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# A Comparison of Tree Species from Nassau County to Suffolk County, NY

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#### Editorial

In this issue of the SATURN Journal there is a continuation of student publications pertaining to a research project embedded in introductory biology courses, and there are publications from an additional research project embedded in a microbiology course.

Students in the introductory biology courses have been identifying the species of trees at their places of residence and comparing them to other locations. This is developing a catalogue of tree species in residential neighborhoods. Students have found it helpful to also compare their findings to the findings of student investigators who have published previously in the SATURN Journal.

Students in a microbiology class have published their findings from an embedded research project in which the antimicrobial properties of spices have been tested.

New embedded research projects and additional courses and colleges are encourage to participate in the SATURN Journal.

Louis Roccanova, Ph.D. Editor in Chief SATURN Journal

#### Comparing Tree Species From Residences of the North and South Shores of Long Island

Authors: Diane Ambrogio, Sandy Arce, Sharon Dennis, Sonymir Pedrosa, Thomas O'Neill, and Tanya Simonetti

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Keywords: Long Island, North Shore, South Shore, Tree Species

#### Abstract:

Samples of residential trees were collected from the North Shore and South Shore of Western Suffolk County in Long Island, New York. These samples were then identified and verified using two dichotomous keys. The trees Identified on the North Shore were; Black Walnut (Juglans naira), Mimosa Silk Tree (Albizin julibriss), two Horse Chestnuts (Aescuius hippocastanum), two Flowering Dogwoods (Cornus florida), two White Pines (Pinus strobes), Water Oak (Quercus naira), Eastern Hemlock (Tsunace canadensis), Black Locust (Robinia psedoacacia), Cockspur Hawthorn, (Crateaequs crusgalli), Gray Birch (Betula populitolia), English Holly (Ilex aquifolium), Arbor Vitale (*Thuja occidentalis*), and one invasive species. On the South Shore the following tree species were identified; two Flowering Dogwoods (Cornus florida), European Beech (Fagus sylvatia), Chestnut (Aescuius hippocastanum), Scarlet Oak (Quercus coccinea), Eastern White Oak (Quercus Alba), Swamp Cottonwood (*Populus herophylla*), Sycamore Maple (*Acer pseudoplatanus*), and a Pecan (Carya illiuoensis). It was found that from the samples taken the North Shore and South Shore residences examined had the following tree species in common; The Flowering Dogwood (Cornus florida) and White Pine (Pinus strobes). Quercus was common to both the North and South Shore, however different species of this genus were found on the North Shore verses the South Shore. The Water Oak (Quercus naira) was found on the North Shore. On the south shore the Scarlet oak (Quercus coccinea), Eastern White Oak (Quercus alba) were found. In this investigation it was confirmed that residences of the North Shore and South Shore of Long Island New York do have tree species in common.

#### **Introduction:**

Today, approximately 62% of New York State is forested with over 18 million acres of trees all throughout (Leopold, 2003). The northeastern region of the United States has a variety of tree species because of the variation of climates throughout the year. It is important to catalog the tree species in our area so that conservationist and researchers may know what species are native and which are foreign to our local land. In order to classify, categorize and distinguish tree species, dichotomous keys can be used. A dichotomous key is a method for finding the identity of something by going through a series of choices that leads to the correct name of the item. Dichotomous means "divided in two parts" hence, why there are two choices given at each step of the process until identification is reached. The Peterson Field Guide for Eastern Trees (Petrides, 1988) can also be used when identifying trees. This field guide contains detailed descriptions of over 400 species of trees native to eastern North America, including the Midwest and South. Numerous pictures and drawings show distinctive details which are needed for identification.

The Northeast is a temperate region, with highly distinct seasons and a wide range in annual temperatures (UCS, 2006). The samples used during this research came from either the north shore or

south shore of Long Island, NY. Towns in the north shore of Long Island which included Northport, Kings Park and Huntington Station had a variety of tree life. In its entirety, New York State is represented as a humid continental type of climate which are found above latitudes of 40 degrees north. Regions with humid-continental climates are described by seasonal temperature differences, with warm to hot- humid summers and cold winters. These varieties of seasonal changes in temperature are the reason behind the vast amount of different species of trees throughout the northeastern region of the United states, In this case Long Island, New York because many species of trees begin to flourish, go dormant or live through all of the seasons.

#### **Methods:**

Samples were taken from residential locations on both the North Shore and South Shores of Western Suffolk County of Long Island, New York. The Following were the locations on the North Shore; Northport, Kings Park, and Huntington Station. The Following were the locations on the South Shore; Brentwood and East Islip. Please see Figure 1 to visualize their relative locations and see Table 2 for GPS coordinates and lot size.

Each sample had no less than three leaves or three buds. Then the samples were identified using, *Tree Finder: A Manual for Identifying Trees by Their Leaves* and then verified using *Peterson Field Guides: Eastern Trees*. The species identified were then catalogued by area and the differences and similarities were compared.





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## **Results:**

	North Shore Species						
# Found	Common Name	Scientific Name					
2	Flowering Dogwood	Cornus florida					
2	White Pine	Pinus strobes					
1	Black Walnut	Juglans naira					
1	Mimosa Silk Tree	Albizin julibrissin					
1	Horse Chestnut	Ascuius hippocastanum					
1	Water Oak	Quercus nigra					
1	Eastern Hemlock	Tsungce Canadensis					
1	Black Locust	Rabinia pseudoacacia					
1	Cockspur Hawthorn	Crataegus crusgalli					
1	Gray Birch	Betula populitolia					
1	Arborvitae	Thuja occidentalis					
1	Unidentified possible invasive species						
	South Shore	e Species					
# Found	Common Name	Scientific Name					
2	Flowering Dogwood	Cornus florida					
1	European Beech	Fagus sylvatica					
1	Horse Chestnut	Aescuius hippocastnium					
1	Scarlet Oak	Quercus coccinea					
2	Eastern White Oak	Quercus alba					
1	Swamp Cottonwood	Populus heterophyla					
1	Sycamore Maple	Acer pseudoplatanus					
1	Pecan	Carya illinoinensis					

Table 1 - North Shore and South Shore Tree Species Found

Key	
	Gray Filled indicate species common to both North and South Shore
	Blue Filled indicate genus common to both North and South Shore
KC y	Gray Filled indicate species common to both North and South Shore Blue Filled indicate genus common to both North and South Shore

	North Shore Properties			Sout	h Shore Prope	erties
	Property 1	Property 2	Property 3	Property 4	Property 5	Property 6
GPS Coordinates	40.905185, - 73.267488, 129	40.890701, -73.233221	40.840077, -73.417961	40.782825, -73.264702	40.781231, -73.230176	40.720785, -73.194062
Town	Northport	Kings Park	Huntington Station	Brentwood	Brentwood	East Islip
Lot size in Acres	2.5	0.3	0.5	0.171	0.5	1.0

Table 2 - Location of Properties and Lot Sizes

As seen in Table 1 above, in this investigation the following species were found on the North Shore; Black Walnut (*Juglans naira*), Mimosa Silk Tree (*Albizin julibriss*), two Horse Chestnuts (*Aescuius hippocastanum*), two Flowering Dogwoods (*Cornus florida*), two White Pines (*Pinus strobes*), Water Oak (*Quercus naira*), Eastern Hemlock (*Tsunace canadensis*), Black Locust (*Robinia psedoacacia*), Cockspur Hawthorn, (*Crateaequs crusgalli*), Gray Birch (*Betula populitolia*), English Holly (*Ilex aquifolium*), Arbor Vitale (*Thuja occidentalis*), and one invasive species.

The following species were found on the south shore; two Flowering Dogwoods (*Cornus florida*), European Beech (*Fagus sylvatia*), Chestnut (*Aescuius hippocastanum*), Scarlet Oak (*Quercus coccinea*), Eastern White Oak (*Quercus Alba*), Swamp Cottonwood (*Populus herophylla*), Sycamore Maple (*Acer pseudoplatanus*) and a Pecan (*Carya illiuoensis*). The Flowering Dogwood (*Cornus florida*) and White Pine (*Pinus strobes*) were found to be present in both the North and South Shore. It was also found that the genus, *Quercus* was common to both the North and South Shore, however different species of this genus were found on the North Shore verses the South Shore. The Water Oak (*Quercus naira*) was found on the North Shore. On the south shore the Scarlet oak (*Quercus coccinea*), Eastern White Oak (*Quercus alba*) were found. All of the other species identified and unidentified were unique to their respective locations in this particular investigation.

#### **Discussion:**

The Black Walnut (*Juglans naira*), Mimosa Silk Tree (*Albizin julibriss*), Horse Chestnut (*Aescuius hippocastanum*), Flowering Dogwood (*Cornus florida*), White Pine (*Pinus strobes*), Water Oak (*Quercus naira*), Eastern Hemlock (*Tsunace canadensis*), Black Locust (*Robinia psedoacacia*), Cockspur Hawthorn, (*Crateaequs crusgalli*), Gray Birch (*Betula populitolia*), English Holly (*Ilex aquifolium*), Arbor Vitale (*Thuja occidentalis*), are invasive species to these locations. The Flowering Dogwood (*Cornus florida*), European Beech (*Fagus sylvatia*), Chestnut (*Aescuius hippocastanum*), Scarlet Oak (*Quercus coccinea*), Eastern White Oak (*Quercus Alba*), Swamp Cottonwood (*Populus herophylla*), Sycamore Maple (*Acer pseudoplatanus*), and a Pecan (*Carya illiuoensis*) are native to these properties.

When comparing our work to Marino et al. (2012) we noticed that they found Japanese Red Maple (*Acer Palmatum*), Silver Maple (*Acer Saccharinum*), Common Pear (*pyrus communis*), Pin Cherry (*Prunus pensylvanica*,), Black Ash (*Fraximus nigra*), and Tulip Tree (*Lirodendron tulipifera*), while we did not find those trees. The Flowering Dogwood (*Cornus florida*), and the Arbor Vitae (*Thuja occidentalis*), were the only findings on the North Shore of Long Island we found to be the

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same. From the South Shore, Marino et al. (2012) found trees that were identified as a Silver Maple (*Acer saccharinum*), a chokecherry (*Prunus virginiana*) and a White Oak (*Quercus alba*.) The only tree findings from the South Shore that we found to be the same are The Flowering Dogwood (*Cornus Florida*) and The White Oak (*Quercus Alba*). From the South Shore we found tress that were identified as European Beech (*Fagus sylvatia*), Chestnut (*Aescuius hippocastanum*), Scarlet Oak (*Quercus coccinea*), Swamp Cottonwood (*Populus herophylla*), Sycamore Maple (*Acer pseudoplatanus*) and a Pecan (*Carya illiuoensis*).

