

EXOTIC INVASIVE VINES IN FAIRMOUNT PARK

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ABSTRACT: Fairmount Park, the largest urban park system in the world, is one of the greatest assets of the City of Philadelphia. Today, forested areas are vulnerable to many environmental abuses. One of the least recognized of these is the invasion of exotic plants. The purpose of this research was to ascertain damage caused by these plants in the Fairmount Park System. The results of field observations demonstrated that Fairmount Park has been disturbed by invasive exotic plants. It was also established that maintenance of the park system is necessary in order to keep these plants in control. Finally, this research confirmed that a combination of invasive exotic plants and deer overpopulation has caused a lack of forest understory, thus endangering the future health of the forest.

INTRODUCTION

The City of Philadelphia has many interesting features, and one of the greatest assets of the City of Philadelphia is its park system. Fairmount Park, the largest urban park in the world, is under the auspices of the Fairmount Park Commission. The purpose of this Commission, established in 1867 by the Commonwealth of Pennsylvania, is to assure that the "greene country towne" founded by William Penn would continue to be preserved and cherished.¹ The cornerstone of this 8,700 acre park system is the forest that can be found in the four major stream valleys located along the Schuylkill River, Pennypack Creek, Tacony Creek, and the Wissahickon Creek.²

The ecosystems of these forested areas are vulnerable to many environmental abuses due to their location within a large urban area, such as: water pollution, deer overpopulation, and human interference. One of the least recognized problems faced by the Fairmount Park System is the invasion of non-indigenous plants.

The introduction of non-native plants has caused problems in other regions of the country. The kudzu, originating in Asia, is now overtaking the landscape in the southeastern portion of the United States, and the melaleuca tree, from Australia, is causing severe ecological damage in the Everglades National Park.³ In this paper, the authors will focus on the introduction of non-indigenous plants to forested areas as they relate to the Fairmount Park System.

FOREST ECOLOGY

To research this topic, it is important to understand the ecology of the forest found in Fairmount Park. According to the Audubon Society, the forest of eastern North America, including the southeast corner of Pennsylvania, is a Mixed Deciduous forest. This type of forest can be found in much of the eastern and middle portion of the United States. The extent of this forest is shown on the following map.⁴

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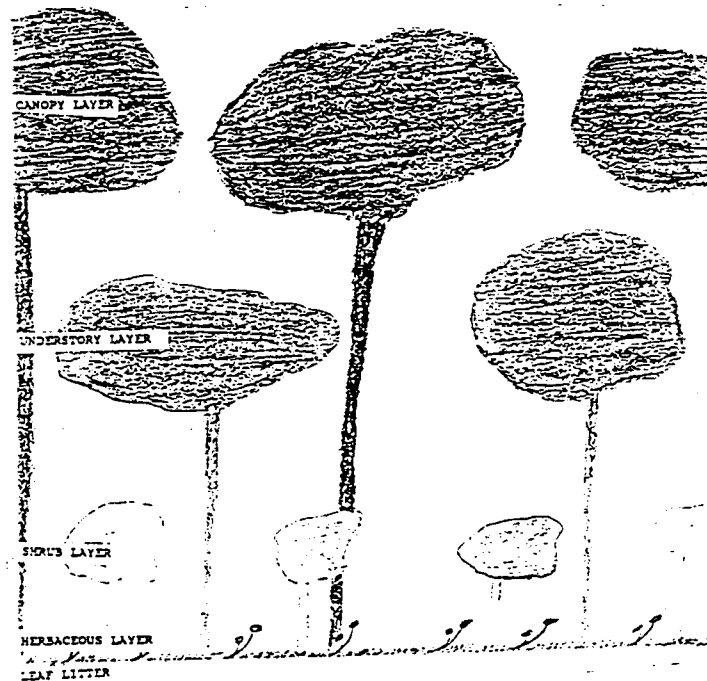
MAP A - RANGE OF MIXED DECIDUOUS FOREST



Source: Audubon Society Nature Guides—Eastern Forests

The Mixed Deciduous forest is diverse and contains at least three dozen species of trees, including broad leaf and evergreens.⁵ In addition, there are a great variety of shrubs in the understory layer and hundreds of wildflowers on the forest floor.⁶ A diagram of the structure of the Eastern Mixed Deciduous Forest is shown below.

