



E-ISSN: 2278-4136  
P-ISSN: 2349-8234  
JPP 2017; 6(1): 316-321  
Received: 02-11-2016  
Accepted: 03-12-2016

**Kelvin Bucktowar**

Department of Pharmacognosy,  
T. John College of Pharmacy,  
Gottigere, Bannerghatta Road,  
Bangalore, Karnataka, India

**Sandeep Bucktowar**

Swinburne University of  
Technology, Melbourne,  
Victoria, Australia

**Mili Bucktowar**

Nanjing Medical University,  
Nanjing, Jiangsu Province,  
China

**Vineeth Chandy**

Department of Pharmacognosy,  
T. John College of Pharmacy,  
Gottigere, Bannerghatta Road,  
Bangalore, Karnataka, India

## Endemic Plants belonging to a Paradise Island - Mauritius

**Kelvin Bucktowar, Sandeep Bucktowar, Mili Bucktowar and Vineeth Chandy**

**Abstract**

Mauritius is an island located in the Indian Ocean near Reunion and Rodrigues islands. Its large lagoons lined with fine white sand are the embodiment of paradise. However apart from quintessential landscape lies some endemic plants that no one will imagine. Forests and trees have always been of great importance to mankind since prehistoric days. They perform vital functions that have been broadly classified into environmental, economic and sociocultural values. They are important, valuable and necessary to our very existence. It's not too hard to believe that, without them we human would not exist on this beautiful planet. Although the forests of Mauritius are small in area, they perform vital functions such as the conservation of soil, water and biodiversity. They are essential to life and are the ground troops on an environmental frontline. Our existing forests and the trees we plant work in tandem to make a better world. People enjoy and appreciate fresh air, clear water, beautiful scenery and wildlife. This review will focus on some of the endemic plants belonging to Mauritius such as *Trochetia boutoniana*, Bois Colophane Batard, *Hyophorbe amaricaulis*, Mandrinette, Bois de Chèvre and *Tetraxis salicifolia*.

**Keywords:** Mauritius, *Trochetia boutoniana*, Bois Colophane Batard, *Hyophorbe amaricaulis*, Mandrinette, Bois de Chèvre, *Tetraxis salicifolia*.

**1. Introduction**

Mark Twain said: "Mauritius was made first, and then heaven, and that heaven was copied after Mauritius" – and it seems some things never change <sup>[1]</sup>. This island in the Indian Ocean is truly heavenly. Clear warm coloured blue turquoise water, and endless white beaches with coconut trees make Mauritius an ideal tropical dream country <sup>[2]</sup>.

An island in the middle of a vast Ocean, untouched for many millennia. A population of unique plants and flowers, developed over a huge amount of time, protected from large herbivores and human destruction due to its isolated location. An island called Mauritius by the ones who came from far to conquer its rare beauty and host of unique endemic plant life. Currently, about 677 species can be counted on the island with 277 existing only there and 147 exclusively found in the Mascarene Islands (Mauritius, Reunion, Rodrigues). More than a third of them figure on the International Union for Conservation of Nature's red list and are classified as being critically threatened or endangered. The island's endemic species are finally on their way to being recognised and appreciated on an international level <sup>[3]</sup>.

All in all there are 15 Nature Reserves, on and around the island. The smallest ones are situated in the Tamarin Falls region and close by sacred Lake Ganga Talao. Several are located on the islets off the coast, and others can be found on the slopes of Landmark Mountains Le Pouce and Corps de Garde, or down south at Combo near Souillac. Two of them, the largest one stretching from Mare Longue Reservoir to Plaine Champagne and Round Island are scientific reserves with permission granted only to bearers of a special permit <sup>[4]</sup>.

**1.1 List of Places containing Endemic Plants**

Sir Seewoosagur Ramgoolam Botanical Gardens - *Trochetia boutoniana*, Mandrinette and Bois Chevre

The Black River Gorges National Park - Bois Colophane Batard, *Tetraxis Salicifolias*  
Ilot Gabriel

Le Morne Brabant - *Trochetia boutoniana*

Pieter Both mountain - *Hyophorbe amaricaulis*

**1.2 History of native flora in Mauritius**

When Mauritius was first visited in the 17th century, it was covered by dense vegetation. Following colonization, the forests of Mauritius have been cleared for agriculture, forestry,

**Correspondence****Kelvin Bucktowar**

Department of Pharmacognosy,  
T. John College of Pharmacy,  
Gottigere, Bannerghatta Road,  
Bangalore, Karnataka, India

villages and towns, and other developments. The island has experienced four centuries of large-scale forest clearance for agriculture and urban development, and when combined with the introduction of invasive species of plants and animals, this has had a disastrous effect on native flora. Some endemic plants such as the palm *Hyophorbe amaricaulis* have been reduced to just one individual in the wild.

