RISK ASSESSMENT OF: CESTRUM SPECIES

BACKGROUND:

Solanaceae is a family of flowering plants including 102 genera and 2460 species (CABI, 2017). The genus Cestrum was established by Linnaeus in 1753 to accommodate material of two species, Cestrum nocturnum L. and Cestrum diurnum L (Monro, 2012). It is a predominantly tropical American genus of 175 to 250 species extending from the southern United States and the Bahamas southwards to Chile and northern Argentina (SAPIA, 2011).

Members of this family are characterized by solitary or clustered flowers with sepals and petals, five in number and fused; five stamens; and a superior ovary composed of two fused carpels. Flowers are usually conspicuous and are pollinated mainly by insects (CABI, 2017). This group of invaders includes species that cause major problems and losses in the forestry and agricultural industries and are a threat to the natural biodiversity in South Africa (SAPIA, 2011).

All parts of Cestrum species are toxic to mammals and may be extremely toxic to cattle, especially during the winter months of June and July, and early spring. Consumption of Cestrum species in large quantities may result in fatalities of animals. The less acute poisoning is said to be accompanied by symptoms such as salivation, watering of the eyes, unsteady gait, accelerated breathing, weak pulse and increasing debility caused by a disease commonly known as the “Chase valley Disease”. Cestrum species are known to cause respiratory problems from the scent and feverish symptoms following ingestion (SAPIA, 2011).

1. a) INFORMATION REGARDING THE RELEVANT SPECIES, INCLUDING-

i. The taxonomy of the species, including its class, order, family, scientific name if known, genus, scientific synonyms and common names of the species;

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Plantae</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phylum</td>
<td>Spermatophyta</td>
</tr>
<tr>
<td>Class</td>
<td>Spermatphyta</td>
</tr>
<tr>
<td>Order</td>
<td>Solanales</td>
</tr>
<tr>
<td>Family</td>
<td>Solanaceae</td>
</tr>
<tr>
<td>Genus</td>
<td>Cestrum</td>
</tr>
<tr>
<td>Species</td>
<td>Cestrum nocturnum</td>
</tr>
</tbody>
</table>

Common Name: Night jessamine, Night cestrum, Night jasmine, Queen of the night, Night flowering jessamine, night-blooming jasmine,

Synonym: Cestrum parqui, Cestrum gracilliflorum, Cestrum leucocarpum, Cestrum multiflorum, Cestrum nocturnum var. mexicanum, Cestrum propinquum, Cestrum scandens, Cestrum suberosum, Chiococca nocturna.
**Description:**

*Cestrum nocturnum* is a shrub species belonging to the Solanaceae family and is commonly referred to as queen of the night. The glabrous shrub grows from 1 to 5 m in height (ISSG, 2017) and is characterised by flexuous branches that are sparsely pubescent, with crisped simple and glandular hairs (CABI, 2017). The species has ovate-oblong, petiolate, and obtuse leaves mostly 7 to 20 cm long. It has cymose racemes which are longer than the petiole and flowers that are greenish-white or pale greenish-yellow that emit a strong sweet scent at night. Its flowers have a green, 5-toothed, calyx about 1/3 as long as the 2.0 - 2.5 cm corolla which has obtuse, erect or spreading lobes which are 5 to 6 mm long. The flower also includes 5 stamens which are puberulent at their bases. It also produces small white berries about 8-10 mm long (ISSG, 2017). Seeds are a few, prismatic, outer face convex, inner faces concave, hilum scar elliptic, minutely reticulate (CABI, 2017) and are capable of being dispersed by birds (ISSG, 2017).

**Figure 1:** The green leaf arrangement of *Cestrum nocturnum*

**Figure 2:** The small white berries produced.

**Figure 3:** The flower of *Cestrum nocturnum*

**Figure 4:** *Cestrum nocturnum* shrub
Kingdom: Plantae
Phylum: Spermatophyta
Class: Spermatophytina
Order: Solanales
Family: Solanaceae
Genus: Cestrum
Species: Cestrum fasciculatum
Common Name: Early jessamine
Synonym: Habrothamus elegans Brongn. ex Neumann,

