

A Case Study of Planting in Two Apartment Complexes* in Korea

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Abstract

The current regulations and laws related to landscaping facilities within apartment estates stipulate the proportion of the estate lot allocated to green area and landscaping. These regulations define the criteria for landscaping, the density of trees and other related matters. In fact, the selection and locations of trees are determined by the builder. The builder first decides the location of the building and then allocates the residual land to landscaping. So landscaping within apartment complexes is often unmet to residents' need and ecological growth and function of trees and plants.

This study was designed to examine the variety of trees and their location as an aspect of their function within each area of the YS and DK apartment complexes. As the results, the difference in the two estates is striking in aspects of quantity and quality. Even though the regulations for landscaping within apartment estate is met, the real landscaping is often unmet to residents and general people.

1. Introduction

Enlarging green areas in cities as a main policy is managed by the Ministry of Environment in Korea. The current regulations and laws such as The regulation on the standards for Housing Construction related to landscaping facilities within apartment estates stipulate the proportion of the estate lot allocated to green area and landscaping. These regulations define the criteria for landscaping, the density of trees and other related matters. But the quality of outdoor space has been deteriorating because of increasing high density housing complexes in new towns and increasing outdoor parking lots. In general, the amount of green areas is inadequate and the classification of trees which is limited to tall trees and shrubs prevents greater variety. Moreover, the actual selection of trees and their locations are determined by the builder. The builder first decides the location of the building and

then allocates the residual land to landscaping. This means the residents' need for landscaping is often unmet.

II. Purpose

This study was designed to examine the variety of trees and their location as an aspect of their function within each area of the apartment complex. So this study evaluated the appropriateness of the location of trees and shrubs and whether the actual location corresponds to what previous studies have considered optimal. This study also examined the variety of trees and their impacts on landscaping focusing on adequacy.

III. Method

After examining the related literature and regulations, evaluative criteria on plants and shrubs were decided by considering the plants' functions at different areas. Korea Institute of Construction Technology(1997), Housing Research Institute(1997) and Seoul Metropolitan Government(1997) have recommended different sorts and shapes of trees and shrubs at different areas in Complex. As cases, we selected YS apartment in Ilsan, Koyang city and DK apartment complex in Bundang, Sunnam city among the five newly developed towns. Both of them have 500 household and over. After examining documents and real situations in apartment complexes, these apartments were selected because they satisfied the criteria allocation 30% area of the estate lot for landscaping and they have average landscaping situations. The field survey was done from October 1998 to January 1999. This information was used along with document data and photographs.

On the basis of the literature, the criteria was selected. The rating scale of the criteria has 3 levels: coincidence, relative coincidence, and rare coincidence. Each criterion is applied to the plants and shrubs to determine whether the types and locations of plants and shrubs are optimal for each area.

The identification and image of a complex should be considered and tall trees are recommended for the entrance of the complex. The landscaping of the first floor garden should be visually appealing while functioning as a screen. For this reason, fruit trees, deciduous trees and flower trees are proposed and fast-growing trees are suggested. For the sides of the buildings, wind-resistant trees that grow well without sunlight, tall trees that provide shade, and trees to mitigate the high concrete walls are recommended. For the entrance of the building blocks, trees which provide a

sense of relief and territory are proposed such as flower trees, fruit trees, herbaceous flowers, evergreens, big shrubs, and beautifully shaped trees. For a walk, a park and a resting area, it is proposed that trees can mitigate air pollution, inform orientation, produce oxygen and shade, secure privacy, and give a rich sense of nature and the seasons' changes. Playgrounds and resting areas should be easily accessible by residents. It would be better to have different shapes of landscaping in each park. A playground should take into account of children's safety. Exhaust gas-proof and radiation-proof trees and shade trees are recommended for parking lots which should be clearly identified by these trees.

This survey has several limitations. First, it is difficult to generalize the results because only two complexes in new towns are examined. Second, the research term is restricted to make sure the changes in the landscaping take place during all four seasons.

IV. Results

The YS apartment complex is composed of 17 buildings with 12 to 20 floors. There is a main park and a pond in front of the complex entrance, and resting places and a walk among the buildings. A walk within the complex are connected to a green area between the side entrance of this complex and the complex next door. The garden in front of the first floor can only be accessed by the residents on the first floor. Evergreen trees in this garden are planted according to the garden's border to divide it from the sidewalk. The DK apartment complex is composed of 39 buildings with 12 to 17 floors and is located near a stream that can be used by the residents. Outside of the complex, next to the road, there is are mound and plants to protect residents from traffic noise.

