LITERATURE CITED

Marzini, K. 1998: Schnell, sicher, preiswert. Deutscher Gartenbau 13:40-43.

Schmidt, P. A. and **A. Krause.** 1997. Zur Abgrenzung von Herkuntsgebieten bei Baumschulgehölzen für die freie Landschaft Natur und Landschaft 72(Nr.2):92-95.

Spethmann, W. 1995. IWU — Tagungsberichte "Die Erhaltung der genetischen Ressourcen von bäumen und Sträuchern" SDW-Tagung Magdeburg.

Other Internet Sources (August 2004) <www.woerlein.de/spezielles-vortrag_eab.html>.

The Role of Propagation in Conserving Endangered Endemic Plants of the Virgin Islands©

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INTRODUCTION

In the last 5 years, a number of plant species in need of conservation attention have been identified in the British Virgin Islands (BVI). *Zanthoxylum thomasianum* (Rutaceae), *Calyptranthes thomasiana,* and *C. kiaerskovii* (Myrtaceae), which grow in Gorda Peak National Park, on Virgin Gorda, are particularly in need of help. *Cordia rupicola* (Boraginaceae) is also of great interest. It was discovered on Anegada Island after being thought to only exist in Puerto Rico.

Calyptranthes thomasiana and *Z. thomasianum* are also known to exist in the United States Virgin Islands (USVI) but with few known individuals they are vulnerable. Most of the individuals of *C. thomasiana* are found in protected areas of the United States National Parks Service; however, this is not the case for the majority of *Z. thomasianum*.

A survey was necessary to determine the conservation status of these species on the islands. The evaluation of the plants and their habitats would include propagation potential, current threats, and population diversity.

The project, undertaken as part of my 3-year Diploma Course at RBG Kew, was based on assisting the J.R. O'Neal Botanic Garden, Road Town, Tortola, BVI, with nursery and propagation techniques and with field research focusing on the above mentioned plants on the islands of Tortola, Virgin Gorda, and Anegada. The work in the USVI was limited to meeting with conservationists and viewing plants in the wild and in cultivation. This would be the focus of the first leg of the trip in the hope that it would enable me to perform the work in the BVI more effectively.

UNITED STATES VIRGIN ISLANDS

The first island visited was St. Croix, 132 km^2 in area and the largest of the USVI. There are two towns, Christiansted and Frederiksted, rich in the history of the Danish West Indies.

The island is home to St. George Village Botanic Garden. Built on the grounds of a ruined sugarcane plantation, the garden currently encompasses 6.5 ha. The collection contains over 800 tropical plant species. One of the most noteworthy areas of the garden is the collection of West Indian endangered plants, which includes the only cultivated individual of *Z. thomasianum* observed on the trip. Visiting the gar-

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den offered the ability to observe, photograph, and take notes on *Z. thomasianum* with great detail in this open setting. This opportunity was underappreciated at the time. I found out a few days later that reaching this plant in its native habitat is a painful and time-consuming endeavour.

The journey from St. Croix to St. John was by seaplane. The unique experience of flying in it was a true joy: skidding across the water before lifting off to circle around the island is a memory that will always be held close.

St. John is the island that evokes the idea of paradise for most visitors. At 45 km^2 it is the smallest of the USVI. The Virgin Islands National Park, a U.S. National Park, takes up two-thirds of the island.

On St. John I met Gary Ray and Eleanor Gibney who helped me to locate wild populations of *C. thomasiana* and *Z. thomasianum* to study. They were able to identify areas to see known populations, areas where I was most likely to find new populations, and gave insight into habitat threats, propagation requirements, and status of known populations.

My first study site was a population of *C. thomasiana* near the Peak of Bordeaux Mountain. There were healthy, mature plants with very good fruit set together with many younger plants and seedlings. However, the road that made these observations possible has caused habitat loss and erosion that continues to damage the area.

The eastern side of the island was explored to find *Z. thomasianum*. A population was observed in an intact dry scrub forest plot. Woody plants many of which are armed with thorns dominate the dry scrub. The scrub is barely penetrable and on a steep incline. The canopy is less than 3 m high and there is almost no under-story because of the rocky, shallow soil. Many epiphytes thrive among the rocks and stems of the woody plants. Entering the scrub was a painful and tedious experience. Several mature specimens of *Z. thomasianum* were found, but no seedlings were seen.

Finding, observing, and exploring populations of both key genera on St. John provided the insight needed to recognise the most promising new areas to explore — for example by helping me identify the indicator species that grow in association with them.