Today good quality native forests occupy less than 2.0% of our total area. These forests are found on mountain ridges, on the Offshore Islets and in Black River Gorges and Bras D' Eau National Parks. These forest remnants provide the last habitats for our endemic flora and fauna. Our remaining native forests are under constant threat of alien invasive plants such as Chinese guava (*Psidium cattleianum*), privet (*Ligustrum robustum*) and ravenale (*Ravenala madagascariensis*). These exotic plants compete with the native species for space, light and nutrients. Introduced animals also contribute significantly to the degradation process either by physically damaging the plants or helping in the dispersion of the seeds of the exotic plants. Herbivorous mammals such as the rusa deer (*Cervus timorensis*) and the hare (*Lepus nigricollis*) browse young plants and tender shoots. Monkeys (*Macaca fascicularis*) selectively destroy flowers and fruits as well as foliage, wild pigs (*Sus scrofa*) cause extensive damage by eating roots of plants and disturbing the soil, and rats eat the ripe fruit. Red whiskered bulbul and wild pigs disperse the seeds of the Chinese guava.

## 2. *Trochetia boutoniana*

*Trochetia boutoniana* is the national flower of Mauritius since 1992 and it is often illustrated on stamps of Mauritius. It was named after French botanist Louis Bouton.

*Trochetia* is a genus of flowering plants from the family Malvaceae (formerly in the Sterculiaceae). They are endemic to the Mascarene Islands that is Mauritius, Reunion Islands, Rodrigues Island. The genus was first described by A.P. de Candolle in 1823, who named it in honour of French botanist Henri Dutrochet<sup>[5]</sup>. *Trochetia boutoniana* also known by its native Creole name 'Boucle d'Oreille' is a shrub from the *Trochetia* genus endemic to Mauritius.

### 2.1 Description and Ecology

The genus *Trochetia* consists of shrubs or small trees. The hermaphroditic flowers are either white (*T. triflora*), pink (*T. parviflora*) or reddish orange (*T. boutoniana*). They are either single-standing or grow in a cluster of three flowers. Some species have bell-shaped petals. All plants of this genus are imperilled due to the competition of invasive species like the guavas from China but also by destruction caused by introduced monkeys and rats. Five species occur on Mauritius and one on La Reunion. The habitat consists of humid forests with a high annual rainfall or mountainous slopes which are directed windwards<sup>[6]</sup>.

*Trochetia boutoniana* can reach a height from two to eight metres. The leaves are oval shaped and due to its xerophyte adaptations, it is leathery on the underparts. Also stipules are present. The petals are between 5 and 6 cm and they grow asymmetrically. They are bell-shaped and the colouring is dark red with a white background. The capsule is globular and contains up to 10 black seeds. The flowering time is from June to October<sup>[7]</sup>.

This plant is relatively rare because of its weak regeneration and due to introduced monkeys which feed on the blossom buds. The only occurrences are on the slopes of Le Morne

Brabant, Mauritius. Thanks to the efforts of botanist Joseph Gueho seeds were successfully germinated and grown in cultivation for the first time in 1973<sup>[8]</sup>.

### 2.2 Pollination

Plants from the genus *Trochetia* belong to the few plants worldwide that can produce coloured nectar. Some scientists, like the Danish ecologist Jens Olesen assume that this could be linked to bird species which have pollinated this plants in the past and are extinct today<sup>[9]</sup>. However, recent research has demonstrated that not only do endemic *Phelsuma* geckos pollinate some of the species but that they actually prefer coloured over clear nectar. Hence, the 'mystery of the Mauritian coloured nectar' can be considered at least partly solved now. Whether the nectar-feeding birds in Mauritius also react to the coloured nectar as a signal for floral reward remains to be seen<sup>[10]</sup>.

The main pollinators of today are the Mauritius olive white-eye (*Zosterops chloronothos*) and the Mauritius grey white-eye (*Zosterops mauritianus*), introduced honey bees or geckos from the genus *Phelsuma*.