The results which examine the two landscaping in YS and DK estate are as follows:

The proportion of the YS apartment estate in the new town, Ilsan allocated to green areas is 41.6% and the corresponding percentage in the DK apartment estate in the new town, Bundang is 30.2%. The difference in the two estates is striking. In the case of YS apartment complex, the per household green area is 33.1m and the per household green area is 14.4m in the DK apartment complex. Thus the green area in the YS estate is 2.3 times as large as that in the DK estate.

The variety of trees, in the two complexes is very different also. In the YS estate, there are 8 kinds of evergreen tall trees(3,838 trees), 17 different kinds of deciduous trees(4,956 trees) and a total of 8,794 trees. There are two different kinds of

evergreen shrubs(6,792) and 5 different kinds of deciduous shrubs(29,802) giving a total of 36,594. There are 29,802 sheets of lawns, also. In the DK estate, there are 6 different kinds of evergreen trees(6,297), and 11 sorts of deciduous trees(7,047), giving a total of 17 kinds of tall trees(13,344). There is one category of evergreen shrubs(7,500), and 4 kinds of deciduous shrubs(18,650), yielding a total of 5 kinds(23,150) of shrubs. Per 100m , the DK estate has 41.96 tall trees, while the YS estate has 30.16. That is, the DK estate has 1.4 times as many as the YS estate has. As for the shrubs, the YS estate has 126.19 per 100m while the DK estate has 82.23 per 100m , or by 1.5 times more in the YS estate. This is explained by the Sungnam city by-laws stipulating a relatively high density of tall landscaping trees in the DK apartment complex. There are 25 kinds of tall trees in the YS estate compared to 17 in the DK estate. But, there are 10 different kinds of tall trees are planted in front of apartment blocks in the DK estate as compared to 5 in the YS estate.

The number of trees and shrubs per households is 51.8 in the YS estate while it is 17.8 in the DK estate. Thus, the residents of the YS complex can enjoy the green areas and landscaping more than the DK residents.

One of the qualities of green areas is their continuity. In the case of the YS estate, the length of continuous green area is 427m (0.48m per household) as compared to 466 m in the DK estate (0.21m per households).

In general, it is desirable to plant a lot of deciduous and broad-leaved trees. However, in the YS apartment complex, deciduous trees account for only 10.9% of the total number of trees. It is also desirable to maximize the number while they account for only 15% in the DK estate.

Fruit trees reflect th efour seasons, attract insects, butterflies and bires, offer a pleasant natural enviornment in the midst of the concrete high-rise apartments, and are important for children's education. The YS estate has 11sorts of fruit trees accounting for 34.3% as compared to 31.8% in theDK estate where there are 7kinds of fruit trees(10,638). The YS estate offers 18.86 fruit trees per household compared to 4.8 in the DK estate. The YS has 10 kinds of trees blossoming in the spring, 5 in the summer and 5 in the fall. In the DK, there are 9 kinds of blossoming trees in the spring, 1 in the summer and 4 in fall. The proportion of blossoming trees in the YS estate is 74.9% as compared to 63.4% in the DK estate. Thus, the YS estate is much better equipped with flower bearing trees than the DK estate. In the YS estate there are 1.17 trees/m and 38.8 per household. The availability of blossoming trees and fruit trees improves the image of the estate and increases the residents' satisfaction.

Those trees which are non-polluting and absorbed and deflect noise from outside the estate are relatively common in both the YS and the DK estates. However, on the basis of the number of households, the YS estate has more of them.

This study also examined the degree to which the spatial distribution of trees in both estates coincides with what is regarded in the previous studies as “optimal”. In both estates, trees behind the apartment block do not coincide with optimal landscaping situations. On the other hand, trees in the front or side of the apartment blocks do coincide. However, in the YS estate, a lot of fast-growing trees are planted in front of the apartment blocks depriving the resident of nice views from the balcony.

