Meeting on Mangrove ecology, functioning and Management (MMM3)
2-6 July 2012, Galle, Sri Lanka

This conference is jointly organized by
the Vrije Universiteit Brussel (VUB), the Université Libre de Bruxelles (ULB), the Kenya Marine and Fisheries Research Institute (KMFRI),
the University of Ruhuna (UoR), and hosted by the latter
MMM3 Secretariat
Laboratory of Systems Ecology and Resource Management
Dept. of Organism Biology, Faculty of Sciences
Université Libre de Bruxelles - ULB
CP 169, Avenue F.D. Roosevelt 50
B-1050 Brussels, BELGIUM.

Tel: +32 (0)2 650 2137/2164
Fax: +32 (0)2 650 2125

E-mail: mmm3@ulb.ac.be
Homepage: http://www.vub.ac.be/APNA/greendyke/MMM3/
Program Book

Meeting on Mangrove ecology, functioning and Management (MMM3)
Organizing Committee

- Prof. Dr. Farid DAHDOUH-GUEBAS, Chair (Université Libre de Bruxelles - ULB & Vrije Universiteit Brussel - VUB, Brussels, Belgium)
- Prof. Dr. Loku Pulukuttige JAYATISSA (University of Ruhuna - UoR, Matara, Sri Lanka)
- Dr. Jared O. BOSIRE (Kenya Marine and Fisheries Research Institute - KMFRI, Mombasa, Kenya)
- Prof. Dr. Sanath HETTIARACHI (University of Ruhuna - UoR, Matara, Sri Lanka)
- Dr. James G. KAIRO (Kenya Marine and Fisheries Research Institute - KMFRI, Mombasa, Kenya)
- Prof. Dr. Nico KOEDAM (Vrije Universiteit Brussel - VUB, Brussels, Belgium)

Local Organizing Committee

- Prof. Dr. Loku Pulukuttige JAYATISSA (University of Ruhuna - UoR, Department of Botany, Matara, Sri Lanka)
- Prof. Dr. Sanath HETTIARACHI (University of Ruhuna - UoR, Department of Botany, Matara, Sri Lanka)
- Prof. Prof. Kanthi K.A.S. YAPA (University of Ruhuna - UoR, Department of Physics, Matara, Sri Lanka)
- Prof. Kumudu DE SILVA (University of Ruhuna - UoR, Department of Zoology, Matara, Sri Lanka)
- Prof. N.P. DISSANAYAKE (University of Ruhuna - UoR, Department of Botany, Matara, Sri Lanka)
- Dr. Saman CHANDANA (University of Ruhuna - UoR, Department of Zoology, Matara, Sri Lanka)
- Mrs. Jagathi HEMMALI (University of Ruhuna - UoR, Center for International Affairs; SAR, Matara, Sri Lanka)
- Mrs. Nilanthi (University of Ruhuna - UoR, Research Assistant to VC and DVC, Matara, Sri Lanka)
- Mr. Sunanda KODIKARA (University of Ruhuna - UoR, Department of Botany, Matara, Sri Lanka)
- Dr. Behara SATYANARAYANA (Université Libre de Bruxelles & Vrije Universiteit Brussel - VUB, Brussels, Belgium)
• Prof. Dr. Farid DAHDOUH-GUEBAS (Université Libre de Bruxelles - ULB & Vrije Universiteit Brussel - VUB, Brussels, Belgium)

Conference Secretariat
• Dr. Behara SATYANARAYANA (Université Libre de Bruxelles & Vrije Universiteit Brussel - VUB, Brussels, Belgium)
• Prof. Dr. Sanath HETTIARACHI (University of Ruhuna - UoR, Matara, Sri Lanka)
• Prof. Dr. Loku Pulukuttige JAYATISSA (University of Ruhuna - UoR, Matara, Sri Lanka)
• Prof. Dr. Farid DAHDOUH-GUEBAS, Chair (Université Libre de Bruxelles - ULB & Vrije Universiteit Brussel - VUB, Brussels, Belgium)

Scientific Committee
• Prof. Dr. Uta BERGER (Technische Universität Dresden, Dresden, Germany)
• Dr. Marília CUNHA-LIGNON (National Institute for Space Research, São Jose dos Campos, Brazil)
• Prof. Dr. Ndongo DIN (University of Douala, Douala, Cameroon)
• Prof. Dr. Norman C. DUKE (University of Queensland, Brisbane James Cook University, Townsville, Australia)
• Dr. François FROMARD (Université Paul Sabatier, Toulouse, France)
• Prof. Dr. Mark HUXHAM (Napier University, Edinburgh, United Kingdom)
• Prof. Dr. Kandasamy KATHIRESAN (Annamalai University, Parangipettai, India)
• Prof. Dr. Joe S.Y. LEE (Griffith University, Gold Coast Southport, Australia)
• Prof. Dr. Victor RIVERA-MONROY (Louisiana State University, Baton Rouge, USA)
• Prof. Dr. Patrik RÖNNBÄCK (Gotland University, Visby, Sweden)
• Prof. Dr. Martin SKOV (Bangor University, Menai Bridge - Anglesey, United Kingdom)
• Prof. Dr. Nora Fung-Yee TAM (City University of Hong Kong, Hong Kong, China)
• Prof. Dr. Brad B. WALTERS (Mount Allison University, Sackville, Canada)
International Conference on Mangroves

E-mail: mmm3@ulb.ac.be

After MMM1 in Mombasa (Kenya) in 2000 and MMM2 in Coolangatta (Australia) in 2006, MMM3 is the 3rd edition of the only recurrent international conference on mangroves.

**MMM3 Conference: 2-6 July, 2012**
Place: Auditorium of the Faculty of Medicine, University of Ruhuna, Karapitiya, Galle, Sri Lanka

**MMM3 Workshop: 9-13 July 2012**
Place: SFFL - Small Fishers Federation (of Lanka), Pambala-Kakkapallya

**Scientific Committee**
Uta BERGER, Germany
Marília CUNHA-LIGNON, Brazil
Ndongo DIN, Cameroon
Norman C. DUXE, Australia
Ilika C. PELLER, USA
François FROMARD, France
Mark HUXHAM, UK
Rangasamy KATHiresan, India
Joe S.Y. LEE, Australia
Víctor RIVERA-MONROY, USA
Patrik RÖNNBÄCK, Sweden
Martin SKOV, UK
Nora F.X. TAM, China
Brad B. WALTERS, Canada

Registration is open!
Keynote Speakers

- Prof. Dr. Stefano CANNICCI
- Dr. Karen L. McKEE
- Prof. Dr. Em. Jurgenne PRIMAVERA

Sessions and Chairpersons

- Macrobenthos and Plant-Animal Interactions I: Candy FELLER
- Macrobenthos and Plant-Animal Interactions II: Jared BOSIRE
- Macrobenthos and Plant-Animal Interactions III: Joe S.Y. LEE
- Oral pitching research highlights: Farid DAHDOUTI-GUEBAS
- Plant, Vegetation and Systems Ecology I: Mala AMARASINGHE
- Plant, Vegetation and Systems Ecology II: François FROMARD
- Plant, Vegetation and Systems Ecology III: Loku Pulukuttige JAYATISSA
- Nutrient Cycling, Biogeochemistry and other Environmental Drivers: Kandasamy KATHIRESAN
- Carbon Sequestration, Stocks and Payments: Sanath HETTIARACHI
- Scientific debate: Nico KOEDAM
- People-Ecosystem Interactions, Conservation and Management I: Marilia CUNHA-LIGNON
- People-Ecosystem Interactions, Conservation and Management II: James G. KAIRO
- Climate Change I: Catherine E. LOVELOCK
- Climate Change II: Behara SATYANARAYANA

Lunch Meetings

- Young Mangrove Scientist Brainstorm Session (for students and PhD students): Nibedita MUKHERJEE and Marco FUSI
- Mangrove Forest Management and Policy Brainstorm Session (for scientists, managers and policy-makers): Marilia CUNHA-LIGNON and Loku Pulukuttige JAYATISSA

Best Student Presentation Award Committee

- Mala D. AMARASINGHE
- Todd E. MINCHINTON
- Ulrich SAINT-PAUL, Chairman
## Venue

The conference will be held at Koggala Beach. The hotel complex consists of three hotels spanning over a kilometer of coastline: Koggala Beach Hotel, the central hotel, the Long Beach Resort to the north and Club Koggala Village to the south.

www.koggalaexperience.com
All activities except for the cultural show and the mid-conference excursions will take place at the same hotel complex.

Lectures and poster presentations as well as coffee/tea breaks and lunches will be held at the Long Beach Resort on the third floor (see map on next page). Access to the conference venue is restricted to persons wearing an MMM3 Conference badge.

