EARLY DETECTION OF EMERGING INVASIVE ALIEN, TRIPLARIS AMERICANA IN KWAZULU-NATAL, SOUTH AFRICA

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ABSTRACT

The Ant Tree (Triplaris americana) originates from South America, and was first taken to South Africa in the 1970s as an horticultural accent plant. This attractive species has become a popular garden ornamental, but is now considered an emerging Invasive Alien Plant (IAP) in KwaZulu-Natal, South Africa. It produces masses of wind-dispersed seeds that pose a threat to South Africa’s rich biodiversity. In South Africa T. americana is a declared invader and must be removed from private property. The Early Detection and Rapid Response programme (EDRR), which is sponsored by the South African Department of Environment has worked in collaboration with the private sector, non-government organisations and governmental institutions to detect and reduce the spread of T. americana in KwaZulu-Natal (KZN), resulting in significant progress towards the eradication of this species from KZN.

Ecology of Triplaris Americana

Triplaris americana (Polygononaceae) is a popular exotic ornamental tree in KZN, South Africa. Characterized by a smooth, greyish coloured bark, these trees often reach heights of up to 10 meters. This dioecious species produces bright pink flowers on female trees and inconspicuous flowers on male trees between April and September in South Africa. Seeds are enclosed in pinkish-brown 3-winged wind-dispersed fruit. Each fruit encloses a single seed and on germination results in an individual seedling.

T. americana is commonly called the Ant Tree, because of the ants which reside in the bark, flowers and leaves of this species. At least five Pseudomyrmex species of ants are found to be associated with the Triplaris genus.

Invasive potential and risk to South African biodiversity

T. americana originates from South America and it is believed that the first Ant Tree introduced to South Africa in the 1970’s was for ornamental purposes. The attractive pink female flowers have led to the popularity of Ant Trees in gardening and landscaping in KZN. However, because of the efficient wind-dispersal of the thousands of

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three-winged fruit, masses of seedlings are produced. It is these offending seedlings that are the major cause for concern as they are capable of jumping the garden fence and spreading along roadsides and water courses, and negatively affecting natural systems. *T. americana* is a potential transformer and a declared weed under the South African Conservation of Agricultural Resources Act (CARA; 1983).

**EDRR efforts to reduce the spread of this species in South Africa**

The EDRR programme, which focuses on emerging IAPs, operates in a number of provinces of South Africa, including the east coast province of KwaZulu-Natal. Concerns about the invasiveness of *T. americana*, were first brought to the attention of the KZN unit of the EDRR programme in May 2009. An initial search on the South African Plant Invader Atlas (SAPIA), revealed only one record of *T. americana* in South Africa. Since then, the EDRR programme has embarked on an intensive search for plants in the area as well as various awareness-raising efforts to educate people about the negative effects of the Ant Tree.

![Leaf](image1)

**Figure 1.** Adult Female Ant Tree, highlighting different plant features in the sub-set photos.

EDRR efforts to reduce the spread of this species in KZN have aimed at altering the mindset of people from positive to negative associations with the tree. Although the escaped seedlings are the real
problem for biodiversity, the spread of this species will continue unless all the adults are also removed from gardens and landscapes.

Collaboration with conservation organisations in South Africa has been useful for disseminating information about the Ant Tree, and has led to an increase in the number of reports of new localities. One such example was a collaborative workshop with a non-governmental organization, in which Ant Tree identification training was provided to local municipality horticulture staff, so that seedlings could be removed as soon as they were detected. A second example of collaborative effort was the use of a local municipality website to disseminate electronic information on the Ant Tree to create awareness around this species.

**Example of a success story**

The Gateway Theatre of Shopping is one of the largest shopping malls in Africa. Seventy four adult *T. americana* trees were detected on the property, growing as part of the landscape. Relevant personnel at the mall were approached by the EDRR programme in 2009, and since then approximately 30 trees have been removed, and several others have been ring-barked. All *T. americana* trees at the site will ultimately be removed and replaced with an indigenous alternative.

**Methods used to engage the public in the management of this species**

These have ranged from talks and presentations at workshops and meetings to exhibits at garden shows and the production of pamphlets, posters, newspaper articles and electronic information during 2009 and 2010. Powerpoint presentations have been summarized in (Table 1).

Most of the public engagement targeted audiences with some degree of knowledge of botany and invasive alien plants. However, this preaching to the converted approach is insufficient in achieving the ultimate goal of eradication of *T. americana* from KZN.

Due to the popularity of *T. americana* as a garden ornamental, there was a need for a suburb-based case-study to evaluate the response of private-homeowners to the call to eradicate the Ant Tree.

**Preliminary results of a study on monitoring of the distribution of *T. Americana* in KZN**

The Berea North region in KZN was identified as the study area, and each street was surveyed for Ant Trees in gardens from a car with a driver and one observer. Awareness-raising Ant Tree pamphlets were placed only in postboxes of *private properties* in which Ant Trees were detected (Ant Trees were also detected in public parks and university grounds, but pamphlets were not administered in these cases, even though these trees and seedlings were recorded). Pamphlets
highlighted negative qualities of Ant Trees, provided contact details with instructions to contact the EDRR programme, and also provided details of two indigenous alternatives to *T. americana*. No calls from the public have been received to date, implying that this particular method of public engagement (placing pamphlets in postboxes) was not successful, and corrective steps need to be taken (e.g. paying a visit to the landowner) Numbers of detected Adult Trees and seedlings per suburb are shown in Figure 2, and totals for the Berea North region are shown in Figure 3.

