



SAPIA NEWS

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ARC-Plant Protection Research Institute

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Focus on Eucalypts

Inside this issue:

Focus on Eucalypts	1
Lantana 'Sundancer' stocks destroyed	1
Eucalypts in South Africa	2
Features used in identification of Eucalypts	3
Guide to identification of invasive Eucalypts	4-7

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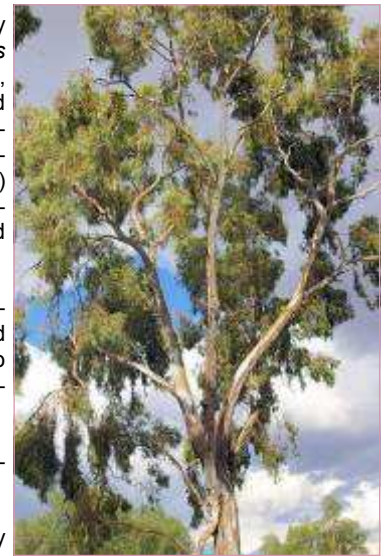
Photos by Lesley Henderson
unless otherwise acknowledged

This issue of SAPIA News deals almost entirely with Eucalypts. Of the more than 200 *Eucalyptus* species that have been cultivated in South Africa, only seven species have been listed as 'declared invaders' and the revised Conservation of Agricultural Resources Act (CARA) and National Environmental Management Biodiversity Act (NEMBA) legislation is more specific in defining the conditions under which these species are declared invaders.

The Eucalypts have been, and are, of huge benefit to South Africa, for their timber, shelter and honey production. The aim of this newsletter is to assist with the identification of ten invasive species, which includes all the declared species.

An appeal is made to the public to not unnecessarily cut down Eucalypts in towns, and on farms.

New insect arrivals pose a threat to the forestry and bee-keeping industries.



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Lantana 'Sundancer' stocks destroyed

SAPIA News congratulates wholesale nursery, Malanseuns in Pretoria, for the voluntary destruction of Lantana 'Sundancer' stocks worth more than R0.5 million. Urged by Jacques Malan, other nurseries have followed his example.

This unprecedented action follows SAPIA News No. 10 which revealed that since Sundancer and other pure-yellow-flowered Lantanas, do occasionally, produce seed, it is illegal (in terms of CARA) to propagate or sell them in South Africa.

While there is no evidence that Sundancer is invasive, there is evidence that cross-pollination occurs between it and the highly aggressive bushy Lantana weed, which most probably aggravates the invasive status of weedy Lantana. That is the reason why it is not in the national interest to grow Sundancer in South Africa.



Eucalypts in South Africa

The benefits of Eucalypts

The genus *Eucalyptus*, with about 800 species, belongs to the myrtle family, Myrtaceae, and is almost entirely native to Australia. The Eucalypts are best known for their commercial use as timber trees and windbreaks. They are also cultivated for ornament, shade, firewood and honey production. The sugar gum, *Eucalyptus cladocalyx*, is indispensable for the bee-keeping industry.

The adverse effects of Eucalypts and legislation

The South African public is often surprised to hear that some *Eucalyptus* species are invasive and a threat to the natural resources of the country. Most **invasion** occurs along watercourses but also on forest margins, in gaps within native forest and plantations as well as into Fynbos and grassland. Eucalypts are well known for their ability to use large volumes of water and this increases with increasing availability of water such as along watercourses.

Eucalyptus leaves contain highly volatile and **flammable** oils, which together with the accumulation of dense leaf litter, can result in very fierce fires, endangering properties, humans and the native fauna and flora.

It is likely that most Eucalypts are also allelopathic—having the potential to suppress understorey plants through chemical inhibitors that leach into the soil.

The CARA 2001 listed invasive species are: *Eucalyptus camaldulensis* (**river red gum**), *E. cladocalyx* (**sugar gum**), *E. diversicolor* (**karri**), *E. grandis* (**saligna gum**), *E. confer-ruminata* (previously misidentified as *E. lehmannii* (**spider gum**)), *E. paniculata* (**grey ironbark**) and *E. sideroxylon* (**black ironbark**).