Oral contributions and Oral Pitching Research Highlights will be presented in the ‘Main Hall’

All food and drinks will be served in the ‘Food and Drinks’ area. Coffee and tea can be consumed in the ‘Posters’ area, whereas the tables in the ‘Discussion Area’ can be used to consume your lunch.

The two lunch meetings that are taking place on Tuesday 3 July 2012 will be held in the ‘Discussion Area’ (Young Mangrove scientist brainstorm session) and in the ‘Main Hall’ (Mangrove forest management and policy brainstorm session).
Participants that have paid for the MMM3 Conference dinner on Thursday 5 July 2012 will be driven to the auditorium of the Medical Faculty of the University of Ruhuna in Karapitiya (Galle) after the scientific program (17h15).

A mix of traditional Sri Lankan dance and music will be offered during a 90 minute show, followed by a multi-flavoured buffet at Club Koggala Village.
Instructions for Chairpersons and Oral presentations

- Presentation time: Every lecture is scheduled for 20 min only (max. 15 min talk and 5 min discussion). If a speaker passes 15 min, the time for discussion will be less or nil.
- Please ensure that the presentation times listed in the program are respected. In case of a no show, there is a waiting list of 5 presenters with the conference organizers that will be activated immediately.
- PowerPoint file submission: We recommend to use PowerPoint (version 1997-2003 or version 2007) for your presentation. The speakers of the day are requested to submit their PowerPoint files before the daily program starts (between 8 and 9 AM). There will be a laptop connected to an LCD projector in the presentations room.
- Session chairs should announce if a presentation is given by a student participating in the Best Student Presentation Award.

Instructions for Oral Pitching Research Highlights

- Presentation time: Every lecture is scheduled for 3 min only (no discussion). The chairperson rings bell at the end of 3 min, and the speaker should leave the stage immediately (even if the presentation is not finished).
- Please ensure that the presentation times listed in the program are respected. In case of a no show, the time slot is lost.
- PowerPoint file submission: see instructions for oral presentations above.

Instructions for Poster presentations

- Each poster has been assigned a unique number, which is indicated in this program book and also listed at the entrance of the poster room.
- Presenters are requested to mount their posters (max. 90 cm x 120 cm dimensions), immediately after registration, in the respective places indicated on the poster boards.
- Velcro will be supplied at the registration desk/poster boards.
- Posters participating in the Best Student Poster Award competition bear the letter ‘S’ after the poster number mounted on the poster board.
Guidelines for evaluation of Oral presentations and Posters

Structure
- Is the message sufficiently clear?
- Can scientific questions be clearly distinguished?
- Is there an answer (conclusion) for each question evoked?
- Are all sections treated in a well-balanced way (not too much material and methods, too little results, etc)?
- Is there a clear introduction, material and methods, results, discussion and conclusions?

Scientific value
- Does the approach testify of understanding and insight into the subject?
- Does the literature review (if applicable) testify of knowledge of the peer-reviewed publications?

Tables and Figures
- Are tables and figures not redundant with what is already provided as text or vice versa?
- Are the figures self-explanatory?
- Are graphs well designed (type of graph, clear legends, no shadows or 3D where not necessary, no confusing colors, correct regressions, tested $r^2$, etc)?

Form and Layout
- Is the poster/presentation elaborated in an understandable language?
- Do illustrations contribute to a good understanding of the topic?
- Is it clear in which order a poster needs to be read?
- Does the poster look attractive and inviting?
- Is there a good balance between text and illustrations?
- Is the font type large enough and readable?

Questions
- How are questions answered and how is the research defended?
MMM3 Schedule

2 July 2012: MMM3 Conference DAY 1
- Arrival and on-site registrations
- Sri Lankan opening ceremony
- Welcome address by university delegates and local authorities
- Keynote address by Stefano CANNICCI
- Participant oral presentations
- Oral pitching research highlights
- Poster session
- MMM3 organizer’s presentation
- DAY 1 findings and announcements

3 July 2012: MMM3 Conference DAY 2
- Arrival and on-site registrations
- Keynote address by Karen L. McKEE
- Participant oral presentations
- Young Mangrove scientist brainstorm session (for students and PhD students)
- Mangrove forest management and policy brainstorm session (for scientists, managers and policy-makers)
- DAY 2 findings and announcements
- Instructions and guidelines for the mid-conference excursions

4 July 2012: MMM3 Mid-conference excursions

5 July 2012: MMM3 Conference DAY 4
- Arrival and on-site registrations
- Mid-conference excursions report and announcements
- Poster session
- Participant oral presentations
- Scientific debate
- DAY 4 findings and announcements
- Conference dinner

6 July 2012: MMM3 Conference DAY 5
- Arrival and on-site registrations
- Keynote address by Jurgenne PRIMAVERA
- Participant oral presentations
- Best student award(s)
- MMM4 announcement organised in 2018
- closing ceremony and reception
Monday, 2 July 2012:

08h00 - 09h00 : Arrival and on-site registrations
09h00 - 09h10 : Sri Lankan opening ceremony
09h10 - 09h40 : Welcome address by university delegates and local authorities
09h40 - 10h00 : MMM3 Welcome address

<table>
<thead>
<tr>
<th>Session: Macrobenthos and Plant-Animal Interactions I</th>
<th>Chair : Candy FELLER</th>
</tr>
</thead>
<tbody>
<tr>
<td>10h00 - 11h00 : Keynote address 1: Functions of macrobenthos in mangrove forests : &gt;20 years of research lessons, by Stefano CANNICCI et al.</td>
<td></td>
</tr>
<tr>
<td>11h00 - 11h30 : Coffee/Tea break</td>
<td></td>
</tr>
<tr>
<td>11h30 - 11h50 : Does ‘you are what they eat’ apply to mangrove sesarmid crabs?, by Lee</td>
<td></td>
</tr>
<tr>
<td>11h50 - 12h10 : Benthos diversity in Yanbu mangrove conservation sites - Red Sea shoreline, by Paimpillil et al.</td>
<td></td>
</tr>
<tr>
<td>12h10 - 12h30 : Thermal response of mangrove macrobenthos: explaining processes in endangered coastal systems, by Fusi et al.</td>
<td></td>
</tr>
<tr>
<td>12h30 - 14h00 : Lunch</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session: Macrobenthos and Plant-Animal Interactions II</th>
<th>Chair : Jared BOSIRE</th>
</tr>
</thead>
<tbody>
<tr>
<td>14h00 - 14h20 : Patterns growth and herbivory in mangrove forests along latitudinal gradients and the consequences of nutrient over-enrichment, by Feller et al.</td>
<td></td>
</tr>
<tr>
<td>14h20 - 14h40 : Multi-country comparison of insect herbivore communities and leaf herbivory, on mangroves, by Burrows</td>
<td></td>
</tr>
</tbody>
</table>
14h40 - 15h00: Impact of typhoon disturbance on key macrobenthos in a monoculture mangrove forest plantation, Can Gio Biosphere Reserve, Vietnam, by Diele et al.

Session: Oral Pitching Research Highlights
Chair: Farid DAHDOUH-GUEBAS

15h00: One year survey of CO₂ fluxes from sediments and water column in mangrove ecosystem (New Caledonia), by Léopold et al.

15h03: Test assembly mechanisms of mangrove communities using geostatistical tools: a study case in the mangrove of Gaoqiao, by Bourgeois et al.

15h06: Mangroves and climate change: effects of increasing temperature on biology, density and distribution of Perisesarma guttatum (A. Milne Edwards, 1869) and Uca urvillei (H. Milne-Edwards, 1852) crabs at Gazi Bay, Kenya, by Kochey et al.

15h09: Managing the mangroves economically: use it or lose it, by Debroy et al.

15h12: High-resolution mapping of mangrove topography and vegetation community structure, by Friess et al.

15h15: Above ground:Below ground productivity ratios in natural mangrove forest of Gazi, Bay Kenya, by Githaiga et al.

15h18: Evaluating the local use of mangroves as a source firewood in Sri Lanka, by Ransara et al.

15h21: Assessing the link between the local people and the mangroves status of Mtwapa Creek, Kenya, by Ochieng et al.