**Description:**

*Cestrum fasciculatum* is commonly known as the Red cestrum. It can grow to a height of 2.5 m, with a concentration of soft, dense and simple hairs in axes and young parts, it becomes glabrous with age and the stems become purplish in colour. The leaves are ovate with a length of 4 to 13 cm and width of 2 to 6 cm. They are rounded at base, entire and acuminate at apex. They are covered on both surfaces with moderately dense simple hairs. The petiole have a length of between 5 to 15 mm. Its inflorescence 5 to 10 flowered, in terminal clusters or racemes. The flowers are purplish to red in colour and have a bracteate, their calyx are often reddish and usually 5-lobed with a height of 7 to 9 mm, with ciliate lobes joined above half way, not increasing in fruit; corolla tube 15 to 25 mm long, glabrous; lobes 3 to 5 mm long, pubescent externally with simple eglandular hairs, glabrous internally; stamens 5, equal, inserted just below halfway in the tube, included; filaments 7 to 8 mm long, widened and sparingly pubescent at base, glabrous above; style 15 to 20 mm long, glabrous; ovary glabrous. The fruit measures 9 to 12 mm long, 6 to 8 mm wide, usually has a black or maroon colour, but can sometimes be red with white-spongy inside. The seeds are between 6 to 12 per fruit, 2.5 to 4 mm long, and dark.

---

*Figure 5:* The inflorescence of *Cestrum fasciculatum* consisting of 5 to 6 flowers.

*Figure 6:* The ovate leaves of *Cestrum fasciculatum*.
Kingdom: Plantae
Phylum: Spermatophyta
Class: Spermatophytina
Order: Solanales
Family: Solanaceae
Genus: Cestrum
Species: Cestrum diurnum
Common Name: Chinese inkberry, Day-blooming jasmine, Day-blooming Cestrum and Day Jasmine
Synonym: Cestrum diurnum var. venenatum

Description:
*Cestrum diurnum* is an evergreen shrub that can grow up to the height of 2 meters and has numerous trunks that are often densely branched and branches arching. It has alternate leaves that are simple and short with a petiole that can extend to 1.2 cm. The leaf blades are smooth, leathery and entire with a shiny green colour and are oval to oblong shaped with a length of 5 to 11 cm and width of 2 to 4.5 cm. They have flowers that are fragrant in daytime and also have a sweet scent during the night time. They have creamy white colour and trumpet-shaped, in several-flowered, stalked clusters at upper leaf axils; corolla tube length extends to 1.8 cm, with tiny petal lobes curled back. (CABI, 2017).
Figure 9: The alternate leaf arrangement of *Cestrum diurnum*

Figure 10: The black, oval berry produced by *Cestrum diurnum*

Figure 11: The *Cestrum diurnum* bush

Figure 12: Flowers of *Cestrum diurnum*
ii. The originating environment of the species, including climate, extent of geographic range and trends;

**Originating environment and extent of geographic range:**

*Cestrum species* are known to be native to tropical Central and South America, with major concentrations in Brazil and the Andean region. The genus name *Cestrum* is thought to have been derived from the Greek word ‘kestron’, for similarity to a plant of that name, or ‘kestrum’, a tool used for engraving which the plant’s anthers resemble (CABI, 2017). Like several other members of the *Cestrum* genus,

*Cestrum nocturnum* is native to the tropical America, Mexico, Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama and Cuba (ISSG, 2017). *Cestrum fasciculatum* is native to Mexico (Weedbuster, 2017). *Cestrum diurnum* is native to Cuba, Jamaica, Puerto Rico, and Tortola in the British Virgin Islands. It is exotic in the Bahamas, Cayman Islands, Hispaniola, the Lesser Antilles and elsewhere. It is widely cultivated and in some areas has escaped from cultivation and is considered an invasive species (IUCN, 2017).

**Distribution:**

*Cestrum nocturnum* is known to have widely naturalized in tropical and subtropical regions throughout the world, including Australia, New Zealand, in Asia: southern China, India, Ogasawara Islands (Japan) and the southernmost United States: California, Texas, Louisiana, Hawaii, Georgia, Florida; the Caribbean: Puerto Rico, US Virgin Islands; the Pacific Islands: American Samoa, Cook Islands, Galapagos Islands, Federated States of Micronesia, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Niue, Pitcaim, Samoa, Tonga, Wallis and Futuna, Midway Islands (ISSG, 2017).
Cestrum fasciculatum is native to Mexico and is reported to have naturalized in waste places in New South Wales and in NW Tas (Weedbusters, 2017).

