



Surveying and collecting voucher specimens in licuati thicket. The typical vegetation of the licuati thicket is not more than 4 m high. The Ronga word 'licuati' means 'thick bush' and describes the thicket vegetation. Photo: Stefan Siebert.

# MAPUTALAND'S LICUATI FOREST AND THICKET

Botanical exploration of the coastal plain south of Maputo Bay,  
with an emphasis on the Licuati Forest Reserve

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**N**amed after the Maputo River that runs through it, Maputaland is a region of great scenic beauty and considerable botanical riches. Characteristic of the area are the high, north-south oriented dune cordons on the inland margin of the coastal plain that mark a succession of still stands and deposits during the regression of the Indian Ocean. The youngest of these dunes are probably 10 000-30 000 years old, making them some of the youngest geological formations in southern Africa. Maputaland is also a world-renowned botanical 'hotspot' that was recognized by WWF/IUCN as a 'Centre of Plant Endemism' in 1992. This area stretches from the Inkomati River in the north to the St Lucia estuary in the south, with the Indian Ocean in the east and the foothills of the Lebombo

Mountains in the west.

Very little of the Maputaland Centre of Endemism south of Maputo Bay in Mozambique had been investigated botanically, and for this reason, the Southern African Botanical Diversity Network (SABONET) gathered together thirty-one botanists from ten southern African countries who recently carried out a plant collecting expedition to the area in and around the Maputo Elephant and Licuati Forest Reserves.

## Maputaland coastal plain flora

The relatively recent origin of the sandy, low-lying coastal plain of Maputaland suggests that the current ecosystems may also be of recent derivation, and therefore that many endemic plants here are 'neo-endemics' (recently developed), an impression supported by the fact

that some have their nearest relatives still extant. It is thus an exceptional opportunity to observe biological evolution (and speciation) in action.

Climate may have played a primary role in the evolution of plant diversity on the coastal plain. The region is warm and humid and many tropical plants reach the southernmost limit of their range here. About 2 500 or more species of vascular plants occur here, yet currently only about 30% of the total Maputaland flora has been recorded for the two Mozambican reserves. Noteworthy species include *Acridocarpus natalitius* var *linearifolius* (narrow-leaved moth-fruit, Malpighiaceae), *Cladostemon kirkii* (Tonga-kierie, Capparaceae), *Enephalartos ferox* (Maputaland cycad, Zamiaceae), *Entada rheedii* (giant sea bean, Fabaceae),

*Pelargonium tongaense* (Geraniaceae), *Salacia kraussii* (Celastraceae), *Rhipsalis baccifera* (rope cactus, Cactaceae) and *Sophora inhambanensis* (African pagoda tree, Fabaceae).

The Maputaland flora is predominantly of Palaeotropical derivation (the world is divided into six plant kingdoms, two of which are found in southern Africa - the Palaeotropical Kingdom and the famous Cape Floristic Kingdom). Many Maputaland floristic elements extend from the core area of the centre along the Mozambican coastal plain to north of Maputo. There is also a well-defined northward extension along the Lebombo mountain range that eventually spreads westwards along the northern slopes of the Soutpansberg Mountains. Floristic elements also penetrate westwards along the arid low-lying Limpopo River valley, reaching the far northern parts of South Africa and the south-eastern parts of Zimbabwe.

#### Licuat forest

The Licuati Forest Reserve was declared in 1943 to ensure sustainable harvesting of *Azelia quanzensis* (chanfuta/chamfute/-pod-mahogany). It is near Tinonganine between the Maputo and Tembe Rivers in the Matutuine District, an area under the jurisdiction of Chief Augusto Santaca of the Ronga people. It covers an area of about 40 000 ha. Many areas are relatively pristine and only utilized for cattle grazing and natural resource based industries, such as palm wine, reed harvesting and charcoal production. Most soils are composed of fine-grained aeolian sands which are easily leached and infertile, but fertile, clayey alluvium occurs on the floodplains of some of the larger rivers such as the Tembe, Maputo and Futi. Summers are hot (27 °C in January) and winters cool to warm with no frost (16 °C in July) and rain falls throughout the year. Annual rainfall declines from 1 100 mm per year at Maputo Elephant Reserve to 600 mm per year at Licuati Forest Reserve.

The vegetation of the Maputaland Centre includes different types of wetland, grassland, woodland, thicket and forest. Most of the region is covered by woodland, with patches of short and tall forest, usually bordered by broad grassland. Communities all merge into one another, particularly



the woodlands and forests. Licuati forest (known as 'sand forest' in South Africa) is endemic to the Maputaland Centre and is very distinctive, not only because of its combination of rare and endemic species, but because it is more or less restricted to the ancient north-south trending dune cordons.

