

LITERATURE REVIEW

USE OF TREES FOR ORNAMENTAL LANDSCAPING

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Ornamental trees are used in a variety of locations such as parks, college campuses, and cemeteries to beautify and enhance the area. Ornamental trees provide many mutualistic benefits for humans in the area. They also provide other benefits in the location that the tree is planted such as shade, production of oxygen and consumption of carbon dioxide as well as being a food resource for wildlife. Ornamental trees and plants are widely used in landscaping, and an entire discipline of horticulture has been designated to studying and growing ornamental trees and plants. According to the University of Nebraska Agricultural Education Center, “Floriculture is a discipline of horticulture concerned with the growing and marketing of flowers and ornamental plants.” (Univ. Nebraska) Ornamental trees are more attractive in areas that are highly trafficked from humans. S. Kerry stated, “plants are used as materials, or building blocks, to apply the principles of design. Plants offer qualities that help to direct foot traffic in the landscape, moderate the environment around the home, hide objects or lead the eye and stimulate other senses like smell and touch. Plants should be used together to enhance the best features of your property” (Kerry, 2013). This statement about landscaping with ornamental plants can also be applied to ornamental trees as well because ornamental trees are primarily planted for the aesthetic value that they provide. Ornamental trees are used in landscaping for the economic, environmental and aesthetic benefits that comes as a result of planting these trees. While these trees provide value there also negative impacts that come as a result of planting highly specialized, often non-native trees. Planting ornamental trees can have negative impacts on native pollinators and other insects and wildlife as well as the surrounding environment through the use of fertilizers to further enhance the ornamental trees.

Any trees whether ornamental or naturally growing are crucial to the survival of humans because of the environmental benefits that they offer. Trees will absorb carbon dioxide emissions

from cars and take in other gases that contribute to the degrading of the environment (Wagner, 2003). Ornamental trees are also planted in landscaping to improve air quality. It is said that, “one tree can remove 11.7kg of carbon dioxide annually from the atmosphere equaling 11,000 miles of car emissions (Wagner, 2003). Ornamental trees are also selected and planted in purposeful locations to help absorb sound waves and reduce noise pollution. They are also used to reduce heat on buildings thus lessening the energy that particular building is consuming. (C. Ekhumelo) Ornamental trees that are planted next to a building can, “guide air movement, dampen noise, and provide a source of shade.” (C. Ekhumelo) According to (Ekhumelo), “properly selected and placed plants and trees can lower home heating and cooling costs by as much as 20%.” (C. Ekhumelo)

Trees are known to have an economic cost value for a variety of reasons. Trees add value to homes and properties that are being sold and can add up to 14% to the resale value of a home and can also speed the process of selling a property by as much as six weeks. (Marc, 2003). Ornamental trees that are pleasing to the eye that are on the property will surely enhance the selling process. Ornamental trees that are planted next to homes also provide an economic benefit by reducing household energy consumption. The U.S. Department of Energy estimates that three trees that are in a particular place around a home can save the homeowner anywhere from \$100 to \$250 in heating and cooling costs (US Department of Energy, 1995). Ornamental trees also add property value, can provide jobs for the landscapers planting the trees and also attracts tourists. One such example is the cherry blossom festival in Washington D.C. Every year during May, people travel to Washington D.C to attend this festival to see the beautiful, blossoming cherry trees. This festival brings income in a variety of ways to Washington D.C and the surrounding areas.

Not only do ornamental trees provide an environmental and economic benefit to the landscape and to humans but they also can provide important health and aesthetic benefits as well. Ornamental trees such as flowering cherry trees, dogwood trees, and crabapple trees add beauty to the environment and make a location more appealing to people. These trees have beautiful, showy flowers that bloom during the spring time.

Ornamental trees also provide health and psycho-social benefits as well. Studies have continuously proven that well landscaped areas are beneficial for one's mental health, attitude and general well-being. One study looked at workers who had a view of a well landscape area with many trees and flowers. These individuals tended to experience less symptoms related to job stress such as headaches and they also reported that they felt less job pressure and were more satisfied with their jobs (S. Kaplan, 1988).

When planting ornamental trees, the landscaper is particular about designing the area in which the ornamental tree will be planted for the environmental and economic reasons stated above. In urban areas, planning and designing the space for ornamental trees is crucial for the wildlife habitats. Species diversity is a major factor that is considered when designing city landscapes and planting ornamental trees in urban areas. More trees that produce berries and fruits attract more native wildlife. (Robinson, 2004; Barnes, 2005) A variety and an abundance of trees provides wildlife with different habitat options thus sustaining the population of wildlife that has been attracted to that area. A study in Malaysia analyzed different ecological approaches to designing neighborhood green spaces, the study used landscape ecology as an approach to better understand landscape design in city parks. Landscape ecology helps one to better understand the use of green space and how-to best conserve and manage the city greenspace (Mohomad, 2012). In these landscaped areas ornamental trees are planted according to how they

will best be utilized by the native wildlife. This studied looked at the possibility of using forest species instead of ornamental species because of the longevity of forest species compared to ornamental trees. The only negative aspect of planting forest species is that they are generally not prolific fruit bearing trees and urban wildlife would have difficulty finding sources of food. (Mohomad, 2012) Ornamental trees have importance for city landscapes because they provide food and habitat for wildlife.