The proposed invasive species list under NEMBA (April 2009) includes *E. tereticornis* (**forest red gum**) and excludes grey and black ironbarks since there is little evidence of their invasiveness. Spider gum, listed as a category 1 plant (prohibited) in the Western Cape under CARA 2001, has been proposed as a category 2 plant (permitted in demarcated areas) under NEMBA.

All the declared species are recognized as being valuable commercial or utility trees and may be cultivated. **It is proposed under NEMBA that demarcation (and a permit) is only necessary for river red gum, saligna, karri and forest red gum where more than 50 stems occur within 50, 000 square metres (0.5 ha). For sugar gum and spider gum it is proposed that demarcation is only necessary within 50 metres from fire-prone vegetation in the Fynbos, Grassland and Savanna biomes. All species are prohibited within riparian areas, wetlands, declared mountain catchment areas, designated high fire-risk areas, and within protected areas.**

Most of the declared Eucalypts invade watercourses and they should be removed from these habitats. River red gum (photo 1 and 2), in particular, can form extensive stands along watercourses and is one of the primary target species for removal by the Working for Water programme, South Africa's largest and most costly alien plant control programme. River red gum is the most widespread eucalypt in Australia, growing along and near watercourses, and potentially has a very wide distribution in South Africa. River red gum is easily confused with forest red gum and **coolibah** (*E. microtheca*), both of which invade watercourses.

'Saligna' has been planted in southern Africa since long before the beginning of the 1900s and is now one of the most widely planted and familiar alien tree species in the region. Professional foresters tend to use the name 'saligna' for trees of both *E. grandis* and *E. saligna*. It appears that most of the stands of *E. grandis*/*E. saligna* in southern Africa are of hybrid origin, though closer to *E. grandis* (White 1978). Saligna gum is better suited to the more tropical regions of KwaZulu-Natal and the northern provinces and is invasive in these regions.

Sugar gum and karri have been cultivated mainly in the Western Cape and it is here that they are invasive. Two more Eucalypts deserve mention as naturalized in the Fynbos and forested areas of the Western Cape: *E. globulus* (**blue gum**) and *E. gomphocephala* (**tuart**).

New insect arrivals in South Africa pose a potentially severe threat to forestry and bee-keeping

The insect *Thaumastocoris peregrinus* (initially thought to be *T. australicus*), is a leaf-sucking bug, from Australia, which is causing much damage to river red gum and several other Eucalypts in South Africa. The bug was first discovered in Pretoria in 2003. The bug causes discoloration of the leaves, dieback of branches and in severe cases, mortality of whole trees. No effective control measures currently exist and no insecticides have been registered for use against the pest. See page 7 for photos of trees damaged by the bug. A gall-forming wasp, *Lyptocybe invasa*, is another very damaging insect that causes galls on the leaves, twigs and shoots.



Features used in identification of Eucalyptus species

More than 200 *Eucalyptus* species have been cultivated in South Africa. In most instances identification of a species requires the examination of the bark, flowering buds, capsules (fruits) and leaves. Identification can be difficult especially because there is a fine distinction between many species. Variations within species and the occurrence of hybrids further complicate identification.

Bark types (descriptions apply to mature specimens):

Smooth (gum bark types): Bark is shed in strips, ribbons, plates or sections from varying portions of the main trunk, leaving a smooth or granular texture on the under layer e.g. river red gum, *E. camaldulensis*

Rough (Iron bark types): Bark is persistent, hard, corky, non-fibrous and deeply furrowed, entirely covering the main trunk. e.g. black iron-bark, *E. sideroxylon*

Miscellaneous bark types: None of the aforementioned types. Bark is sub-fibrous to fibrous, closely interlaced, rough or fine, flaky or friable covering the entire main trunk. e.g. tuart, *E. gomphocephala*