15h24: Impact of flood on Rhizophora plantation in Batticaloa, Sri Lanka, by Mathiventhal & Jayasingam

15h27: Variations in the crab diversity of the mangrove environment from Tamil Nadu, Southeast coast of India, by Ravichandran & Wilson
15h30 : Species preferences of the crab *Sesarmops intermedius* to seedling predation in mangrove ecosystem of Kerala, India, by Nayar *et al.*

15h33 : Analyses of the mangrove's recover process in abandoned salt pounds constructed areas, in the Ceará river, Northeast Brazil, by Reis-Neto *et al.*

15h36 : Vegetation structure of mangroves in the Rio del Rey estuary (Cameroon), by Essomé-Koum *et al.*

15h39 : Successive cambia in the mangrove *Avicennia*: a study on the three-dimensional structure of the cambia and the functioning of the internal phloem tissue, by Kodikara *et al.*

15h42 : Size does matter, but not only size: two alternative dispersal strategies for viviparous mangrove propagules, by De Ryck *et al.*

15h45 : Episodic sediment mixing from the tidal flat to the mangrove forest: a disturbance gradient for seedling survival, by Balke *et al.*

15h48 : Mangrove management at the Gulf of Kutchch, India for coastal protection and resilience to climate change, by Saint-Paul

15h51 : Satellite remote sensing and GIS to assess anthropogenic pressures and aid mangrove forest management: a case study at the São Francisco River Estuary (Northeast Brazil), by Santos *et al.*

15h54 : Photosynthesis in mangrove seedlings ceases underwater, by Mangora

15h57 : Studies on sulphate reducing bacteria from Southeast coast of India, by Abirami *et al.*

16h00 - 17h00 : Coffee/Tea break & Poster session in poster room

17h00 - 17h45 : MMM3 organizer’s presentation: Meeting on Mangrove ecology, functioning and Management (MMM3): more than two decades of insight on mangrove research in Kenya, Sri Lanka and beyond, by Dahdouh-Guebas *et al.*
Tuesday, 3 July 2012:

08h00 - 09h00 : Arrival and on-site registrations

**Session: Macrobenthos and Plant-Animal Interactions III**

*Chair: Joe S.Y. LEE*

09h00 - 10h00 : Keynote address 2: Ecological functioning of mangroves under changing climatic conditions, by Karen L. MCKEE

10h00 - 10h20 : Human-induced environmental change affecting macrobenthic communities in the Segara Anakan Lagoon, Java, Indonesia, by Nordhaus et al.

10h20 - 10h40 : Barcoding needs morphology and vice versa: the case of a new East African sesarmid crab species, by Fratini et al.

10h40 - 11h00 : The bidirectional relationship between mangrove vegetation and sesarmid crabs: complex interaction amongst density and composition of vegetation, crab density and propagule density, by Van Nedervelde et al.

11h00 - 11h30 : Coffee/Tea break

**Session: Plant, Vegetation and Systems Ecology I**

*Chair: Mala AMARASINGHE*

11h30 - 11h50 : Casting the net: functional networks of mangroves, by Mukherjee et al.

11h50 - 12h10 : How does tree competition and stand dynamics lead to spatial patterns in monospecific mangroves?, by Khan (M.N.I.) et al.

12h10 - 12h30 : Mapping functional-structural models to fields of neighbourhood, by Grüters et al.

12h30 - 14h00 : Lunch + Lunch meetings

**Meeting 1**: Young Mangrove scientist brainstorm session (strictly for students and PhD students only)

*Chairs: Nibedita Mukherjee & Marco FusI*
Meeting 2 : Mangrove forest management and policy brainstorm session (for scientists, managers and policy-makers)
Chair : Marília CUNHA-LIGNON & Loku Pulukuttige JAYATISSA

Session: Plant, Vegetation and Systems Ecology II
Chair : François FROMARD

14h30 - 14h50 : Genetic diversity of *Avicennia schaueriana* and *A. germinans* along the Brazilian coast: population structure, migration and admixture, by Mori *et al*.


15h10 - 15h30 : Quantifying and monitoring vulnerability of Amazon-influenced mangrove coasts. Case study from French Guiana, by Blanchard *et al*.

15h30 - 15h50 : Biological and environmental drivers in mangrove propagule dispersal and recruitment: a field and modelling approach, by Van der Stocken *et al*.

16h00 - 16h30 : Coffee/Tea break

Session: Plant, Vegetation and Systems Ecology III
Chair : Loku Pulukuttige JAYATISSA

16h30 - 16h50 : Mangrove forest regeneration in tsunami impacted sites of Nicobar Islands, India, by Nehru & Balasubramanian

16h50 - 17h10 : The ecological success of the mangrove *Avicennia*: the perfect combination of well-adapted wood anatomical characteristics and special radial growth?, by Robert *et al*.

17h10 - 17h30 : Mangrove invasion of salt marsh in temperate Australia: predicting patterns of seedling recruitment under fluctuating environmental conditions, by Minchinton

17h30 - 17h45 : Conference DAY 2 findings and announcements

17h45 - 18h00 : Instructions/guidelines for the mid-conference excursions
Wednesday, 4 July 2012:

**Mid-conference excursions**

**Excursion 1: Selected mangrove communities of Galle-Unawatuna, Rekawa, Kahandamodara and Kalametiya**

*Leader: Prof. Farid DAHDOUH-GUEBAS*

*Place and time of Departure: Unawatuna Beach Resort at 08h00*

This excursion will start off at the small but unique mangrove of Galle-Unawatuna, which has been studied by the Belgian and Sri Lankan organisers since the 1990s. The mangrove at Galle-Unawatuna is a basin mangrove affected by heavy alteration of the topography and the hydrography by roads, paths and a small dam. In addition, the mangrove is characterised by an accidented topography due to burrowing activity of *Thalassina anomala*. After a stop at the Weherahena Temple near Matara, which hosts a colossal six story high Buddha statue. We then continue South to the Bandagiriya Training Centre of the Small Fishers Federation of Lanka (SFFL) where we will take lunch. Next, we visit the Kiralakele Mangroves Resource Centre of SFFL where you will be able to drink the tasty mangrove apple juice. Finally, on the way back we halt at three mangrove lagoons in a row, being Kalametiya Lagoon Kahandamodara Lagoon and Rekawa Lagoon, all of which were featured in the 2005 front cover article of *Current Biology* 15(6). Rekawa Lagoon has been extensively studied by the University of Ruhuna for decades.

**Excursion 2: Udawalawe National Park, the Udawalawe Irrigation Scheme and its downstream mangrove lagoons**

*Leader: Dr. Dammini PREMACHANRA*

*Place and time of Departure: Unawatuna Beach Resort at 05h00*

Udawalawe National Park was created to provide a sanctuary for wild animals displaced by the construction of the Udawalawe reservoir on the Walawe River, as well as to protect the catchment of the reservoir. The reserve covers 30,821 hectares of land area and was established on 30 June...
1972. Udawalawe is an important habitat for water birds and Sri Lankan Elephants, which are relatively easy to spot, but also home to some large carnivores such as the Sri Lankan leopard and the Sloth bear. It is a popular tourist destination and the third most visited park in the country. The excess water of the Udalwale Irrigation Scheme is dumped in the Kirama Oya, the Urubokka Oya and the Kuchchigal Ara rivers that discharge in Rekawa Lagoon, Kahandamodara Lagoon and Kalametiya Lagoon respectively, which host large mangrove communities.

**Excursion 3: Yala National Park and the mangrove of Palatupana Lagoon**

**Leader:** Dr. Saman CHANDANA

**Place and time of Departure:** Unawatuna Beach Resort at 07h30

Yala National Park is the most visited and second largest national park in Sri Lanka. Actually it consists of five blocks, two of which are now open to the public. Ruhunu National Park is the best know block. Yala National Park covers 979 square kilometres and was designated as a wildlife sanctuary in 1900 and is best known for its variety of wild animals. It is important for the conservation of Sri Lankan Elephants and aquatic birds. The area around Yala has hosted several ancient civilisations. Two important pilgrim sites, Sthalupahuwa and Magul Vihara, are situated within the park. The 2004 Indian Ocean tsunami caused severe damage on the Yala National Park including on the mangrove of Palatupana Lagoon, which we will visit in the park, if road conditions permit. On the way to Yala National Park we will visit *Hoo-maniya* or the natural blow hole in Dickwella.
Excursion 4. Ancient and recent tsunami-affected sites in the South of Sri Lanka and rehabilitation projects
Group Leader: Prof. L.P. JAYATISSA
Place and time of Departure: Galle Fort at 06h30

The 26/12/2004 Indian Ocean tsunami killed over 230000 people of which more than 35000 in Sri Lanka. The damage of this recent tsunami has been enormous and so were the rehabilitation efforts, such as artificial plantations of coastal vegetation, housing and other projects. After a short visit to Hoo-maniya, a natural blow hole in Dickwella, our excursion will take off at the Kirinda Temple which is the setting of one of the popular legends that constitute early Sri Lankan history. The legend tells that Princess Viharamahadevi drifted ashore at Kirinda following an ancient tsunami. From this spot one can also view part of the coast where the 2004 tsunami struck and appreciate the sand dunes that offered protection. During the trip we will also spend some time visiting the Bandagiriya Training Centre of the Small Fishers Federation of Lanka, an NGO helping fisherfolk in their livelihoods. On the way back a stop will be made at Casuarina plantations and at the largest seated Buddha statue in Sri Lanka (Dickwella Temple).