#### Conclusion:

It was found that in the residential locations where the tree samples were collected that there were two species of tree found to be present in both the North and South Shore. The Flowering Dogwood (*Cornus florida*) and the White Pine (*Pinus strobes*) were found in residential locations on both the North and South Shores of Long Island. It was also found that the genus *Quercus* was common to both the North and South Shore all though different species within this genus were found on the North Shore verses the South Shore. *Quercus naira* was common to the North Shore, while *Quercus caccinea* and *Quercus alba* were common to the South Shore. All of the other species identified and unidentified were unique to their respective locations in this particular investigation.

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#### A Comparison of Tree Species from Commack, Plainview, and East Islip

Authors: Joanne Bernero, Nicole Santiago, and Connor Faughnan

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Keywords: trees, Commack, Plainview, East Islip, Silver Maple, English Holly, Atlantic White Cedar, Flowering Dogwood, Red Maple, Red Cedar.

#### Abstract:

In this investigation several tree samples were acquired from different towns on Long Island, Commack, Plainview, and East Islip. Two dichotomous keys were used to classify the trees. The samples found were a Silver Maple (*Acer saccharinum*) in Commack, an Atlantic White Cedar (*Chamaecy paris thyoides*) in Plainview, two samples of English Holly (*Ilex aquifolium*) both in Plainview, a Flowering Dogwood (*Cornus florida*) in Plainview, a Red Maple (*Acer rubram l*) in East Islip, and a Red Cedar (*Junioerus virginia l*) in East Islip.

#### **Introduction:**

Taxonomy is the study of the classification of living organisms. Appearance or morphology is used to distinguish the organisms from each other. They are put into a system called the Linnaean system of classification that was developed by the Swedish Biologist Carolus Linnaeus. Species of trees were identified using two dichotomous keys in this tudy. Previous investigators on Long Island had found the tree species of each tree and the diameters of trees by using a key and a branch from each tree. Each organism is referred to by a genus and species name. Linnaeus developed the sequences from largest to smallest such as kingdom, phylum, class, order, family, genus, and species. These phyla and divisions are interchangeable for plants, fungi and algae. To find the name of the species investigators used a dichotomous key for tree species in the Northeastern United States (George A. Petrides/ Janet Wehr. 1988). Their results came from different locations on Long Island.

Long Island is an island off New York stretching into the Atlantic Ocean. Long Island is 118 miles long. It is a mostly suburban area in Nassau and Suffolk county, but also includes urban areas including Queens and Brooklyn. Commack in its earliest days was flat lands with rich soil and thick oak forests. It was known for its fertile soil, plentiful game, and wood. Today all of Commack is settled and suburban. Plainview's land was considered desirable for farming because of a small pond. Plainview is located in the middle of Long Island, bordering Suffolk County. East Islip currently borders 4 other hamlets. These hamlets are Oakdale, Islip, Great River and Islip Terrace. East Islip borders the Great South Bay to the south.

#### Methods:

While conducting this experiment, the following research tools were used to find the species of trees on Long Island properties; "The Tree Finder: A Manual for the Identification of Trees" by May Theilgaard Watts (1988), and also the dichotomous key in the book, "A Field Guide to Eastern Trees" by George A. Petrides (1988). The tools were used to find the species of the leaves collected from three different properties in three different towns, one at 7 Ruth Place, Plainview, one at 43 Watson Street, East Islip, and one at 36 Speaker Street, Commack. Student Investigators narrowed down the choices of their trees by first using the "The Tree Finder." They narrowed them by examining the leaves by the shape of their leaves or pines, the color, and also the size. After finding the family in which the leaf samples belonged, they then used the dichotomous key in "A Field Guide to Eastern Trees".

#### **Results:**

The property in Plainview contained the Atlantic White Cedar (*Chamaecy paris thyoides*), English Holly (*Ilex aquifolium*) and a Flowering Dogwood (*Cornus florida*). The property in East Islip contained the Red Maple (*Acer rubram*) and also a Red Cedar (*Junioerus virginiana*). The property in Commack contained a Silver Maple (*Acer saccharinum*).

The Red Maple (*Acer rubrum*) is a medium sized tree with smooth gray young bark, lobed whitened and hairless or hairy leaves.

The Red Cedar (*Juniperus virginiana*) is a small evergreen tree, commonly 10 to 40 feet, of pyramidal shape becoming rounder in age. The leaves are opposite and scale like, covering older twigs closely in alternating pairs to 1/8 inch long, on new shoots awl shaped, sharp pointed and spreading, 1/4 inch long and dark green. The stems are single with upright or spreading branches. The bark is reddish- brown. Roots are deep and widely spreading.

The Atlantic White Cedar (*Chamaecy paris thyoids*) is similar to Northern White- Cedar, Atlantic white cedar is an evergreen with scaly leaves that occur in a flat fern-like appearance. This species usually grows in very dense; solid stands, and has small rounded cones.

The English Holly (*Ilex aquifolium*) is a large, dense, slow-growing, evergreen tree or shrub, 15 to 50 feet tall and up to 15 feet wide or more. Leaves are thick, glossy, dark green and wavy, 1-3 inches long, alternate and simple.

The Flowering Dogwood (*Cornus florida*) is a small to medium sized tree, with hidden side buds and stalked flower buds. The leaves are hairless.

The Silver Maple (*Acer saccharinum*) is a tall tree with grayish older bark that tends to flake and leaves brown spots. The leaves are deeply five lobed with U-shaped sinuses and the base of the leaf lobe is narrowed.

	Red Maple	Red Cedar	Atlantic White Cedar	English Holly	Flowering Dogwood	Silver Maple
Commack						Х
Plainview			Х	Х	Х	
East Islip	Х	Х				

Table 1: Distribution of Tree Species from Commack, Plainview, and East Islip

#### **Discussion:**

When the finished results were recorded, there were no tree species found in more than one town. No species was common to all three properties. The comparison of the towns on Long Island showed that they were all different neighborhoods and that different trees can survive in different environments. Deorag et al. (2012) also discovered a Red Cedar and an Atlantic White Cedar, however the locations on Long Island didn't match the locations where our trees were found. Lennon et al. (2012) also found an Atlantic White Cedar on Long Island, but the location didn't match any of the

previous results. Kim (2012) found an Atlantic White Cedar in Wantagh, Long Island. This again is a different location. This shows that the two tree species can grow in different towns.

#### **Conclusion:**

These conclusions did not reveal that samples of trees from the different locations came from the same tree species. The tree species were a Silver Maple (*Acer saccharinum*), an Atlantic White Cedar (*Chamaecy paris thyoides*), two samples of English Holly (*Ilex aquifolium*), a Flowering Dogwood (*Cornus florida*), a Red Maple (*Acer rubram l*), and a Red Cedar (*Junioerus virginia l*) from the towns on Long Island, Commack, Plainview, and East Islip.

### **Reference:**

**Petrides A. George and Janet Wehr**., 1988. "Eastern Trees": Boston, NY: Houghton Mifflin Company.

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#### Influence of Spices on the Growth of Candida albicans and Enterobacter cloacae

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Keywords: Microbiology, Bacteria, Spices, Yeast, Garlic

#### Abstract:

The sensitivity of *Candida albicans* and *Enterobacter cloacae* to cinnamon, clove, garlic and turmeric was tested in this study. The microbes were treated with the spice extracts by performing the disc diffusion procedure. *C. albicans* was very sensitive to garlic while it was susceptible to cloves to a lesser extent. *E. cloacae*, on the other hand, was resistant to all the four spices.

#### **Introduction:**

The medicinal value of spices has been revealed by various studies. Cinnamon is a spice obtained from the inner bark of several trees from the genus *Cinnamonum* and it is used in both sweet and savory foods (Iqbal, 2012). It has been shown that "Cinnamon improves glucose and lipid levels in people with type 2 diabetes" (Premanathan, 2000). Another study suggested that cinnamon supplementation is able to significantly improve blood glucose control in Chinese patients with type 2 diabetes (Lu, 2012). The compound eugenol, a major component of the essential oil from the leaves of the cinnamon tree, has antiviral properties *in vitro*, specifically against both the HSV-1 and HSV-2 (Oral and Genital Herpes) viruses. Pharmacological experiments suggest that the cinnamon-derived cinnamic aldehyde activates the Nrf2-dependent antioxidant response in human epithelial colon cells (Wondrak, 2010).

Cloves (*Syzygium aromaticum*) are the dried up flower buds of a tree of the family Myrtaceae (Bensky, 2004). It is considered a very strong spice because of the chemical that makes up its taste, eugenol. Cloves were also used as a traditional medicine such as a carminative. A carminative increases the hydrochloric acid in the stomach and increases peristalsis. It can also be used in aromatherapy. Cloves have also been known to help in dental pain (Bensky, 2004).

Throughout history garlic has been used as a remedy for various health problems and as an antimicrobial substance. Garlic could be and has been used as a remedy for many health problems such as wounds, ulcers, skin infections, flu, athlete's foot, some viruses, high blood pressure, blood thinning (Koch, 1999). *Allium sativum*, commonly known as garlic, is a strong antiseptic. Louis Pasteur verified its antiseptic properties in 1858. Throughout history of garlic has been used for purposes such as an antibacterial, antifungal, antiviral and anti-parasitic agent (Ghannoum, 1998).

Turmeric is a rhizomatous herbaceous perennial plant of the ginger family, Zingiberaceae. It is native to tropical South Asia and needs a considerable amount of annual rainfall to thrive (Ragasa, 2005). Plants are gathered annually for their rhizomes and propagated from some of those rhizomes in the following season. Phytochemicals found in turmeric have been investigated in preliminary research for their potential effects on diseases such as cancer, diabetes, arthritis and other clinical disorders (Chan, 2009).

#### Methods and Materials:

Broth Cultures Used to Inoculate the Plates: The plates were inoculated with the cultures purchased from Carolina Biological and then grown in Brain Heart infusion Broth (BHIB). Broth culture of *Enterobacter cloacae* was incubated at 37°C for 24 hours while the broth culture of *Candida albicans* was incubated at 30°C for 24 hours.