Recent research has shown that in the absence of the locally extinct Mauritius olive white-eye, *Trochetia blackburniana*'s main pollinator in the area of Le Pétrin is the blue-tailed day gecko (*Phelsuma cepedianana*). Interestingly, the pollination efficiency of these geckos depend on the proximity to dense patches of *Pandanus*, which are a favourite microhabitat for the geckos - possibly because the spiky leaves of *Pandanus* protect them from their main predator, the Mauritius kestrel (*Falco punctatus*)

### 2.3 Species

Six species belong to that genus. Some authorities have classified much more species but these are either in doubt or synonyms of other plants. The similar Atlantic genus *Trochetiopsis* was until 1981 included herein<sup>[11]</sup> but actually *Helmiopsis* might be a closer relative of *Trochetia* (as is also suggested by biogeography)<sup>[4]</sup>. The formerly recognised species *Trochetia richardii* was reclassified as *Helmiopsis richardii*. *Trochetia thouarsii* was first synonymised with *Trochetia pentaglossa* and later reclassified as *Nesogordonia thouarsii*. Both plants are from Madagascar.

Species of *Trochetia*<sup>[12]</sup>:

- *Trochetia parviflora* - an extremely rare tree (with about 63 individuals). Discovered in 1794. Thought to be extinct in 1863 and rediscovered on the slopes of Corps de Garde, Mauritius in 2001 by a team from the Mauritius herbarium.
- *Trochetia boutoniana* (native name: Boucle d'Oreille (in English: Earring tree) because of its bell-shaped look) is the national flower of Mauritius since 1992. It was named after French botanist Louis Bouton. The only occurrence is the slopes of Le Morne Brabant, Mauritius. The flowering time is from June to October.
- *Trochetia uniflora* - Occurrence: Trois Mamelles, Le Pouce, and Letard Mountains in the west of Mauritius. Flowering time: May to June
- *Trochetia triflora* - Occurrence: Trou aux Cerfs in the central, Grand Bassin, Piton Savanne, and Little Black River peak in the south-west of Mauritius. Flowering time: April to July
- *Trochetia blackburniana* - Occurrence: several places on Mauritius, most common species of that genus. Flowering time: April to May

- *Trochetia granulata* - Occurrence: Réunion

## 2.4 Uses <sup>[13]</sup>

Flower essence and is known to cure trauma and emotional pain.

## 3 Bois Colophane Batard

Bois Colophane Batard is having biological source *Protium obtusifolium* <sup>[14]</sup>. It is a dicotyledonous plant species belonging to the family Burseraceae <sup>[15]</sup>.

*Protium obtusifolium* is also known as Bois Colophane Batard, Bois Colophane Rouge, Bois de Compagnie.

## 3.1 Description and Ecology

The tree has a relatively expanded top and may reach up to 20 m in height with a trunk that can have a diameter of about 75 cm. The bark is grayish in colour often cracked from which a clear, sticky and turpentine-smelling liquid exudes. The small branches are strong, smooth and have a pale colour <sup>[16]</sup>.

The leaves are grouped at the furthest extremities of the branches are pinnately arranged and are very rarely arranged in a unifoliar manner. The petiole is 2 to 7 cm long while the petiolules are 0.8 to 1.5 cm in length and may reach a maximum of 2.5 cm.

The leaf lamina is dark green, shiny and usually changes to a bright red colour when dying. The shape is more or less ellipsoidal or obovoid measures 5 to 10 cm by 2.5 to 6 cm and the leaf is quite tough. The leaf margin is entire with a rather rounded tip and a cuneiform base.

Influorescence is prominent, axillary, paniculate and grouped at the extremities of the leaflets. It can be as long as 15 cm, with the flowers arranged in dense cymoses. The flowers are numerous, bear pedicels that measure around 2 mm in length and bear small triangular bracts. The sepals too are triangular in shape and in the male flowers measure 0.5 mm while being slightly longer in the female flowers. The sepals also possess trichomes on their dorsal side <sup>[16]</sup>.

The oblong petals are 1.5 to 2 cm by 0.6 to 1 mm and bear trichomes on the dorsal surface as well. 10 stamens are present and measure between 1 to 1.5 mm in the male flowers. The staminodia of the female on the other hand, are much longer than those in the males. The stigma has 5 rather hemi-spherical lobes with a sterile ovary in the male flowers.