< Table 1 > Proprieties of plants and shrubs in YS estate

	Plants and shrubs in YS apartment complex			Plants and shrubs in DK apartment complex		
	Name	Optimal Proportion (percent)	Level Of Propriety	Name	Optimal Proportion (percent)	Level Of Propriety
① Front of buildings (first floor gardens)	Chinese Juniper, <u>Japanese Yew</u> , <u>Korean Azalea</u> , <u>Golden Rain Tree</u> , <u>Manshurian Fullmoon Maple</u> , <u>Japanese Maple</u> , <u>Japonica</u> , <u>Storax</u> , <u>Crabapple</u> , <u>Kobus Magnolia</u> , <u>Chinese Quince</u> , <u>Dilatata Lilac</u> , <u>Ibota Prvjet</u>	11/12 (91.7%)	●	White Birch, Chinese Juniper, <u>Japanese Maple</u> , <u>False Rosebay</u> , <u>Red Cedar</u> , <u>Japanese Wistaria</u> , <u>Chinese Scholar Tree</u> , <u>Carbapple</u> , <u>Kobus Magnolia</u> , <u>Chinese Quince</u> , <u>Manshuan Fullmoon Maple</u>	8/11 (72.7%)	●
② Side of buildings	<u>Chinese Quince</u> , <u>Golden Rain Tree</u> , <u>Korean Azalea</u> , <u>Dawn Redwood</u> , <u>Zelkova Tree</u> , <u>Dilatata Lilac</u> , <u>Japanese Maple</u> , <u>Rose</u> , <u>Japonica</u> , <u>Storax</u> , <u>Manshurian Fullmoon Maple</u> , <u>Chinese Juniper</u> , <u>Lace back Pine</u> , <u>Trident Maple</u> , <u>Japanese Red Pine</u> , <u>Norway Spruce</u> , <u>Chinese Scholar Tree</u> , <u>Crabapple</u> , <u>Korean Box Tree</u> , <u>White Birch</u> , <u>Ginkgo</u> , <u>White Pine</u> , <u>Silk Tree</u> , <u>Kobus Magnolia</u>	16/23 (69.6%)	□	<u>Japanese Red Pine</u> , <u>Chinese Scholar Tree</u> , <u>Dilatata Lilac</u> , <u>Crabapple</u> , <u>White Pine</u> , <u>Japanese Maple</u> , <u>Manshurian Fullmoon Maple</u> , <u>Zelkova Tree</u> , <u>Korean Pine</u> , <u>Flower Quince</u>	7/10 (70.0%)	●
③ Back of buildings	<u>Kobus Magnolia</u> , <u>Korean Azalea</u> , <u>Manshurian Fullmoon Maple</u> , <u>Japanese Maple</u> , <u>Japonica</u> , <u>Storax</u> , <u>Chinese Juniper</u>	2/6 (33.3%)	ρ	<u>Korean Pine</u> , <u>Korean Box Tree</u> , <u>Japanese Maple</u> , <u>Crabapple</u> , <u>Folwer Quince</u>	2/5 (40.0%)	ρ

④ Entrance of a building	<u>Korean Azalea, Japanese</u> <u>Yew,</u> <u>Dilatata Lilac, Kobus</u> <u>Magnolia,</u> <u>Korean Box Tree, False</u> <u>Rosebay</u>	6/6 (100.0%)	●	<u>Korean Box Tr Ginkgo,</u> <u>Chinese Juniper, Japanese</u> <u>Red Pine, Japanese flowering</u> <u>Cherry, Manshurian Fullmoon</u> <u>Maple, Korean Azalea,</u> <u>Dilatata Lilac, Kobus</u> <u>Magnolia,Japanese</u> <u>Maple, White Birch, Koran</u> <u>Pine, Koran Box Tree, Chinese</u> <u>Scholar Treeee, Rose</u>	2/2 (100.0%)	●
⑤ Walks	<u>Manshurian Fullmoon</u> <u>Maple,</u> <u>Crabapple, Golden Rain</u> <u>Tree,</u> <u>Trident Maple, White Birch,</u> <u>Chinese Juniper</u>	4/6 (66.9%)	□	<u>Zelkova Tree, Dilatata Lilac,</u> <u>Japanese Maple, Kobus</u> <u>Magnolia,</u> <u>Chinese Scholar Tree</u>	4/5 (80.0%)	●
⑥ Parks and resting areas	<u>Japanese Red Pine,</u> <u>Norway Spruce,</u> <u>Chinese Juniper, Chinese</u> <u>Scholar Tree, Manshurian Fullmoon</u> <u>Maple, Crabapple, Kobus</u> <u>Magnolia, Trident Maple,</u> <u>Silk Tree, Japonica</u> <u>Storax, False Rosebay,</u> <u>Korean Azalea, Korean Box Tree,</u> <u>Japanese Yew, White Birch, Dilatata</u> <u>Lilac, Japanese Maple, Zelkova</u> <u>Tree, Golden Rain Tree, Ginkgo,</u> <u>Common Apricot, Japanese Wistaria</u>	13/21 (61.9%)	□	<u>Dilatata Lilac, Zelkova Tree,</u> <u>Flower Quince,</u> <u>Crabapple, Kobus</u> <u>Magnolia, Manshurian</u> <u>Fullmoon Maple, White Pine,</u> <u>Japanese Maple,</u> <u>Japanese Red Pine,</u> <u>Chinese Quince</u>	6/10 (60.0%)	□
⑦ Play- grounds	<u>False Rosebay, Rose of</u> <u>Sharon, Korean Box Tree,</u> <u>Japanses Maple,</u> <u>Zelkova Tree, Chinese</u> <u>Juniper, Manshurian Fullmoon</u> <u>Maple, Crabapple, kobus Magnolia,</u> <u>Trident Maple, Silk Tree, Japonica</u> <u>Storax, Oriental Arbor-vitae</u>	10/14 (71.4%)	●	<u>Oriental Arbor-vitae,</u> <u>Korean Azalea, Chinese Quince,</u> <u>Japanese Maple, White Pine, Ibota,</u> <u>Privet, Ginkgo, Zelkova Tree,</u> <u>Chinese Scholar Tree</u>	6/9 (66.7%)	□
⑧ Around parking lots	<u>Japanese Maple,</u> <u>Zelkova Tree, Norway Spruce,</u> <u>Trident Maple,</u>	2/4 (50.0%)	□	<u>Manshurian Fullmoon</u> <u>Maple, False Rosebay,</u> <u>Flower Quince, Crabapple,</u> <u>Zelkova Tree, White Pine,</u> <u>Korean Box Tree,</u>	3/7 (42.8%)	ρ
⑨ The roof of an under- ground parking lot	<u>False Rosebay, Rose of</u> <u>Sharon,</u> <u>Korean Box Tree, Dilatata</u> <u>Lilac,</u>	2/4 (50.0%)	□	<u>Zelkova Tree,</u> <u>Korean Azalea</u>	1/2 (50.0%)	□