Boiled Extract: Spice powder for cinnamon, cloves, garlic and turmeric were purchased from a local supermarket. Five grams of each spice was added to 100 ml of sterile water. The suspension was heated in a LG microwave oven at a power level of 100 for 1 minute. The boiled suspension was then strained, using a sterile coffee filter, to separate the powder from the extract. This was considered as boiled concentrated extract.

Dilute Extract: Ten milliliter of concentrated extract was added to 10 ml of sterile water to make a diluted extract.

Sterility of the Extracts: To determine the sterility of the extracts, when the disc diffusion method was performed, the extracts were inoculated on Brain Heart Infusion Agar plates. One set of plates were incubated at  $37^{\circ}$ C and another set was incubated at  $30^{\circ}$ C for 48 hours.

Disc Diffusion method: The broth cultures were inoculated on to Mueller-Hinton plates for confluent growth. The plates were then divided into four sections. Each section was labeled with the name of the spice used. A filter paper disc, that was 6 mm in diameter and has been soaking in a spice extract, was placed in the center of the appropriate section on the medium. *E. cloacae* plates were incubated upside down at 37°C for 24 hours. *C. albicans* was incubated upside down at 30°C for 24 hours. After the incubation, diameter of the zone of inhibition was measured to determine the antimicrobial activity of each spice on the microbes.

#### **Results:**

#### Table 1: Diameter of Zone Inhibition Produced by Boiled Concentrated Extracts

Spices	Candida albicans.	Enterobacter cloacae
Cinnamon	9mm	0 mm
Cloves	12mm	0 mm
Garlic	20mm	0 mm
Turmeric	0 mm	0 mm

mm - millimeters

# Table 2: Diameter of Zone InhibitionProduced by Boiled Diluted Extracts

Spices	Candida albicans.	Enterobacter cloacae
Cinnamon	0 mm	0 mm
Cloves	9mm	0 mm
Garlic	18mm	0 mm
Turmeric	0 mm	0 mm

mm-millimeter

Figure 1: *C. albicans* in Boiled Diluted Extract



C – Cinnamon, Cl – Cloves, G- Garlic T- Turmeric

Figure 2: *C. albicans* in Boiled Concentrated Extract



C – Cinnamon, Cl – Cloves, G- Garlic T- Turmeric

Both concentrated and diluted garlic extracts demonstrated the strongest antimicrobial activity (Table 1 and 2, Figures 1 & 2) on *Candida albicans*. Clove extracts produced smaller zones of inhibition on this microbe (Tables 1 and 2, Figures 1 & 2). A slight suppression of growth was seen on this organism with the concentrated cinnamon extract (Figure 2 and Table 1).

All the extracts were sterile except the garlic extract, where a few white and dry colonies were seen. Distinct zones of inhibition around the colonies of the contaminant were not seen (Figure 1 and Figure 2) when the disc diffusion method was performed on *C. albicans*. This suggests the growth inhibition of *C. albicans* was produced by the garlic extract, not by the contaminant. Nitrocellulose filters can be used to eliminate the contaminant from the extract.

*Enterobacter cloacae* had no zones of inhibition with any of the spice extracts used in this experiment (Table 1 and Table 2).

#### **Discussion:**

Garlic showed the strongest antimicrobial activity on *C. albicans* which is a fungus and an opportunist. One of the natural habitats for *C. albicans* is the intestinal tract of humans (Rybak *et al.*, 2004). The results obtained in this experiment is consistent with the study conducted by Rybak *et al.* (2004), where the growth of all soil fungi was totally inhibited by an aqueous garlic extract. Medically important fungi and yeasts, notably *Candida albicans*, were also inhibited and then killed by the increasing concentrations of garlic extract (Rybak *et al.*, 2004).

Clove extract also showed some suppression of growth on the fungus. Similar results were obtained, with certain species of bacteria, by a previous study (Sung-Youn *et al.*, 2011). A slight zone of

inhibition observed with the cinnamon extract might be due to the phenolic compounds found in this spice (Sofia *et al.*, 2007).

The bacterium used in this study, *E. cloacae*, was resistant to all the spices used in this experiment. It has been shown that this bacterium is highly resistant to antibiotics (Fraser, 2007).

#### **Conclusions:**

The growth of *C. albicans* was strongly inhibited by the garlic extract. The clove extract was also effective in suppressing the growth of this fungus to a certain extent. In addition, the concentrated cinnamon extract slightly prevented the growth of *C. albicans*. All the spices used in this study, did not stop the growth of *E. cloacae*.

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#### A Comparison of Native and Invasive Tree Species of the North and South Shores of Suffolk County, New York from North Babylon, Lindenhurst and Huntington

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Keywords: biology, tree, invasive, native, species, Long Island

#### Abstract:

Twelve tree specimens were picked from residential areas located in Suffolk County, New York. Six tree specimens were picked from a yard in Huntington, located on the North Shore of Suffolk County. Six tree specimens were picked from three different yards on the South Shore of Suffolk County, two located in North Babylon and the other located in Lindenhurst. The specimens were identified using two dichotomous keys. It was discovered that more native species than invasive species were found on both shores of Long Island. The tree species found to be native to the North Shore were the Eastern Red Cedar (*Juniperus virginiana L.*), Pin Oak (*Quercus palustris*), White Oak (*Quercus alba*), and Bitternut Hickory (*Carya cordiformis*). The tree species found to be invasive to the North Shore were the Sycamore Maple (*Acer pseudoplatanus*) and Weeping Willow (*Salix babylonica*). The tree species found to be native to the South Shore were the Black Ash (*Fraxinus nigra*), Flowering Dogwood (*Cornus florida*), Eastern White Pine (*Pinus strobus L.*) and Northern White Cedar (*Thuja occidentalis L.*). The tree species found to be invasive to the South Shore were the Sycamore Maple (*Acer pseudoplatanus*) and Horse Chestnut (*Aesculus hippocastanum*).

#### **Introduction:**

Suffolk County is located in Long Island, New York, an island east of Manhattan, New York. Long Island's climate is similar to other Northeastern coastal areas in the Atlantic Ocean with warm, humid summers and cold, wet winters. Suffolk County takes up more than half the island and is the most eastern part of Long Island. The North Shore and the South Shore are topographically different. The North Shore is hilly and rocky while the South shore is mostly flat and sandy. "There are approximately 88 species of trees believed to be native to Long Island" (Karpen 1991).

The Black Ash (*Fraxinus nigra*) is native to northeast United States and eastern Canada, at 15-20 meters tall. It is part of the olive family (*Oleaceae*) (Dickerson 2002).

The Flowering Dogwood (*Cornus florida*) is native to northeastern and southeastern United States, spreading from Maine to Texas, growing up to 10 meters high with big, white flowers (Wennerberg 2004).

The Eastern White Pine (*Pinus strobus L.*) grows all over the eastern United States and eastern Canada, stretching all the way down to Arkansas and Minnesota. It reaches about 45 meters in height, with cones about 10 to 20 centimeters long (Dickerson 2002).

The Northern White Cedar (*Thuja occidentalis L.*) is primarily located in eastern Canada and northeastern United States but spreads down to South Carolina. It is endangered or threatened in many states. It grows 15 -30 meters tall and with seed cones about 9-14 millimeters long (Nesom 2003).

The Eastern Red Cedar (*Juniperus virginiana L.*) is native to eastern North America, found on many types of soil, at about 3 to 12 meters, with cones resembling berries about 6 millimeters in diameter (Mohlenbrock 1991)

The Pin Oak's (*Quecus palustris*) native range spans from Rhode Island to Arkansas. It grows about 20-30 meters tall with round acorns about 7 millimeters long (Dickerson 2002).

The White Oak (*Quecus alba L*) is native from Maine to Texas, growing up to 30 meters tall, adapting to many kinds of soil (Moore 2002)

Bitternut Hickory grows throughout the eastern United States and southeastern Canada, to eastern Texas. It grows up to 35 meters tall (Nelson 1965).

The Sycamore Maple (*Acer pseudoplatanus*) is a native species to central Europe and southeast Asia and can reach up to 30 meters in height. Its danger to the environment is its ability to grow in large numbers, possibly preventing native trees from growing (DCNR 2001). Two Sycamore Maple trees were identified, one from each shore.

The Horse Chestnut (*Aesculus hippocastanum*) is native to southeast Europe, growing about 36 meters tall. It has been planted as an ornamental tree for its large white flowers but this species competes with native trees for sunlight, moisture and nutrients (USDA 2005).

The Weeping Willow (*Salix babylonica*) is native to northern China, growing 20-25 meters tall. "Its roots can spread into the bed of a watercourse, slowing the flow of water and reducing aeration, and possibly causing flooding, while the leaves create a flush of organic matter when they drop in autumn, reducing water quality and available oxygen, and directly threatening aquatic plants and animals" (USDA 2005).

#### **Methods:**

Six branches from different tree species were picked from a yard located on 16 Sterling Court in Huntington, New York, a town on the North Shore of Long Island. Six branches from different tree species were picked from three different yards on the South Shore, two yards being located in North Babylon, one from 10 Brookside Avenue and another from 687 Deer Park Avenue, and from one yard located at 90 Bayview Avenue in Lindenhurst. Each branch had at least three leaves or buds to help identify the species correctly. The circumference of the trunk of each tree specimen was measured and recorded using measuring tape.

The specimens were split into two groups—branches picked from the North Shore and branches from the South Shore. The species of each specimen was identified using a dichotomous key, finding the genus, species and common name of each specimen (Watts 1991). A field guide was used to check results and learn more information, including the tree's native area, recording this data and any other useful data (Petrides 1998).

The North Shore group was then divided into native species and invasive species. The South Shore group was also divided into native species and invasive species. The groups were compared.

#### **Results:**

Tree specimens from the North Shore were collected from a yard located in Huntington, New York. The first tree was a Red Cedar (*Juniperus virginiana*), with a 246.6 centimeter trunk circumference. The second tree was identified as a Pin Oak (*Quercus palustris*) with a 135.9 centimeter trunk circumference. The third tree was found to be a Bitternut Hickory (*Carya cordiformis*) with a 159.5 centimeter trunk circumference. The forth tree was identified to be a Weeping Willow (*Salix babylonica*) with a 386.4 centimeter trunk circumference. The fifth tree was a White Oak (*Quercus alba*) with a 514.5 centimeter trunk circumference. The sixth and last tree specimen on the North Shore was identified to be a Sycamore Maple (*Acer pseudoplatanus*) with a trunk circumference of 239.1 centimeters.