Figure 13: The map with the geographic distribution of Cestrum nocturnum (www.discoverlife.org).

Figure 14: The map with the geographic distribution of Cestrum fasciculatum (www.discoverlife.org).
Cestrum diurnum is native to Cuba, Jamaica, and Puerto Rico. It has been introduced as an ornamental in many tropical and subtropical regions of the world and now it can be found naturalized in India and South Africa, on many islands in the Pacific Ocean and across tropical and subtropical America (CABI, 2017). It is a widespread and generalist species that establishes itself easily and reproduces quickly. It has no specific known threats in its native range and is considered an invasive species in some areas outside its native range (IUCN, 2017).

Habitat:

Cestrum nocturnum is known to occur in natural forests, planted forests, riparian zones, ruderal or disturbed, shrublands, and in urban areas. It is often cultivated as an ornamental plant in gardens. It is able to escape and can establish dense, impenetrable thickets in scrub, moist or wet forests including riparian zones. It can also form secondary forests and dense lowland forests as well as open areas, both natural and disturbed. It is also known as an aggressive invader of disturbed sites such as trail sides, forest gaps and landslides (ISSG, 2017).

Cestrum fasciculatum has been found in large colonies in scrub and secondary forest. Plants most commonly appearing in scrub, bush margins and waste places. Odd plants occur in open pasture. The terrain on which the plants occur is steep to very steep. Known infestations occur mainly as strips some 2-5m wide along bush margins penetrating more open areas of the bush, where canopy closure is incomplete (VRO, 2017).

Cestrum diurnum is found most often in dry soils. It does not prosper on exposed subsoil nor grow on swampy ground (FLEPPC, 2001). It is also salt tolerant if protected from heavy salt spray and over wash of storms (Menninger 1964). It grows in disturbed sites, pastures, along roadsides and in secondary forests. In Guam it is common on abandoned fields, and in pastures as a secondary component of the northern limestone community. In

![Figure 15: The map with the geographic distribution of Cestrum diurnum (CABI, 2017)](image-url)
Puerto Rico, this species can be found growing in gardens, roadsides, fence rows, pastures, vacant lots, and abandoned farmland. In Florida (USA), *Cestrum diurnum* is abundant in hammocks and open disturbed areas. It invades coastal strand hammocks where it can form dense thickets at the margins (CABI, 2017).

**Climate:**

*Cestrum nocturnum* thrives in light, sandy soil and can adapt to a variety of soil types and conditions, but has low salt and waterlogging tolerance. It does best under full sun but tolerates light shade. It occurs at low-to-mid elevations. In Antioquia, Colombia, the species has been reported for elevations of 1000-1500 m and similarly in Madagascar, where the species lives in humid to sub-humid bio-climate, the species occurs between 1500 and 1999 m. In the warm temperate climate that is wet all year, it tolerates temperatures with an average temperature more than 10°C and cold temperatures more than 0°C. In warm temperate climate with a dry summer, it tolerates and average of more than 10°C and a cold average temperature of more than 0°C in dry summers. It prefers precipitation average of more than 60mm per month in tropical rainforest areas. In the tropical savanna climate with dry summers, it prefers an average of less than 60 mm rainfall in the driest month (CABI, 2017).

*Cestrum fasciculatum* prefers rich, moist soils that are available in a protected and sunny position. It is sensitive to drought and frost. It is a hardy shrub, tolerating temperatures up to 1°C/34°F and require a wall protection when they grow in cold areas (VRO, 2017).

*Cestrum diurnum* tolerates a mean annual temperature of between 15°C to 30°C (CABI, 2017). It is intolerant of heavy shade and quickly disappears when overtopped by forest, thus, it invades disturbed areas and quickly completes its life cycle ahead of encroaching forest. The species may grow as individual plants or in thickets. *Cestrum diurnum* will grow in areas receiving from about 800 to 3000 mm of precipitation, but most aggressively colonizes areas that receive from about 1400 to 2400 mm of precipitation (FLEPPC, 2001).