Excursion 5. Rainforest at the Sinharaja Forest Reserve
Group Leader: Prof. Mala AMARASINGHE
Place and time of Departure: Unawatuna Beach Resort at 05h00

Sinharaja Forest Reserve is a national park and a biodiversity hotspot in Sri Lanka. It is of international significance and has been designated a Biosphere Reserve and World Heritage Site by UNESCO. The hilly virgin rainforest, part of the Sri Lanka lowland rain forests eco-region,
was saved from the worst of commercial logging by its inaccessibility, and was designated a World Biosphere Reserve in 1978 and a World Heritage Site in 1988. The reserve's name translates as Kingdom of the Lion. The reserve is only 21 km (13 mi) from east to west, and a maximum of 7 km (4.3 mi) from north to south, but it is a treasure trove of endemic species, including trees, insects, amphibians, reptiles, birds and mammals. Because of the dense vegetation, wildlife is not as easily seen as at dry-zone national parks such as Yala. There are about 3 elephants and the 15 or so leopards are rarely seen. The commonest larger mammal is the endemic Purple-faced langur.

An interesting phenomenon is that birds tend to move in mixed feeding flocks, invariably led by the fearless Greater racket-tailed drongo and the noisy Orange-billed babbler. Of Sri Lanka's 26 endemic birds, the 20 rainforest species all occur here, including the elusive Red-faced malkoha, Green-billed coucal and Sri Lanka Blue Magpie. Reptiles include the endemic Green pit viper and Hump-nosed vipers, and there are a large variety of amphibians, especially tree frogs. Invertebrates include the endemic Common Birdwing butterfly and the inevitable leeches. You are expected to dress appropriately in order to avoid giving leeches access to your skin.

The arrival time for all excursions is expected to be 20h00 at the latest. Depending on animal sightings in Yala, Excursion 3 may return later. All coaches will halt at Koggala Beach, Unawatuna Beach and Galle Fort on their way back.
Thursday, 5 July 2012:

08h00 - 09h00 : Arrival and on-site registrations
09h00 - 09h30 : Mid-conference excursions report and announcements
09h30 - 10h30 : Poster session in poster room
10h30 - 11h00 : Coffee/Tea break

**Session: Nutrient Cycling, Biogeochemistry and other Environmental Drivers**
*Chair: Kandasamy KATHIRESAN*

11h00 - 11h20 : How mangroves act as a filter toward trace metals between open-cast mining and lagoon, by Marchand et al.
11h20 - 11h40 : Bioremediation and mangrove: an original method for wastewater treatment, by Herteman et al.
11h40 - 12h00 : Feasibility of reverse adaptation: Physiological and biochemical approach for two mangroves from Sundarbans, India, by Dasgupta & Das
12h00 - 12h20 : Better than nothing: biomass and carbon storage in natural and planted mangroves in Kiên Giang Province, Viet Nam, by Wilson et al.

12h30 - 14h00 : Lunch

**Session: Carbon Sequestration, Stocks and Payments**
*Chair: Sanath HETTIARACHI*

14h00 - 14h20 : Very-high-resolution diameter, biomass and carbon stock mapping on the two-thousand hectare mangroves of the Cameroon estuary, by Nfotabong Atcheull et al.
14h20 - 14h40 : Carbon sequestration potential of mangroves and their sediments in southeast coast of India, by Kathiresan et al.
14h40 - 15h00 : Marketing the mangroves: can carbon payments make conservation work?, by Huxham et al.

15h00 - 15h30 : Coffee/Tea break

15h30 - 17h00 : Scientific debate
*Chair: Nico KOEDAM*

17h00 - 17h15 : Conference DAY 4 findings and announcements
18h00: Cultural show and Conference dinner

**Friday, 6 July 2012:**

08h00 - 09h00: Arrival and on-site registrations

<table>
<thead>
<tr>
<th>Session: People-Ecosystem Interactions, Conservation and Management I</th>
<th>Chair: Marília CUNHA-LIGNON</th>
</tr>
</thead>
<tbody>
<tr>
<td>09h00 - 10h00:</td>
<td>Keynote address 3: A lifetime of mangrove research, management and advocacy, by Jurgenne PRIMAVERA</td>
</tr>
<tr>
<td>10h00 - 10h20:</td>
<td>Modelling mangrove propagule dispersal: sensitivity analysis and implications for shrimp farm rehabilitation, by Di Nitto et al.</td>
</tr>
<tr>
<td>10h40 - 11h00:</td>
<td>A study on the impact of anthropogenic activities on the sustainability, habitat preference and distribution of bird fauna associated with mangrove reserve in Kadolkele, Negombo, Sri Lanka, by Jayamanne &amp; Jayamanne</td>
</tr>
<tr>
<td>11h00 - 11h30:</td>
<td>Coffee/Tea break</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session: People-Ecosystem Interactions, Conservation and Management II</th>
<th>Chair: James G. KAIRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>11h30 - 11h50:</td>
<td>Urban mangrove dynamics under increasing anthropogenic pressure: analysis of remote sensing data and Brazilian legislation, by Cunha-Lignon et al.</td>
</tr>
<tr>
<td>11h50 - 12h10:</td>
<td>Delimitation of global mangrove biogeographic regions based on species composition using Self-Organizing Maps, by Ximenes et al.</td>
</tr>
<tr>
<td>12h10 - 12h30:</td>
<td>Disturbances in a mangrove ecosystem – implications in the long term recovery patterns and climate change, by Mohamed et al.</td>
</tr>
<tr>
<td>12h30 - 14h00:</td>
<td>Lunch</td>
</tr>
</tbody>
</table>
### Session: Climate Change I

**Chair:** Catherine E. LOVELOCK

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>14h00 - 14h20</td>
<td>Prediction on recovery pathways of the cyclone-disturbed mangroves in the Ayeyarwady Delta, Myanmar</td>
<td>Aung et al.</td>
</tr>
<tr>
<td>14h20 - 14h40</td>
<td>Predicting future latitudinal limits of mangroves in South-Africa with species distribution modelling</td>
<td>Quisthoudt et al.</td>
</tr>
<tr>
<td>14h40 - 15h00</td>
<td>Potential geographic distribution of <em>Rhizophora apiculata</em> Blume under different future climate change and sea level rise scenarios</td>
<td>Record et al.</td>
</tr>
<tr>
<td>15h00 - 15h30</td>
<td>Coffee/Tea break</td>
<td></td>
</tr>
</tbody>
</table>

### Session: Climate Change II

**Chair:** Behara SATYANARAYANA

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Authors</th>
</tr>
</thead>
<tbody>
<tr>
<td>15h30 - 15h50</td>
<td>Variation in sea level and effects on surface elevation gains in coastal wetlands</td>
<td>Lovelock et al.</td>
</tr>
<tr>
<td>15h50 - 16h10</td>
<td>Impacts of climate-induced mangrove expansion on the ecological functions of salt marshes</td>
<td>Mendelsohn &amp; Perry</td>
</tr>
<tr>
<td>16h10 - 16h30</td>
<td>A global standardized network for monitoring mangrove vulnerability to sea-level rise</td>
<td>Webb et al.</td>
</tr>
<tr>
<td>16h30 - 18h00</td>
<td>- Best Student Awards</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- MMM4 announcement organised in 2018</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Closing ceremony and reception</td>
<td></td>
</tr>
</tbody>
</table>
**Poster Presentations**