Tree specimens from the South Shore were collected from two yards in North Babylon and one yard in Lindenhurst. A Black Ash (*Fraxinus nigra*) was identified with a trunk circumference of 8.7 centimeters. A White Pine (*Pinus strobus*) was found with a trunk circumference of 24.5 centimeters. A Flowering Dogwood (*Cornus florida*) was found with a trunk circumference of 44.3 centimeters. A second Sycamore Maple (*Acer pseudoplatanus*) was identified with a 252.6 centimeter trunk

circumference. A Horse Chestnut (*Aesculus hippocastanum*) was also found with a trunk circumference of 383.2 centimeters. A White Cedar (*Thuja occidentalis*) was identified with a 59.6 centimeter trunk circumference.

Eight out of the twelve tree species collected were identified to be native. Four of the twelve species were identified to be invasive.

Norm Shore mee Specimens						
Leaf	Trunk	Species	Common Name	Native or		
Characteristics	Circumference			Invasive		
Scale-like, green	246.6	Juniperus	Red Cedar	Native		
with tiny blue	centimeters	virginiana				
cones						
Simple palmate,	135.9	Quercus palustris	Pin Oak	Native		
seven lobed	centimeters					
Simple pinnate	159.5	Carya	Bitternut	Native		
	centimeters	cordiformis	Hickory			
Compound	386.4	Salix babylonica	Weeping Willow	Invasive		
pinnate	centimeters					
Simple palmate,	514.5	Quercus alba	White Oak	Native		
nine lobed	centimeters					
Palmate simple	239.1	Acer	Sycamore Maple	Invasive		
leaf	centimeters	pseudoplatanus				

# Table 1:North Shore Tree Specimens

#### Table 2:

#### **South Shore Tree Specimens**

Leaf	Trunk	Species	Common Name	Native or
Characteristics	Circumference			Invasive
Palmate simple leaf,	252.6	Acer	Sycamore Maple	Invasive
opposite leaves, 5	centimeters	pseudoplatanus		
veins				
Pinnate compound	8.7 centimeters	Fraxinus nigra	Black Ash	Native
leaf,13 leaflets,				
opposite leaves				
Palmate compound	383.2	Aesculus	Horse Chestnut	Invasive
leaf, 7 huge leaflets	centimeters	hippocastanum		
Pinnate simple	44.3	Cornus florida	Flowering	Native
	centimeters		Dogwood	
9 cm blue-green	24.5	Pinus strobus L.	Eastern White	Native
needles in clusters of	centimeters		Pine	
4				
Green, scaly leaves,	59.6	Thuja	White Cedar	Native
compound leaflets	centimeters	occidentalis L.		

#### **Discussion:**

Long Island has a diversity of trees. While many native species still exist, invasive species can threaten environments. It was found that more native tree species exist on both shores of Long Island than invasive tree species.

Various other studies from the *SATURN Journal* show that more native species are found on Long Island than invasive species.

In one study, the American Mountain-Ash (*Sorbus americana*), Eastern Hemlock (*Tsuga canadensis*), Red Cedar (*Juniperus virginiana*), Arbor Vitae (*Thuja occidentalis*), and Atlantic White Cedar (*Chamaecyparis thyoides*) were all found to be native to Long Island while one tree species, the Norway Maple (*Acer platanoides*), was found to be invasive (Deorag et al. 2012).

In another study, the Eastern Hemlock (*Tsuga Canadensis*), Northern White Cedar (*Thuja occidentalis*) and Red Maple (*Acer rubrum*) were identified as native species while only one species, another Norway Maple (*Acer platanoides*), was found to be invasive (Cutrone et al. 2012).

In a third study, the Red Maple (*Acer rubrum*), Arbor Vitae (*Thuja occidentalis*), White Oak (*Quercus alba*), and Flowering Dogwood (*Cornus florida*) were found to be native to Long Island while the Southern Magnolia (*Magnolia grandi flora*), Weeping Juniper (*Juniperus flaccida*), Flowering Plum (*Prunus mume*), Weeping Cherry (*Prunus subhirtella pendula*), and Bradford Pear (*Pyrus calleryana*) were all identified as invasive to Long Island (Alcindor and DiNapoli 2012).

A fourth study finding more native tree species than invasive tree species on Long Island identified the following trees to be native, the White Pine (*Pinus stroba*), Sugar Maple (*Acer saccharum*), Red Cedar (*Juniperus virginica*), Atlantic White Cedar (*Chamaecyparis thyoides*), Blue Ash (*Fraxinus quadrangulata*), Flowering Dogwood (*Cornus florida*), Eastern Hemlock (*Tsuga canadenis*), White Birch (*Betula papyrifera*), White Oak (*Quercus alba*), and Arbor Vitae (*Thuja occidentalis*), while the White Mulberry (*Morus rubra*) and English Oak (*Quercus robur*) were found to be invasive (Garistina 2012).

#### **Conclusion:**

Twelve tree species, six from the North Shore and six from the South Shore, were identified and confirmed using two dichotomous keys. From the North Shore, four trees were found to be native, the Red Cedar (*Juniperus virginiana*), Pin Oak (*Quercus palustris*), Bitternut Hickory (*Carya cordiformis*) and White Oak (*Quercus alba*). From the South Shore, four trees were found to be native, the Black Ash (*Fraxinus nigra*), Flowering Dogwood (*Cornus florida*), Eastern White Pine (*Pinus strobus*) and White Cedar (*Thuja occidentalis*). From the North Shore, two trees were identified as being invasive, the Sycamore Maple (*Acer pseudoplatanus*) and Weeping Willow (*Salix babylonica*). From the South Shore, two trees were also found to be invasive, another Sycamore Maple (*Acer pseudoplatanus*) and Horse Chestnut (*Aesculus hippocastanum*). Eight trees were found to be native to Long Island while four trees were found to be invasive.

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#### Comparison of Invasive and Native Tree Species in Deer Park and North Babylon

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Keywords: Biology, tree, species, Deer Park, North Babylon, New York

#### Abstract:

The purpose of this study was to compare the number of native and invasive tree species that were found in both the towns of Deer Park and North Babylon, both of which are located in Long Island, New York. Leaf samples were taken from two different properties in Deer Park, and the trees were identified by using a *dichotomous key*. Additional research was then done to find what types of trees are found on properties in North Babylon so the two results could be compared. The trees found in the two Deer Park residences were the Shortleaf Pine (*Pinus enchinata*), Norway Maple (*Acer platanoides*), Japanese Maple (*Acer*), Colorado Spruce (*Picea pungens*), Red Maple (*Acer rubrum*), and a Flowering Dogwood (*Cornus florida*). LeGodais and Weiss (2012) found that North Babylon residences were found to have Red Maple (*Acer rubrum*), Flowering Dogwood (*Cornus florida*), Japanese Maple (*Acer*), Southern Magnolia (*Magnolia grandi flora*), Weeping Juniper (*Juniper flaccida*), White Spruce (*Picea glauca*), Flowering Plum, (*Prunus subhirtella*), Weeping Cherry (*Prunus subhirtella*), and a Bradford Pear (*Pyrus calleryana*). Ten of the Twelve species found were invasive.

#### Introduction:

Long Island is an island off of New York, located east of Manhattan. It is separated into four counties, Queens, Brooklyn, Nassau and Suffolk and two of which are considered part of the four boroughs of New York City. Normally Long Island is just known for its counties Nassau and Suffolk and this is to fully separate Long Island from New York City because of it being a more suburban area. According to the Native Plant Database (Lady Bird Johnson Wildflower Center, 2012) there are 180 trees that are native to the entire state of New York.

In total there were six different trees that were identified. There was the Shortleaf Pine (*Pinus enchinata*) which is native to Long Island. This tree has a straight trunk, and the bark is a red-brown color. Its leaves are needle-like, in bundles of two or three. This tree can reach heights of 20-30 meters (Kral 1993).

The Norway Maple (*Acer platanoides*) is invasive to Long Island. This tree can grow 20-30 meters tall and the bark is grey-brown. It has opposite leaves that have five lobes and its stems secrete a milky substance when they are broken. This tree was found on the two Deer Park properties, and with further research it was found that this tree reproduces easily. It produces a very large amount of seeds that sprout very easily. They also can grow quickly in a variety of different conditions (Morgan 2005).

The Colorado Spruce (*Picea pungens*) is invasive to Long Island. It usually grows from 25-30 meters but sometimes to 46 meters. It has grey bark, and has sharp, needle-like leaves (Taylor 1993).

The Red Maple (*Acer rubrum*) is invasive to Long Island but is very commonly found on Long Island in the wooded areas. It reaches heights of 18 to 27 meters but sometimes can grow up to 35 meters. When the tree is young, the bark is a pale grey but it turns darker the older the tree becomes. Their leaves have five lobes (Morgan 2005).

The Flowering Dogwood (*Cornus florida*) is native to Long Island and is a small tree growing to 10 meters. The leaves are opposite but have no lobes, but are finely toothed. It has small flowers that are usually white but sometimes pink in color and the petals are 3 centimeters long (The Royal Horticulture Society 2011).

The Southern Magnolia (*Magnolia grandi flora*) is a medium to large tree considered evergreen, that can grow up to 90n feet tall. It has dark green leaves considered thick and leathery, and it produces white flowers that are followed by a rose colored fruit (Maisenhelder 1970).

The Weeping Juniper (*Juniper flaccida*) is a small tree, sometimes considered a shrub that grows slowly but lives for a long time. It's final height at maturity is 25 to 30 feet (Powell 1988).

The White Spruce (*Picea glauca*) grows up to 49 to 98 feet tall and is also considered an evergreen. It is invasive to Long Island, also being called a "Canadian Spruce". In has thin bark, and needle-like leaves (Rushforth 1987).

The Flowering Plum (*Prunus mume*) is a tree that is invasive to Long Island, sometimes being called the "Chinese Plum" or "Japanese Apricot". It flowers around January to late February and the flowers are followed by fruit (Wessel 2011).

