

Intentional Introductions, Unintended Consequences: The Legacy of Exotic Species in South Africa

South Africa's invasive alien species crisis did not begin by accident — it began by design. The vast majority of species that today threaten the country's indigenous ecosystems were deliberately introduced by humans for practical, economic and aesthetic purposes.

The first major wave of introductions was driven by industrial necessity. As South Africa's population and economy grew, so did the demand for timber, fuel, and raw materials. To meet this need, vast plantations of fast-growing exotic trees — primarily Pines from Europe and North America, Eucalyptus (Gums) from Australia, and Wattles — were established across the country. These species were chosen precisely because of the traits that would later make them so problematic: rapid growth, hardiness, and prolific seed production.

The second major pathway was the horticultural industry. As towns and cities developed, there was a growing appetite for ornamental plants to beautify gardens, parks, and streetscapes. Thousands of exotic species were imported from around the world and actively promoted for their aesthetic appeal, shade, or novelty. Nobody anticipated that many of these garden favourites would one day escape cultivation entirely, spreading into surrounding landscapes and natural areas far beyond the garden wall.

These two industries — timber and horticulture — together laid the foundation for what is now recognised as one of South Africa's most pressing environmental challenges.



***Callisia repens* spreading
and smothering other vegetation
in common areas of Leisure Isle**

Leisure Isle's Public Spaces

In the Knysna Municipal area, gardening in public places is primarily governed by the Public Amenities By-law (2014) and the Public Nuisance By-law (2014).

Under these regulations, the Department of Parks and Recreation holds exclusive responsibility for the upkeep and maintenance of all public open spaces, sidewalks, and municipal garden beds.

Key Restrictions for Public Gardening

- Prohibited Dumping: It is illegal to dump garden waste or garbage on municipal property, including road verges and "enviro gardens". Doing so can introduce alien species and lead to fines.
- Consent Requirements: Undertaking certain activities in a public amenity requires formal consent or a permit from the Municipality. This typically includes any unauthorized planting or alteration of public land.
- Planting Near Infrastructure: Residents are advised against planting gardens near municipal drains, as root systems can block storm water pipes and gulleys, leading to sewage spills or flooding.

Public Amenities Bylaw:

"public place" means any square, building, park, recreation ground, public beach or open space which: (a) is vested in the municipality; (b) the public has the right to use, or 5 December 2014 Province of the Western Cape: Provincial Gazette 7338 2191 (c) is shown on a general plan of a township filed in a deeds registry or a Surveyor-General's office and has been provided for or reserved for the use of the public or the owners of erven in such township; "public road" means any road, street or thoroughfare or any other place (whether a thoroughfare or not) which is commonly used by the public or any section thereof or to which the public or any section thereof has a right of access, and includes:-- (a) the verge of any such road, street or thoroughfare; (b) any bridge, or drift traversed by any such road, street or thoroughfare, and (c) any other work or object forming part of or connected with or belonging to such road, street or thoroughfare;

Public Nuisances Bylaw:

Behaviour and conduct (1) Notwithstanding the provisions of any other by-law, no person shall: (a) Do work on any premises or use any building or land for purposes calculated to depreciate or to disfigure such premises or to interfere with the convenience or comfort of the neighbours or to become a source of danger to any person. Should the municipality be of the opinion that this provision is being ignored, the municipality may direct that such work or use be discontinued forthwith and that the previous condition be reinstated.

Problems with Gardening in Leisure Isle's Public Spaces

First, confirm whether permission was granted. Anyone gardening in public spaces must hold a valid permit or letter proving an official agreement.

Introducing alien invasive species listed under NEMBA regulations (2020) violates the law. Growing them in gardens or public areas falsely suggests these harmful plants are acceptable, furthermore planting highly poisonous species threatens public safety in these open spaces.

Alien Invasive species in Parks, Gardens and other Open spaces

Before 1983, South Africa's natural environment lacked statutory protection. Gardeners and landscapers relied on alien species now listed as invasives under current laws, such as Australian tea tree, Cestrum, privet, Cotoneaster, Tecoma, Sesbania, elderberry, and bottlebrush, a list that carries on. At the time, their invasive potential was unknown, and no regulations restricted their use.

Ecosystem degradation eventually spurred action. The National Environmental Management: Biodiversity Act (NEMBA) was enacted in 2004, followed by Alien and Invasive Species Regulations in 2014. These created a strict framework for controlling invasives. Any new introduction of plants now require monitoring before commercial sale, and it's a criminal offense for nurseries to sell listed invasives—or for anyone to plant, gift, trade, or propagate them.

Despite these laws, invasives continue spreading in residential areas. The main driver isn't commercial trade, but informal exchanges at homes, community markets, fêtes, and bazaars, where people share or sell prohibited plants unaware of—or ignoring—the rules.

Introduction of declared Alien Invasive Species Regulations:

The management of alien and invasive plant species can sometimes lead to confusion in terms of applicable legislation. There are two national laws that need to be considered, namely the Conservation of Agricultural Resources Act 43 of 1983 (CARA) and the National Environmental Management: Biodiversity Act 10 of 2004 (NEMBA). All landowners have a responsibility and legal liability in relation to the control of invasive vegetation.

