The State of *Antigonon Leptopus* (Corallita) on St Eustatius in 2014

Briana Berkowitz
STENAPA Botanical Garden intern, August – November 2014
December 2014

Table of Contents

Project Background……3

About Corallita…….3-4

a. History……..3
b. Effects on the Environment ..……..3
c. How Corallita Spreads…….3
d. Possible Control Methods……4

Objectives ……..……4

Methodology …….……..…5

Results…..……6

a. Zeelandia Area.……7
b. Fort De Windt Area……..7
c. Quill Area..……..……8
d. NuStar Terminal……..…8

Reasons for Increase in Range……9-10

a. Lack of Mitigation Efforts…….…..……9
b. Increasing Development……..……9
c. Weather Influences…….10

Future Recommendations…….10-11

Acknowledgements……12

Consulted Sources of Information……..……13

Project Background

Anyone who has visited St Eustatius has seen *Antigonon leptopus* (from here on referred to by its common name on the island, Corallita). It dominates roadsides, infests entire neighborhoods, and has sullied otherwise ecologically varied landscapes. Corallita has been steadily expanding its range in the past two decades, and is an increasing threat. A pilot study on the range of Corallita and potential control methods was conducted in 2006-2007 by two Dutch researchers, Dr. Joris Ernst and Dr. Pieter Ketner. Few previous studies on Corallita have been done on St. Eustatius or elsewhere, so it was important for establishing baseline information on the plant. Their study produced a map of the locations of Corallita on the island, studied the effectiveness of a variety of eradication methods, and presented suggestions for control. Unfortunately, little follow up has been undertaken since, and the Corallita problem has increased. This 2014 study was undertaken to determine the present distribution of Corallita on St. Eustatius to see how much growth has occurred in the past seven years, with the hope that further research will inspire action to be taken to mitigate this serious environmental problem.

About Corallita

a. History

Corallita originates in Mexico, and since gaining popularity as an ornamental plant, has spread to many other tropical regions (*Antigonon leptopus* (Coral Creeper) 2011). It is a nuisance on several islands in the Pacific, and has the potential to become a problem on other Caribbean islands. After being introduced in gardens on Statia in 1907, Corallita spread into the countryside and established itself (Ernst and Ketner 2007). It has particularly spread since the 1980s, as development has increased and agriculture has decreased, which has led to more disturbed landscapes and less clearing of fields, ideal conditions for Corallita to thrive (Ernst and Ketner 2007).

b. Effects on the Environment

Corallita also poses a threat to native vegetation and animal habitat. It grows over native trees and shrubs, smothering them and reducing their access to sunlight. Because of this, the habitat for animals such as native birds and the threatened Lesser Antillean Iguana is being reduced, resulting in detrimental effects for these animals.

c. How Corallita Spreads

Corallita has several dispersal mechanisms that allow it to become widespread. It blooms year-round, producing seeds with a long viability that are able to float on water (Ernst and Ketner 2007). Secondly, the plant consists of dense networks of roots and rhizomes that expand quickly and can grow as deep as two meters (Ernst and Ketner 2007). The transport of soil with any of these roots or tubers will allow it to grow easily in new locations (Burke and DiTomasso 2011).

d. Possible Control Methods

Several methods have been experimented with to control the spread of Corallita. Herbicides, particularly glyphosate, are often effective in killing the plant, but are most effective when applied to only the stump, a much more time consuming process than applying to foliage (Ernst and Ketner 2007). Herbicides are also expensive and can be detrimental to surrounding plants, which can be drawbacks when dealing with large scale infestations. Burning the plant will temporarily hinder growth, but isn't a long term solution. Manual removal of the plant will slow the growth and may weaken and potentially kill it if done frequently enough, especially if care is taken to remove all the roots and tubers (Coral Vine/*Antigonon leptopus* 2014). A combination of these methods may prove most effective in killing the plant and in terms of labor and money required.

Picture 1. Corallita regrowth, 12 days after being trimmed to the roots

Objectives

The objective of this study was to create a current map of the distribution of Corallita on St Eustatius as of November 2014. This map could then be compared to the 2007 map to see whether the amount of Coralllita covering the island has increased, determining the locations where Corallita has spread the most, and determining why those areas are particularly favorable for Corallita growth. In addition there were several areas pin-pointed by the 2006-2007 report as of particular concern for Corallita growth which will be particularly observed and commented on. The new map will give an idea of of the extent to which Corallita is a threat , and whether the situation is becoming dire with a huge need for action.