Rough bark: Iron bark



Miscellaneous bark



Smooth bark

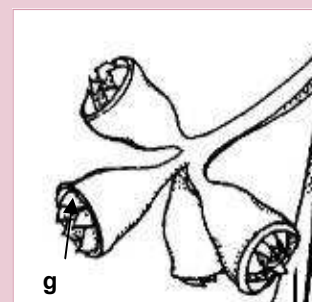
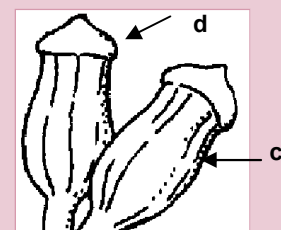
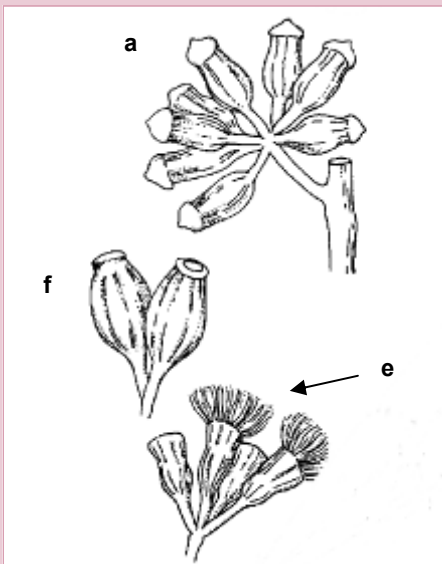
Flowering buds and inflorescences:

The inflorescence is the term used for the whole flowering structure. A simple inflorescence (a) has one umbel of flowers; a paired inflorescence has umbels in pairs; a compound inflorescence (b) is divided into branches of umbels each bearing two or more flowers; some species have solitary flowers. A flowering bud consists of the calyx tube or hypanthium (c), the operculum (d) or lid covering the stamens (e).

The name *Eucalyptus*, from the Greek words *eu-*, well, and *kaluptos*, cover, meaning "well-covered", describes the operculum.

Fruits (capsules):

The mature capsule (f and g) is dry and splits open via valves at the top of the capsule. The valves may be exserted (protruding) (g), level with the opening or totally enclosed as in (f)



Guide to identification of invasive Eucalypts

The following key is only a guide to the identification of ten species which includes all the species that have been listed under CARA (2001) and proposed for listing under NEMBA (April 2009). Three species * not listed are included here. At least a further 30 species are known to spread from seed and may become a nuisance. **NB if the tree under examination does not match the description of one of the following species in all respects then assume that it is not one of the listed species!**

Bark persistent on the entire length of the trunk

Bark persistent to the small branches

Bark dark grey to black, hard, ridged and deeply furrowed, often with copious gum; dark greyish-green crown; umbels simple; buds pendulous with conical or beaked lids; capsules round to oval, valves deeply included.....black ironbark (*E. sideroxylon*)

Bark light grey, hard, ridged and deeply furrowed; dark green crown; leaves discolorous (undersurface paler) at all stages; axillary umbels simple, terminal umbels compound; buds with conical lids; capsules hemispherical, valves deeply included.....grey ironbark (*E. paniculata*)



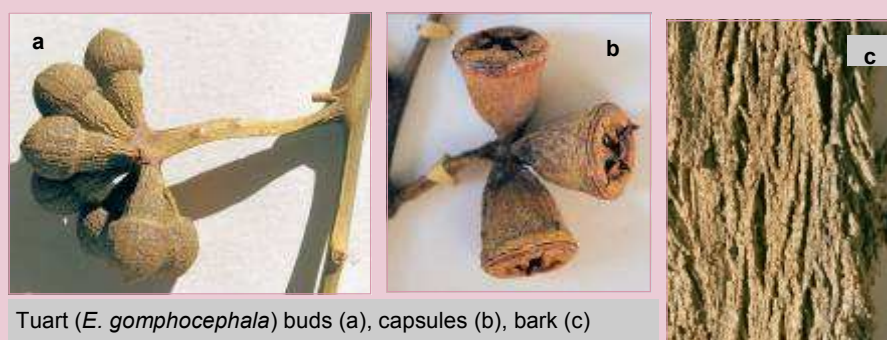
Black ironbark (*E. sideroxylon*) buds (a), capsules (b) (8—10 mm long), bark (c)

Grey ironbark (*E. paniculata*) buds (a), capsules (b) (6—10 mm long), compound umbel (c)

Bark persistent to secondary branches

Bark grey, flaky-fibrous; club-like buds (15—19 mm long) and stalkless bell-shaped capsules (13—22 mm long); peduncle (umbel stalk) flattened.....tuart (*E. gomphocephala*)*
Invades Fynbos, particularly in coastal areas, W Cape.

