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A STUDY OF PLANT SUITABILITY IN THE URBAN AREA

By

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Abstract

"Know the place, select the plant" (Harris et. al., 1999). Tree selection is founded on 'right plant, right place'. Selecting a tree must begin with a thorough understanding of the environmental and cultural conditions surrounding the tree. This research paper, "A study of plant suitability in the urban area" , will discuss and discover the characteristics of trees, identify suitable trees species for urban environment, study about the urban trees. requirements and discover the plants guidelines and specifications for urban area. Now a day, there are many issues and problems being raised up regarding the inappropriateness of plant suitability at the urban area. In some cases the trees a being planted above the overhead cables, dense and bushy plant will create unsafe condition to the road users, limited unpaved area, and inappropriateness of plant selection that will cause damage or cracked to pavement. Three case studies had been done at Central Market, Daya Bumi Complex and Jalan Masjid India for further research studies according to the topic being discussed. At the end of this research, it is hope that suitable plant species and planting guidelines for the urban area will be discovered.

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CHAPTER 1

1.0 INTRODUCTION

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" Air pollution, crowded conditions, lack of open spaces and scarcity of greenery, all contribute to the pressures and stresses of urban life.... With planning and civic action, cities can be transformed into gardens so that people can live and work in a balanced and healthy environment" (Mahathir, 1990).

A nationwide campaign to promote greenery in urban areas was launched in 1997 by Malaysia's Prime Minister, Dato' Seri Dr Mahathir Mohamad. The programmed aims to turn Malaysia into a 'Garden Nation' by planting 3 million trees in built-up areas across all 13 states and Federal Territory by the tear 2000. A further 17 million trees are planned for 2020, bringing the total number to 20 million (Soepadmo, 1998).

Rapid urban and industrial development in Malaysia has brought various environmental problems in its wake. But as forests and agricultural plantations are cleared to make way for 'concrete jungles', a new complement of plants adapted to city conditions are springing up (Soepadmo, 1998). It is then, the idea of 'garden city' being introduced.

According to Yap (2000), understanding the importance of greenery within the urban centers, Malaysia especially Kuala Lumpur, began its own aggressive planting programmed in the early eighties. With the development of the large-scale sophisticate projects in the Klang Valley like KLCC, KLIA and Putrajaya there begins a need for different quality of plants. The types of species used in these projects are also more diverse than the few common plants used so widely in the early planting in the cities.

Today, in Malaysia landscape industry, the awareness and demands to have large-scale greening of the environment especially the urban centers to improve the harsh landscape by the many infrastructures has been actively practiced landscape. The question of suitability, quality, predictability of requirement, higher cost of production, understanding the biology of plants and the plants guidelines and specifications become obvious but the issues sometimes being ignored and less important to certain authority..

Therefore, one of the purposes of this study is to search solutions for current issues and problems beside discover appropriate guidelines for plants suitability at urban area in order to meet with the country vision as to create 'Garden city' in our environment.

1.1 RESEARCH BACKGROUND

It is very important that plants be placed appropriately in the landscape not only to achieve aesthetic and functional goals, but also to ensure healthy plants by sitting them in the appropriate microclimatic conditions, and to facilitate effective and efficient maintenance. Accomplishing this is often simply a matter of being aware of maintenance issues along with the types of equipment and methods used in maintaining the facility, and then considering these during the planning and design process.

Nowadays, there are many issues and problems being raised up regarding the inappropriateness of plant suitability at the urban area. In some cases the trees being planted above the overhead cables, which are not very strategic place. If doing so, the utility companies have the right to prune trees to keep overhead cables clear. Usually by regular cutting or the use of growth-retardant chemicals to control tree shape and size. In some cases trees should be removed.

According to O'Brien & Chambers (1993) small growing shrub-like species that have been planted which are bushy and dense growing to the ground has created a myriad of problems which are, sightlines are obstructed for drivers with regard to pedestrians who wish to cross the street, pedestrians cannot see the road clearly at points unless they actually step into the gutter and some of the shrubs and trees take up much more footpath space than a larger tree would do.

As being known, most of the urban areas are paved. Trees that are being planted need sufficient unpaved areas for maximum health and vigor. They should be allowed to develop into perfect specimens and true representatives of their species as to achieve as

much growing environment as allowable (Phillips, 1993). The problems are, because of the limited unpaved area, and the inappropriateness of plant selection, it will cause damage or cracked to the pavement, which will create unsafe and uncomfortable condition to the users.