In 1984, regulations were published in terms of CARA. These regulations were amended in 1985 and again in 2001. The regulations include a list of 198 species classified as weeds or invader plants according to categories 1, 2 or 3.

The list of alien and invasive species published in terms of NEMBA in 2020 includes 381 plant taxa. The categories applied in these two lists of alien and invasive species do not correspond in all cases. NEMBA categories include 1A, 1B and 2. There are five species listed in the CARA regulations that are not on the NEMBA list, namely burweed (*Achyranthes aspera*) two species of Eucalyptus (grey and black ironbark – *E. paniculata* and *E. sideroxylon*), and two species of willow (*Salix babylonica* and *S. fragilis*). In these few cases, the CARA regulations will prevail.

As stated by the Agricultural Research Council, the CARA regulations have been superseded by the NEMBA Regulations which became law on 1 October 2014 (<https://www.arc.agric.za/arc-ppri/weeds/Pages/Legal-Obligations-Regarding-Invasive-Alien-Plants-in-South-Africa.aspx>). However, CARA has not been repealed yet by an updated Act and therefore, both pieces of legislation are in force. Notwithstanding, in the event of conflict between NEMBA and any other national legislation, section 8(1)(a) specifically states that NEMBA prevails where it concerns the management of biodiversity.

Key aspects of the regulations regarding the introduction of invasive species:

- **Prohibition & Permits:** Introduction of listed invasive species into the country is generally prohibited unless authorized by a permit.
- **Restricted Activities:** Activities such as Importing (including from the sea), Possession, Growing/Breeding, and Moving are prohibited for Category 1a and 3 species, while Category 2 species require a permit.

Management Categories

The regulations classify invasive species into four categories based on their threat level and management requirements:

- **Category 1a:** High-priority invaders that must be combated and eradicated immediately. Any form of trade or planting is strictly prohibited.
- **Category 1b:** Invasive species that must be controlled and, where possible, removed. Trade and planting are prohibited.
- **Category 2:** Species with commercial or utility value (e.g., for timber or honey) that may only be grown with a permit. They must be confined to a demarcated area.
- **Category 3:** Species that may remain in situ but cannot be further propagated, traded, or planted. If they occur in riparian areas, they are automatically reclassified as Category 1b and must be controlled.

Duty of Care: Owners of land where listed invasive species occur are legally required to take steps to control

and prevent their spread.

Penalties for Non-Compliance

Failure to adhere to these regulations is a criminal offence.

A Question of Consistency

It may seem contradictory that invasive alien trees are visibly present on Leisure Isle, while residents face penalties for plantings in common areas. The answer lies in how South African law navigates the tension between environmental protection and economic or historical reality. Under the National Environmental Management: Biodiversity Act (NEMBA), invasive species are not treated as a single blanket category. Instead, the Act establishes a tiered classification system that acknowledges not all invasive species pose the same risk, and that some carry significant commercial or historical value that cannot simply be dismissed.

Category 2 of this system is particularly relevant here. Species listed under Category 2 are recognised as invasive, but their removal or prohibition is balanced against their practical importance. Where a species holds high commercial value — such as in timber or food production — or carries historical significance, NEMBA makes provision for its continued presence and even planting, provided this is done under controlled conditions and with the appropriate permit in place. In other words, the law does not treat all invasive species equally, and for good reason. The presence of certain alien trees on Leisure Isle may therefore be entirely lawful under this framework — a permitted exception rather than an overlooked violation. Understanding this distinction is key to making sense of what can appear, on the surface, to be an inconsistent approach to managing invasive species on the island.

Highly Toxic Plants in Leisure Isle's Common Gardens

Of particular concern among the numerous alien invasive species introduced into the three common areas on Leisure Isle are those that are acutely toxic to humans and animals. This raises a critical question of legal liability: in the event of harm, who bears responsibility — the Municipality, the Ratepayers Association, or the individual who introduced these species?



Catharanthus roseus

(commonly known as Madagascar Periwinkle) is extremely toxic if ingested. Every part of the plant contains potent alkaloids, including vinblastine and vincristine, which are used in chemotherapy but can cause severe systemic poisoning in raw form.

Toxicity in Humans:

Symptoms of ingestion can range from mild discomfort to life-threatening complications:

- **Gastrointestinal:** Severe stomach cramps, nausea, vomiting, and gastric ulcers.
- **Neurological:** Peripheral nerve damage (paresthesia), muscle numbness, tremors, and hallucinations.
- **Organ Damage:** Potential for hepatotoxicity (liver injury), kidney damage, and bone marrow suppression.
- **Cardiovascular:** Hypotension (low blood pressure) and potential cardiac complications.
- **Severe Cases:** Systemic paralysis and multi-organ failure can lead to death.

Toxicity in Animals

The plant is considered toxic by the [ASPCA and other veterinary sources](#):

- Dogs & Cats: Ingestion commonly leads to vomiting, diarrhea, depression, and low blood pressure.
- Livestock: Grazing animals (like sheep) have shown symptoms including incoordination, bloody diarrhea, anorexia, and death.