The fruit when mature resembles a capsule but when young looks like a drupe. It becomes reddish green with a rather tough mesocarp and measures 1.5 to 2 cm in length. Usually 1 to 3 or a maximum of 4 asymmetrical or 5 symmetrical grains are formed. These are globose shaped. One peculiarity about the grains is that these attract birds <sup>[17]</sup>.

## 4. Bois de Chèvre

Bois de Chèvre (English: wood/antler of goat) is *Senecio lamarckianus* belonging to the Asteraceae family. It is endemic to the island of Mauritius and is threatened by habitat loss <sup>[18]</sup>. *S. lamarckianus* is named after the French philosopher, botanist and zoologist Jean-Baptiste Pierre Antoine de Monet, Chevalier de Lamarck

## 4.1 Description

*S. lamarckianus* is a many-branched perennial shrub that grows to be 2 metres (6.6 ft) to 3 metres (9.8 ft) tall <sup>[19]</sup>.

**Leaves and stems:** The stalk and branches are densely covered with white hairs. Oblong leather-like leaves are

silvery greenish coloured 11 centimetres (4.3 in) to 13 centimetres (5.1 in) long by 3 centimetres (1.2 in) to 5.2 centimetres (2.0 in) wide and are attached to the branch with a leaf stalk 1 centimetre (0.39 in) to 2 centimetres (0.79 in) long, which bear on opposite sides small, well-spaced lanceolate lobules. Pointed at the tips and slender at the base; serrated, more so at the tips, <sup>[4]</sup> mostly hairless on the tops and densely hairy underneath <sup>[20]</sup>.

**Flowers:** Numerous flower heads which cluster into a flat top, each on its own flower stalk; center flower heads tending to open first. <sup>[1]</sup> Inflorescence is completely covered in white hairs and appears in groups of seven. <sup>[4]</sup> Clusters composed of ray florets, with 2.8 millimetres (0.11 in) long yellow rays, tube 2 millimetres (0.079 in) long. Internal florets, with yellow 3.9 millimetres (0.15 in) corolla with 1.6 millimetres (0.063 in) long lobes <sup>[21]</sup>.

**Fruits:** Achenes can vary between 1.2 millimetres (0.047 in) and 1.8 millimetres (0.071 in) in length, are smooth and bear a pappus of 2.7 millimetres (0.11 in) to 3 millimetres (0.12 in) long with white hairs.

Endemic to Mauritius, now very rare, found in dry mountainous regions around the summit peaks of the island. Localities: Mondrain, Pieter Both Mountain, Gubbies, Piton du Fougé Ridge Forest <sup>[3]</sup>, crests above Port Louis, <sup>[1]</sup> most of them in Piton du Fougé. There is a chance there are more individuals in more remote areas <sup>[3]</sup>.

## 4.2 Species <sup>[22]</sup>

- *Senecio lyratus* Forssk.
- *Senecio auriculatus* Vahl
- *Senecio lyratipartitus* A. Rich.
- *Cineraria schimperii* Oliv. & Hiern
- *Senecio basipinnatus* Baker
- *Senecio masonii* De Wild.
- *Senecio lyratipartita* (A. Rich.) Cu

## 5. Mandrinette

Mandrinette is having scientific name *Hibiscus fragilis* belonging to the family Malvaceae. The Mandrinette (*Hibiscus fragilis*) is an extremely rare endemic shrub only known from steep slopes of the mountains Corps de Garde and Le Morne Brabant on Mauritius and from two further plants on Rodrigues.

## 5.1 Description and Ecology

The Mandrinette is an evergreen plant with flowers 7–10 cm diameter with five bright pink to carmine red petals.

The Mandrinette looks rather similar to the Chinese Hibiscus (*Hibiscus rosasinensis*) and the introduction of that to Mauritius as a garden plant is one of the main reasons for the dramatic decline of the Mandrinette. Only 46 mature individuals exist in the wild but they are not able to reproduce due to competition from and hybridisation with this invasive Hibiscus species <sup>[23]</sup>.

## 6. *Hyophorbe amaricaulis*

*Hyophorbe amaricaulis* is also known as Loneliest palm. It is a species of palm tree of the order Arecales, family Areaceae, subfamily Arecoideae, tribe Hyophorbeae. It is found exclusively on the island of Mauritius, and only a single surviving specimen has been documented in the Curepipe Botanic Gardens in Curepipe. It is a highly

threatened species [24].