Beside that, the inappropriateness of plant suitability will also cause maintenance problems. The plants need to be maintained as such if it is not meticulously cared for, it will look unkept and neglected. The maintenance works including watering, pruning, weeding, pest control, fertilizing and also plant replacement. It is important to ensure the plants health and to keep up the beauty of the plants to make them always flourish. Suitable plants selection according to site condition is importance as it can reduce maintenance cost

The performance of trees in the landscape depends on how well the species are suited for the specific site where they are to grow. The tree selection should be based upon the mature size of tree and whether the site can accommodate the roots for this tree at maturity (Philips, 1993). While according to Harris et. al., (1999) good trees and tree care start with quality plants. Tree selection is founded on 'right plant, right place'. Selecting a tree must begin with a thorough understanding of the environmental and cultural conditions surrounding the tree. "Know the place, select the plant".

A study of plant suitability consider the need, appearance in all seasons, appearance in all stages of growth, compatibility of form, texture, color, and association in the total building and site composition, hardiness, cultural requirements, and degree of maintenance needed (Simonds, 1998).

1.2 GOAL

The aim of this study is to discover the suitability of plants selection at the urban area in order to achieve the vision of garden city.

1.3 OBJECTIVES There are some aspects need to be followed in order to fulfill the objectives of this research:

- To study the characteristics of urban environment
- To identify tree species that suitable with the urban environment characteristics
- To study about the urban trees requirements
- To propose plants guidelines and specifications for urban area.

1.4 RESEARCH PROBLEMS AND ISSUES

The current issues and problems about this study is how the plants can tolerate to the urban environment. Some aspects and problems that need to be addressed when dealing with plant suitability at the urban area are:

1.4.1 Drought tolerant

Urban trees should be tolerant of drought to account for increased of air and soil temperature as the compacted and poorly drained soil contain little oxygen; a gas that tree roots need to survive and grow. Only species that tolerant of wet sites can survive in this difficult soil (Gilman, 1997).

1.4.2 Soil Characteristic

Many urban soils are poorly textured, low in organic matter and over-compacted by machinery and traffic. The nutritional status of urban soils varies greatly, and the major plants requirements can be deficient (Bradshaw et. al., 1995). It is best to plant trees adapted to the existing soil pH than to attempt to change the soil pH (Gilman, 1997).

1.4.3 Pollution

Air pollution was a major problem in urban areas in the past, due to Sulphur emissions. These have left a legacy of acidified soils. Now there are problems of NO_2 and ozone caused by car exhausts, which could cause increasing difficulties in the future (Bradshaw et. al., 1995). The pollution from vehicles and factories also will cause acid rain.

1.4.4 Climate

Rapid urbanization has been associated with a steady increase of temperatures at the urban city, which caused 'heat effect'. The warmer temperature in cities compared to rural areas has other implications, such as increases in carbon dioxide emissions from fossil fuel, unhealthy ozone levels and human discomfort and disease. These problems could be accentuated by global climate change, which may double the rate of urban warming (Gordon, 1995).

1.4.5 Disease problems

A plant disease is any abnormal change in the structure or physiological processes of a plant. Such damage by environmental conditions unfavorable for optimum plant growth, such as cold, heat, poorly aerated soil, lack of moisture or by a parasitic organism (Feucht and Butler, 1988)

1.5 SCOPE OF STUDY

This study or research will be focused on the climatic factors and characteristic of the urban environment. This paper will try to propose the appropriate guidelines and specification of trees at the urban area, as well as their characteristics and requirements.

Trees can be used by people to provide a sun, sound, and wind screen; to improve the quality of living; to provide privacy; to screen out unsightly views or to enhance good views and to add beauty to our environment through a tree's graceful shape, colorful foliage, fragrant flower and unique fruit,

There may be other species that are unacceptable due to local conditions such as hardiness, overabundance, not adaptable to local soils or local pest or disease problems Shaped trees and ornamental flowering or fruiting trees should be carefully selected and located to avoid distractions to drivers while at the same time providing accent denoting a special view or structure (Philips, 1993).

Trees need sufficient unpaved areas for maximum health and vigor. They should be allowed to develop into perfect specimens and true representatives of their species. They should not be dangerously close to traffic in the street and whenever possible

should be planted behind the sidewalk to achieve as much growing environment as allowable (Gilman, 1997).