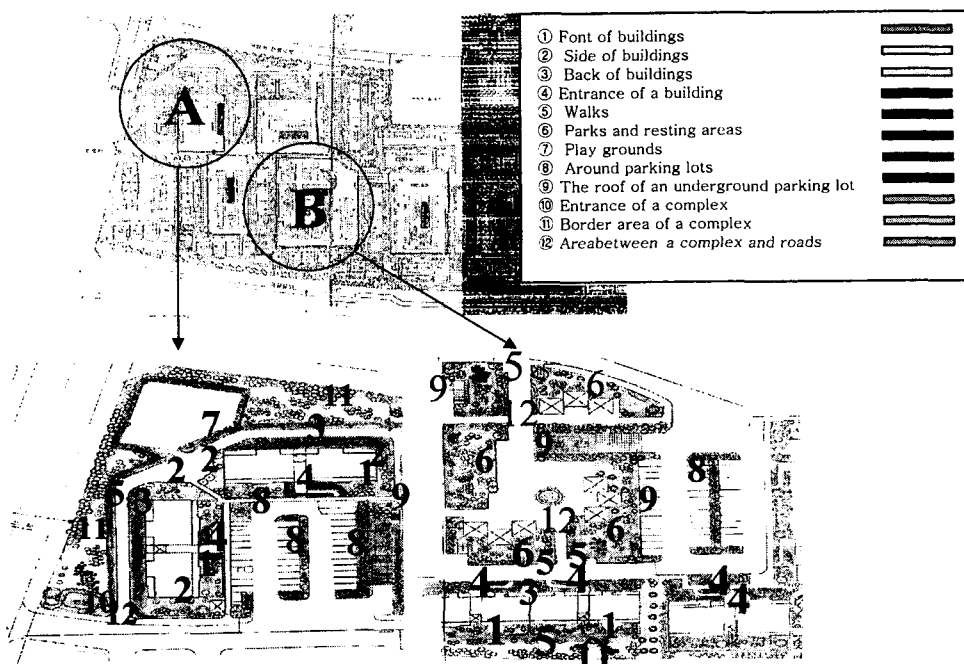
⑩ Entrance of a complex	<u>Japanese Red Pine</u> , <u>Manshurian Fullmoon Maple</u> , <u>Ginkgo</u> , <u>Rose</u> , <u>False Rosebay</u> , <u>Korean Box Tree</u> , <u>Japanese Yew</u> , <u>Japanese Maple</u> , <u>Zelkova Tree</u> , <u>Chinese Scholar Tree</u> , <u>Trident Maple</u> , <u>Korean Azalea</u> , <u>Rose of Sharon</u>	8/13 (61.5%)	□	<u>Ginkgo</u> , <u>Japanese Red Pine</u> , <u>False Rosebay</u> , <u>Japanese Flowering Cherry</u>	3/4 (75.0%)	●
⑪ Border area of a complex	<u>Norway Spruce</u> , <u>Chinese Juniper</u> , <u>Dawn Redwood</u> , <u>Ibota</u> , <u>Privet</u> , <u>White Birch</u> , <u>White Pine</u> , <u>Trident Maple</u> , <u>Crabapple</u> , <u>Ginkgo</u> , <u>Dilatata Lilac</u> , <u>Chinese Scholar tree</u> , <u>Korean Azalea</u>	10/12 (83.3%)	●	<u>Crabapple</u> , <u>Chinese Scholar Tree</u> , <u>Chinese Juniper</u> , <u>Ibota Privet</u> , <u>Oriental Arbor-vitae</u> , <u>White Birch</u> , <u>Korean Pine</u> , <u>Dilatata Lilac</u> , <u>Japanese Red Pine</u> , <u>False Rosebay</u> , <u>Japanese Maple</u> , <u>Ginkgo</u> , <u>Japanese Flowering Cherry</u> , <u>Chinese Quince</u> , <u>White Pine</u> , <u>Kobus Magnolia</u> , <u>Korean Azalea</u>	12/17 (70.6%)	●
⑫ Area between a complex and roads	<u>Chinese Juniper</u> , <u>Chinese Scholar Tree</u> , <u>Manshurian Fullmoon Maple</u> , <u>Kobus Magnolia</u> , <u>Japonica</u> , <u>Storax</u> , <u>False Rosebay</u> , <u>Korean Azalea</u> , <u>Korean Box Tree</u> , <u>Japanese Yew</u> , <u>White Birch</u> , <u>Zelkova Tree</u> , <u>Ginkgo</u> , <u>Dawn Redwood</u>	10/13 (76.9%)	●	<u>Ginkgo</u> , <u>Chinese Juniper</u> , <u>Japanese Red Pine</u> , <u>Japanese flowering Cherry</u> , <u>Manshurian Fullmoon Maple</u> , <u>Korean Azalea</u> , <u>Dilatata Lilac</u> , <u>Kobus Magnolia</u> , <u>Japanese Maple</u> , <u>White Birch</u> , <u>Koran Pine</u> , <u>Koran Box Tree</u> , <u>Chinese Scholar Tree</u>	9/13 (69.2%)	□