DIAGRAM - STRUCTURE OF MIXED DECIDUOUS FOREST



There are a number of reasons why the Mixed Deciduous forest has such a diversity of plant life. One reason is that these forests contain a number of micro-habitats, such as cool, shady ravines and warm, open spaces.⁷ Therefore, a myriad of plants, whether they flourish in cool or in warm environments, are able to live in the Mixed Deciduous forest. Another reason pertains to the vegetation, and all the plants and trees have adapted and coexist in the same space. For example, the forest wildflowers will complete their entire life cycle prior to the growth of the new spring tree leaves.⁸ Thus, the wildflowers take advantage of the sunlight before the forest floor is shaded by the canopy trees.

This diverse vegetation has also contributed to the vast array of animal species in the Mixed Deciduous forest. The variety of flowers attract a number of insects; the shrub layer contains a large amount of small mammals and the understory layer is the home for many songbirds.⁹

The characteristics of the Mixed Deciduous forest can be seen in the Fairmount Park System. There are some excellent forest stands which consist of this multi-layer structure in the Fairmount Park System, including West Fairmount Park and Pennypack Park.¹⁰ However, there are many areas where the forests do not exhibit these healthy layers. The major problems are caused by storm damage, deer overpopulation, pollution, and encroachment of vines (as a result of increased forest edge caused by development.)¹¹ With such problems, the Fairmount Park forests are in danger of being lost forever.

STATEMENT OF PROBLEM

Invasive plants are overtaking our native forests. There are two methods by which exotic plants enter this region's forests--the intentional introduction and the unintentional introduction.¹²

Intentional introduction is when non-native plants are brought in for a specific purpose. Certain types, such as English ivy and Asiatic orange bittersweet, were imported for plantings in gardens. Other types, such as multiflora rose and kudzu, were imported because of their useful role in controlling soil erosion.

Invasive plants were also introduced by means of unintentional introduction, i.e., natural causes. Birds eat the fruit from vines and their droppings spread the seeds to other areas. These plants may also spread into the forests from windblown seeds.

Invasive plants have both positive and negative effects on the ecosystem. Some positive effects of the vines include a roosting place for hawks and owls, food for birds, and cover for small mammals. Although these vines are helpful in these aspects, they still suffocate and weaken the trees. Much of the forest understory is destroyed by vines which leads to a loss of habitat for animals that live in this layer. For example, neo-tropical songbirds are in danger of becoming extinct as a result of a loss of their habitat in both the temperate and tropical forests.¹³ Another problem occurs when these plants dominate the native species for essential light and habitat. This problem is exacerbated by the deer overpopulation. Deer eat the native species but not the exotic ones.¹⁴

METHODOLOGY

The methodology consisted of literature review, interviews, observations, and other means of data collection. The literature review was used to learn about forest ecology. Interviews were useful for the process of defining the problem, of gaining insight as to the nature of the problem caused by exotic plants, and of determining solutions to the problem. Observations revealed the extent of the

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damage caused by the non-native vines. Data collection included photographs of affected areas and determination of the type of vines which affected those areas.

The literature review included government reports, ecology books, and magazine articles. This provided specifics on the topic which was then applied to the Fairmount Park System.

Interviews with nature specialists, land managers, wildlife biologists, botanists, landscape technicians, and biogeographers provided the necessary foundation to study the topic. Interviewing was also useful in narrowing the field of study to four areas: Ridgeland Mansion in West Fairmount Park, Pennypack Park in Northeast Philadelphia, Lemon Hill in East Fairmount Park, and the Pennypack Ecological Restoration Trust in Huntingdon Valley, Pennsylvania. Ridgeland Mansion and Pennypack Park were chosen because specialists in ecology and landscape management were readily available to answer any questions that surfaced.

Ridgeland Mansion and Pennypack Park were also chosen to demonstrate the difference between intentional and unintentional introduction of the vines in question. Lemon Hill and Pennypack Ecological Restoration Trust were chosen as comparison sites.

Literature review and interviews helped in the determination of which types of exotic invasive plants are affecting Fairmount Park. The three which were mentioned most often were Japanese honeysuckle, multiflora rosa, and Asiatic orange bittersweet, all of which are from Asia.¹⁵

Observations in the four selected areas indicated the location, extent, and manifestation of the damage. The two areas used for comparison provided examples of possible solutions to the problem. Photographs were taken of the affected areas in the data collection process. Determinations were then made as to which types of vines were impacting these areas.

