2024年12月7日 制定

第1章 総則

第1条 日本マングローブ学会（以下、本学会）の会則第14条により本規定を設ける。

第2条 本規定による学会賞の種類は、優秀口頭発表賞ならびに優秀論文賞の2種とする。

第2章 優秀口頭発表賞

第1条 本賞は、本学会年次大会において筆頭著者として口頭発表を行った学会員のうち、若手研究者（博士あるいは修士の学位取得後5年未満の学会員）もしくは現役学生を対象とし、発表内容が特に秀逸と評価された1件に授与する。

第2条 発表内容の審査は、研究の新規・独創性、発展性、ならびに質疑応答内容により、点数制で評価する。

第3条 本賞の選考は、優秀口頭発表賞選考委員会（以下、発表賞委員会）が行い、その長は年次大会委員長が併任するものとし、またその委員は、委員長が年次大会の参加者から適任者を数名選択し、委任する。

第4条 本賞の審査を希望する発表者は、その旨を大会参加申込書に示すとともに、若手研究者であることを証明する書類（コピー可）を当該年次大会に持参する。

第5条 発表賞委員会の委員長は、本賞審査希望の発表がすべて終了した後に審査会を開催し、授賞者を決定する。

第6条 本賞受賞者には、原則として、年次総会において、本学会会長が当人に賞状を授与するとともに、授賞対象口頭発表の発表者名とタイトルを本学会ホームページに掲載する。

第3章 優秀論文賞

第1条 本賞は、本学会が発行する学会誌 Mangrove Science に、選考年度を含めた過去2年間に掲載された総説及び原著論文のうち、特に秀逸と評価された1編に授与する。ただし、選考対象論文が5編未満の時は、上記対象期間を延長することがある。

第2条 論文内容の審査は、独創性、革新性、及び社会的波及効果の観点から評価する。

第3条 本賞の選考は、優秀論文賞選考委員会（以下、論文賞委員会）が行う。

第4条 論文賞委員会の委員長と委員は、それぞれ、本学会学会誌編集委員長と委員が兼任する。

第5条 論文賞委員会は、年次大会役員会までに選考委員会を開催した後、授賞候補の有無をその理由とともに役員会に報告し、役員会は選考委員会報告の妥当性を審議する。授賞は、役員会出席者総数の3分の2以上の賛成をもって決定する。

第6条 本賞受賞者には、原則として、年次総会において、本学会会長が当人に賞状を授与するとともに、授賞対象論文の著者名とタイトルを本学会ホームページに掲載する。

MANGROVE SCIENCE 投稿規程

本学会誌に掲載する論文の種類は、原著論文、総説論文、短報、資料とする。

1. 正会員は本学会誌へ投稿できる。著者複数の場合は少なくともその内の一人が正会員でなければならない。但し、編集委員会が依頼した場合はこの限りではない。
2. 原著論文は和文または英文で書かれたオリジナルとし、別に定める執筆要領に従って作成されたものとする。
3. 総説論文は、編集委員会がテーマや分野を定め、これの執筆者を選定し依頼したもの、または会員が総説論文として投稿し、編集委員会が認めたものとする。
4. 短報は原著論文に準じ、内容が編集委員会において短報と判定されたもので、刷り上がりは5ページを超えないものとする。
5. 原稿はpdfファイルとし、e-mailで添付書類として提出する。
6. 原稿の採否は編集委員会が決定する。受け付けられた原稿のうち、原著論文、短報については、編集委員会が選定した複数の専門家に校閲を依頼する。その結果、内容、体裁に問題ありと判断された場合は、その旨を著者に伝えて修正

を求める。また受理できないと判定された論文は理由を明記して著者に返却する。

7. 受理された場合は完全原稿を電子ファイル（Word 原稿）にて提出する。著者校正は原則として初校に限っておこない、誤植の訂正にとどめる。
8. 論文は図表を含め、刷り上がり原則 20 ページまでとし、超過分については著者負担とする。ただし編集委員会が依頼した原稿はこの限りではない。
9. 著者には執筆論文の pdf ファイルを無料で贈呈する。
10. 原稿は下記 e-mail アドレスに送付する。また本学会誌に関する問い合わせ先は編集委員会宛とする。