The final USVI visited was St. Thomas, home of the main port for cruise ships and imports from the U.S.A. and elsewhere. *Zanthoxylum thomasianum* was known to grow there and I studied a large population, which seems to be surviving in the face of adversity. Most of the plants are on road verges and on land that has yet to be developed or is too steep for housing. These were the largest and healthiest plants of the species observed on the trip. They showed very good fruit set, vigorous growth, and good regeneration. Unfortunately, many more of the mature plants may be lost as development continues in the area. Further inland, up the steep hillsides, more individuals were seen, but in less frequency.

The threats to *Z. thomasianum* on St. Thomas seemed the worst of all the populations observed on the islands. With this being the largest population, conservation work is crucial here to maintain genetic diversity and secure habitat for the species.

BRITISH VIRGIN ISLANDS

Tortola is the largest of the BVI at 54 km^2 and home to the J.R. O'Neal Botanic Garden in the capital city of Road Town. The garden is a mere 1.6 ha but has a good collection of indigenous and exotic plants. The BVI National Parks Trust (BVINPT)

is currently maintaining the garden as a tourist attraction and scientific collection. However, one hopes an expanded nursery for propagating conservation-significant plants will be included in plans for the garden's future.

It was pleasing to discover that most of the collection was accurately labelled and appeared to be growing well, while the nursery facility was in a much better state than I had imagined. Discussions about the possibilities of expansion and future goals for the garden were undertaken. I used the information gathered to produce a document to outline the current status of horticultural practices being employed, the nursery and its possible expansion/re-organisation, and the need for a records system for the garden and nursery. This document has been submitted to the BVINPT for consideration.

Virgin Gorda was the next island to be visited. The 21 km^2 island is home to Devil's Bay National Park and Gorda Peak National Park. Gorda Peak contains a wide range of plants, both indigenous and exotic, and has been reforested with mahogany trees. The park is home to many plants of conservation importance. In particular, populations of *Z. thomasianum*, *C. thomasiana,* and *C. kiaerskovii* have been located and observed in fruit.

The terrain at the foot of the upper trail into the park appeared very similar to areas observed on St. John. Raymond Walker of the BVINPT led the way to the three known individuals of *Z. thomasianum*. These consisted of a mature female in fruit, along with a seedling nearby, and a mature male. Time was taken to note, photo, and evaluate the conservation risks to the plants.

The dense, dry scrub of the lower slopes soon became greener and more open as we climbed. The two species of *Calyptranthes* were seen in mixed association in a very confined area near the peak. Healthy, mature plants with very good fruit set were seen, together with many younger plants and seedlings.

Returning down the upper trail, the vegetation was surveyed for more *Z. thomasianum*; however, none were seen. We decided to explore the lower trail even though no plants had been discovered there before. As the trail began to ascend, the vegetation began to look very familiar. The plants were surveyed meticulously through the dense growth. Several short excursions were attempted into the scrub, thwarted by impassable vegetation. Finally, a clearing was noticed off the trail. Entering the vegetation to make an attempt at reaching the clearing, I noticed a young *Z. thomasianum*. As I called Raymond to come and see it, I was amazed to see another plant of about the same age only metres away. Photos were taken and detailed notes made on the plants and their habitat.

Carrying along the trail after the discovery, we soon came across a burned area, beyond which the vegetation was changing from scrub to upland forest. This slash through the scrub-forest boundary was very disheartening as it may well have been home to more *Z. thomasianum*. We decided to turn back and look further down the trail. Although no more plants were found, the newly discovered *Z. thomasianum* population had made the day a huge success.

Remote Anegada was the final BVI visited. *Cordia rupicola* grows across much of the northern part of the 39-km^2 island. Further south the island is much drier and fewer plants are seen. The diversity of the populations across the island was very good — I noted many variations in leaf morphology, habit of growth, and regeneration. Plants on the northwest side of the island were found in fewer numbers and were more dispersed than on the northeast side. This may be a result of recent disturbances.

The main threat noticed was from development. Roads are constructed and maintained using heavy equipment and several uprooted shrubs were seen. Driveways being cut to new housing developments had disturbed several large populations. The final threat for this plant is natural disaster. Though this is possible on all the islands, here it is even more of a concern. Anegada is almost completely flat and only a few metres above sea level at its highest point. A rise in sea level resulting from global warming or floods caused by a hurricane could seriously threaten the future of this plant. For these reasons, *C. rupicola* was selected to be used for the propagation workshop at the botanic garden.