While ornamental trees are beautiful and provide several benefits to the environment and economy there are also negative issues associated with planting ornamental trees. The biggest issue being is that the tree is not native to the environment. Ornamental trees are planted in parks and urban areas to support biodiversity and to attract native pollinators (Garbuzov, 2017). A study in Sussex, England looked at ornamental plants for sale in garden centers and how attractive those flowering plants are for flower visiting insects. The study identified five retail garden centers and one nursery all within a certain radius of Sussex, England. In the study different plants were identified at peak bloom and insects that visited each plant were counted. It was found that most flowering plants and trees being sold at these garden centers and nursery were unattractive to flower-visiting insects. It is important that flower visiting insects are attracted to the blooms produced by trees because flowers are reliant on flower visiting insects to reproduce through pollen picked up by insects such as bees and butterflies (Garbuzov, 2017). Although this particular study didn't study trees specifically the same principles can be applied to understanding the attractiveness of ornamental trees for flower visiting insects.

In order to maintain the beauty of ornamental trees many landscapers will use fertilizers to enhance the growth and development of the tree. Fertilizers have long been a source of controversy due to the negative impacts that they have on the environment. The use of fertilizers

is bad for the soil, human health, and aquatic life. Nitrates and phosphates are heavily found in chemical fertilizers (C. Ekhumelo). A buildup of nitrates in bodies water of water will lead to algae blooms which in turn leads to a lack of oxygen in the water (C. Ekhumelo). This lack of oxygen kills macroinvertebrates and other life forms in the water. These chemicals can also be found in the ground water which eventually becomes drinking water. If this water is consumed it can have harmful effects on humans, especially in pregnant women. High concentrations of nitrates in the soil can impact the growth of plants and trees. Although fertilizers can aid in beautifying and enhancing ornamental landscapes they are harmful and should be carefully considered before use.

Another way that ornamental trees and plants are controlled is through the use of pesticides. Studies have estimated that less than 0.1% of the pesticide actually reaches the intended organism which leaves the rest of the pesticide in the air (C. Ekhumelo). Pesticides have the same impacts on soil, air, and water as fertilizers, but another negative impact of pesticides is a growing resistance to the pesticide. The more that a pesticide is used to rid an ornamental plant or tree of a pest the more likely the plant or tree will become resistant to the pesticide. More than 500 insect and mite species across the world have become resistant to pesticides and herbicides. (Mulugeta, 2009).

Trees and humans provide a mutualistic relationship in many ways. Trees provide humans with oxygen, consume carbon dioxide that humans produce and provide shade as well as a number of other important jobs. Humans can be beneficial to the tree by replanting trees that are both ornamental trees and native forest species. Humans can also get jobs pruning and caring for trees. It is especially important that ornamental trees are well cared for in locations that are in highly trafficked areas. It is important that ornamental trees are looked after because that will

directly impact how the rest of the location is viewed. A failure to prune trees can also pose a safety hazard in urban areas for people walking on sidewalks or the potential for individuals to hide among low lying tree branches.

Ornamental trees are used in landscaping to beautify the area, to provide health and economic benefits and to support the native wildlife that inhabits that region, whether located in an urban or suburban area. The use of trees for ornamental landscaping has long been a standard for natural beauty. Bright and showy flowers are more likely to draw people into an area rather than green leaves. College campuses across the country direct thousands of dollars towards landscaping departments and pruning to attract students to attend a particular school. Ornamental trees are of value and importance. Each of the papers and studies analyzed discussed how ornamental trees play an important role to our society. Forest species trees have always held value whether economic or environmental. For centuries trees and entire forests have been cut down to support human needs, such as furniture building and paper. Other measures should be looked into and further evaluated to prevent any potential negative impacts from ornamental trees from harming the environment. There are natural ways to prevent and reduce pests from damaging ornamental trees and the use of fertilizers to enhance the beauty of ornamental trees should also be stopped and other methods to grow and further beautify the tree should be researched. Ornamental trees are highly important for the landscaping sector and should continue to be used in urban and suburban settings.

References:

Chalker-Scott, Linda. (2007). Impact of Mulches on Landscape Plants and the Environment — A Review. *Journal of Environmental Horticulture*. 25. 239-249. 10.24266/0738-2898-25.4.239.

“Economic Benefits of Landscape”, Associated Landscape Contractors of America.
<http://commerce.infosrc.com/docdelivery/alca/Uploads/Econben.doc>

Ekhuemelo, David. (2016). IMPACT OF FLORICULTURE AND LANDSCAPING ON SUSTAINABLE ENVIRONMENTAL MANAGEMENT. *NIGERIA JOURNAL OF EDUCATION, HEALTH AND TECHNOLOGY RESEARCH (NJEHETR)*. 8. 9.

Kaplan, S., J.F. Talbot, and R. Kaplan. 1988. “Coping With Daily Hassles: The Impact of Nearby Nature on the Work Environment”. Project Report. USDA Forest Service, North Central Forest Experiment Station, Urban Forestry Unit Cooperative Agreement 23-85-08.

(PDF) Most ornamental plants on sale in garden centres are ... (n.d.). Retrieved from https://www.researchgate.net/publication/314260501_Most_ornamental_plants_on_sale_in_garden_centres_are_unattractive_to_flower-visiting_insects

Ornamental Trees. (n.d.). Retrieved from <https://www.sciencedirect.com/topics/agricultural-and-biological-sciences/ornamental-trees>

Web Audit | University of Nebraska-Lincoln. (n.d.). Retrieved from <https://webaudit.unl.edu/sites/505/scans/134863/unl/versions/>

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.461.417&rep=rep1&type=pdf>