Bark fibrous, grey to grey-black; very small ovoid buds (3—4 mm long) and capsules (2—5 mm long); valves exerted; umbels compound with up to 7 flowers per umbel.....coolibah (*E. microtheca*)*

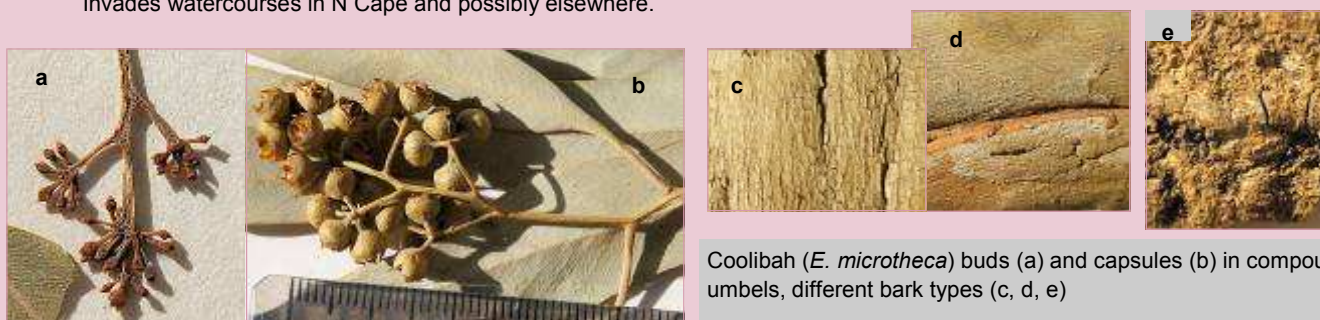


Tuart (*E. gomphocephala*) buds (a), capsules (b), bark (c)

Bark persistent only on trunk

Bark grey to grey-black, fibrous, on trunk and smooth grey above; very small ovoid buds (3—4 mm long) and capsules (2—5 mm long); valves exerted; umbels compound with up to 7 flowers per umbel.....coolibah (*E. microtheca*)*

Bark may also extend to secondary branches (above), be persistent on lower part of trunk only (next page) or be smooth throughout (page 6). Leaves concolorous, lateral veins clearly visible, dull, green or grey-green. Invades watercourses in N Cape and possibly elsewhere.



Coolibah (*E. microtheca*) buds (a) and capsules (b) in compound umbels, different bark types (c, d, e)

Guide to identification of invasive Eucalypts continued

Bark shed from main trunk (smooth or gum types)

Bark persistent on lower part of trunk

Exposed trunk smooth, blotchy, bluish or brownish-green with greyish-brown, subfibrous bark at base; massive trunk; juvenile leaves bluish-green, powdery, ovate, stalkless, on 4-winged stem; buds and capsules large (10—20 mm long), warty, bluish-green, powdery, singly or in small groups.....blue gum (*E. globulus*)* Invades disturbed forest, W Cape

Exposed trunk powdery grey, white or greenish with some rough flaky bark at base up to 4 m; bark peels off in long thin strips; buds and capsules ± stalkless, buds pear-shaped with conical lids; capsules pear-shaped with protruding valves that arch inwards.....saligna or rose gum (*E. grandis*)
Tall commercial plantation species; may be confused with *E. saligna* which has valves spreading outwards, or erect. Hybrids with river red gum and forest red gum occur. Invades forest gaps and watercourses, Limpopo southwards to E Cape.