The Weeping Cherry (*Prunus subhirtella*) is a tree that originated in Japan making it invasive to Long Island, but it is unknown where this tree grows on its own in the wild. It is a small flowering tree, that is also known by the names "Spring Cherry", "Higan Cherry" or "Rosebud Cherry" (Bailey 1976).

The Bradford Pear (*Pyrus calleryana*) is a medium-sized tree that is categorized for its rapid growth. Its leaves are simple and ovate with a leathery texture, and it produces white flowers in late April to early May followed by fruit (Brand 2001).

One of the trees that were found on both of the Deer Park properties and one of the North Babylon properties was not able to be identified according to the *dichotomous key*. It was the Japanese Maple tree, which would be in the *Acer* classification because of its maple characteristics and it is invasive to Long Island. It is a tree that reaches heights of 6-10 meters, sometimes (but rarely) 16 meters. It has multiple trunks stemming from the ground. Its leaves have five, seven or sometimes nine lobes (Rushforth 1999).

#### **Methods:**

Two residences in Deer Park that were chosen: 19 Winnecomac Avenue and 10 Wheeler Court. Leaf samples that were still attached to the stems were taken from both areas. 19 Winnecomac Avenue had three trees available for sampling and 10 Wheeler Court had five. The trees were identified using a *dichotomous key* (Watts 1998). Once all of the trees were identified and recorded, the identified trees for both areas were compared.

Using the online science journal, *Saturn Journal*, reports studying trees in North Babylon were found. The reports had trees already identified in the same way that the Deer Park trees were identified. The two areas were 116 Erlanger Blvd. and the second was 4 Kent Lane (Alcindor and DiNapoli 2012). The results of these tree identifications were compared with the ones from the Deer Park areas. 116 Erlanger Blvd had six trees identified, and none were in common with either Deer Park residence. 4 Kent Lane had three trees identified and one was in common with both Deer Park residences, and its other two trees were in common with 10 Wheeler Ct.

#### **Results:**

**Table 1:** Invasive and Native Trees Found in Deer Park and North Babylon Properties.

Species	Amount found on 10 Wheeler Court	Amount found on 19 Winnecomac Avenue	Amount found on 4 Kent Lane	Amount found on 116 Erlanger Blvd.	Native or Invasive to Long Island?
Colorado Spruce	1	-	-	-	Invasive
(Picea pungens)					
Norway Maple	1	-	-	-	Invasive
(Acer Platanoides)					
Red Maple	1	1	1	-	Invasive
(Acer rubrum)					
Flowering Dogwood	1	-	1	-	Native
(Cornus florida)					
Japanese Maple	1	1	1	-	Invasive
(Acer)					
Shortleaf Pine	-	1	-	-	Native
(Pinus enchinata)					
Southern Magnolia	-	-	-	1	Invasive
(Magnolia gandi					
flora)					
Weeping Juniper	-	-	-	1	Invasive
(Juniper flaccida)					
White Spruce	-	-	-	1	Invasive
(Picea glauca)					
Flowering Plum	-	-	-	1	Invasive
(Prunus subhirtella)					
Weeping Cherry	-	-	-	1	Invasive
(Prunus subhirtella)					
Bradford Pear	-	-	-	1	Invasive
(Pyrus calleryana)					

The hypothesis prior to research was there would be similar species of trees in the North Babylon and Deer Park areas consisting of many more native than invasive species between the four properties. This was thought because the distance between the two towns is only about 1.38 miles. Two of the three tree samples from the first residence in Deer Park were the same as the trees found in the second Deer Park residence. The research that was done provided evidence that supports the hypothesis of having similar tree species, but does not support that the majority of species found are native.

Two areas in North Babylon were researched to match the two areas in Deer Park that were originally studied. The first North Babylon residence did not have any trees similar to the ones in the Deer Park residences, but the second North Babylon area had all three trees similar to ones that were located on the Deer Park residences. The Species that were found to be the same between the 4 Kent Lane, North Babylon and both Deer Park properties were the Red Maple, Japanese Maple and Flowering Dogwood. Because these trees are common in all three properties studied, it can be shown that many of the tree species on Long Island are invasive. Based on table 1, the only native trees that were found were the Shortleaf Pine and the Flowering Dogwood, supporting that there are not many native species between the two towns on residential properties.

#### **Discussion:**

Neighboring towns on Long Island have similar trees because of their close proximity to one another. The closeness allows for the trees to naturally grow, having a short distance for their seeds to travel. Also, homeowners that live in neighboring towns could possibly be buying similar invasive trees to plant on their properties because of shared nurseries that may be located between the two towns leading to more invasive species being planted on their properties.

Two different studies about trees in Bay Shore, NY also showed this to be true. One property, 1322 Manor Lane in Bay Shore, NY had identified the tree species Sugar Maple (*Acer saccharum*) (Garistina, 2012). A second property, 111 Queen Street that is also located in Bay Shore, NY was also able to identify this species (Prince, 2012). These two properties are only about 2 miles away from one another, and the same tree species was able to be found on both properties. While the Sugar Maple is a native species to New York, it is invasive to Long Island where it was originally brought to the island to plant on new and developing housing properties for aesthetic purposes (Luzadis and Gossett 1996).

#### **Conclusion:**

The collection of 9 tree species, six from Deer Park and three from North Babylon were observed and confirmed using a dichotomous key. Three species were confirmed to be the same in both towns showing there were a total of 6 different species found.

From the Deer Park sites there was the Colorado Spruce (*Picea Pungens*), Norway Maple (*Acer Platanoides*), Red Maple (*Acer Rubrum*), Flowering Dogwood (*Cornus Florida*), Japanese maple (*Acer Palmatum*), and the Shortleaf Pine (*Pinus Enchinata*). From the North Babylon sites the three species that were found were the same as the ones in Deer Park: Red Maple, Japanese Maple, and Flowering Dogwood. The only confirmed native species were the Flowering Dogwood and the Shortleaf Pine.

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#### A Comparison of Tree Species in Two Elementary Schools within East Northport

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Keywords: Nonnative, native, tree, Long Island, species.

#### Abstract:

In this experiment, a total of eight samples all together; four tree samples from 623 Ninth Avenue East Northport New York and another four samples from 1157 Fifth Avenue East Northport, were collected. Each tree sample was identified by using the dichotomous key. It was concluded that only northern Pin Oak (*Quercus ellipsoidalis*) was not native to the Long Island region, while Black Ash (*Faxinus nigra*), American Sycamore (*Platanus occidentalis*), Red Oak (*Quercus rubra*), Box Elder (*Acer negudo*), White Pine (*Pinus strobus*), and White Spruce (*Picea glauca*) were native to Long Island.

#### **Introduction:**

Ecosystems are major systems that include organisms and their nonliving environment (Raven 2011). In an ecosystem, organisms rely on each other as well as the nonliving things around them. The nonliving environment is composed of the soil, water, amount of sunlight, air and water temperature, etc. The Earth is divided into many biomes. Biomes are major types of ecosystems on Earth (Raven 2011). These biomes can be defined by their regional climatic trends and organisms that inhabit that specific region. The climatic trends are long term measurements of humidity, air temperature, precipitation, wind, and atmospheric pressure. Biomes are usually named after the vegetation the vegetation prevalent in that region.

The eastern coast of the United States is a temperate deciduous forest. A temperate deciduous forest experiences mild seasonal climate meaning it has cold winters and warm summers (Raven 2011). It is called a deciduous forest because deciduous trees are those that lose their leaves in the winter and grow them in the spring going into summer. However, even these major climates can be broken down into even more regional and local ecosystems as shown in the figure below.



Figure 1: Regional Ecosystems, U.S Forest Service

The figure shows the United States, which is separated into 221 provinces. The province of East Northport, specifically New York, is an Eastern broadleaf forest (oceanic) province according to the U.S forest service. This means that the area is usually characterized by a variety of oaks, basswoods, sugar maple, pines, and other species of deciduous and coniferous trees.

In the experiment a total of eight tree samples was collected from two points in East Northport Long Island, in order to determine whether the trees in this area correlate with the trees normally found in the regional ecosystem by U.S. Forest Service. It was hypothesized that the tree samples found were to be deciduous and coniferous trees that are native to Long Island due to the fact that both locations are located in the same province.

#### Method:

Two sites were sampled: one from Pulaski Road Elementary School located at 623 Ninth Avenue East Northport, NY 11731, and other from Fifth Avenue Elementary School located at 1157 *Fifth Avenue* East Northport, NY 11731. Four species samples were taken from each area along with the circumferences and GPS coordinates of the trees. Once the samples were secured, they were organized and identified by using a dichotomous key.

#### **Results:**

Table 1A: Tree data from Pulaski Road Elementary School

Tree	Circumference (cm)	Latitude	Longitude	Species
1	216	40.876930	-73.336294	Black Ash
				Faxinus nigra
2	190	40.877077	-73.336230	American Sycamore
				Platanus occidentalis
3	205	40.876957	-73.336805	Red Oak
				Quercus rubra
4	93	40.876882	-73.336899	Box Elder
				Acer negudo

Table 2A:	Tree data	from	Fifth	Avenue	Elementary	School
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Tree	Circumference (cm)	Latitude	Longitude	Species
1	167	40.876320	-73.306415	American Sycamore
				Platanus occidentalis
2	69	40.876314	-73.306398	White Pine
				Pinus strobus
3	241	40.876397	-73.306410	Northern Pin Oak
				Quercus ellipsoidalis
4	95	40.876159	-73.305793	White Spruce
				Picea glauca



Table 1B: Tree pictures from Pulaski Road Elementary School



Table 2B: Tree pictures from Fifth Avenue Elementary School

The trees identified in this research were: Black Ash (*Faxinus nigra*), Red Oak (*Quercus rubra*), Box Elder (*Acer negudo*), which are all deciduous species, in Pulaski Road Elementary School. In contrast, both coniferous species such as White Pine (*Pinus strobus*), and White Spruce (*Picea glauca*) were in Fifth Avenue Elementary school, as well as the deciduous Northern Pin Oak (*Quercus*  *ellipsoidalis*). Both elementary schools contained a deciduous species called American Sycamore (*Platanus occidentalis*) on their grounds.