**iii. Persistence attributes of the species, including reproductive potential, mode of reproduction, dispersal mechanisms and undesirable traits;**

**Reproductive potential and mode of reproduction:**

*Cestrum species* produces small white berries about 8 to 10 mm long, with seeds capable of being dispersed by birds. Seeds are produced after 18 months of establishment and can remain dormant in the soil for many years (ISSG, 2017). The seeds germinate mainly in autumn with young plants taking two or more years to flower and set seed. Mature plants will flower and seed each year. The seeds from these plants can remain dormant in the soil for many years. The established plants are semi-deciduous, losing most of their leaves during winter and producing rapid new growth in spring. *Cestrum* species sucker freely from the base of their stumps are not treated after cutting. The plant will also grow from sections of the fleshy root which remain after a plant has been partly dug or pulled out (Croft and Holding, 2004). Vegetative reproduction is also possible from cut roots or buds from creeping roots (ISSG, 2017).

**Dispersal mechanisms:**

*Cestrum* species are known to be popular ornamental species that are widely used and distributed for their strongly fragrant flowers that bloom at night and day. Their seed are dispersed by birds and their ability to reproduce
vegetatively has resulted in escapes from cultivation, where in some areas they aggressively colonise disturbed sites such as road edges and forest gaps forming dense impenetrable thickets and resulting in competition with and displacement of native plant species (ISSG, 2017).

_Cestrum_ species fruits are succulent and readily eaten by birds (VRO, 2017). They are spread by seeds which are consumed and dispersed by birds (Morton, 1982). The fruits are fleshy berries dispersed by birds through consumption and deposit of faeces. Fruits of the species are poisonous to humans and other mammals, affecting the nervous system. In the West Indies, _Cestrum diurnum_ is particularly associated with pasture fence rows because its seeds are deposited there by birds, vegetative competition is controlled by grazing, and it is rarely eaten by cattle (CABI, 2017).

iv. Invasive tendencies of the species elsewhere and of close taxonomic relatives in South Africa and elsewhere;

_Cestrum nocturnum_ produces long-lived and widely dispersed seeds and forms dense, shady masses. It is most likely to invade disturbed and open forest and margins, streamsides, and shrublands, especially in warmer areas (Weedbusters, 2017). It has a high reproductive potential and has propagules that can remain viable for more than one year. Its high mobility and adaptability to different environments enables it to manifest in introduced areas when not treated or managed (CABI, 2017). It is known to be very invasive in the Hawaii islands where it has aggressively colonized the trail sides, forest gaps, and landslides, up to 400 m elevation on Rarotonga and 900 m elevation in the rain forests of Tahiti (Wagner et al, 1999). _Cestrum nocturnum_ is known to be poisonous if ingested, forming a risk to grazing livestock and has been known to produce hay-fever like symptoms in some people (ISSG, 2017).

_Cestrum diurnum_ has been introduced as an ornamental shrub into most of tropical and subtropical America. The species has escaped from cultivation and naturalized in many regions where it grows as individual plants or in thickets. It is included in the Global Compendium or Weeds as an environmental weed. It is also listed as invasive or potentially invasive in Florida, Hawaii, Marianas Islands, Guam, Tonga, South Africa, the Dominican Republic, Bahamas, and Mexico (CABI, 2017).

v. The history of domestic propagation or cultivation of the species, introductions and the extent of naturalization in South Africa and elsewhere;

The genus _Cestrum_ (Solanaceae) has many species that are used in the Chinese traditional medicine for the treatment of burns and swellings. Several compounds including steroidal saponins, flavonoids, vitamin D3 derivative and lignans have been isolated from the genus Cestrum (Mohamed et al. 2007). In traditional medicine, leaves of _Cestrum_ have been used for their pharmacological significance in burns and swellings. It is also used for treating epilepsy and as stupefying charm medicine in West Indian Islands. The volatile oil is known to be mosquito-repellent and hence _Cestrum_ species are used to prevent malaria in several African Nations (Shaita, 2016).