Methodology

Field surveying to determine the extent of Corallita was conducted in September, October and November of 2014. Surveying was done through a combination of walking main and secondary roads of St Eustatius, and surveying by truck. GPS points were taken in certain locations to enable more accurate mapping of Corallita. Any location where Corallita was present was recorded

on a St Eustatius road map with a scale of 1:10000, which was published in 2014 by Michal Kasprowski. Field notes were also taken to identify problem areas, or any survey areas that need to be revisited.

Results

To give context, following is the 2007 Corallita distribution map made by Ernst and Ketner. They estimated that Corallita covered 15-20% percent of the island at that time.

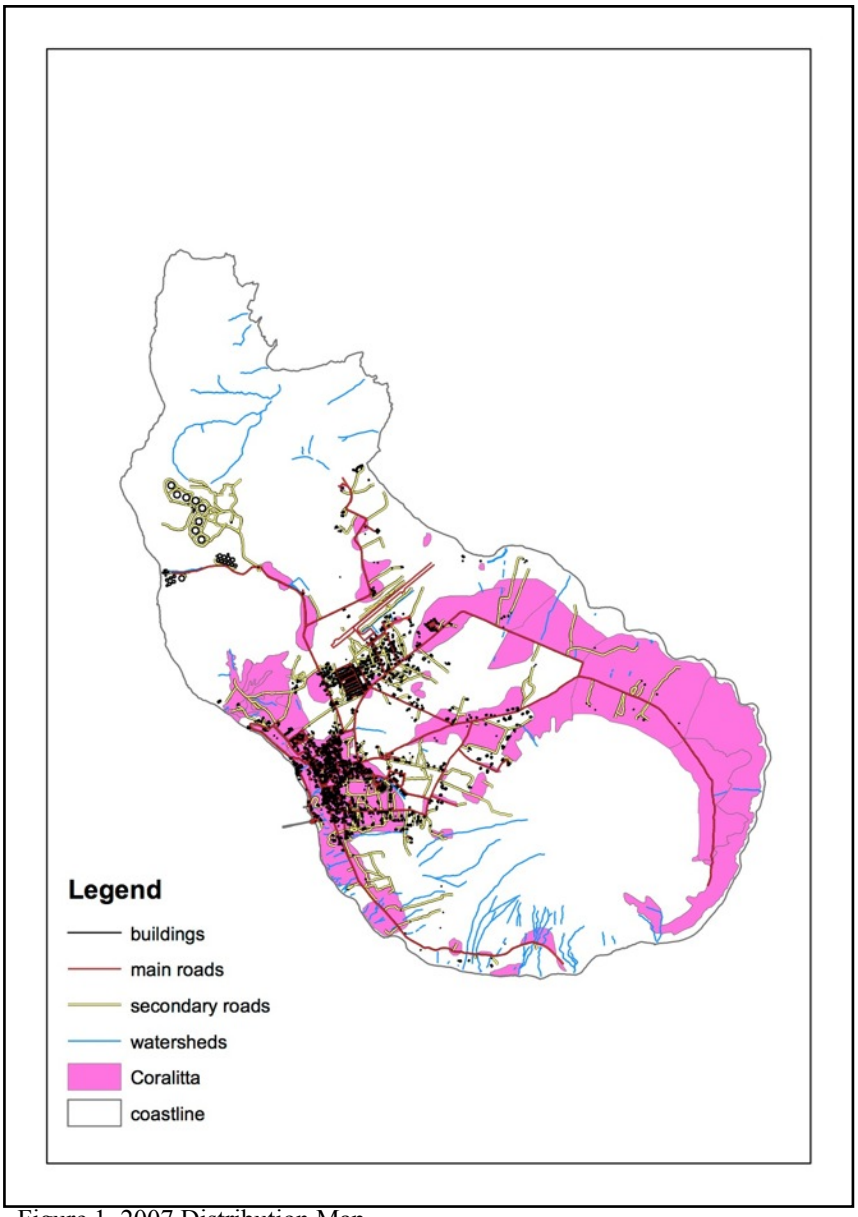

Figure 1. 2007 Distribution Map

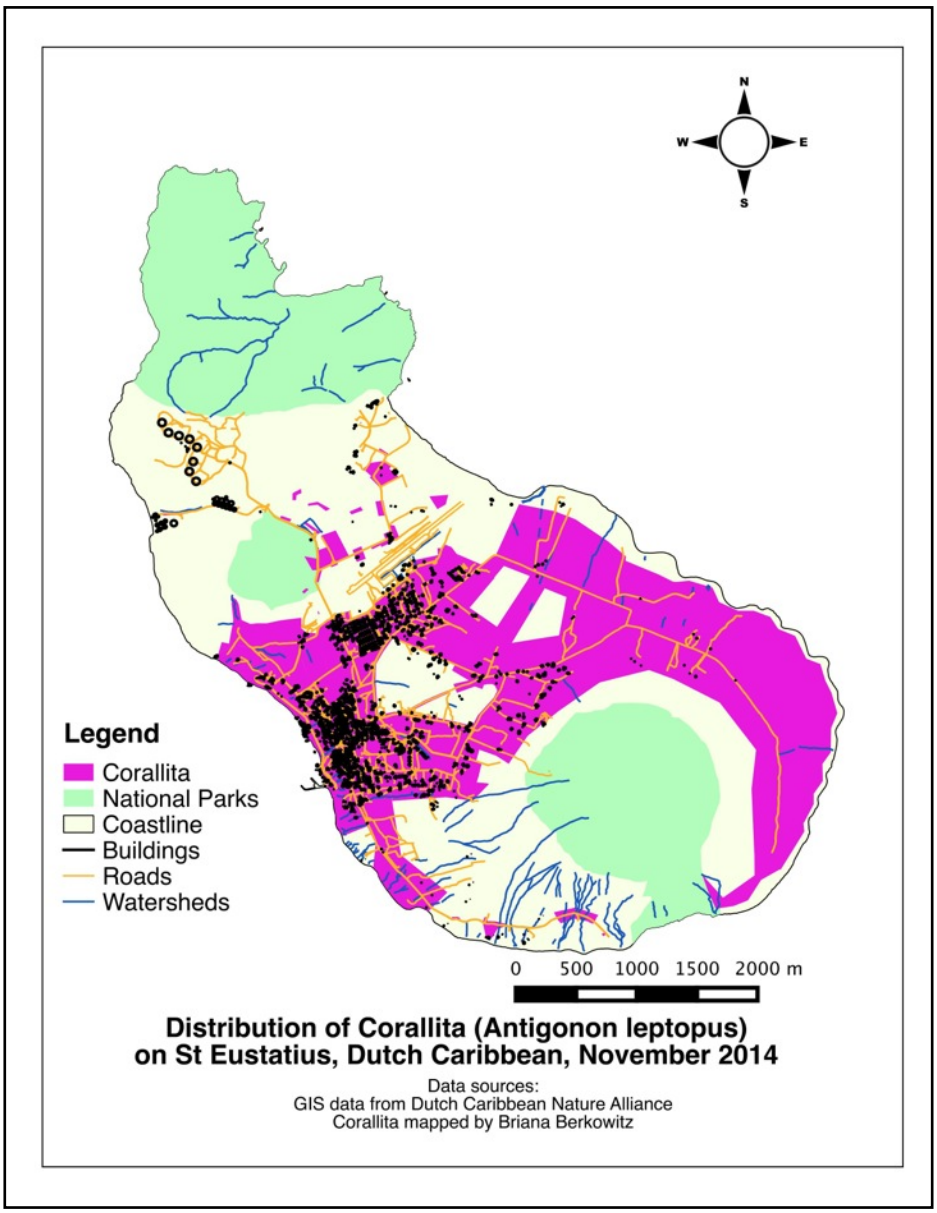

Figure 2. 2014 Distribution Map

The following map was made using QGIS software and gives a representation of where Corallita is found on St Eustatius as of November 2014.

Corallita currently covers about 33% of the island, or about 7 km^2 of Statia's total 21 km^2 land area. For another comparison, if one were not to include the area of the national parks, Corallita covers about 48% of the remaining area. Compared to Ernst and Ketner's estimate of 15-20% coverage in 2007, this is a significant increase in the past seven years. It should be noted that mapping isn't always an exact science. Although every effort was made to create an accurate representation of Corallita, not all areas where it is present are accessible and thus some inferences of its presence were made. Interestingly, there are some small areas where Corallita was

observed in 2007 where it was definitely not present in 2014. Assuming this was not a mapping error, exploring the reason that Corallita has disappeared from these areas would be a useful future endeavor.