#### **Discussion:**

American Sycamore (*Platanus occidentalis*), Red Oak (*Quercus rubra*), White Pine (*Pinus strobus*), Black Ash (*Faxinus nigra*), Box Elder (*Acer negudo*) and White Spruce (*Picea glauca*) were proven to be native to Long Island. Only Northern Pin Oak (*Quercus ellipsoidalis*) was confirmed not native to Long Island, New York region. (NRCS). It is possible that the latter was planted by people located in the region for aesthetic purposes, for such a tree is found to be native to Midwest United States. Oddly, this tree species was also the tree with the largest circumference of 241cm. In future studies, we intend on attempting to understand whether or not the circumference of the tree can be used to define the native species from nonnative species.

#### **Conclusion:**

Only two out of eight samples, the White Pine (*Pinus strobus*), and White Spruce (Picea glauca), were confirmed as coniferous species. While the rest of the tree samples such as Black Ash (*Faxinus nigra*), American Sycamore (*Platanus occidentalis*), Red Oak (*Quercus rubra*), Box Elder (*Acer negudo*), and Northern Pin Oak (*Quercus ellipsoidalis*) were confirmed as deciduous trees. All but one of the tree species were native to Long Island. The hypothesis was proven to be generally accurate, although in such environments nonnative species are occasionally planted for aesthetic or other purposes.

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# Antimicrobial Activity of Spice Extracts on Escherichia coli, Staphylococcus epidermidis and Pseudomonas aeruginosa

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Keywords: Microbiology, Antimicrobial, Cloves, Escherichia coli, Pseudomonas aeruginosa

#### Abstract:

Antimicrobial activity of four different spices was tested on three species of bacteria, namely, *Escherichia coli, Staphylococcus epidermidis* and *Pseudomonas aeruginosa*. The spices used in this study were cinnamon, clove, garlic and turmeric. The cultures were exposed to concentrated and diluted spice extracts. Only the concentrated clove (*Syzygium aromaticum*) extract showed antimicrobial activity on *Escherichia coli* and *Staphylococcus epidermidis*. *Pseudomonas aeruginosa* was resistant to all the spice extracts used in this study.

#### **Introduction:**

Spices have been part of our diet since the beginning of time and it has been used for many purposes. Clove, cinnamon and garlic, among other spices have been "used in folk medicine and are still used in the alternative system of health care" (Sofia, 2007). Cloves (*Syzygium aromaticum*) have been used by people who cannot afford expensive medications (Gupta, 2009). Eugenol and eugenyl acetate found in clove extract have antibacterial activity (Sung-Youn *et al.*, 2011). Cinnamon (*Cinnamomum*) contains eugenol and cinnamaldehyde and these phenolic compounds, which could be responsible for their antimicrobial activity (Sofia, 2007). Turmeric (*Curcuma longa*) contains an active compound called curcumin, which has antioxidant, anti-inflammatory and anticancer properties (Tzu Yu, 2012). Garlic also contains chemicals such as allicin that increase antioxidant and antimicrobial effectiveness (Kim, 2010). This study was conducted to determine the sensitivity of *Escherichia coli, Staphylococcus epidermidis and Pseudomonas aeruginosa* to the above mentioned spices.

#### **Methods and Materials:**

The broth cultures that were used to inoculate the plates for antimicrobial activity were purchased from Carolina Biological. The cultures were inoculated in Brain Heart Infusion Broth (BHIB) and were incubated at 37° C for 24 hours. The spice powders were purchased from a local supermarket. The concentrated extracts were prepared by soaking 5 grams of each spice powder into 100 ml of water for 72 hours at room temperature. After the spices were soaked, the suspensions were strained to get the extract using sterile coffee filters. To get the dilute extract, 10 ml of the concentrated extract was added to 10 ml of sterile water.

Disc diffusion method was used to test the antimicrobial activity. The bacteria were inoculated, for confluent growth, on to Mueller-Hinton agar plates. The plates were divided into four sections and each section was then labeled with the spice used in this study. The letter C was used for cinnamon, Cl for cloves, G for garlic and T for turmeric. Aseptic procedure was used to inoculate each plate for confluent growth. A sterile cotton swab was dipped in the culture and it was moved in a zigzag pattern throughout the medium, until the entire surface of the medium is covered with the bacteria. A filter

paper disc, 6 mm in diameter, was soaked in the extract and then was placed in the middle of the section with the appropriate label. The forceps that was used to pick up the disc was passed through a flame of the Bunsen burner before the procedure was done again with a difference extract. After placing the four discs in the corresponding sections on the Mueller-Hinton plates, the plates were incubated upside down at  $37^{\circ}$ C for 24 hours. When the experiment was performed, the sterility of the extracts was determined by inoculating the extracts on the Brain Heart Infusion Agar plates and incubating the plates at  $37^{\circ}$ C for 48 hours.

#### **Results:**

It was found that the concentrated extracts of cloves (*Syzygium aromaticum*) produced the zones of inhibition on *Escherichia coli* and *Staphylococcus epidermidis* plates (Table 1). The diameter of the inhibition zone on *Escherichia coli* was 8 mm (Table 1, Figure 1) and on *Staphylococcus epidermidis* was 9 mm (Table 1). The other three spice extracts did not produce any zones of inhibition on these two species (Table 1 and Table 2). Absence of growth was not seen with all the four diluted spice extracts, namely, Garlic (*Allium sativum*), Cinnamon (*Cinnamomum*), Turmeric (*Curcuma longa*) and Cloves (*Syzygium aromaticum*) on any of the three species of bacteria (Table 2). *Pseudomonas aeruginosa* was resistant to all the spices tested in this study including the concentrated extracts (Figure 2, Table 1, Table 2).

All the extracts used in this study were sterile except the garlic extract which had a few white, dry colonies similar that of *Bacillus*.

Spices	Escherichia coli	Pseudomonas aeruginosa	Staphylococcus epidermidis
Cinnamon	0 mm	0 mm	0 mm
Cloves	8 mm	0 mm	9 mm
Garlic	0 mm	0 mm	0 mm
Turmeric	0 mm	0 mm	0 mm

Table 1: Zones of inhibition Produced by the Concentrated Spice Extracts

mm - millimeters

Table 2: Zones of inhibition Produced by the Diluted Spice Extracts

Spices Diluted Extract	Escherichia coli	Pseudomonas aeruginosa	Staphylococcus epidermidis
Cinnamon	0 mm	0 mm	0 mm
Cloves	0 mm	0 mm	0 mm
Garlic	0 mm	0 mm	0 mm
Turmeric	0 mm	0 mm	0 mm

mm - millimeters

# Figure 1: *Escherichia coli* in the Concentrated Spice Extracts



Figure 2: *Pseudomonas aeruginosa* in the Concentrated Spice Extracts



C -Cinnamon, Cl-Clove, G- Garlic and T-Turmeric

#### **Discussion:**

Slight inhibition of growth was seen on *S. epidermidis* and *E. coli* with the concentrated extract of cloves. Similar results were obtained by Sofia *et al.* (2002) who also reported that the cinnamon inhibited the growth of *Escherichia coli*. The resistant of *E. coli* to cinnamon that was seen in this study may be due to the strain of *E. coli* or the lower concentration of the cinnamon extract used in this experiment.

*Pseudomonas aeruginosa* was resistant to all the spices including the cloves, which is similar to the results obtained by Gupta *et al.* in 2009. *P. aeruginosa* has a "low permeability outer membrane and expression of a number of broadly specific multidrug efflux systems" (Kermanshahi, 2011). The resistance of *P. aeruginosa* to the extracts is consistent with the characteristics of this bacterium.

Standardization of the cultures will facilitate more accurate comparison on the sensitivity of bacteria to spice extracts. Microbial contamination in the garlic extract can be removed by using nitrocellulose filters.

#### Conclusion

*S. epidermidis* and *E. coli* were slightly sensitive to clove extract. Cinnamon, garlic and turmeric extracts were not effective in preventing the growth of these two bacteria. *P.* aeruginosa was resistant to all the spice extracts used in this experiment.

Further studies could be conducted by using higher concentrations of the spice extracts on the same species of bacteria and also on different species of microbes. In addition, other spices and herbs can also be tested to observe the sensitivity microbes.

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#### A Comparison of Tree Species from Northern, Central, and Southern Long Island

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Key Words: Tree, Species, Brentwood, Bay Shore, East North Port, New York

#### Abstract:

Seven

different tree species were collected from three residential properties in Brentwood, Bay Shore, and East North Port on Long Island, New York. Balsam Poplar (*Populous balsamifera*), Serviceberry (*Amelanchier arborea*), European Beech (*Fagus syluatica*), and White Mulberry (*Morus alba*) were found in Brentwood. Sugar Maple (*Arcer saccharum*), and Sycamore (*Platanus occidentalis*) were found in Bay Shore. Pin Oak (*Quercus palustris*) was found in East North Port. There were no tree species that were similar to the three properties.

#### **Introduction:**

Throughout Long Island there is a large variety of different tree species. In this study the tree species identified were a Balsam poplar (*Populous balsamifera*), Serviceberry (*Amelanchier arborea*), European Beech (*Fagus syluatica*), White Mulberry (*Morus alba*), Sugar Maple (*Arcer saccharum*), Sycamore (*Platanus occidentalis*), and a Pin Oak (*Quercus palustris*). The Balsam Poplar (*Populous balsamifera*) grows generally in the North Western Hemisphere, but is not native to Long Island. Its leaves are rounded at the bottom and come to a point, and it has jagged edges. They have one large vein down the middle with more veins coming off if the main vein. The Balsam poplar can grow between 60 and 80 feet tall when mature. (Watts, 1991) (Strathe, 2001)

The Serviceberry also known as the Juneberry (*Amelanchier arborea*) is widespread in the United States, and is native to Long Island. Its leaves are oval shape with pointy edges. They also have one large vein down the middle with more veins coming off if the main vein. The Serviceberry can grow between 10 and 25 feet. (Watts, 1991) (Strathe, 2001)

The European Beech (*Fagus syluatica*) grows in the North East of the United States, but is not native to Long Island. Its leaves have an oval shape with smooth edges. They have one large vein down the middle with more veins coming off if the main vein. When mature, it can grow from 10-80 feet tall. (Watts, 1991)(Strathe, 2001) The White Mulberry (*Morus alba*) grows in all states of the United States except Arizona, Alaska, and Nevada, and are native to Long Island. Its leaves are rounded at the bottom and come to a point, and it has jagged edges. They have one large vein down the middle with more veins coming off if the main vein. The White Mulberry can grow to 30-50 feet tall. (Watts, 1991) (Strathe, 2001)

The Sugar Maple (*Arcer saccharum*) grows in Eastern United States, and is native to Long Island. Its leaves have three lobes with points. They have three main veins and have more veins coming off of the main veins. The Sugar Maple's normal height ranges between 70 to 100 feet. (Watts, 1991) (Strathe, 2001)

The Sycamore (*Platanus occidentalis*) grows mid-United States to Eastern United States, but is not native to Long Island. The leave have three to five lobes with points. They can have three to five main veins with more little veins coming off of the main veins. The Sycamore can grow to heights of 98-130 feet. (Watts, 1991) (Strathe, 2001) Pin Oak (*Quercus palustris*) grows throughout mid-western and eastern United States, but is not native to Long Island. The leaves have four or more distinct lobes with points. They have one main vein and more veins

coming from the main vein. The Pin Oaks grow between 50-75 feet tall. (Watts, 1991) (Strathe, 2001)

#### Method:

Samples of seven trees were taken from three different residential properties located in northern, central and southern Long Island, New York; 1001 Crooked Hill Rd. Brentwood, New York; 1213 Hyman Ave. Bay Shore, New York; and 130 Ketay Dr. South East North Port, New York. Two dichotomous keys (Watts, 1991, Strathe, 2001) were used to identify and confirm the species of each tree.