_Cestrum nocturnum_ is mostly introduced to new areas through ornamental purposes. It is commonly cultivated in many countries as an ornamental plant due to its fragrant flowers that bloom at night (ISSG, 2017). It may also be used for medicinal purposes (CABI, 2017).

vi. Nutritional or dietary requirements of the species and, where applicable, whether it has a specialist or generalist diet;
vii. The ability of the species to create significant change in an ecosystem;

_Cestrum_ species have a negative impact on native ecosystems, as they form dense, shady thickets that outcompete native flora and prevent natural regeneration (CABI, 2017). They grow in gardens, roadsides, fencerows, pastures, vacant lots, and abandoned farmland in Puerto Rico (Liogier, 1995). They form dense stands in forest understorey and shrubland and prevent the establishment of native plant seedlings. They have poisonous berries and rotting vegetation may affect native fauna (Weedbusters, 2017). They are particularly associated with pasture fencerows because their seeds are deposited there by birds. They grow quickly and reproduce by both cuttings and seeds. They are thought to be one of the invasive species that competed with _Acalypha wilderi_, a rare endemic species of the Rarotonga Islands, driving it to possible extinction (CABI, 2017). In Auckland, New Zealand, the _Cestrum_ species are considered as seriously invasive weeds. _Cestrum nocturnum_ has invaded areas of some of the Pacific Islands where it has formed dense and virtually impenetrable thickets. As a garden escape, _Cestrum nocturnum_ has invaded land near Sydney (New South Wales) and it is also reported as present in areas of coastal northern New South Wales (Queensland gov, 2016).

viii. The potential to hybridize with other species and to produce fertile hybrids;

_Cestrum fasciculatum_ cultivar "Newellii" (also as _Cestrum newellii_) is considered to be a hybrid between _Cestrum fasciculatum_ and _Cestrum elegans_, most horticultural sources citing it as having glabrous corollas; true distinctions are unclear (Weedbusters, 2017).

(c) Information regarding the receiving environment, including-

(i) The presence of natural enemies, predators and competitors;

No information available.

(ii) The presence of potentially reproductive compatible species.

No information available.

2) A RISK ASSESSMENT CARRIED OUT IN TERMS OF SUB-REGULATION (1) MUST IDENTIFY-

a) The probability that the species will naturalize in the area in which the restricted activity is to be carried out or in any other area elsewhere in the Republic;
Above, is the climatic representation of areas that may be suitable for the establishment of *C. nocturnum* in South Africa. Using the Australian climate match model, the area of origin of *C. nocturnum*, which is tropical Central and South America climate was compared to the climate of South Africa. From the results, it can be noted that the species, *C. nocturnum*, is more likely to establish cluster in provinces such as the North West, Limpopo, Free State, Gauteng Mpumalanga and KwaZulu-Natal. These results also indicate that these areas are most suitable for the establishment and survival of *Cestrum nocturnum*, due to the similarities in climate conditions showing possibility of establishment in these area. The species is also not known to occur in South Africa, however, should it be introduced, the possibility of invasion and competition for growth space and resource with native species is possible. It is worth noting that the results indicate the low probability of the species to establish in areas such as the northern parts of the Northern Cape, the Western Cape and parts of Eastern Cape. This is due to the low suitability in climate conditions which will not favour establishment of the species.
The above image (Figure 17), is a climatic representation of areas that may be suitable for the establishment of *Cestrum diurnum* in South Africa. Using the Australian climate match model, the area of origin of *Cestrum diurnum*, which is Cuba, Jamaica, and Puerto Rico climate was compared to the climate of South Africa. From the results, it can be noted that the species, *C. diurnum*, is more likely to establish populations in the coastal provinces such as the Eastern Cape, KwaZulu-Natal and selective parts of the Western Cape. Although there are limited areas which indicate suitability for the establishment of the species. These results also indicate that these areas are most suitable for the establishment and survival of *C. diurnum* due to the similarities in climate conditions showing possibility of establishment in these area. The species is also not known to occur in South Africa, however, should it be introduced, it could compete with the natural growth space and resource with native species. It can also be noted that the results indicate that the species will not be able to survive in areas of the Western Cape, Northern Cape, Free State, North West, Limpopo and Gauteng due to the lack of similarities in climate conditions.