1. A survey of the Sunderban mangrove wetlands of India: an environmental threat, by Bandyopadhyay
2. Mangrove management at the Gulf of Kutchch, India for coastal protection and resilience to climate change, by Saint-Paul
3. Variations in the crab diversity of the mangrove environment from Tamil Nadu, Southeast coast of India, Ravichandran & Wilson
4. Episodic sediment mixing from the tidal flat to the mangrove forest: a disturbance gradient for seedling survival, by Balke et al.
5. Photosynthesis in mangrove seedlings ceases underwater, by Mangora
6. The role of mangrove habitat in the life of women in Akshi village, Maharashtra State, India, by Thakur & Yeragi
7. Present status of mangrove ecosystem in and around Mumbai (West Coast of India), by Kulkarni et al.
8. Coringa mangroves in relation to local environmental conditions on the East coast of India, by Satyanarayana et al.
9. Spatial heterogeneity in mangroves assessed by GeoEye-1 satellite data: a case-study in Zhanjiang Mangrove National Nature Reserve (ZMNNR), P.R. China, by Leempoel et al.
10. Long-term mangrove forest development in Sri Lanka: early predictions evaluated against outcomes using VHR remote sensing and VHR ground-truth data, by Koedam et al.
11. Forest composition and structure in the mangroves at Matang, West Peninsular Malaysia, after a century of sustainable management, by Goessens et al.
12. Habitat recovery assessment of reforested mangrove sites in the Gazi Bay, Kenya: a study testing the role of molluscs as bioindicator species, by Dahdouh-Guebas et al.
13. Are the mangroves in the Galle-Unawatuna area (Sri Lanka) at risk? A social-ecological approach involving local stakeholders for a better conservation policy, by Mulder et al.
14. Vegetation structure at Zhanjiang Mangrove National Nature Reserve (ZMNNR), P.R. China: comparison between original and non-original trees using ground-truth, remote sensing and GIS techniques, by Durango et al.
15. Socio-economics of mangrove dependent people on the south east coast of India, by Rajendran & Kathiresan
16. Analyses of the mangrove’s recover process in abandoned salt pounds constructed areas, in the Ceará river, Northeast Brazil, by Reis-Neto et al.
17. Salinity imposed biochemical changes towards efficient adaptation of some mangroves of Sundarbans, India, by Dasgupta & Das
18. Test assembly mechanisms of mangrove communities using geostatistical tools: a study case in the mangrove of Gaoqiao, by Bourgeois et al.
19. Studies on sulphate reducing bacteria from Southeast coast of India, by Abirami et al.
20. DNA markers for understanding mangrove genetics, by Sahu et al.
21. Species preference of the crab Sesarmops intermedius to seedling predation in mangrove ecosystem of Kerala, India, by Nayar et al.
22. Mangrove fisheries and livelihoods, by Abu Hena
23. Macro-algae in Lawas mangroves, Sarawak, Malaysia: ecosystem functions and economic aspects, by Abu Hena et al.
24. Elucidating the influence of reproductive traits on population genetic structure in mangroves from the Malay Peninsula, by Wee & Webb
25. Self-Organizing Maps to determine global distribution patterns of mangrove plant species and analysis of threats using socio-economic indicators, by Ximenes et al.
27. Mangrove spatial structure in a monospecific stand of the black mangrove Avicennia germinans (L.) Stearn in the Cameroon estuary, by Nfotabong Atheull et al.
28. High-resolution mapping of mangrove topography and vegetation community structure, by Friess et al.
29. Robust baselines of mangrove extent do not exist for conservation policy, by Friess & Webb
30. Successive cambia in the mangrove Avicennia: a study on the three-dimensional structure of the cambia and the functioning of the internal phloem tissue, by Kodikara et al.
31. Impact of flood on Rhizophora plantation in Batticaloa, Sri Lanka, by Mathiventhan & Jayasingam
32. Community based mangrove restoration in Palk Bay, by Balaji
33. Variation of air temperature on conserved and impacted mangroves: preliminary results on the Southern coast of São Paulo State, Brazil, by Lima et al.

34. Survey and biodiversity identification of mangrove ecosystem in Lagos Lagoon and Eastern part of Badagry Creek, Nigeria, by Omogoriola & Williams.

35. Stand structure and carbon stocks in a *Pelliciera rhizophorae* dominated mangrove forest in Montijo Gulf Ramsar site, Panama, by Gross et al.

36. Size does matter, but not only size: two alternative dispersal strategies for viviparous mangrove propagules, by De Ryck et al.

37. Mangroves facing climate change: landward migration potential in response to projected scenarios of sea level rise, by Di Nitto et al.

38. Assessing the link between the local people and the mangroves status of Mtwapa Creek, Kenya, by Ochieng et al.


40. Evaluating the local use of mangroves as a source firewood in Sri Lanka, by Ransara et al.


42. Above ground: Below ground productivity ratios in natural mangrove forest of Gazi Bay, Kenya, by Githaiga et al.

43. Weaver ants as potential controlling agent of mangrove apple fruit borer, by Rajapaksha et al.

44. Mangroves and climate change: effects of increasing temperature on biology, density and distribution of *Perisesarma guttatum* (A. Milne Edwards, 1869) and *Uca urvillei* (H. Milne-Edwards, 1852) crabs at Gazi Bay, Kenya, by Kochey et al.

45. What is a mangrove? A global expert-based approach on definition, functionality and resilience of the ecosystem, by Mukherjee et al.

46. Governance of coastal plantations in southern India: long-term ecological vision or short-term economic opportunity?, by Dahdouh-Guebas et al.

47. Excluding random walks in the foraging behaviour of the Portunid crab *Thalamita crenata*: modelisation and simulation based on real data, by Grüters et al.

48. Distribution of mangrove species: effects of environmental variables, by Gupta (Joshi) & Ghose.
49. Status of mangroves of the Sundarbans: some ecological observations, by Ghose
50. Effects of mono-specific plantation of Rhizophora stylosa on the mangrove community, by Asaeda et al.
51. One year survey of CO₂ fluxes from sediments and water column in mangrove ecosystem (New Caledonia), by Léopold et al.
52. Influence of salinity on biomass production, total phenols, damage markers, and water relations in mangroves, by Aziz et al.
53. Minimum temperature requirements per aridity class of the mangrove genera Avicennia and Rhizophora at their upper latitudinal limits, by Quisthoudt et al.
54. Colombian mangroves: recent advances towards their understanding, by Polanía et al.
55. Testing mangrove forest structure development and various forest management options in Gazi (Kenya) by combining KiWi individual-based modelling with >20 years of field data, by Khan (M.N.I.) et al.
56. Investigation of the population genetics of Rhizophora mangle (Rhizophoraceae) along the Brazilian coast using microsatellite markers, by Francisco De Oliveira et al.
57. Discrimination of mangrove vegetation habitat types (Northeast Brazil) using CBERS-2B images and the normalized difference vegetation index (NDVI), by Santos et al.
58. Satellite remote sensing and GIS to assess anthropogenic pressures and aid mangrove forest management: a case study at the São Francisco River Estuary (Northeast Brazil), by Santos et al.
59. Managing the mangroves economically: use it or lose it, by Debroy et al.
60. Seasonal changes in macrobenthos at Basatin mangrove creeks, Bay of Nayband, The Persian Gulf, Iran, by Kamrani et al.
61. Spatial variation in the morphological structure of monospecific stands of the mangrove Avicennia marina in an arid-zone world heritage area: challenges for management and conservation, by Rule et al.
62. Comparative studies on crown foliage dynamics of three mangrove species of the Family Rhizophoraceae in Okinawa Island, Japan, by Sharma (Sahadev) et al.
63. Litterfall in a peri-urban mangrove receiving raw domestic sewage, Mombasa, Kenya?, by Mohamed et al.
64. Are mangroves sustainable as peri-urban forests? A Case Study of Mombasa, Kenya, by Mohamed et al.
66. Relationships between nesting and vegetation of three cichlids in Batticaloa lagoon Sri Lanka, by Riyas Ahamed & Dharmaretan
67. Fruit size and predispersal herbivory by insects influence recruitment of the mangrove Avicennia marina, by Minchinton
68. Application of remote sensing and GIS for detection of long-term mangrove shoreline changes in Ca Mau, Vietnam, by Tran Thi et al.
69. Comparison of population structures of widely distributed sea-dispersal plants with mangrove species, by Kajita et al.
70. Global phylogeography of Rhizophora species, by Takayama et al.
71. Phylogeography of Bruguiera gymnorrhiza, by Ono et al.
72. Development of SSR markers for five mangrove species using next-generation sequencing with preliminary results of analyses of genetic diversity, by Shinmura et al.
73. Phylogeography of Xylocarpus granatum, by Tomizawa et al.
75. Bottlenecks in conserving mangroves associated with the Puttalam estuary, with special reference to the Seguwantivu Conservation Forest, by Perera (N) & Kotagama
76. Mangrove die-back due to massive sedimentation and its impact on associated biodiversity, by M’rabu et al.
77. Insect pest infestation on mangrove forests of Kenya: identification, threats and impacts, by M’rabu et al.
78. The propagule dispersal black box - driving factors and complexities: a review, by Van Der Stocken et al.
80. First report on fish composition and abundance in Sibunag creek, Guimaras, Central Philippines, by Abroguena
82. Mangroves beyond their distribution. Is it a case of invasion at Nahoon estuary, South Africa?, by Rajkaran et al.
83. Macrobethons assemblages in Cameroonian mangrove forests. First evidence from the Wouri estuary, Douala, by Fusi et al.
84. Are mangrove crabs true intertidal ectotherms? Different thermal strategies to cope with climate change, by Babbini et al.
85. New findings and current taxonomic uncertainties about Sesarmidae of East African mangroves, by Fratini et al.
86. The tree-climbing behavior of Cerithidea decollata (Mollusca: Potamididae): how does this snail decide when to climb and where to stop?, by Vannini & Fratini
87. Spatial distribution patterns of intertidal crabs in tropical estuaries as a baseline for estuarine health monitoring, by Vermeiren & Sheaves
88. Diel and tidal changes in intertidal fish fauna composition from mangrove creeks of Qeshm Island, Persian Gulf, Iran, by Shahraki et al.
89. First structural and functional study of unexplored mangroves in the Iles Eparses, Southwest Indian Ocean, by Fromard et al.
90. Nutrient cycling and use by the species Rhizophora mucronata in two contrasted mangrove settings from the French Scattered Islands, Western Indian Ocean, by Mangion et al.
91. Canopy gaps and the natural regeneration of Matang mangroves, by Aldrie Amir
92. Vulnerability of mangroves in the WIO region to climate change, by Bosire et al.
93. Contribution of plant species to carbon sequestration function of mangrove ecosystems in Sri Lanka, by Perera et al.
94. Efficacy of traditional practice of mangrove cultivation in Negombo estuary, by De Silva et al.
95. Forest structure and regeneration of gray mangrove (Avicennia marina) in Red Sea coastal region of Egypt, by Teraminami et al.
96. Reproductive biology of the most-at-risk mangrove species (Rhizophora annamalayana) and its parental species, by Kavitha & Kathiresan
97. Investigation of possible bioshields to protect vulnerable sections of the Sri Lankan coast, by Rans et al.
98. Vegetation structure of mangroves in the Rio del Rey estuary (Cameroon), by Essomè-Koum et al.
Participants at the MMM3 Conference