〒305-8506 茨城県つくば市小野川 16-2

国立環境研究所生物多様性領域(環境ストレス機構研究室)

日本マングローブ学会編集委員会

井上 智美

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執筆要領

1. 論文原稿は和文または英文とし、次の順序で記述する。
和文の場合：(1) 表題、(2) 英文表題、(3) 著者名、(4) ローマ字著者名、(5) 所属、(6) 英文アブストラクト、(7) Key Word (アルファベット順に 5 語以内)、(8) 本文、(9) 文献。
英文の場合：(1) 表題、(2) 著者名、(3) 所属、(4) 英文アブストラクト、(5) Key Word (アルファベット順に 5 語以内)、(6) 本文、(7) 文献。
2. 和文原稿の場合は MS 明朝 10.5 ポイント、英文原稿の場合は Times New Roman 10.5 ポイントを使用する。フォーマットはとくに指定しないが、1 段組み、40 字、36 行を目安に作成する。
3. 論文中に引用した文献はすべて記載するものとし、文献の書式は下記の例に習い、配列は著者のアルファベット順とする。Web サイトの場合も下記の例にならい、そのアドレスと引用の日付も記載する。

<例>

藤本潔・宮城豊彦 (2016) : マングローブ林の植生配列と微地形との関係およびその応用可能性. 藤本潔・宮城豊彦・西城潔・竹内裕希子編著『微地形学—人と自然をつなぐ鍵—』80-104, 古今書院.

Hong, P. N. (2004) : Effects of mangrove restoration and conservation on the biodiversity and environment in Can Gio District. In Vannuchi, M. (ed.) *Mangrove management & conservation: present & future*. United Nations University Press, Tokyo, pp 111-137.

Matsuda, Y. and Kamiyama, K. (2007) : Tidal deformation and inundation characteristics within mangrove swamps. *Mangrove Science* 4: 21-29.

中村武久・中須賀常雄 (1998) : 『マングローブ入門』めこん.

大田克洋・皆川礼子・中村武久 (2010) : タイ国における *Sonneratia* 属 4 種の髄腔の形態に関する新発見. *Mangrove Science* 7: 29-35.

Spalding, M., Kainuma, M. and Collins, L. (2010) : *World atlas of mangroves*. Earthscan, London.

UNESCO 2002. *UNESCO-MAB biosphere reserve directory: Can Gio Mangrove*.

<http://www.unesco.org/mabdb/br/brdir/directory/biores.asp?mode=all&code=VIE+01> (Accessed February 3, 2017)

4. 和文原稿で動植物名を記す場合、和名はカタカナ書きとし、学名はイタリック体とする。
5. 論文中への図表の掲載は自由であるが、そのまま印刷できるもの（清書した図表・プリント写真）であること。
6. 図 (Fig.) 表 (Table) および写真 (Fig. または Photo) には英文でキャプションをつける。その説明は別紙に書き、図表・写真と一致するよう番号を Fig.1, Table1, Photo1 のように明示する。ただし、和文原稿の場合は和文キャプションも付加し、図表中の記載を日本語とすることもできる。その場合の番号は、図 1, 表 1, 写真 1 とする。
7. 本学会誌に関する問い合わせ先は編集委員会宛とする。

日本マングローブ学会役員名簿 (2026 年度)

顧問：大田克洋、鈴木邦雄、中西康博、馬場繁幸、松田義弘 (50 音順)
会長：藤本 潔
副会長：田淵隆一、宮城豊彦
理事：井上智美 (編集担当)
瀬山智子 (会計担当)
檜谷 昂 (総務担当)
柳澤英明 (広報担当)
渡辺 信 (企画担当)
人江憲治、梶田 忠、北宅善昭、豊原秀和、
古川恵太、皆川礼子、持田幸良
監事：今井伸夫、桃井尊央

Mangrove Science Vol.17, 2026

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横浜市中区山手町 24-11 201 号
印刷・発行 2026 年 3 月 印刷
2026 年 3 月 発行