**Figure 17:** The climate model indicating the areas of possible establishment of *Cestrum diurnum* in South Africa due to similarities in climatic conditions (http://data.daff.gov.au:8080/Climatch/climatch.jsp )

**Figure 18:** The climate model indicating the areas of possible establishment of *Cestrum fasciculatum* in South Africa due to similarities in climatic conditions (http://data.daff.gov.au:8080/Climatch/climatch.jsp )
Climatic representation of areas that may be suitable for the establishment of *C. fasciculatum* in South Africa is depicted in Figure 18. Using the Australian climate match model, the climate of the area of origin of *C. fasciculatum*, which is Mexico, was compared to that of South Africa. From the results, it can be noted that the species has a much more potential of establishing populations in the Northern Cape, Eastern Cape, KwaZulu-Natal, Gauteng, North West, Limpopo, Mpumalanga and the Free State due to similarities in climatic conditions.

b) The possible impact of the species on the biodiversity and sustainable use of natural resources

*Cestrum nocturnum* has a negative impact on native ecosystems, as it may form dense, shady thickets that outcompete indigenous flora of the area where it occurs and may prevent natural regeneration of the flora. It grows quickly and reproduces by both cuttings and seeds (CABI, 2017). *Cestrum nocturnum* may form dense stands in forest understory and may prevent the establishment of native plant seedlings. The poisonous fruit and rotting vegetation may affect native fauna (Weedbusters, 2017). The species is thought to be one of the invasive species that competed with *Acalypha wilderi*, a rare endemic species of the Rarotonga Islands, driving it to possible extinction (CABI, 2017). The species can also have a negative impact on human and animal health due to the toxic alkaloids its parts contain which may be poisonous and capable of resulting in the death of livestock (ISSG, 2017).

*Cestrum diurnum* is an aggressive invasive shrub. This species is an opportunist that invades mostly disturbed areas and quickly completes its life cycle ahead of encroaching forest. It is a serious problem in open disturbed areas in Florida, Hawaii, and Guam where it is replacing native vegetation. It is also considered a “serious threat” to natural areas in south Florida (USA). It also invades coastal strand hammocks in Florida where it grows forming dense thickets at the margins (CABI, 2017).
c) The risks of the specimen serving as a vector through which specimens of other alien species may be introduced;

The risk of introduction for *Cestrum* species and other alien species is very high. They are repeatedly introduced outside of their native range due to their continued popularity as ornamentals. Not only do they reproduce profusely by seeds, but also produces plant parts that are harmful to humans and livestock (CABI, 2017). They are not known to carry any pests and diseases (VRO, 2017), however they are known to have a significant economic impact as they cause poisoning of farm livestock, but not reported as causing diseases.

d) The risks of the method by which a specimen is to be introduced or the restricted activity carried out serving as a pathway through which specimens of other alien species may be introduced;

The species are aggressive shrubs and are widely cultivated ornamentals. They produce seeds which can be easily dispersed by birds. In addition, seeds are still sold by regional seed houses and ornamental seedlings are offered by nurseries. Consequently, the probability of colonizing new areas remains high principally in disturbed areas near cultivation (CABI, 2017). In their introduced range, *Cestrum* species have been observed invading moist habitats along drainage lines such as creek banks and wetland edges, and in disturbed edges of bushland pockets where thickets dominate, and growth and regeneration by native species is prevented (GISD, 2017). They may be introduced into new areas through growing for ornamental and medicinal purposes and propagating for the same reason. As garden escapes, there are increased chances of establishing populations outside of their controlled areas.

e) Any measures proposed in order to manage the risks.

**Biological:**
*Cestrum* species seeds can be suppressed by vigorous competition from other plants. It is recommended that the control adult plants, should be done through planting a vigorous pasture species or indigenous species, which will compete with seedlings. It’s acknowledge that this method may not always be practical on riverbanks and gravel beds (GISD, 2017).

**Chemical control:**
Cutting and painting the cut surface with herbicide solution can be done all year round. Kökeye Museum staff have reported good control of the species with triclopyr ester at 20% in crop oil applied to basal bark, and the species may be sensitive to foliar applications of triclopyr (CABI, 2017). If annual treatments are performed and seeding is reduced, germination will be reduced. In pasture areas, one should avoid heavy grazing as it will encourage saffron thistle growth, and apply superphosphate to promote pasture growth. Slashing shortly before flowering can also effectively prevent seed production. However, if slashing is carried out too early, plants often regrow and produce new flower heads (Queensland gov, 2016).