### 6.1. Description and Ecology

This species is one of nine species of palm which are indigenous to Mauritius and one of the seven palms which are also endemic. In the 1700s, this palm species was described from specimens taken from the mountain Pieter Both, where it seems to have been widespread at the time. Currently, only the single specimen exists in Curepipe Botanic Gardens, and it is not known if this specimen was planted here or was a survivor from the area's wild population that became included when the gardens were established [25].

The palm is about 12 meters high with a relatively thin gray trunk with a waxy crown shank. It is related to the bottle palm and spindle palm. It is said to resemble the green variety of *H. indica*. It is reported to have white to cream-coloured flowers, but years and years of efforts have not resulted in fertile offspring [26].

### 7. *Tetrataxis salicifolia*

*Tetrataxis salicifolia* is a species of plant in the Lythraceae family. It is endemic to Mauritius.

Its natural habitat is subtropical or tropical dry forests [27].

#### 7.1 Future works and projects

Work continues with the core elements of the project which are rare plant monitoring and search and managing the field gene bank. The data from rare plant monitoring is used to update the IUCN *Red List* for plants and the field work allows plants to be collected for the Mauritius Herbarium.

In an attempt to save not only species but also the genetic diversity of the rarest plant species, a field gene bank was set up in the uplands in the year 2000. It is a collaborative project between the National Parks and Conservation Service (NPCS) and MWF. This project aims to capture the genetic diversity of rare species by taking cuttings or seeds from each known wild individual and developing a duplicate collection in a protected environment. After an initial plant survey of the location, plant materials are taken (cuttings, seeds, seedlings) to propagate in the Pigeon Wood nurseries at Plaine Paul in Black River Gorges National Park (upland plants). Some of the successfully propagated individuals from Pigeon Wood are distributed to the NPCS and Forestry Service.

The remainders are planted in the field gene bank, a plot of forest in Pigeon Wood. Plants in the gene bank are monitored and regular maintenance weeding is carried out in collaboration with the NPCS. These plants will be propagated on a larger scale in different nurseries for future restoration projects. During 2015/16, some 15 species have been propagated with 13 successes and 64 upland plant individuals were planted in the Pigeon Wood field gene bank.

There is also the establishment of a field gene bank on Ile aux Aigrettes for lowland plants. Of the 23 species of rare plants that were propagated in 2015, 21 were successful. Planting is usually done during the rainy season, from January to April, and takes place all around the island, in clusters. Each plant is guarded with large pieces of coral to protect them from trampling by giant tortoises. The plants are then given a unique code, tagged and regularly monitored. During 2009/10, over 1,300 individuals of 21 Critically Endangered species were raised, of which 782 were planted on the island.

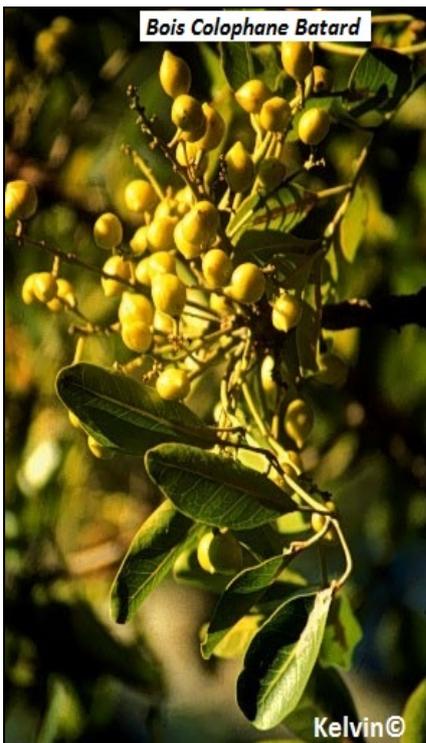
As part of the rare plant searches that are carried out, the location of a number of individuals of a very rare plant, *Chassalia boryana*, an upland species, which was

previously known from only a single wild individual in Mondrain Nature Reserve. A population of 12 individuals in Chamarel Forest and 2 individuals on Mont sur Mont were also located. All these newly found individuals were relatively young with limited material for collection. The restoration of the sites have been done, which has been implemented with the collaboration of the private sector, and the plants are now being closely monitored.