**Table-1. Powerpoint presentations on *Triplaris americana* made during 2009-2010.**

<table>
<thead>
<tr>
<th>Date</th>
<th>Target Audience or Group or Event, for the Presentation</th>
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</thead>
<tbody>
<tr>
<td>15 July 2009</td>
<td>Working for Water Environmental Training Workshop</td>
</tr>
<tr>
<td>18 July 2009</td>
<td>eThekwini Conservancy Association</td>
</tr>
<tr>
<td>20 Sept 2009</td>
<td>Custodians for Rare and Endangered Wildflowers (CREW) Summer Rainfall Annual Workshop</td>
</tr>
<tr>
<td>8 Oct 2009</td>
<td>Gateway Theatre of Shopping: General Managers and Landscaping Consultants</td>
</tr>
<tr>
<td>16 Nov 2009</td>
<td>The Botanical Society of South Africa (KZN Coastal branch)</td>
</tr>
<tr>
<td>3 Dec 2009</td>
<td>KZN Invasive Alien Species (IAS) Forum</td>
</tr>
<tr>
<td>13 Apr 2010</td>
<td>WfW Project Managers Workshop</td>
</tr>
<tr>
<td>13 May 2010</td>
<td>KZN Invasive Alien Species (IAS) Forum</td>
</tr>
<tr>
<td>20 May 2010</td>
<td>29th AGM of the KZN Conservancy Association</td>
</tr>
<tr>
<td>1 Sept 2010</td>
<td>Durban University of Technology Horticulture 2nd year students</td>
</tr>
<tr>
<td>8 Sept 2010</td>
<td>Birdlife Port Natal General Meeting</td>
</tr>
</tbody>
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**Figure 4. Ratio of seedlings vs Adults, per suburb.**

There were 130 Adult Ant trees and 62 seedlings detected in Berea North, during the drive-by monitoring survey (Fig 3). Most of the Adult Ant trees were detected in Suburb B, whilst most seedlings were found in Suburb D (Fig. 2).
Figure 2. Numbers of Adult Ant Trees and seedlings detected per suburb in Berea North.

Figure 3. Total number of Adults and seedlings detected in Berea North region.
This indicates a non-linear relationship between Adult vs Seedlings per suburb, and to re-iterate this point, ratios of seedlings to Adult Trees were calculated in each suburb using the following formula: Number of Seedlings/Number of Adults*100. Results in Fig. 4 below, show that the smallest ratio of Seedlings: Adult trees occurred in Suburb C, i.e. only 1 seedling was sighted for every 5 Adult trees detected.

The non-linear relationship between Seedlings: Adults per suburb, and the relatively small number of seedlings detected in total compared to Adult Trees, could be attributed to size: Seedlings are much shorter and in properties surrounded by high fences, would have remained undetected during the survey, but Adult trees which grow up to 10 m high could easily be seen over fences. This is further emphasized by the fact that only 15 out of the 62 seedlings in total, were detected on private property (which tend to be surrounded by high walls or fences).

Due to the different areas of the 4 suburbs, a possible correlation between the number of Adult Ant Trees detected and the area of suburb was investigated and data are presented in figure 5 below:

**Figure 5. Suburb area and the number of Adult Ant Trees detected.**

One would have expected a positive correlation between suburb area and number of Adult Ant Trees, but this was not found to be the case. The largest suburb (Suburb C) actually showed the least number of Adult Ant Trees detected, and quite a large number of trees were detected in the smallest suburb (Suburb D). Since suburbs are displayed in figures according to the order in which they were surveyed (i.e. Suburb A was surveyed first, and Suburb D last), there does not seem to be a decline in research effort over time: i.e. there is no indication of detection withering over time.
PRELIMINARY RESULTS

Although data from this monitoring case study are still being analyzed, preliminary results of an incomplete data set, indicate that:

a) The response of the general public to the Ant Tree pamphlet was poor, despite the significant number of Ant Trees that were detected in the area. This was to be expected since resistance to change is an inherent trait in most people. Timeous follow-ups are extremely important in public engagement, and time lapses between interlinked methods of public engagement should be minimized to encourage public participation and to strengthen the cause of the study and/or organization. There may also need to be an incentive attached to such exercises to encourage public participation.

b) The implementation of South African Law on IAPs needs to be improved and more information about the relevant Acts need to be communicated to the public. Despite the pamphlets clearly stating that *T. americana* is a declared invader and illegal to have on one’s property, this did not prompt the public into action.

c) Various factors such as: time of day, time of year, number of observers, etc, impact on monitoring surveys and these factors need to be taken into consideration in future such studies: e.g. Simultaneous driving and looking for trees proved to be ineffective and dangerous: There should be at least 2 observers, separate to a designated driver.

d) Numbers of Seedlings detected during monitoring surveys may not always be truly reflective, as many of them escape detection simply because they are too small to be seen over boundary fences.

e) Detection is much greater where dense populations of Ant Trees occur. The 2 suburbs with the highest number of Adults detected, comprised localized dense populations on property with no boundary fences, and this would have enhanced detection of the trees.

CONCLUSION

Some species introduced into countries as ornamentals end up as garden escapees, as they flourish and spread into areas where they were not planted. *T. americana* is such a species and its occurrence in KZN needs to be addressed so that it does not spread to other provinces. All *T. americana* trees detected in KZN should be removed, preferably before they set seed. Sites at which *T. americana* have been cleared should be monitored on a regular basis to detect and eliminate any seedlings that may have survived. Due to its popularity as a garden ornamental, buy-in of the public is vital in the eradication of this species from SA. The formation of a *T. americana* working group and collaboration with stakeholders will facilitate eradication of this invasive species.