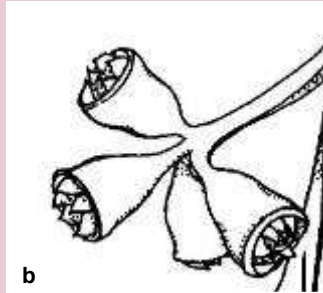
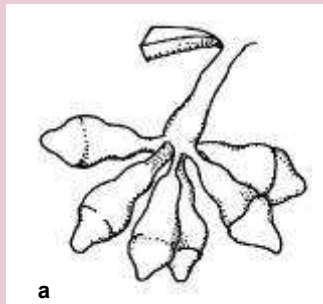
Exposed trunk grey or white; inflorescences compound, buds and capsules very small—see coolibah (*E. microtheca*)* on page 4



In South Africa the Afrikaans name 'bloekom' is a corruption of the English name 'blue gum' (blougom).



Blue gum (*E. globulus*) buds (a), capsules (b) (to 20 mm long)



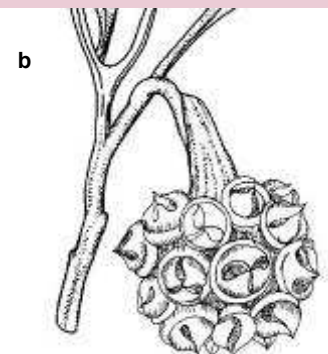
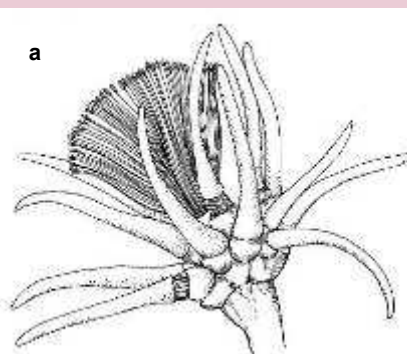
Saligna gum (*E. grandis*) buds (a), capsules (b) (to 10 mm long), bark peels off in long strips (c)

Bark usually shed from entire trunk (smooth or gum types)

Bushy, branching near ground level

Bark smooth, grey-brown; fused clusters of finger-like buds and woody fused capsules up to 50 mm long and 80 mm wide.....'spider gum' (*E. conferruminata*)

Previously misidentified as *E. lehmannii*. The common name of 'spider gum' probably alludes to the spider-like inflorescence with its strange elongated, curved bud lids which cover the stamens. Often planted as windbreaks in the W Cape, where it invades Coastal Fynbos and coastal dunes.



'Spider gum' (*E. conferruminata*) buds (a), capsules (b) (to 50 mm long and 80 mm wide)

Guide to identification of invasive Eucalypts continued

Bark usually shed from entire length of trunk (smooth or gum types)

Trees, high branching

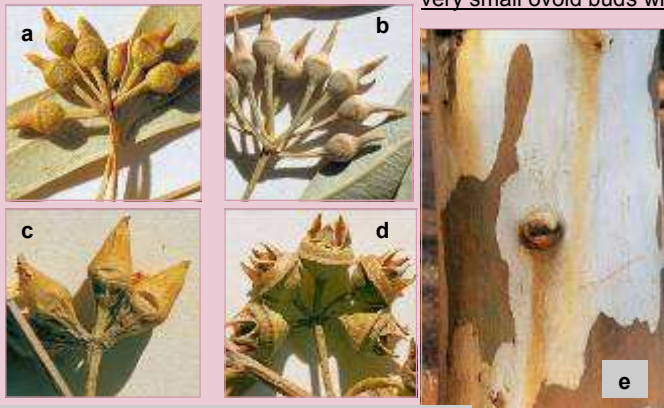
Leaves concolorous (upper and lower surfaces the same colour)

Bark white or grey, mottled; leaves with distinct veins; petioles and twigs red; umbels simple; capsules with prominent rims and protruding valves

Buds variably shaped (egg-shaped, beaked to conical) with lid 4—6 mm long; in cold localities bark streaked with red; sometimes with rough reddish-brown or black bark accumulating at base of trunk.....*river red gum (E. camaldulensis)*
Invades watercourses in most parts of SA, but mainly in W Cape.

Buds conical with lid 8—13 mm long;*forest red gum (E. tereticornis)*
Invades watercourses, W Cape and possibly elsewhere. Blakely's red gum, *E. blakelyi*, is similar but lid shorter (5—8 mm long).