#### **Results:**

In Brentwood the following trees were identified; the Balsam Poplar (*Populous balsamifera*), the Serviceberry also known as the Juneberry (*Amelanchier arborea*), the European Beech (*Fagus syluatica*), and the White Mulberry (*Morus alba*). In Bay Shore the Sugar Maple (*Arcer saccharum*), and the Sycamore (*Platanus occidentalis*) were identified. In East North Port the Pin Oak (*Quercus palustris*) was identified.

Areas	Address	Common Name	Scientific Name
		<ul> <li>Balsam Poplar</li> </ul>	Populous
Central Long	1001 Crooked Hill	<ul> <li>Serviceberry</li> </ul>	balsamifera
Island	Rd.	<ul> <li>European Beech</li> </ul>	✤ Morus alba
	Brentwood, NY	<ul><li>White Mulberry</li></ul>	Fagus syluatica
			✤ Amelanchier
			arborea
Southern Long	1213 Hyman Ave.	<ul> <li>Sugar Maple</li> </ul>	✤ Arcer saccharum
Island	Bay Shore, NY	<ul> <li>Sycamore</li> </ul>	Platanus
			occidentalis
Northern Long	130 Ketya Dr. South	Pin Oak	<ul> <li>Quercus palustris</li> </ul>
Island	East North Port, NY		

#### Table 1: Tree Species on Long Island

#### **Discussion:**

When comparing other tree studies from Long Island, similarities and differences can be found. Cutrone et al. (2012) identified the following tree species in Brentwood: Easter Hemlock (*Tsuga canadensis*) and Norway maple (*Acer platenoides*). Also in Brentwood, Deorag, et al. (2012) identified Red Cedar (*Juniperus virginiana*), Norway Maple (*Acer platanoides*), American Mountain-Ash (*Sorbus Americana*), and Arbor Vitae (*Thuja occidentalis*). In Brentwood, Leiva and Ferrandes (2012) identified Bald Cypress (*Taxoduim distichum*), Arbor Vitae (*Thuja occidentalis*), American Mountain-Ash (*Sorbus Americana*), and Douglas Fir (*Pseudotsuga menziesii*). Lennon and Palacios (2012) identified a Sugar Maple (*Arcer saccharum*) and a White Cedar (*Chamaecyparis thyoides*) in Brentwood. Rivera et al. (2012) identified a Northern Pin Oak (*Quercus ellipsoidalis*) in Brentwood, a Balsam Fir (*Abius balsam*) in East North Port, and an American Mountain-Ash (*Sorbus Americana*) and a Balsam Poplar (*Populous balsamifera*) in Bay Shore. Also in Bay Shore, Garistina (2012) identified the following: White Pine (*Pinus strobe*) Sugar Maple (*Arcer saccharum*) Red Cedar (*Juniperus virginica*) White Cedar (*Chamaecyparis thyoides*) Blue Ash (*Fraxinus quddrangulata*) White Mulberry (*Morus rubra*) Flowering Dogwood (*Cornus florida*) English Oak (*Quercus alba*) Arbor Vitae (*Thuja occidentalis*).

Species	Species Common Name Number Found By Location		Location	Reference	
-		Southern	Central	Northern	
Tsuga	Easter Hemlock		1		Cutrone et al. (2012)
canadensis					
Acer	Norway Maple		2		Cutrone et al. (2012)
platenoides					Deorag et al. (2012)
Juniperus	Red Cedar	1	1		Deorag et al. (2012)
virginiana					Garistina (2012)
Acer	American	1	2		Deorag et al. (2012)
platanoides	Mountain-				Leiva et al. (2012)
	Ash				Rivera et al. (2012)
Thuja	Arbor Vitae	1	2		Deorag et al. (2012)
occidentalis					Leiva et al. (2012)
					Garistina (2012)
Taxoduim	Bald Cypress		1		Leiva et al. (2012)
distichum					
Pseudotsuga	Douglas Fir		1		Leiva et al. (2012)
menziesii					
Arcer	Sugar Maple	1	1		Lennon and Palacios
saccharum					(2012)
					Garistina (2012)
Chamaecyparis	White Cedar	1	1		Lennon and Palacios
thyoides					(2012)
					Garistina (2012)
Quercus	Northern Pin		1		Rivera et al. (2012)
ellipsoidalis	Oak				
Abius balsam	Balsam Fir			1	Rivera et al. (2012)
Populous	Balsam Poplar	1			Rivera et al. (2012)
balsamifera					
Pinus strobe	White Pine	1			Garistina (2012)
Fraxinus	Blue Ash	1			Garistina (2012)
quddrangulata					
Morus rubra	White Mulberry	1			Garistina (2012)
Cornus florida	Flowering	1			Garistina (2012)
	Dogwood				
Quercus alba	English Oak	1			Garistina (2012)

 Table 2: Tree Species found on Long Island in additional studies

During this tree species study, Pin Oak was found on Northern Long Island, Sugar Maple was found on Southern Long Island, and Balsam Poplar and White Mulberry were found on Central Long Island. When comparing this study to other tree specie studies Pin Oak and Sugar Maple were found on Central Long Island, and Balsam Poplar and White Mulberry were found on Southern Long Island.

#### **Conclusion:**

The tree species found in Central Long Island in Brentwood were: Poplar (*Populous balsamifera*), Serviceberry (*Amelanchier arborea*), European Beech (*Fagus syluatica*), and White Mulberry (*Morus alba*). The tree species found in Southern Long Island in Bay Shore were: Sugar

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Maple (*Arcer saccharum*), and Sycamore (*Platanus occidentalis*). The tree species found on in Northern Long Island in East North Port was Pin Oak (*Quercus palustris*). In this comparison there were no tree species that were identified to be the same on each property, but from other comparisons there are some similar tree species between Central, and Southern Long Island, and Central and Northern Long Island. Red Cedar, Arbor Vitae, American Mountain-Ash, White Mulberry, Balsam Poplar, and Sugar Maple, were found to be similar in central and southern Long Island. Northern Pin Oak was similar in central and northern Long Island.

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#### A Comparison of Tree Species from the North Shore and the South Shore of Long Island

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Keywords: comparison, species, New York, tree, Long Island

#### Abstract:

Ten trees were identified using two dichotomous keys from four residential properties on Long Island. The trees identified in Commack were the Silver Maple (*Acer saccharinum*), and the Flowering Dogwood (*Cornus florida*). The trees identified in Northport were the Silver Maple (*Acer saccharinum*), the Tree of Heaven (*Ailanthus altissima*), and the Sassafras (*Sassafras albidum*). The trees identified in Huntington were the Flowering Dogwood (*Cornus florida*), the Red Maple (*Acer rebrum*), the Sweetbay Magnolia (*Magnolia virginiana*), the Northern White Cedar (*Thuja occidentalis*), and the Black Cherry tree (*Prunus seratina*). The tree identified in Lindenhurst was the Yellowwood tree (*Cladrastis kentuka*). It was found that deciduous trees are more abundant on the North Shore and South Shore of Long Island than coniferous trees.

#### **Introduction:**

This comparison suggests that deciduous tree species are more abundant than coniferous tree species on the North Shore and South Shore of Long Island. The most abundant were identified as deciduous (Lounsberry, 2012). Some examples of a deciduous tree existing on Long Island are the Silver Maple (*Acer saccharinum*), the Tree of Heaven (*Ailanthus altissima*), and the Black Cherry Tree (*Prunus seratina*). A coniferous tree is one that produces seeds in a cone. One example of a coniferous tree found on Long Island is the Northern White Cedar (*Thuja occidentalis*) (Watts 1998).

The Silver Maple (*Acer saccharinum*) is a very popular tree in the United States and is a fastgrowing ornamental tree. Being one of the most common trees in the United States, it reaches a height of 80 feet with a 50 foot spread. It grows rapidly and can grow in either full sunlight or partial sunlight (Lounsberry 2012).

The Tree of Heaven (*Alianthus altissima*) also known as the Chinese sumac or thinking shumac is a deciduous tree that grows mostly in the tropical quassia family. This tree normally is found in central China but has been seen in many states across the United States. The Tree of Heaven can reach up to 80 feet in height (Lounsberry 2012).

The Flowering Dogwood (*Cornus florida*) is one of the most common understory trees, meaning it grows beneath taller trees. This tree grows to be about 30 feet tall in height and its trunk isn't more than 8 inches wide. In the fall, the leaves of this tree turn bright red (Lounsberry 2012).

The Sassafras (*Sassafras albidum*) is a genus of three extant and one extinct species of deciduous trees that comes from the family Lauraecea. It is native to eastern North America and eastern Asia. These trees grow from about 9-18 meters tall and spread from 7.5-12m. Its trunk grows 70-150 cm in diameter (Lounsberry 2012).

The Red Maple (*Acer rebrum*) is also known as the Swamp, Water or Soft Maple tree. It is one of the most common and widespread deciduous trees in eastern North America. This tree is classified as a medium to large size tree reaching heights of 18 to 27 meters. The diameter of the trunk can range from 46 to 76 cm depending on the growing conditions (Lounsberry 2012).