Characteristic woody species include *Balanites maughamii* (green thorn), *Cola greenwayi* (hairy cola), *Dialium schlechteri* (Zulu pod-berry), *Drypetes arguta* (water ironplum), *Hymenocardia ulmoides* (red-heart tree), *Monodora junodii* (green apple), *Newtonia hildebrandtii* (Lebombo wattle),

The yellow flowers of the characteristic Maputaland tree, *Acridocarpus natalitius* var *linearifolius*, commonly known as the narrow-leaved moth-fruit. Photo: Braam van Wyk.





Above left At the southernmost limits of its distribution range - *Xylopia torrei* growing in the Licuati Forest Reserve.

Above right The false tamboti, *Cleistanthus schlechteri*, is a dominant and characteristic small tree of licuati thicket.

Left The spectacular dark maroon flowers of *Dicerocaryum forbesii* catch the eye in open areas in the licuati thicket.

Photos: Braam van Wyk.

*Pseudobersama mossambicensis* (mock white ash), *Ptaeroxylon obliquum* (sneezewood), *Pteleopsis myrtifolia* (inock bush-willow) and *Uvaria lucida* subsp. *virens* (large-fruited cluster pear). Some of these species are shared with the sandveld of the Kruger National Park.

Many new plant groups from the licuati forest zone await description. Recent discoveries include *Pavetta vanwykiana* and new species of *Tricalysia* and *Berchemia*. The maroon-flowered form of the prostrate herb *Dicerocaryum senecioides* is soon to be instated as an independent species, *Dicerocaryum forbesii*. Interesting new plant distribution records include *Xylopia torrei* which previously was only known from Chibuto in the Gaza Province, and *Lannea antiscorbutica* (sand mock marula), a disjunct occurrence with central Africa (i.e. found in two or more widely separated regions).

Licuati forest is a dense, species rich forest with a relatively short canopy of 5-15 m. It occurs under drier conditions than most other southern African forest types. Classified as tropical dry forest, it



Above left With most unusual flowers, *Oxyanthus latifolius* is another Maputaland Centre endemic. Above centre *Ochna barbosa* (sand plane) is common within licuati thicket and is easily identified by its interesting flowers: after shedding their yellow petals, the sepals turn from green to pink, thus assisting in advertising the ripening fruits to birds. Above right *Hyperacanthus microphyllus* is a beautiful white-flowered endemic tree of the Maputaland Centre of Endemism and is common within licuati thicket. Below Licuati thicket is characterized by dense stands of *Psydrax fragrantissima*. Photos: Braam van Wyk.

occurs in a patchy mosaic with dry woodland. Licuati forest is generally evergreen, with semi-deciduous trees also occurring, but these species are not dominant. In southern Africa, forests generally show low levels of tree endemism. Licuati forest, however, is an exception in being a forest type rich in endemic plant and animal species. Of the 230 Maputaland Centre endemic plant species, thirty-five are associated with, and twenty restricted to, licuati forest and thicket.

#### Licuati thicket

One of the most significant findings of the SABONET expedition was the identification of a new vegetation type for which the name 'licuati thicket' is proposed. Wayne Matthews was the first to distinguish between two types of sand forest in KwaZulu-Natal, namely tall and short sand forest. Tall sand forest in South Africa is the same as what is called licuati forest in Mozambique. Until recently, however, the ecological status of short sand forest was unclear, and was usually considered a developmental stage towards tall sand forest. During the expedition we found particularly well-developed stands of short sand forest between the Tembe and Maputo Rivers in the Tinonganine District.

Based on historical, structural and floristic evidence, we propose 'licuati thicket' as a formal descriptive name for short sand forest. In 1943 the Portuguese erroneously named Licuati Forest





Two members of the thirty-one strong SABONET expedition team from ten countries in the Licuati Forest Reserve. Information gathered will guide reserve management, land-use planning and sustainable utilization programmes for the conservation of these endemic-rich vegetation types.

Photo: Stefan Siebert.

Reserve as such, ignoring the fact that the Ronga word 'licuati' refers only to a specific vegetation type in the reserve, namely 'thick bush', or what ecologists would call 'thicket'. Licuati Thicket Reserve would therefore have been a more appropriate name. Following the vegetation type definitions of Denzil Edwards, thicket comprises 10-100% tree crown cover of 2-10 m in height and more than 10% shrub cover of 1-5 m in height. Forest comprises 75-100% tree crown cover of 2-20 m in height and more than 10% shrub cover of 1-5 m in height.

Licuati forest and thicket share many species, but the latter is floristically characterized by *Cleistanthus schlechteri* (false tamboti), *Croton pseudopulchellus* (small lavender fever berry), *Grewia microthyrsa* (sand raisin), *Hyperacanthus microphyllus* (Tonga thorn-gardenia), *Ochna barbosa* (sand plane), *Oxyanthus latifolius* (Zulu loquat), *Psydrax fragrantissima* (Tonga quar), *P. locuples* (krantz quar), *Tricalysia junodii* (fluffy-flowered jackal-coffee), *Warneckea sousae* (Tonga rose-apple) and *Xylopia torrei*. The Rubiaceae is particularly well represented, with twenty-one species of this family recorded here.