Some comments on particular areas:

a. Zeelandia

Figure 3. Close up of Zeelandia area 2007

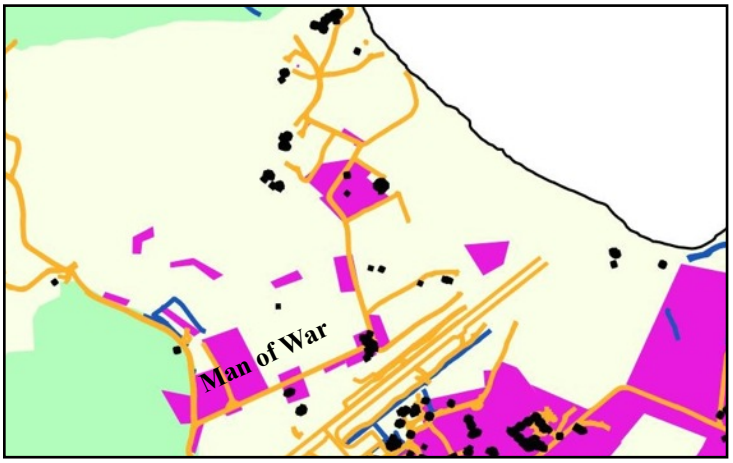

Figure 4. Close up of Zeelandia area 2014

Expansion in the Zeelandia area since 2007 has been relatively minimal. However, Corallita growth has increased along the roads. There is growth in the area northeast of the Man of War neighborhood, and given the nearby Corallita on roads, it seems likely that the expansion of Corallita in both of those areas could join to create a domination of it on the landscape there. There is still no Corallita present in the Boven National Park.

c. Fort de Windt

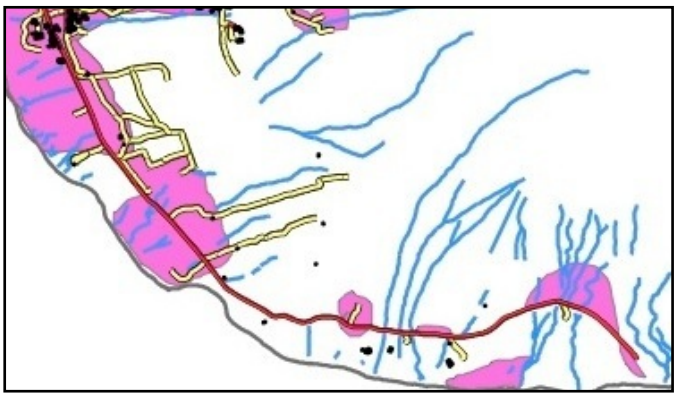

Figure 5. Close up of Fort de Windt Area, 2007

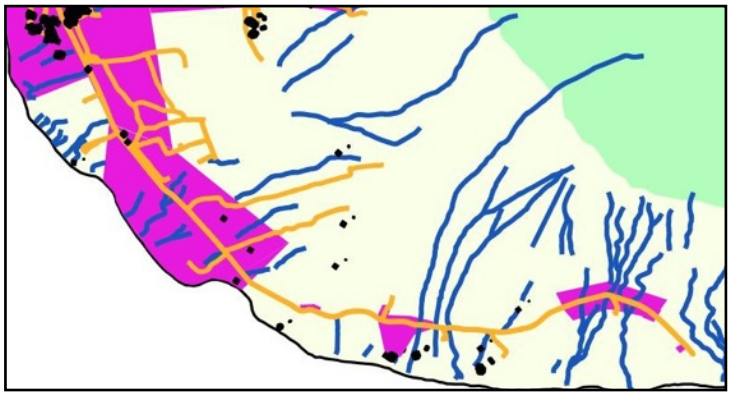

Figure 6. Close up of Fort de Windt Area, 2014

Expansion in the Fort de Windt area has been relatively minimal as well, with generally the same areas affected by Corallita currently as in 2007. There has been significant construction of new houses in this area in the past few years, a growth condition that Corallita favors, but there has been little growth near the new houses so far. This area should be closely monitored for expansion in those new developments.