### 8. Conclusion

Mauritius is world-known for being a paradise island but it has more to offer other than its sandy beaches and its blue lagoons. The International Union for Conservation of Nature (IUCN) has quoted Mauritius as having the third most threatened island flora in the world, after Hawaii and the Canary Islands. The island is also rich in its endogenous flora and fauna some of them are unique to only some places of the island. There have been many factors affecting the once luxuriant flora of the island, such as deforestations, long drought periods and the over exploitation of certain plants used in medicine or as raw material in the production of handicraft works. With the collaboration of the Forestry Service and nature conservation organisations, today a larger and improved nurseries has been erected in different places. There is no doubt that the critically endangered plants in Mauritius will be protected and successfully propagated in the coming years.







Nectar No Longer A Mystery: A Visual Signal For Lizard Pollinators. *Biol. Lett.* 2006; 2(2):165-168.

10. Marais W. Trochetiopsis (Sterculiaceae), A New Genus From St Helena. *Kew Bulletin* 1981; 36(3):645-646.
11. Olesen, Jens M, Ronsted Nina, Tolderlund Ulrik, Cornett Claus, Molgaard Per *et al.* Mauritian Red Nectar Remains A Mystery. *Nature* 1998; 393(6685):529
12. In: Baill. *Adansonia* 8; 1867(1868):62
13. Roskov Y, Kunze T, Orrell T, Abucay L, Paglinawan L, Culham A *et al.* (Ed) *Species 2000 & Itis Catalogue Of Life: 2014 Annual Checklist*, 2014.
14. *World Plants: Synonymic Checklists Of The Vascular Plants Of The World*
15. Natraj. *Protium obtusifolium* (Bois Colophane Batard, Bois Colophane Rouge, Bois de Compagnie), 2012.
16. *Description of Gardens and Their History*, 2011.
17. Sir Seewoosagur Ramgoolam Garden Mysterra Magazine, 2014.
18. Ameenah Gurib-Fakim, Thomas Brendler. *Medicinal and Aromatic Plants of Indian Ocean Islands*. Crc Press, 2004.
19. *Synonyms of Senecio Lamarckianus*. *Encyclopedia of Life*, 2014.
20. Page W, Florens D. *Senecio Lamarckianus – Critically Endangered*. 2006 Iucn Red List of Threatened Species. 2000, 2008.
21. *Senecio Lamarckianus (Bois De Chèvre)*. *Endemics in Mondrain*. *Floralis*.
22. *Entry For Senecio Lyratus Forssk. [Family Compositae]*. *African Plants*. Ithaka Harbors, Inc. 2008.
23. Bachraz, Strahm. *Hibiscus Fragilis*. *Iucn Red List of Threatened Species*. Version 2012.2. International Union For Conservation Of Nature, 2000, 2013.
24. *Loneliest Palm (Hyophorbe amaricaulis)*, 2013.
25. Mabberley DJ. *The Plant-Book*, 2nd Ed. Cambridge University Press, Uk, 1997.
26. Ian Parker. *Digging for Dodos*, the New Yorker, 2007; 22:64-73.
27. Florens D. *Tetrataxis Salicifolia*. 2006 Iucn Red List of Threatened Species, 2000, 2007.

## 9. References

1. Natalie Edwards: *Mirror; Mark Twain Was Right - The Tiny Indian Ocean Island Of Mauritius Is Heavenly*, 2013
2. Kasenally R. *Mauritius: Paradise Reconsidered*. *J Democr.* 2011; 22(2):160-9.
3. *Mauritius Endemic Plants*, 2012
4. Ameenah Gurib-Fakim. *An Illustrated Guide to the Flora of Mauritius and the Indian Ocean Islands*, 2003.
5. *Republic of Mauritius- National Symbols - Government of Mauritius*, 2017.
6. *Herbarium MSIRI*
7. Cao, Nathanaël; Le Pechon, Timothée & zaragüeta-bagils, reñe Does Minimizing Homoplasy Really Maximize Homology? *Mahö: A Method For Evaluating Homology Among Most Parsimonious Trees*. *C. R. Palevol* 2006; 7(1):17-26.
8. Friedmann F. *Sterculiacées*. In: Bosser, J.; Cadet, T.; Guého, J. & Marais, W. (Eds.): *Flore Des Mascareignes: 1-50*. The Sugar Industry Research Institute, Réduit, Mauritius. 1987, 53.
9. Hansen DM, Beer K, Müller CB. *Mauritian Coloured*