Toxic Mechanisms

The primary toxins are vinca alkaloids. These compounds interfere with microtubule formation, which is essential for cell division (mitosis). While this property makes them effective for killing cancer cells, it also makes them highly destructive to healthy normal cells throughout the body.

Note on Handling: The plant is generally safe to touch, but it is recommended to wash hands after planting or pruning to remove any residual sap, which is considered toxic.



Euphorbia tirucalli, commonly known as Firesticks, Pencil Cactus, or Milk Bush, is highly toxic to humans and animals due to its corrosive, milky white sap (latex).

Human Health Risks

The sap contains diterpenoid esters, which are among the most irritating substances known in the plant kingdom.

- Skin Contact: Causes immediate burning, redness, and painful rashes. It can result in chemical burns, blisters, and localized inflammation.
- Eye Contact: This is a medical emergency. Sap in the eyes causes excruciating pain, intense inflammation, and severe swelling. Without immediate and proper treatment (such as professional irrigation), it can lead to temporary or permanent blindness.
- Ingestion: Causes burning of the mouth, lips, and tongue. It can lead to nausea, vomiting, abdominal pain, and, in rare severe cases, potentially fatal respiratory distress or gastrointestinal injury.

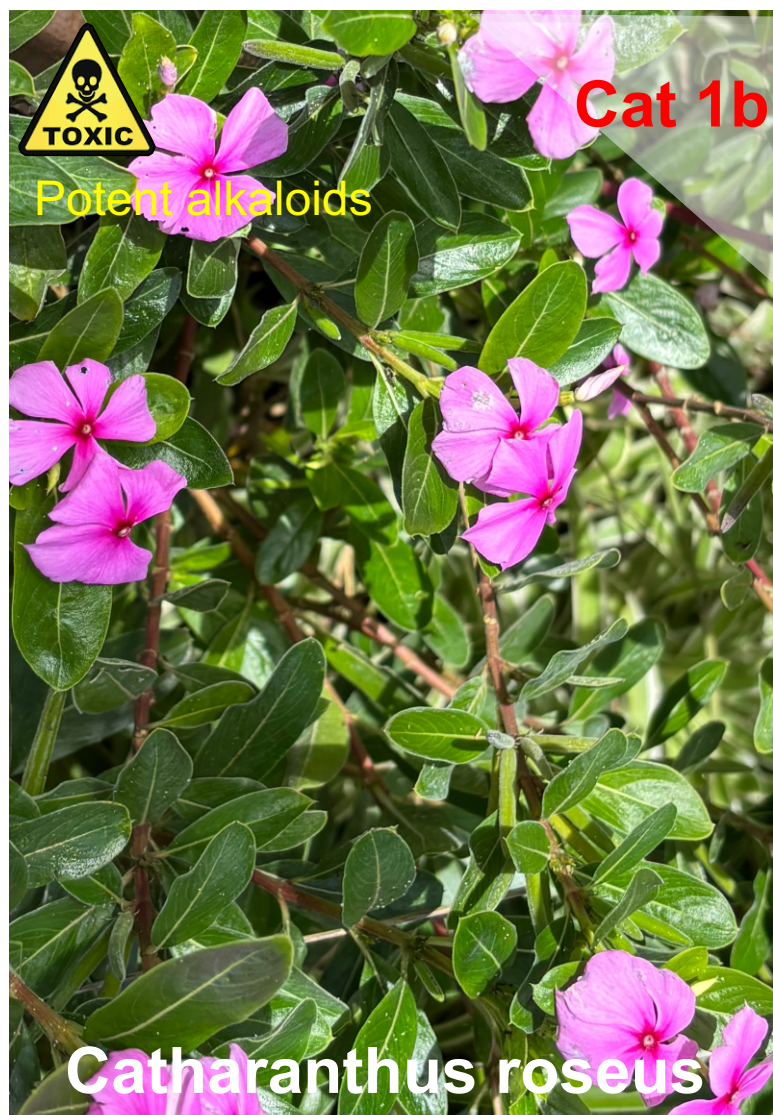
Pet and Wildlife Toxicity

Firesticks are hazardous to dogs, cats, horses, and livestock.

- Symptoms: Ingesting the plant typically causes oral irritation, excessive salivation, and vomiting.
- Skin/Eye Injury: Pets can suffer severe chemical burns on their skin (especially after rolling in cuttings) or serious eye ulceration if they brush against a broken branch. (I can attest to this, I ended up in Emergency for treatment, and was half blind in one eye for ten days!)

Handling and Safety Precautions

- Protective Gear: Always wear gloves and eye protection when pruning or handling the plant. Some specimens can even "spray" or flick sap when cut.
- Placement: Avoid planting Firesticks near walkways, children's play areas, or where pets can easily reach them.



Cat 1b

Nephrolepis cordifolia

Cat 1b

Sterile hybrids not listed

Canna indica



**Hepatotoxic
compounds
like lantadenes**

Cat 1b

Lantana camara

**Cat 3 Elsewhere in SA
Not listed in WP, but has
invasive tendencies in
Knysna area**

*Phlebodium
pseudoaureum*