PROPAGATION WORKSHOP

During the last day, on Tortola, I conducted a workshop on cutting propagation techniques for the nursery staff at J.R. O'Neal Botanic Garden. The focus was collecting material from conservation-significant plants for ex-situ conservation. Using cuttings from *C. rupicola* collected on Anegada, all aspects of the process were outlined and demonstrated. Particular emphasis was placed on record keeping, hygiene, and treatment. In conjunction with the workshop, I helped the staff design two forms to use in relation to propagation work. The first, a seed propagation form, will allow them to track seed collection, treatment, sowing, germination, and success results. The second, a cutting propagation form, will track parentage, collection time, treatment, media used, and success.

CONCLUSIONS

Plants were observed, evaluated, and photographed on each island where they were known to be present. Contact details for interested parties on the USVI were provided to persons on the BVI and vice-versa to encourage more cooperation between individuals and organisations. International boundaries often restrict the flow of information between the islands — but the plants do not observe these boundaries and neither do the threats to them. More exchange of ideas and resources is needed to ensure the future for these plants.

The propagation work on *C. rupicola* from Anegada was the focus of the study. This plant needs protection from development and ex-situ conservation as insurance for its genetic diversity. The progress of the cuttings propagated during the visit is being monitored. At last update, the success was fairly low, probably because of the time of year the cuttings were taken. Hopefully, the process will be repeated at different timings.

Zanthoxylum thomasianum observed on St. John, St. Thomas, and Virgin Gorda appear to have a very definite habitat preference. Plants were observed only on the southeastern side of each island. The St. Thomas population was the largest and had the best material for vegetative propagation. Developing seeds were observed on all the islands.

Calyptranthes thomasiana was observed on St. John and Virgin Gorda. *Calyptranthes kiaerskovii* was observed on Virgin Gorda only. Both species seem to only grow in very isolated areas at high elevation. The populations observed were quite large and showed good seed set, recruitment, and overall health. However, the need for ex-situ and in-situ conservation is immediate because their restricted range makes them very susceptible to natural disaster and habitat loss caused by development. Securing genetic diversity in seed banks and living collections, along with protecting the wild populations, is crucial.

The memories that are taken from this experience are life changing. Having seen the impact humans can have in a very short time, the importance of conservation rings through loud and clear. The value of horticultural expertise in conservation is now very apparent. Only through cooperation, good husbandry, ex-situ and in-situ conservation, and education will the battle to save plants on the edge be won. I hope the front-line holds a place for the skills I have gained through this wonderful experience.

A full report of the study is available to Mary Helliar supporters. Please contact the Secretary of I.P.P.S. GB&I Region for further information about the Scholarship.

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Behaviour Patterns of Irish Gardening Consumers©

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INTRODUCTION

To stem the increasing flow of nursery stock imports and to increase competitiveness in relation to nursery stock production, Irish growers must put more effort into marketing and product development. Fundamental to this is identifying and understanding the background and behaviour of the "true" customer — the end-user or consumer. The Bord Bia (Irish Food Board) research presented in this paper profiles the "typical" Irish gardening consumer, describes the motivation behind their gardening purchases and identifies the main factors influencing the decision process at point of purchase.

Present Position of the Irish Market. The Irish gardening market has been riding high on the strength of the overall economy — the beautiful, albeit ephemeral, Celtic Tiger. Assuming that the fickle Irish weather co-operates, sale figures are expected to remain strong for the medium term and possibly beyond. Gardening as a leisure activity is extensive among the general public and appears to be growing in popularity, as evidenced by increasing sales and growing interest in gardening programmes, shows and literature. Moreover, according to Bord Bia research, there is an increase in numbers of people classed as "novice" gardeners and a reduction in the proportion of gardeners who consider themselves "experienced". This is good news for producers and retailers of ornamental plants, as it is the novice gardeners who are more likely to be the high spenders and are the ones most open to being influenced by promotion and marketing initiatives.

However, not all is as rosy as it seems. Ted Levitt, the former Chairman of Marketing at the Harvard Business School, pointed out: "Every major industry was once a growth industry but some that are now riding a wave of growth enthusiasm are very much in the shadow of decline. Industries that assume themselves to be riding some automatic growth escalator invariably descend into stagnation" (Levitt, 1975). Are growers complacent about the future? Could the Irish horticulture sector be accused of self-destructive shortsightedness? How can the industry avoid the seemingly unavoidable descent into stagnation?