● : 100-70% coincidence, □ : 50-69% relative coincidence, ∅ : 0-49% rare coincidence

As far as trees at the entrance of the estate and along the walks are concerned, the DK estate is closer to optimal. On the other hand, as for trees along the roads inside the estate and at the children's playgrounds and around parking lots, the YS is closer to optimal.

<Figure 1> is the landscapes plan of DK estate and YS estate, shows the detail plan about the area near the main entrance of the YS apartment complex and playground of the complex.

It is obviously important to plant trees in accordance with the functions of the space within the estate and each tree's ecological features. However, one has to insure a proper mix of trees in terms of their growth. For instance, if one plants fast-growing trees in front of slow-growing trees, this will hamper the growth of the slow-growing trees. In general, landscaping in apartment complexes should have the following characteristics: abundance, variety (including a proper mix of fruit trees, blossoming trees, plants and lawns), and location.



< Figure1> landscape plan of YS apartment complex

V. Conclusion

Residents' need of quality and quantity for landscaping in apartment complexes becomes higher. Even though the laws and regulations for landscaping within apartment estate are met, there are big differences between the actual landscaping and residents' need.

This study evaluated the appropriateness of the location of trees and shrubs and whether the actual location corresponds to what previous studies have considered optimal. This study also examined the variety of trees and their impacts on landscaping focusing on adequacy. As cases, we selected YS apartment in Ilsan, Koyang city and DK apartment complex in Bundang, Sungnam city. Both of them had 500 household and over and satisfied the criteria allocation 30% area of the estate lot for landscaping and they have average landscaping situations. As the results, the green area per household, the variety of trees, length of continuous green area, number of trees and shrubs in the YS estate are better than in DK estate. But

the DK estate has 1.4 times trees per 100m as many as the YS estate. This is explained by the Sungnam city by-laws stipulating a relatively high density of tall landscaping trees in the DK apartment complex. Those trees that are non-polluting and absorbed and deflect noise from outside the estate are relatively common in both the YS and the DK estates. However, on the basis of the number of households, the YS estate has more of them.

Both of landscaping in two apartments are not satisfied quite. The selection of trees and their locations are determined by the builder who first decides the location of the building and then allocates the residual land to landscaping. So for better landscaping, the regulations which are related with variable types and level of growing-up of trees and plants in details are needed. And plants change of builder's thought for landscaping and stronger need of housing consumer are needed.

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