### Ecology

In the Maputaland Centre, plant diversity is controlled by the dune systems. This interplay, together with the geology and geomorphology, has resulted in unique hydrological systems. Water table depths vary considerably. After

rains, there are quick fluctuations in local water levels, as ground water is almost exclusively replenished by rainwater. Moisture availability is therefore a major determinant of vegetation patterns, which in turn is influenced by the interconnected effects of ground water movements, soil type and topography.

Licuati thicket communities in the Licuati Forest Reserve prefer the drier soils of the more elevated ancient dune cordons. Vegetation zones on ancient dunes are therefore mainly forest or thicket in high-lying areas, blending into woodland, then grassland in the low-lying areas, and finally wetlands in the inter-dune depressions. In many parts of Africa the boundary between forest and adjacent vegetation types (usually grassland or woodland) is abrupt because of fire, an important determinant of forest edge composition. Forest rarely burns, as fires usually stop at the forest margin. In the case of licuati forest, it also has a narrow zone (1-3 m) of nearly bare soil immediately adjacent to it. This zone may protect licuati forest from fire by acting as a kind of natural firebreak.

Regular fires have a destructive effect on Licuati forest. Many of these 'negative' fire-impacted licuati forest patches and margins do not regenerate at all. Licuati thicket appears to be more fire tolerant, although the impact of a fire that occurred ten years previously in the Licuati Forest Reserve, was still very clear from the air in 1998.

### Conservation

Until recently the areas south of Maputo Bay were relatively undeveloped. Few humans lived there because of the scarcity and seasonality of surface water, and the civil war that drove many people to Maputo. However, rapid urbanization and rampant poverty has placed pressure on plant resources for sustainable livelihoods. City people ignore the cultural taboos of rural people, and this leads to overharvesting of plant species from various types of savanna and forest nature reserves in Maputaland.

Tembe Elephant Park and Licuati Forest Reserve contain well-preserved stands of licuati forest and licuati thicket. In the case of the Licuati Forest Reserve, Pedro Mangué has indicated that the main threats to plant diversity are selective species utilization. The bark of *Cassipourea mossambicensis* (sand onionwood) is used for cosmetic purposes, *Warburgia salutaris* (pepper-bark tree) and *Securidaca longepedunculata* (violet tree) are both used as multi-purpose healthcare drugs, *Cleistanthus schlechteri* and *Azelia quanzensis* are both used in the wood carving trade, *Spirostachys africana* (tamboti) and *Balanites maughamii* are used for timber, *Newtonia hildebrandtii* and *Terminalia sericea* (silver cluster-leaf) are used for charcoal production, and the fruits of *Sclerocarya birrea* (marula) and *Strychnos madagascariensis* (black monkey-orange) are harvested. The forests and woodlands surrounding the licuati thicket are utilized



Left A charcoal production line in the Licuati Forest Reserve. Right The stump of a Lebombo wattle, *Newtonia hildebrandtii*, felled for charcoal production in the Licuati Forest Reserve. Once a sustainable resource, rapid urbanization and rampant poverty is placing pressure on these trees. Photos: Stefan Siebert.

heavily, but the thicket itself has been rather inaccessible because of its dense vegetation cover. However, bulk harvesting for the markets in Maputo is placing an increasing demand on the surrounding areas and it is expected that plant harvesting will soon increase within licuati thicket.

The coastal dunes of Maputaland are rich in heavy metals and there is increasing pressure to mine the coastal dune zone of southern Mozambique. Most of the coastline from Richards Bay in South Africa, up to Maputo Bay in Mozambique, is protected in the form of government and private land. However, in Mozambique the situation is changing with foreign companies showing great interest in the establishment of a new harbour in Maputo Bay and even further south at Ponta Dabela, which in turn could facilitate the development of mines along the coast.

The region south of Maputo Bay in Mozambique is earmarked to become one of the most popular tourist destinations in southern Africa with its elephants, white

beaches, sea turtles and magnificent coral reefs. Development is inevitable and the growth in the local human population in the next ten years will increase substantially as more people find ways to make a living in this tourist bound region. Licuati forest and licuati thicket, like the 'woody grasslands' of Maputaland, are vulnerable because manipulation of the natural systems will strongly influence the ecology of its ancient dunes. We hope that the information gathered during the SABONET expedition will make people aware of this very special place and that it will guide reserve management, land-use planning and sustainable utilization programmes for the conservation of these endemic-rich vegetation types for future generations. ♡

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A list of Maputaland Centre endemics/near-endemics recorded for the licuati forest and licuati thicket can be obtained from [nrn@nbipre.nbi.ac.za](mailto:nrn@nbipre.nbi.ac.za).