Urban trees can be used to emphasize direction and movement. These highlight direction by accentuating road lines. Planting trees can create seclusion and privacy. Planting around a building for instance defines spaces, provides screening and generates private areas. This is very important in a city where privacy is scarce (O'Brien and Chambers, 1993).

1.6 METHODOLOGY

There are two types of methods that need to be considered in collecting the data: the quantitative method and qualitative method. The qualitative method implies a particular philosophical orientation and the choice of problem, which is exploratory, interpretive, cultural or process directed. While the quantitative method samples a wide range of phenomena and emphasizes the reliability of measures (Asiah, 2001).

Quantitative method consists of data collection from book, journal, and newspaper while qualitative method consists of face-to-face interview, survey using questionnaires and observation. The methods being used for this study are:

1.6.1 Literature Review

For this study, a few of relevant books that related to the topic were referred. Beside that, other sources that being used and referred are Internet, magazines, journals, and thesis papers. The literature review is important as it will provide detailed information about the topic and give some understanding.

1.6.2 Case Study

Three case studies that will be conducted around Kuala Lumpur have been chosen in order to study the plant suitability at the urban area. The areas are Central Market, Daya Bumi and Masjid India Street. These areas have been selected because there are the most hectic areas with high density population and vehicles as well as lots of air pollution occurred and different microclimate but the area still have varieties of plant species that can be identified and studied about their characteristics.

1.6.3 Data Collections

Well-planned and detailed research methods will produce proper and good research. In order to have this, gathering information and data collection need to be done while doing the research process. The aim and objectives of the research can be achieved through case studies. As to strengthen the case studies, observation will be conducted. While taking photograph as another research method being used to support the data collection.

1.6.4 Data Analysis

From the above methods, the data will be transformed and analyzed into statistic and useful data. Analyzing the data may provide characteristics of urban environment and a list of suitable plants that suit the urban microclimate and propose plants guideline for the urban area. Tables, results findings and recommendation will be based on the data being analyzed.

CHAPTER 2

2.0 LITERATURE REVIEW

2.1 INTRODUCTION

The greening of the urban environment to ameliorate the harsh landscape created by the many infrastructures has been actively practiced only during the last two decades. Production of planting stocks, however, began in the southern state of Johore in the early seventies. Demand of planting materials came from Singapore in its aggressive programmed of greening the many development within the city center (Wong, 1975).

To break up the monotonous urban landscape of houses and factories, city planners have always advocated the introduction of greenery in built-up areas. Trees are not only important as shade for pedestrians and other road users, but they also add a pleasing visual aspect (Soepadmo, 1998). The awareness to have a garden in a city then creates the concept of 'Garden City', 'Garden Nation' and 'Urban Forest'.

According to Gordon (1995), Urban Forest can be defined as the area in and around the places we live that has or can have trees. Street trees, park trees, green spaces, residential land, public and private spaces with vegetation collectively make up an urban forest or in the other word, it is as a ecosystems provides the context for building better places for people to live.

More local species from our forests have been introduced. Soepadmo (1998), stated that, The Forest Research Institute Malaysia (FRIM) has identified 10 species of trees for urban landscaping. The selected trees are study and the characteristics being discovered are fast growing local species with deep, penetrative roots and the ability to withstand stormy weather, such as Sentang (*Melia excelsa*), Kelumpang (*Sterculia foetida*) and Janda Merana (*Salix babylonica*).

To make the idea into reality, it is not a simple thing, but many aspects need to be considered and done, especially the suitability of plants in the urban context; the plant characteristics, plant requirements, specifications, guidelines and microclimate of urban area.

2.2 LITERATURE REVIEW

2.2.1 Characteristics of the Urban Trees

An understanding of the biology of plants will be required to ensure a proper selection of potentially suitable plants. Specific characteristics like crown shape, trunk height, root system, leaf density, leaf texture, flowers and their ability to survive in a harsh environment are prerequisites for introduction.

Arnold (1993), have stated eight important design characteristics of tree use at the urban area, which are:

1. Transparency at the pedestrian's eye level permits the visual grasp of extensive areas of the city. The emphasis is on spatial continuity.
2. In each view, a discrete pattern or rhythm is discernible flowing from the arrangement, spacing and structure of trees.
3. Each landscape conveys a scale that is sympathetic to the movement and perception of pedestrians.
4. The great diversity and intricacy of individual trees is subordinated to an established repetitive composition that acts as a counterpoint in unifying the individual parts into a single whole.