d. Quill Area

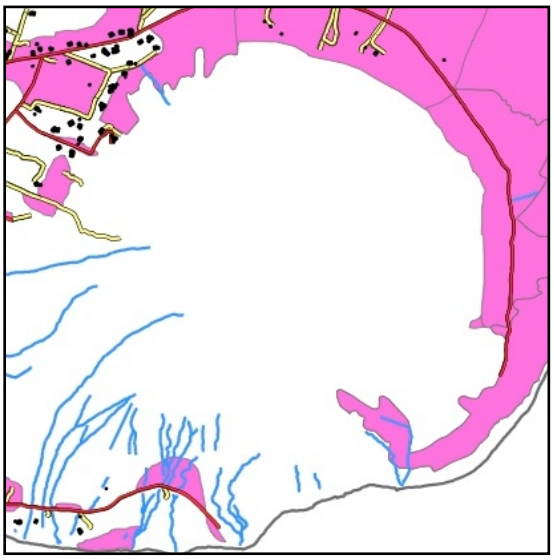

Figure 7. Close up of Quill Area, 2007

Figure 8. Close up of Quill Area, 2014

The lower Quill area, particularly along the road to the Botanical Garden, has been surrounded by Corallita for years, but luckily very little is found within the park boundaries itself. There has been some growth in the area, particularly in the neighborhoods on the Northwestern side of the Quill. The increase in slope and heavy vegetation may be the cause of the lack of spread into the Quill National Park itself (Ernst and Ketner 2007).

b. NuStar Terminal

A tour by truck of the NuStar Terminal was conducted to look for Corallita within the facility. In 2007 a small amount of Corallita was found near a gut near the oil pipeline, but it wasn't abundant (P. Ketner, personal communication, December 6, 2014). In 2014, Corallita in this area was still present, and there were an additional two small isolated spots nearby. Corallita should be careful watched in this area and care should be taken to ensure that it doesn't spread further.

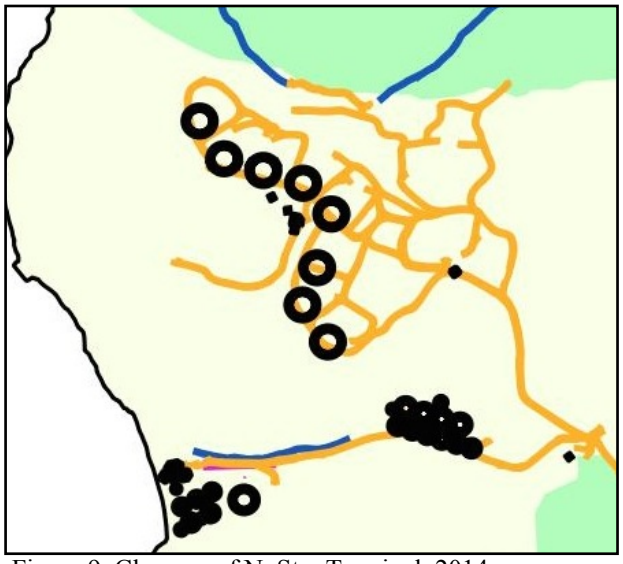

Figure 9. Close up of NuStar Terminal, 2014

Reasons for Increase in Range

a. Lack of Mitigation Efforts

Corallita is a plant that will easily and quickly spread if not controlled, and little effort to date has been made to control it. Though difficult, control is not impossible, especially in private residences. Especially at the base of the Quill, there are many large and beautiful gardens, within Corallita infested areas that are Corallita-free, meaning there must be successful or semi-successful eradication techniques used by gardeners. These techniques could be shared with the wider community to start discussion of mitigation efforts.

Photo 2. A Corallita free garden on the slopes of the Quill. Corallita can be seen on the left side of the road.

b. Increasing Development

Statia has been experiencing increasing development in recent years due to an increase in employment opportunities and tourism (Crowfoot 2011). Corallita favors disturbed land, such as that on building sites, and accidental transport of soil or plant material can provide opportunities for Corallita to spread in such locations. One instance of this is the Cherry Tree neighborhood, which has been housing development in recent years. Corallita coverage in that neighborhood has increased from isolated patches of in 2007 to nearly complete coverage today.

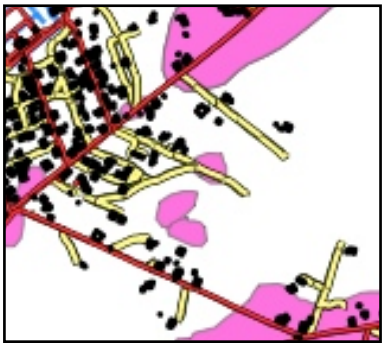

Figure 10. Cherry Tree, 2007

Figure 11. Cherry Tree, 2014

c. Weather Influences

Ernst and Ketner explored the idea that heavy rainfall encourages vegetative growth, and concluded that this is likely the case for Corallita (Ernst and Ketner 2007). According to their report, there was particularly heavy rainfall several years prior to their study, which may have aided the dramatic spread of Corallita. Since 2007, rainfall levels have remained relatively constant (between 943mm and 1201 mm in 2007, 2008, 2012 and 2013), with heavier rainfall levels in 2010 and 2011, and less rainfall so far in 2014 (Statia Rain History 2014). Healthy rainfall the past few years has certainly aided the large spread in Corallita since 2007. From personal observation, Corallita seems to be very rain dependent- after a week or two of constant rain the plants grow many new shoots and seem to spread more.