Abirami, G.
Annamalai University
CAS in Marine Biology
Faculty of Marine Science
608502 Parangipettai
India.
E-mail: abinish.g@gmail.com

Abu Hena, M.K.
Universiti Putra Malaysia
Dept. of Animal Science and Fishery
Nyahau Road 97008
Bintulu, Sarawak
Malaysia.
E-mail: hena71@yahoo.com

Aldrie Amir, A.
Institute for Environment and Development (LESTARI)
Universiti Kebangsaan Malaysia
43600 Bangi, Selangor
Malaysia.
E-mail: aldrie@ukm.my

Alqarawi, A.A.
Dept. of Plant Production
College of Food & Agri. Sciences
King Saud University
P.O. Box. 2460
11451 Riyadh
Saudi Arabia.
E-mail: alqarawi@ksu.edu.sa

Amarasinghe, M.D.
Dept. of Botany
University of Kelaniya
Dalugama, Kelaniya
Sri Lanka.
E-mail: mala@kln.ac.lk

Asaeda, T.
Dept. of Environmental Science
Saitama University
255 Shimo-okubo
Sakura 338-8570, Saitama
Japan.
E-mail: asaeda@mail.saitama-u.ac.jp

Aung, T.T.
Laboratory of Plant Ecology
Graduate School of Environment and Information Sciences
Yokohama National University
79-2, Tokiwadai Campus
Hodogayaku, Yokohama
Japan.
E-mail: toeaung02@gmail.com

Aziz, I.
Institute of Sustainable Halophyte Utilization
University of Karachi
Karachi-75270
Pakistan.
E-mail: irfanaziz@uok.edu.pk

Balaji, V.
OMCAR Foundation
India.
E-mail: omcarfoundation@gmail.com

Balke, T.
Marine and Coastal Systems
Deltares
2600 MH Delft
The Netherlands.
E-mail: thorsten.balke@deltares.nl

Barnuevo, A.P.
Kanepackage Group Philippines, Inc.
KP-Green Earth
Kakuyo Bldg., 1st Ave. Ext., Cor. 5th Ave. MEPZ1
6015 Lapu-lapu
Philippines.
E-mail: apbarnuevo@kp-grp.com

Blanchard, E.
Institut de Recherche pour le Développement (IRD)
UMR AMAP, TA A51/PS2
Boulevard de La Lironde,
34398 Montpellier Cedex 5
France.
E-mail: elodie.blanchard@ird.fr

Bosire, J.O.
Kenya Marine and Fisheries Research Institute (KMFRI)
Mombasa
Kenya.
E-mail: bosire98@yahoo.com

Bourgeois, C.
Laboratory of Systems Ecology and Resource Management
Université Libre de Bruxelles (ULB)
Av. F.D. Roosevelt 50
B-1050 Brussels
Belgium.
E-mail: cbourgeo@ulb.ac.be

Burrows, D.
TropWATER – Centre for Tropical Water and Aquatic Ecosystem Research
James Cook University, Townsville,
Qld. 4811
Australia.
E-mail: damien.burrows@jcu.edu.au

Cannicci, S.
Department of Evolutionary Biology
Leo Pardi,
University of Florence
via Romana 17, 50125 Firenze
Italy.
E-mail: stefano.cannicci@unifi.it

Cunha-Lignon, M.
Instituto Nacional de Pesquisas Espaciais (INPE)
Divisão de Sensoriamento Remoto
Avenida dos Astronautas, 1758,
12227-010
São José dos Campos, SP
Brazil.
E-mail: cunha.lignon@gmail.com

Curinick, D.J.
Marine and Freshwater Conservation Programme Coordinator
British Zoological Society of London
N19 3SB, London
United Kingdom.
E-Mail: david.curnick@zsl.org

Dahdouh-Guebas, F.
Laboratory of Systems Ecology and

Resource Management
Dept. of Organism Biology
Faculty of Sciences
Université Libre de Bruxelles (ULB)
Av. F.D. Roosevelt 50
B-1050 Brussels
Belgium.
E-mail: fdahdouh@ulb.ac.be
Laboratory of Plant Biology and
Nature Management (APNA)
Vrije Universiteit Brussel (VUB)
Pleinlaan 2, B-1050, Brussels
Belgium.
E-mail: fdahdouh@vub.ac.be

De Silva, K.H.W.L.
Department of Botany
University of Kelaniya
Kelaniya
Sri Lanka.
E-mail: wasana_cbc@yahoo.com

DebRoy, P.
Dept. of Fish Business Management
Fisheries Economics
Extension and Statistics Division
Central Institute of Fisheries
Education
Mumbai – 400061
India.
E-mail: piyashi.debroy@gmail.com

Dasgupta, N.
Agricultural and Ecological Research
Unit
Indian Statistical Institute
Kolkata-700108
India.
E-mail: ndg.1009@gmail.com

De Ryck, D.J.R.
Laboratory of Plant Biology and
Nature Management (APNA)
Vrije Universiteit Brussel (VUB)
Pleinlaan 2, B-1050 Brussels
Belgium.
Laboratory of Systems Ecology and
Resource Management
Dept. of Organism Biology
Faculty of Sciences
Université Libre de Bruxelles (ULB)
Av. F.D. Roosevelt 50
B-1050 Brussels
Belgium.
E-mail: dderyck@vub.ac.be

Di Nitto, D.
Laboratory of Plant Biology and
Nature Management
Mangrove Management Group
Vrije Universiteit Brussel (VUB)
Pleinlaan 2, B-1050 Brussels
Belgium.
Laboratory of Systems Ecology and
Resource Management
Dept. of Organism Biology
Faculty of Sciences
Université Libre de Bruxelles (ULB)
Av. F.D. Roosevelt 50
B-1050 Brussels
Belgium.
E-mail: diana.dinitto@gmail.com

Diele, K.
Edinburgh Napier University
Faculty of Health, Life and Social
Sciences
Sighthill Campus, Edinburgh, EH11 4BN
United Kingdom.
E-mail: k.diele@napier.ac.uk

Duke, N.C.
TropWater
James Cook University
Australia.
E-mail: norman.duke@jcu.edu.au

Durango, J.S.
Laboratory of Plant Biology and Nature Management
Mangrove Management Group
Vrije Universiteit Brussel (VUB)
Pleinlaan 2, B-1050 Brussels
Belgium.
E-mail: jotadurango@yahoo.es

Essomè-Koum, G.L.
Department of Botany, Faculty of Science
University of Douala
PO Box 8948, Douala,
Cameroun
E-mail: essomekoum@yahoo.fr

Feller, I.C.
Smithsonian Environmental Research Center
Edgewater, MD 21037
USA.
E-mail: felleri@si.edu