**Mechanical control:**
Small plants and seedlings can be hand pulled all year round and left on site to rot down (CABI, 2017). Since stems can resprout and reinestation can occur through the seed bank, care must be taken to remove all the yellow roots, otherwise regrowth will occur. It is preferable to burn the roots (Queensland gov, 2016). The cleared sites should be replanted to prevent regrowth (CABI, 2017).
(3) Based on the information in Sub-regulations (1) and (2), a risk assessment must consider:

a) The likelihood of the risks being realized;

*Cestrum* species compete strongly with bush and pasture for living space. Livestock and dairy farmers don’t like *Cestrum* species at all because when green feed is short, animals eat it and die a quick and painful death. It can also be toxic to other animals and even humans. Because of its vigorous regrowth and seed lifespan, *Cestrum nocturnum* may be extremely difficult to control. Escaping of seeds is possible and could cause damage to ecosystem services. They are known to grow vigorously if neglected and needs careful control because its extensive, shallow rooted system can produce many new plants from suckers, particularly after root disturbance or injury (GISD, 2017).

b) The severity of the risks and consequences of the realization of the risks for other species, habitats and ecosystems;

The establishment of the species in areas where they do not naturally occur may alter the ecosystem and may cause extreme monoculture. The reduction of indigenous biodiversity may threaten the survival of endangered species that are dependent on the outcompeted indigenous species (CABI, 2017). If the parts of *Cestrum* species are ingested, they may be poisonous and cause the death of livestock although the death of humans is not confirmed (ISSG, 2017). The reduction of indigenous biodiversity may threaten the survival of endangered species that are dependent on the outcompeted indigenous species (CABI, 2017). Their leaves cause toxicity in livestock through the action of atropine-like alkaloids that are common in the family Solanaceae (Knight and Walter, 2004). Although the leaves and fruit are used for medicinal purposes in countries such as Mexico, their consumption by livestock may be poisonous and should not be eaten by humans (Staples and Herbst, 2005). During control of the species, the bushes that have been cut down or killed with herbicide are likely to retain poison in their leaves, branches and berries. Because recently sprayed wilting plants are more palatable then fresh healthy plants, livestock are more likely to consume them and potentially can cause more deaths. Therefore livestock should always be removed from any paddock where a *Cestrum* species control program is under way and not returned until the leaf material has disintegrated or been removed (Croft and Holding, 2004).

c) The potential costs associated with the control of the species to minimize harm to biodiversity;

No information.

d) Options for minimizing the potential risks.

Under the National Environmental Management: Biodiversity Act, 2004: Alien and Invasive Species Lists, 2016, *Cestrum* species were listed under categories 1b and 3. This means that the species are exempted from possession, but should not be used for any other purpose as they are highly negative to the ecosystem. The risk assessment proposes that *Cestrum* species be listed as category 3, and further proposes deletion of sterile cultivars or hybrids from the list.
REFERENCES:


---

**Annexure C: Suggested Summary:**

Invasive status:  
- [ ] Invasive  
- [ ] Under surveillance  
- [ ] Not invasive  

[If invasive, fill in the rest of the section.]

Range:
- [ ] Whole of South Africa  
- [ ] Specific Provinces/Biomes:  
- [ ] Specific habitats:

Ability to spread:
- [ ] High:  
- [ ] Moderate  
- [ ] Mild

Ability to control:
- [ ] Eradication possible  
- [ ] Effective control possible  
- [ ] Very difficult to control in areas invaded  
- [ ] Beyond control in areas invaded:

Impacts:
- [ ] High  
- [ ] Moderate  
- [ ] Low

Known utility:
- [ ] High  
- [ ] Moderate  
- [ ] Low

Recommended Category:
Recommended Restricted Activities:

a. Importing into the Republic, including introducing from the sea, any specimen of a listed invasive species.
b. Having in possession or exercising physical control over any specimen of a listed invasive species.
c. Growing, breeding or in any other way propagating any specimen of a listed invasive species, or causing it to multiply.
d. Conveying, moving or otherwise translocating any specimen of a listed invasive species.
e. Selling or otherwise trading in, buying, receiving, giving, donating or accepting as a gift, or in any way acquiring or disposing of any specimen of a listed invasive species.
f. Spreading or allowing the spread of any specimen of a listed invasive species.

☐ Releasing any specimen of a listed invasive species