Statia has also experienced two tropical storms in recent years- Earl in 2010, and Gonzalo in 2014. While large storms or hurricanes could aid in the spreading of seeds and creating new disturbed landscapes in which Corallita could grow, neither storm was particularly devastating, and thus probably did not have a huge overall effect on the spread of Corallita.

Future Recommendations

The dramatic increase in the amount of Corallita on Statia in the past seven years speaks to a definite need for action. Therefore, here are some recommendations for action:

- Map the distribution of Corallita on Statia every five years. It is important to monitor how fast the vine is spreading, and whether people are doing more to control it. It is also essential to monitor residents' control methods and whether these are contributing to an overall reduction in the vine's spread. One technique that Ernst and Ketner experimented with, but not attempted by this study, is determining coverage percentages of Corallita within different locations (P. Ketner, personal communication, October 31, 2014). This is a more accurate way of determining the amount of Corallita present, as its denseness and frequency varies from location to location. Using this technique will also be increasingly important if the amount of Corallita keeps expanding, as it can be used to determine which areas should be prioritized when attempting to control Corallita.

- Create more public awareness of the threats caused by Corallita. Everyone on Statia knows that Corallita exists and is a major problem, but the public needs more information about its ecological properties and what they can do to stop it. Informing people about Corallita's detrimental effects to Statia's flora and fauna, and some of the control techniques they can use, should be given top priority.

-One thing not mentioned by Ernst and Ketner is the effect that Corallita is having on touristic sites. Corallita is overgrowing many of Statia's important historical ruins, such as the warehouses on Oranje Bay and any ruins in town. In order to attract more visitors to historical sites they need to be properly maintained. Similarly, Corallita is increasing its range in the Botanical Garden and needs to be controlled before this area becomes too infested.

Photo 3. Corallita growing on warehouse ruins near Oranje Bay

Photo 4. Corallita growing in the Botanical Garden

- Continue experimenting with control techniques. Although this study was not able to delve into this too much, this is one of the most essential parts of the equation. The simplest and most time- and cost-effective solution seems to be herbicide, but the ideal ways to use it (number of applications, how to combine it with manual removal, etc.) should be explored further. One way to find a good answer this is to consult with local gardeners and residents with large Corallita-free gardens in Corallita-ridden areas in order to gather their techniques.

Acknowledgements

Thanks to Hannah Madden at Stenapa for her guidance, and other members of Stenapa staff for their help. Joris Ernst and Pieter Ketner were consulted during the course of this study, and their willingness and enthusiasm to help build on their initial research was much appreciated. Thanks to Nathaniel Miller and Eseld Imms from the Dutch Caribbean Natural Alliance, who helped with providing the GIS data. My visit to the NuStar terminal was arranged by Chris Butler, and thanks to Theodore, the employee who showed me around.

Consulted Sources of Information

"*Antigonon leptopus* (Coral Creeper)", BioNET-EAFRINET, 2011. Web. December 2, 20140.

Coral Vine/*Antigonon leptopus*", Center for Aquatic and Invasive Plants, University of Florida, 2014. Web. December 2, 2014.

Burke, J. & DiTommaso, A., 2011, Corallita (Antigonon leptopus): Intentional Introduction of a Plant with Documented Invasive Capability, Invasive Plant Science and Management, 4(3): 265-273.

Crowfoot, Betsy. *St. Eustatius Residents Fear Losing Their Island to Expanded Oil Terminal.* Ecology, December 12, 2011. Web. December 12, 2014.

Ernst, J. J. and P. Ketner. 2007. Final Report: Corallita pilot project: St. Eustatius, Netherlands Antilles. St. Eustatius, Netherlands Antilles: Published by the authors. 38 p.

"Statia Rain History 1981 – Today", St Eustatius Animal Welfare Foundation, 2014. Web. November 20, 2014.