The Sweetbay Magnolia (Magnolia virginiana) is a fast-growing trunked tree with great

ornamental appeal. It grows to be from 10-60 feet tall and spreads from 10-30 feet. It grows fast and can grow in full sunlight or partial sunlight. Its flowers are white and in the fall its evergreen (Lounsberry 2012).

The Northern White Cedar (*Thuja occidentalis*) is an evergreen coniferous tree that is native to the North east of the United States and the South east of Canada. It grows to be a height of 10-20 meters tall with a 0.4 meters trunk diameter (Lounsberry 2012).

The Yellowwood (*Cladrastis kentuka*) is native to the Southeastern United States. It is a small to medium-sized deciduous tree that grows from 10-15 meters tall. Its leaves turn a mix of yellow, gold, and orange in the fall (Lounsberry 2012).

The Striped Maple (*Acer pensylvanicum*) is also known as Moosewood and Moose Maple. It is a species of maples native to northern North America. It is a small deciduous tree that grows from 5-10 meters tall with a trunk up to 20 cm diameter (Lounsberry 2012).

The Black Cherry (*Prunus seratina*) is a woody plant species that is native to eastern North America. It is a deciduous tree growing to 15-30 meters hall with a trunk diameter of up to 70-120 cm (Lounsberry 2012).

#### Methods:

In this study four students from both the North Shore and South Shore of Long Island collected samples of trees from their properties and used two dichomous keys to identify the tree species (Watts, Watts b, 1998). Tree samples were collected from 35 Waterside Road, Northport New York, 11768; 28 Fox Lane, Commack New York, 11725; 10 Polly Drive, Huntington New York, 11743; 28 Brooktree Circle, Lindenhurst New York, 11757.

#### **Results:**

On the North Shore of Long Island, the trees identified were the Silver Maple (*Acer saccharinum*), Tree of Heaven (*Alianthus altissima*), Flowering Dogwood (*Cornus florida*), Sassafras (*Sassafras albidum*), Red Maple (*Acer rebrum*), Sweetbay Magnolia (*Magnolia virginiana*), Northern White Cedar (*Thuja occidentalis*), Yellowwood (*Cladrastis kentuka*), and Black Cherry (*Prunus seratina*). Of all the trees studied on the North Shore of Long Island, only the Northern White Cedar was found to be conferious while the rest were all deciduous. On the South Shore of Long Island the tree identified was the Striped Maple (*Acer pensylvanicum*), also found to be deciduous.

Towns	Common Name	Scientific Name
Northport	• Silver Maple	Acer saccharinum
	• Tree of Heaven	Ailanthus altissima
	• Sassafras	Sassafras albidum
Commack	• Silver Maple	Acer saccharinum
	Flowering Dogwood	Cornus florida
Huntington	Flowering Dogwood	Cornus florida
	Red Maple	• Acer rebrum
	Sweetbay Magnolia	• Magnolia virginiana
	Yellowwood	Cladrastis kentuka
	Black Cherry Tree	• Prunus serotina
Lindenhurst	Striped Maple	Acer pensylvanicum

Table 1: Tree species on Long Island

	Property 1	Property 2	Property 3	Property 4	Property 5	
Address	35 Waterside	28 Fox Lane	10 Polly	508	28 Brooktree	
	Road		Drive	Heathcote	Circle	
				Road		
Town	Northport	Commack	Huntington	Lindenhurst	Lindenhurst	
Tree Count	3	2	5	0	1	

Table 2: Properties on Long Island

#### **Discussion:**

Many of the trees identified in this study are not native to Long Island. The Tree of Heaven (*Alianthus altissima*) is from central China but could be found in the continental United States and Hawaii (Lounsberry 2012). The Sassafras (*Sassafras albidum*) is native to Eastern North America and Eastern Asia (Lounsberry 2012). These findings are similar to the results found by Rivera et al. (2012). They found the Tamarack (*Larax laricinia*) and the Sugar Maple are not native to Long Island but are located on properties on Long Island. Cutrone et al. (2012) reported the Norway Maple (*Acer plantanoides*) is native to Eastern Europe and Southwest Asia. Prince (2012) reported that the Gingko tree (*Gingko biloba*) is not a native tree to Long island yet was found in Bayshore, New York, it is native to China.

Tree Name	Native	North	South	References
	Location	Shore	Shore	
Tree of Heaven	Central China			Puca et al.
(Alianthus		$\checkmark$		
altissiam)				
Sassafras	Eastern Asia			Puca et al.
(Sassafras		$\checkmark$		
albidum)				
Tamarack (Larix	Canada		$\checkmark$	Rivera et
laricinia)				al. 2012
Sugar Maple	Canada			Rivera et
(Acer saccharum)		$\checkmark$		al. 2012
Norway Maple	Eastern Europe		$\checkmark$	Cutrone et
(Acer	and Southwest			al. 2012
plantanoides)	Asia			
Gingko (Gingko	China		$\checkmark$	Prince
biloba)				2012

Table 3: Additional Reports of Non-Native Tree Species found on Long Island

#### **Conclusion:**

Nine species from the North Shore of Long Island were identified; these are the Silver Maple (*Acer saccharinum*), the Tree of Heaven (*Alianthus altissima*), the Flowering Dogwood (*Cornus florida*), the Sassafras (*Sassafras albidum*), the Red Maple (*Acer rebrum*), the Sweetbay Magnolia (*Magnolia virginiana*), the Northern White Cedar (*Thuja occidentalis*), the Yellowwood (*Cladrastis kentuka*), and the Black Cherry (*Prunus seratina*). Of the nine tree species found in the North Shore,

only one was identified as being coniferous. On the South Shore, a tree was identified as a Stripped Maple (*Acer pensylvanicum*), and was found to be deciduous.

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#### A Comparison of Tree Species from Nassau County to Suffolk County, NY

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#### Abstract:

Eight trees from four different residential properties were identified from two of the different counties of Long Island. The species of trees were identified and confirmed using two dichotomous keys. The trees in Nassau County were identified as a Black Gum (*Nyssa sylvatica*), Sugar Maple (*Acer saccharum*), and a Norway Maple (*Acer platanoides*). The trees in Suffolk County were identified as a Black Locust (*Robinia pseudoacacia*), Norway Maple (*Acer platanoides*), Red Spruce (*Picea rubens*), and a Sugar Maple tree (*Acer saccharum*). It was found that both counties commonly have maple trees.

#### **Introduction:**

Long Island is located on the southeast of the United States, in the state of New York. Long Island is made up of four counties, two of which are districts of New York City (Queens and Brooklyn), and the other two are primarily suburban (Nassau and Suffolk). We explored the many different tree species found in the suburban counties of Long Island, Nassau and Suffolk County. The main objective of this study was to determine if the two counties had the same tree species. We hypothesized that we would not find the same trees in both counties. However, we discovered that in fact both counties are frequently filled with maple trees.

#### Method:

Two students observed and identified trees on their property. They also identified some species of trees from their neighbor's properties. The students identified five species of trees in total. Recorded in Tables 1 and 2 below, they collected data included the address, lot size, region, and town where they found the tress. This was recorded in Table 1. Four properties were observed in total. Two properties were located in Brentwood, NY (Suffolk County) and the other two were located in Garden City, NY (Nassau County). Leaves were collected from each property. The species were identified using two dichotomous keys (Watts 1998, Petrides and Wehr 1988).

#### **Results**:

In Nassau County the type of trees that were identified were the Sugar Maple (*Acer saccharum*), Norway Maple (*Acer platanoides*), and Black Gum (*Nyssa sylvatica*). In Suffolk County the type of trees that were identified were the Sugar Maple (*Acer saccharum*), Black Lotus (*Robinia pseudoacacia*), Norway Maple (*Acer platanoides*), and Red Spruce (*Picea rubens*). The common tree identified in both counties was the Sugar Maple (*Acer saccharum*) and the Norway Maple (*Acer platanoides*) tree as seen in Table 2.

	Property 1	Property 2	Property 3	Property 4
Address	134 Oray Street	132 Oray Street	68 2 <sup>nd</sup> Avenue	54 2 <sup>nd</sup> Avenue
Lot Size (sq. ft)	2,373	2,278	2,500	7,500
Region	Suffolk – Central	Suffolk – Central	Nassau –	Nassau –
	L.I.	L.I.	Western L.I	Western L.I.
Town	Brentwood	Brentwood	Garden City	Garden City

Table 1: The properties in Suffolk and Nassau County

Table 2: The Type of Tress

<b>Types of Tree</b>	Property 1	Property 2	Property 3	Property 4
Sugar Maple Tree	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$
(Acer saccharum)				
Black Lotus	$\checkmark$	$\checkmark$		
(Robinia				
psedudoacacia)				
Norway Maple Tree	$\checkmark$		$\checkmark$	$\checkmark$
(Acer platanoides)				
Black Gum Tree			$\checkmark$	$\checkmark$
(Nyssa sylvatica)				
Red Spruce	$\checkmark$	$\checkmark$		
(Picea rubens)				

#### **Discussion:**

The results we had did not support the hypothesis we had made. We believed we were going to find different species of trees in Suffolk County than in Nassau County. Instead, we identified similar trees from both Nassau and Suffolk County. Compared to the findings of Marino et al. (2012) we didn't get the same species of trees. However, in their experiment they did get the same species of trees from their properties. Cutrone et al. (2012) identified a Norway Maple Tree (*Acer platanoides*) in the same town as our studies, which was Brentwood, NY (Suffolk County).

#### **Conclusion:**

The trees found in our study were a Black Gum (*Nyssa sylvatica*), Sugar Maple (*Acer saccharum*), and a Norway Maple (*Acer platanoides*) in Nassau Country and Black Locust (*Robinia pseudoacacia*), Norway Maple (*Acer platanoides*), Red Spruce (*Picea rubens*), and a Sugar Maple tree (*Acer saccharum*) in Suffolk country. Based on our results, we've found that Sugar Maple trees were the most commonly planted tree on all properties. Of Long Island's maple trees, the most common types are the Red Maple (*Acer rubrum*), Sugar Maple, and Norway Maple. The Red Maple (*Acer rubrum*) is very common in the woods of Long Island (Petrides et al. 1988).While Norway (*Acer platanoides*) and Sugar Maples are planted as shade trees. The experiment concludes that the same types of trees are found in both Suffolk and Nassau County.

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