RESULTS OF STUDY

The research showed that the problem of exotic invasive vines is quite extensive in Fairmount Park. Upon entering these forests, the total amount of damage is not immediately evident. Many trees, both old and young, are wrapped in vines, mostly Japanese honeysuckle and much of the ground is covered with multiflora rosa. Although the forest of the park looks quite healthy because of the enormous amount of green foliage, these areas are endangered. Older trees are being lost by storm damage, old age, and various other environmental problems. Under normal conditions, the older trees would be replaced by young trees; however, the young trees are destroyed by the invasive vines.

The vine problem at Ridgeland Mansion is worse than that of Pennypack Park. These plants were intentionally introduced into Ridgeland Mansion and escaped from the confines of the original gardens. Furthermore, the vine problem has magnified due to an increase in sunlight at the forest edge caused by construction of roadways through the park.

At Pennypack Park, storm damage has been a factor in allowing the exotic vines to progress. Several years ago, a fierce storm tore down several large trees, leaving a hole in the canopy.¹⁶ As a result, there was more light in the forest enabling the vines to grow. Today, this area is infested with Japanese honeysuckle and multiflora rosa. In September 1993, a tornado brought down several trees in a nearby section of the park.¹⁷ If steps are not taken, this area will soon be overrun by the invasive vines.

There have been attempts to deal with this problem. For example, the Pennypack Ecological Restoration Trust, a natural land area located in Huntingdon Valley, Pennsylvania, deals with vine invasion. The managers of this park have organized a "Free-A-Tree" Program which brings in volunteers to cut down the vines. Although this program has been somewhat successful, the cleared forest is still not considered a healthy forest.¹⁸ The reason for this is that the young trees are either

cleared away with the vines or eaten by deer, leaving no understory. In an attempt to prevent the vines from re-invading the forest, the managers of the Pennypack Ecological Restoration Trust are planning to plant white pine trees along the forest edge. These trees will provide shade and prevent the vines from growing, thus allowing the forest to recover.¹⁹

Lemon Hill, located in East Park, is an example of how exotic vines, if properly maintained, will not invade the surrounding forest. Lemon Hill is also an example of intentional introduction; however, unlike Ridgeland Mansion, these gardens have been maintained by volunteers from the Colonial Dames of America. Thus the vines have not invaded nearby forests and have not caused any damage.

CONCLUSION

The exotic invasive plants are recognized by park managers as a serious problem; unfortunately, little has been accomplished beyond acknowledging the problem. Several employees of the Fairmount Park Commission stated that the problem will surely magnify if ignored. Fairmount Park is essential to the Philadelphia region. One reason is that the region's air quality currently does not meet federal clean air standards, and the forests in this park system provide a natural relief mechanism for cleansing the air. Since this mechanism cannot be replicated, it is vital that the Fairmount Park System and its forests are protected. Although the efforts of volunteers are extremely important in protecting Fairmount Park, there is still much more that needs to be done.

According to local land managers, more maintenance funds and manpower are necessary to address this issue.²⁰ The maintenance budget of the Fairmount Park Commission is limited; therefore, maintenance is restricted to general cleanups, such as grass cutting and removal of damaged trees.²¹ Because of a lack of funds and manpower, no measures have been taken to deal with the problem caused by invasive plants.

However, these same land managers agree that before the problem of invasive species is addressed, the problem of deer overpopulation must first be resolved. With the combination of a high deer population and exotic invasive vines, young native trees have no chance of survival. Therefore, policy recommendations must incorporate a series of concerns in order to be truly effective.

Questions were raised during this study that, with the appropriate amount of time, would offer invaluable information to park management in general. Observations showed that the wild grape vine is also infesting Fairmount Park; however, this vine is native to the Mixed Deciduous forest, and its growth is part of the natural succession process.²² One question that arises is whether the removal of the grape vine is interfering with the natural process. Some naturalists feel that humans have already interfered with the forest ecosystem causing excessive growth of the vine and thus, its removal is appropriate. This question may be considered for future research.

Overall, this research has demonstrated that the problem of non-indigenous species is an increasing environmental threat to the forests of Fairmount Park. This study has proved valuable in comprehending the important role that Fairmount Park plays within its urban environment of Philadelphia. It is essential that the forests of Fairmount Park are maintained and protected because they are the "lungs of our city."²³

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