Francisco de Oliveira, P.M.
Molecular Biology and Genetic Engineering Centre

Duke University of Campinas,
Campinas, São Paulo
Brasil.
E-mail: patricia_francisco@ymail.com

Fratini, S.
Department of Evolutionary Biology
University of Florence
via Romana 17, Florence
Italy.
E-mail: sarafratini@unifi.it

Friess, D.A.
Department of Geography
National University of Singapore
1 Arts Link, Singapore 117570
Singapore.
E-mail: dan.friess@nus.edu.sg

Fromard, F.
Université de Toulouse
INP, UPS, EcoLab (Laboratoire Ecologie Fonctionnelle et Environnement)
118 Route de Narbonne, 31062 Toulouse
France.
E-mail: francois.fromard@univ-tlse3.fr

Fusi, M.
Università Cattolica del Sacro Cuore
Agricultural and Environmental Chemistry Institute
29100 Piacenza
Italy.
E-mail: marco.fusi@unimi.it
Ghose, M.
Agricultural and Ecological Research Unit
Indian Statistical Institute
203 B.T. Road, Kolkata 700 108
India.
E-mail: mghoseisi@gmail.com

Gnaneswaran, R.
University of Jaffna
Dept. of Zoology
Ramanathan Road 40000, Jaffna
Sri Lanka.
E-mail: raji0706@yahoo.co.uk

Gross, J.
1202 B - Mango Drive
Yigo, Guam 96929
USA.
E-mail: jess.gross@web.de

Grüters, U.
Dresden University of Technology (TU Dresden)
Institute of Forest Growth and Computer Sciences
Postfach 1117, D-01735 Tharandt, Germany.
E-mail: uwe.grueters@forst.tu-dresden.de

Herteman, M.
Impact-Mer, 90 rue Pr Didier
97200 Fort de France
Martinique F.W.I.
France.
E-mail: mherterman@impact-mer.fr

Hettiarachi, S.
University of Ruhuna
Department of Botany
Wellamadama 81000, Matara
Sri Lanka.
E-mail: sanath.hetti@gmail.com

Jayamanne, S.C.
Uva Wellassa University
Passara Road, Badulla
Sri Lanka.
E-mail: sepalikauwu@yahoo.com

Jayatissa, L.P.
University of Ruhuna
Dept. of Botany / Faculty of Graduate Studies
Wellamadama, 81000 Matara
Sri Lanka.
E-mail: lpj@bot.ruh.ac.lk

Kairo, J.G.
Kenya Marine and Fisheries Research Institute (KMFRI)
P.O. Box 81651, Mombasa
Kenya.
E-mail: gkairo@yahoo.com

Kajita, T.
Dept. of Biology
Graduate School of Science
Chiba University
1-33 Yayoi, Inage, Chiba, 263-522
Japan.
E-mail: tkaji@faculty.chiba-u.jp

Kamrani, E.
Marine and Fisheries Ecology
Department
University of Hormozgan
PO Box - 3995, Bandar Abbas
Iran.
E-mail: ezas47@gmail.com

Kathiresan, K.
Centre of Advanced Study (CAS) in Marine Biology
Faculty of Marine Sciences
Annamalai University
Parangipettai - 608 502
India.
E-mail: kathirsum@rediffmail.com

Khan, M.N.I.
Laboratory of Systems Ecology and Resource Management
Dept. of Organism Biology
Faculty of Sciences
Université Libre de Bruxelles (ULB)
CP 169, Avenue F.D. Roosevelt 50
B-1050 Bruxelles
Belgium.
E-mail: mnikhan@yahoo.com

Kodikara, K.A.S.
University of Ruhuna
Wellamadama, Matara
Sri Lanka.
E-mail: sunandaruah@gmail.com

Koedam, N.
Laboratory of Plant Biology and Nature Management
Mangrove Management Group
Vrije Universiteit Brussel (VUB)
Pleinlaan 2, B-1050 Brussels
Belgium.
E-mail: nikoedam@vub.ac.be

Lambs, L.
CNRS, Ecolab UMR 5245
118 route de Narbonne
31068 Toulouse
France.
E-mail: luc.lambs@univ-tlse3.fr

Lee, S.Y.
Australian Rivers Institute and School of Environment
Griffith University Gold Coast campus
Southport, Qld 4222
Australia.
E-mail: joe.lee@griffith.edu.au

Léopold, A.
EA 3325
Université de la Nouvelle-Calédonie
Nouméa
New Caledonia.
E-mail: audrey.leopold@univ-nc.nc

Lovelock, C.E.
The School of Biological Sciences
The University of Queensland
St Lucia, QLD 4067
Australia.
E-mail: c.lovelock@uq.edu.au

Mangora, M.M.
Institute of Marine Sciences
University of Dar es Salaam
P.O. Box 668, Zanzibar
Tanzania.
E-mail: mangora@ims.udsm.ac.tz
Marchand, C.
Institut de Recherche pour le Développement (IRD)
UR 206/UMR 7590 IMPMC, Nouméa
New Caledonia.
E-mail : cyril.marchand@ird.fr

Mathiventhan, T.
Dept. of Botany
Eastern University
Chenkalady
Sri Lanka.
E-mail: tmathiventhan@gmail.com

McKee, K.L.
U.S. Geological Survey
National Wetlands Research Center
700 Cajundome Blvd.
Lafayette, Louisiana 70506
USA.
E-mail: mckeek@usgs.gov

Mendelssohn, I.A.
Dept. of Oceanography and Coastal Sciences
Louisiana State University
Baton Rouge, LA 70803
USA.
E-mail: imendel@lsu.edu

Minchinton, T.E.
Institute for Conservation Biology and Environmental Management
University of Wollongong
New South Wales 2522
Australia.
E-mail: tminch@uow.edu.au

Möhler, K.S.
Laboratory of Systems Ecology and Resource Management
Dept. of Organism Biology
Faculty of Sciences, and
Dept. of Journalism
Université Libre de Bruxelles (ULB)
Av. F.D. Roosevelt 50
B-1050 Brussels
Belgium.
E-mail: karin.moehler@gmail.com

Mohamed, M.O.S.
Kenya Wildlife Service
Coast Conservation Area
P.O. Box 82144-80100, Mombasa
Kenya.
E-mail: msaid@kws.go.ke

Mori, G.M.
Centro de Biologia Molecular e Engenharia Genética
Universidade Estadual de Campinas
Av. Cândido Rondon 400 CEP 13083-875
CP 6010, Campinas, São Paulo
Brazil.
E-mail: mori@unicamp.br

Mukherjee, N.
Laboratory of Systems Ecology and Resource Management
Dept. of Organism Biology
Faculty of Sciences
Université Libre de Bruxelles (ULB)
CP 169, Avenue F.D. Roosevelt 50
B-1050 Brussels
Belgium.
Plant Biology and Nature Management Laboratory (APNA) Vrije Universiteit Brussels (VUB) Pleinlaan 2, B-1050 Brussels Belgium. E-mail: nibedita.41282@gmail.com

**Nehru, P.**
Division of Landscape Ecology Salim Ali Centre for Ornithology and Natural History Coimbatore - 641 108, Tamil Nadu India. E-mail: nehrumcc@gmail.com

**Nfotabong Athull, A.**
The University of Douala Dept. of Botany, Faculty of Science P.O. Box 8948 Douala Cameroon. E-mail: atheull@gmail.com

**Nordhaus, I.**
Leibniz Center for Tropical Marine Ecology (ZMT) Fahrenheitstraße. 6, 28359 Bremen Germany. E-mail: inga.nordhaus@zmt-bremen.de

**Ochieng, J.A.**
Plant Biology and Nature Management Laboratory (APNA) Vrije Universiteit Brussels (VUB) Pleinlaan 2, B-1050 Brussels Belgium. E-mail: judith_okello2003@yahoo.com

**Omogoriola, H.O.**
Nigeria Institute of Oceanography and Marine Research (NIOMR) P.M.B. 12729, Wilmot Point Road Victoria Island, Lagos Nigeria. E-mail: adehannah2002@yahoo.com

**Ono, J.**
Dept. of Biology, Graduate School of Science Chiba University 1-33 Yayoi, Inage, Chiba, 263-522 Japan. E-mail: tkaji@faculty.chiba-u.jp

**Paimpillil, J.S.**
Center for Earth Research and Environment Management Cochin 17 India. E-mail: psjoseph@eth.net

**Perera, K.A.R.S.**
Dept. of Botany University of Kelaniya, Kelaniya Sri Lanka. E-mail: roshanperera@yahoo.com

**Perera, N.**
Dept. of Zoology University of Colombo Sri Lanka. E-mail: nmpperera@yahoo.com

**Polania, J.**
Departamento de Ciencias Forestales
Universidad Nacional de Colombia
Sede Medellín
Colombia.
E-mail: jhpolaniav@unal.edu.co