Bark white or grey; leaves with distinct veins; umbels compound; capsules with narrow rims and protruding valves; very small ovoid buds with lid 1—2 mm long.....*coolibah (E. microtheca)** (see page 4)



River red gum (*E. camaldulensis*) buds (a, b, c) (6—9 mm long), capsules (d) (to 8 mm long), bark (e)



Forest red gum (*E. tereticornis*) buds (a) (10—15 mm long), capsules (b) (to 7 mm long)

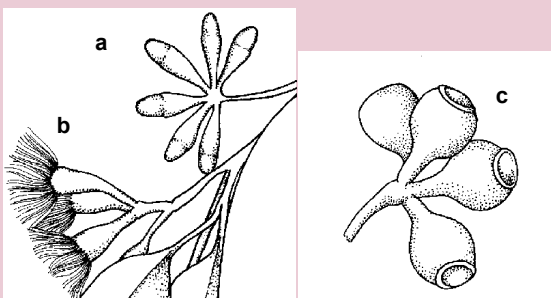
Leaves discolorous (paler on undersurface)

Dense, massively branched tree; bark grey to blue-grey and orange-yellow in blotches; a little rough bark persists at the base of the trunk

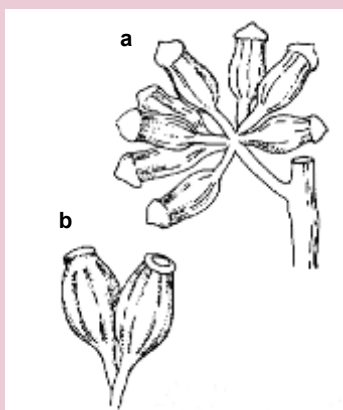
Leaves glossy; juvenile leaves oppositely arranged, ovate to broadly lance-shaped; twigs and petioles rusty coloured; buds conical and capsules globose; adapted to high rainfall, frost-free areas*karri (E. diversicolor)*
Invades watercourses, forest gaps and Fynbos in the W Cape.

Slender, shapely tree; bark tan-coloured, flaky

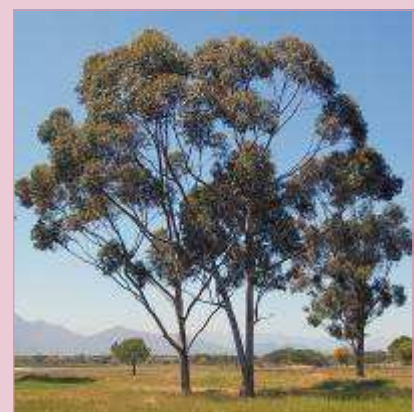
Leaves glossy; foliage concentrated at ends of branches; juvenile leaves alternately arranged, elliptic or circular with reddish twigs; conspicuously ribbed buds and capsules;*sugar gum (E. cladocalyx)*
Invades watercourses, Fynbos, forest gaps in the W Cape.



Karri (*E. diversicolor*) buds (a), flowers (b), capsules (c) (to 12 mm long)



Sugar gum (*E. cladocalyx*) buds (a), capsules (b) (to 16 mm long)



Guide to identification of invasive Eucalypts contin.

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'Washed-out' reddish appearance of *Eucalyptus* trees infested with *Thaumastocoris peregrinus* (photo S Nesar)

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The Weeds Research Division of the Plant Protection Research Institute is responsible for research on the ecology and control of invasive alien plants in South Africa. These plants were introduced either intentionally (e.g. for ornamental use or agroforestry purposes), or accidentally (e.g. in livestock feed) and now threaten biodiversity and agriculture. In addition, they reduce run-off from water catchments, thus diminishing flow in streams, and adversely affect the quality of life of communities.

- Biological control
- Chemical control
- Bioherbicides
- Integrated control
- Monitoring the emergence and spread of invasive alien plants



We are on the Web: www.arc.agric.za

see PPRI Newsletter

for current news from the Weeds Research Division

Read PPRI Newsletter No. 80 for the following news from the Weeds Research Division:

- ARC-PPRI host international *Chromolaena* webpage
- What can be learnt from the biology and crossbreeding of two *Pareuchaetes insulata* populations on *Chromolaena*?
- Initial establishment of the *Lantana* petiole gall weevil
- Workshop on the biological control of invasive alien plants