Praveen, V.P.
Division of Conservation Biology
Tropical Botanic Garden and Research Institute
Palode, Thiruvananthapuram - 695562, Kerala
India.
E-mail: praveencancrum@gmail.com

Primavera, J.H.
Pew Fellow in Marine Conservation Scientist Emerita
SEAFDEC Aquaculture Department
Tigbauan, Iloilo
Philippines.
E-mail: georginehp@yahoo.com

Quisthoudt, K.
Laboratory of Plant Biology and Nature Management
Vrije Universiteit Brussel (VUB)
Pleinlaan 2, B-1050 Brussels
Belgium.
Laboratory of Systems Ecology and Resource Management
Dept. of Organism Biology
Faculty of Sciences
Université Libre de Bruxelles (ULB)
Av. F.D. Roosevelt 50
B-1050 Brussels
Belgium.
E-mail: kquistho@vub.ac.be

Rajapaksha, A.C.D.
Dept. of Zoology
Faculty of Science
University of Ruhuna
Sri Lanka.
E-mail: anuradhadarshani@gmail.com

Rajkaran, A.
Dept. of Botany
Rhodes University
P.O. Box 94, Grahamstown 6140
South Africa.
E-mail: a.rajkaran@ru.ac.za

Ransara, G.B.M.
Dept. of Botany
Faculty of Science
University of Ruhuna
Sri Lanka.
E-mail: muditharansara@gmail.com

Record, S.
Harvard Forest
Harvard University
324 North Main Street, Petersham
01366
USA.
E-mail: srecord@fas.harvard.edu

Reis-Neto, A.S.
PRODEMA
Universidade Federal do Ceará
Fortaleza
60455-900
Brazil.
E-mail: armandoreisneto@live.com
Riyas Ahamed, A.M.
Dept. of Zoology
Eastern University Sri Lanka
Vantharumoolai, Chenkallady
Sri Lanka.
E-mail: riyasahame@yahoo.co.uk

Robert, E.M.R.
Laboratory for Plant Biology and Nature Management (APNA)
Vrije Universiteit Brussel (VUB)
Pleinlaan 2, B-1050 Brussels
Belgium.
E-mail: erobert@vub.ac.be

Rule, M.J.
Marine Science Program
Dept. of Environment and Conservation
17 Dick Perry Ave, Kensington
Western Australia.
E-mail: michael.rule@dec.wa.gov.au

Sahu, S.K.
CAS in Marine Biology
Faculty of Marine Sciences
Annamalai University, Parangipettai - 608 502
India.
E-mail: sunil.mangroves@gmail.com

Saint-Paul, U.
Leibniz Center for Tropical Marine Ecology
Fahrenheitstr. 6, 28359 Bremen
Germany.
E-mail: ulrich.saint-paul@zmt-bremen.de

Santos, L.C.M.
Laboratório de Ecologia da Paisagem e Conservação (LEPaC)
Departamento de Ecologia
Instituto de Biociências, Universidade de São Paulo. Rua do Matão Travessa 14, Cidade Universitária, São Paulo-SP
Brasil.
Laboratory of Systems Ecology and Resource Management
Dept. of Organism Biology
Faculty of Sciences
Université Libre de Bruxelles (ULB)
CP 169, Avenue F.D. Roosevelt 50
B-1050 Brussels
Belgium.
E-mail: santosl@usp.br

Satyanarayana, B.
Laboratory of Systems Ecology and Resource Management
Dept. of Organism Biology
Faculty of Sciences
Université Libre de Bruxelles (ULB)
B-1050 Brussels
Belgium.
Laboratory of Plant Biology and Nature Management
Vrije Universiteit Brussel (VUB)
Pleinlaan 2, B-1050 Brussels
Belgium.
E-mail: satyam2149@gmail.com

Shahraki, M.
Leibniz Center for Marine Tropical Ecology (ZMT)
Fahrenheitstrasse D- 628359
Bremen,
Germany.
E-mail: maryam.shahraki@zmt-bremen.de

Sharma, S. (Sahadev).
Graduate School of Engineering and Science
University of the Ryukyus
Okinawa 903-0213
Japan.
E-mail: mangrove_coral@yahoo.co.in

Shinmura, Y.
Dept. of Biology
Graduate School of Science
Chiba University
1-33 Yayoi, Inage, Chiba 263-522
Japan.
E-mail: papi-rokoroko@hotmail.co.jp

Teraminami, T.
Laboratory of Plant Ecophysiology
Graduate School of Environmental Science
Okayama University
1-1-1 Tsushima-naka, Kita-ku,
Okayama 700-8530
Japan.
E-mail: phic8l26@s.okayama-u.ac.jp

Thakur, S.A.
Dept. of Zoology
K.J. Somaiya College of Science and Commerce
University of Mumbai, Mumbai
India.
E-mail: sandhyajit@gmail.com

Tomizawa, Y.
Dept. of Biology
Graduate School of Science
Chiba University
1-33 Yayoi, Inage, Chiba 263-522
Japan.
E-mail: z8s4021@students.chiba-u.jp

Tran Thi, V.
Center for HydroMet and Environment Consultancy
Vietnam Institute of Hydrology,
Meteorology and Environment (IMHEN)
23/62 Nguyen Chi Thanh, Hanoi
Vietnam.
E-mail: ttran1@vub.ac.be

Van der Stocken, T.
Laboratory of Plant Biology and Nature Management
Vrije Universiteit Brussel (VUB)
Pleinlaan 2, B-1050 Brussels
Belgium.
Laboratory of Systems Ecology and Resource Management
Dept. of Organism Biology
Faculty of Sciences
Université Libre de Bruxelles (ULB)
Av. F.D. Roosevelt 50
B-1050 Brussels
Belgium.
E-mail: tvdstock@vub.ac.be

Van Nedervelde, F.
Laboratory of Systems Ecology and Resource Management
Université Libre de Bruxelles (ULB)
Av. F. D. Roosevelt 50
B-1050, Brussels
Belgium.
Laboratory of Plant Biology and
Nature Management (APNA)
Vrije Universiteit Brussel (VUB)
Pleinlaan 2, B-1050 Brussels,
Belgium.
E-mail: fynederv@ulb.ac.be

Vermeiren, P.
Estuary and Tidal Wetland
Ecosystems Research Laboratory
James Cook University
Townsville, Queensland 4811
Australia.
E-mail: peter.vermeiren@my.jcu.edu.au

Webb, E.I.
Dept. of Biological Sciences
National University of Singapore
Science Drive 4, Singapore 117543
Singapore.
E-mail: ted.webb@nus.edu.sg

Wee, A.K.S.
Dept. of Biological Sciences
National University of Singapore
Science Drive 4, Singapore 117543
Singapore.
E-mail: alisonwks@gmail.com

Wilson, F.S.
Centre of Advanced Study (CAS) in
Marine Biology
Faculty of Marine Sciences
Annamalai University

Parangipettai - 608 502
India.
E-mail: sylvesterfredy@gmail.com

Wilson, N.C.
50A Sunrise Road, Palm Beach
NSW 2108
Australia.
E-mail: rstylosa@gmail.com

Wodehouse, D.C.J.
Bangor University & Mangrove
Action Project
Dept. of Environment, Natural
Resources and Geography
Adeilad Thoday
Deiniol Rd., LL57 2UW, Bangor
United Kingdom.
E-mail: dwodehouse@yahoo.com

Ximenes, A.C.
Laboratory of Systems Ecology and
Resource Management
Université Libre de Bruxelles (ULB)
Av. F. D. Roosevelt 50, B-1050,
Brussels
Belgium.
Laboratory of Plant Biology and
Nature Management (APNA)
Vrije Universiteit Brussel (VUB)
Pleinlaan 2, B-1050 Brussels,
Belgium.
E-mail: ari.ximenes@gmail.com
Notes
Acknowledgements

Our earnest thanks to all sponsors, who made this conference possible, and to the scientific community that made organizing this symposium a pleasure. Special thanks are due to the financial and administrative authorities at the Vrije Universiteit Brussel (VUB), the Université Libre de Bruxelles (ULB), the University of Ruhuna (UoR), and the Kenya Marine and Fisheries Research Institute (KMFRI). The MMM3 Proceedings layout/printing was supported by the Vlaams Instituut voor de Zee (VLIZ) and published as:

Rhizophora apiculata with the extended aerial roots in Matang Mangrove Forest Reserve, Malaysia (Behara SATYANARAYANA)