



Creation and Application of Aromatic Plants in Healing Garden

SUN QINHUA^{1,2}, SHU BO² AND DONG LIANG³

¹School of Environment Engineering, Xuzhou Institute of Technology, Xuzhou, Jiangsu, 221111, P.R.China

²School of Architecture, Southwest Jiaotong University, Chengdu, Sichuan, 611756, P.R. China

³School of Architecture, Huaqiao University, Xiamen, Fujian, 361021, P.R. China

Email: sunqinhua1984@163.com

Abstract: Aromatic plants, which are a category of plants that bear the attributes as medicinal plants and natural perfume, manifest many functions, such as adjusting moods and beautifying the environment. Healing garden is a type of landscape which takes the function of healing and health care as the theme in design, and it is a venue utilized to treat specific physical or mental illness. In accordance with the characteristics of aromatic plants and healing garden, the type of sensory environment created by aromatic plants in the healing garden is analyzed, and the form, in which aromatic plants operate in the healing garden is discussed. This is advantageous to people's voluntary involvement in the treatment of physical and mental illness in the form of landscape planning which bears the function of healing and health care. Furthermore, it can guide people to fit into the creation of healing garden with aromatic plants, and recuperate and maintain their health condition.

Keywords: Aromatic Plants; Healing Garden; Horticulture Therapy; Landscape Planning and Design

1. Introduction

Healing garden is a form of garden that began to flourish in America in recent three decades. Under the objective of healing, it aims at delivering a sense of security, alleviating pressure and adding comfort and vitality [1-3]. Plant is the primary element of garden. As a category of plants that bear special functions and characteristics of appreciation, aromatic plants occupy a unique position in the development history of gardens. At present, garden designers can often skillfully handle the image of plants and the application of colors, but they are quite limited when it comes to the application of aromatic plants[4]. Thoroughly exerting the role of aromatic plants in healing garden can enrich the pattern of manifestation of gardens, and provide certain reference to the application of aromatic plants in gardens.

2. Characteristics of the Healing Garden

The difference between healing garden and common garden lies in the excavation and expression of the characteristic of healing of the garden space. Healing garden includes the essentials and characteristics of common garden. It places particular emphasis on the creation of the environment for recuperation and healing in accordance with different groups of users, and highlights the functionality of facilitating healing. Furthermore, it guarantees that patients can utilize the garden space conveniently and comfortably, and plays the role of facilitating the healing [5].

Healing garden mainly involves four aspects, which are the orientation towards the disadvantaged groups, the objective of healing, the landscape as the material and interaction as the medium [6]. Healing garden, which is oriented towards the physiologically or mentally disadvantaged (disabled) groups, such as the

elderly, the sick, the disabled and the injured, etc., relies on such plant landscapes as arbor, shrub and flower (grass) to organize patients' multi-dimensional landscape experience and social activities. Hence, it implements comprehensive landscape venues which alleviate pain, recover (physiological) functions, build up confidence and delight the mood [7].

3. The Functions and Categories of Aromatic Plants

3.1. The Functions of Aromatic Plants

3.1.1. Adjust mood and alleviate pain

The effect of aromatic plants' volatile matter in adjusting mood has been proved by many scholars. By virtue of olfactory pathway, aromatic matter acts on the central nervous system, adjusts and balances the vegetative nervous system, so as to generate the effect of stabilizing, relaxing, delighting or agitating. According to the findings of Johnson [8], lemon essential oil can effectively alleviate medical school students' anxiety before exams; in light of the findings of Louis [9], lavender essential oil can effectively improve terminal cancer patients' anxiety and depression, and enhance their sense of happiness; Ulrich [10] proves through experiments that plant landscape can alleviate negative and nervous emotions, reinforce positive emotions and attention, and more importantly, facilitate the maintenance of a good mood; spending 4-5 min in the healing garden can alleviate pressure, spending longer time there is advantageous to physical rehabilitation, such as lesser dependence on pain killers and shortened hospital stays [11].

3.1.2. Lower blood pressure and improve immune function

It has been proved by experiments that aromatic plants' volatile matter plays a certain role in lowering blood pressure and improving immune function. It is pointed out by research that specific combination of aromatic plants manifests significant effect in lowering blood pressure and facilitating health care. After smelling the fragrance in the aromatic plant area, which is mainly constituted of *Lavandula angustifolia*, *pelargonium graveolens*, *origanum vulgare* and sweet basil, mild hypertension patients' systolic pressure and diastolic pressure are significantly higher than before. The scores of all the indexes listed in the SCL90 self-reporting inventory decrease to different degrees, and the general symptomatic index and somatization drop significantly after smelling the fragrance [12]. It is found out by Son and Park et al. that after inhaling volatile matter of Japan cypress, the experimental subjects' physiological status (electroencephalogram and blood pressure) becomes increasingly stable [13]. It is suggested by the research of Li [14], NK cell viability and the quantity of NK, NKT and anti-cancer protein in human blood significantly increase after a forest bath, and the increased NK cell viability can maintain till 30 days after the bath.

3.1.3. Beautify and aromatize the environment

Aromatic plants' flower, fruit, branch and leaf are of very high ornamental value. Meanwhile, the diversified colors, shapes, charms, fragrance and texture can all bring all-round enjoyment of beauty. Fragrant flowered plants can also attract butterflies and bees, which can collect pollen. The fruits of some aromatic plants can attract a number of birds, through which an ideal landscape effect with birds' twitter and fragrance of flowers can be realized.

3.1.4. Purify air and drive away mosquitoes and flies

The fragrance volatilized by aromatic plants, which plays a role of sterilizing, disinfecting and resisting oxidation, can sterilize the air, which further realizes the effect of purifying air. Through their blades, aromatic plants can absorb toxic substances in the air, so that some toxic substances can decompose within the body or degrade and convert into non-toxic substances on their own. The special aroma secreted by certain aromatic plants, which can drive away mosquitoes, flies and insects, become an efficient and generally popularized natural mosquito repellent that's non-toxic and non-pollutant, and leaves no residue.

3.2. Classification of Aromatic Plants

In accordance with the different aromatic parts, aromatic plants can be basically divided into seven categories. See Table 1.

Table 1: Classification of Aromatic Plants

Name	Basis of Classification	Common Varieties
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Fragrant grass	Generally speaking, fragrant grass refers to aromatic herbal plants that deliver fragrance through the whole grass or the ground.	Lavender, mint, verbena, purple perilla, sage, parsley, spearmint and cymbopogon, etc.
Fragrant flower	Fragrant flower refers to a type of aromatic plants whose flowers deliver fragrance.	Sweet-scented osmanthus, wintersweet, narcissus, banana shrub, freesia, edgeworthia chrysantha, rose chinensis, fragrant plantain lily, Chinese wisteria, gardenia, orchid, jasmine, magnolia flower and sophora flower, etc.
Fragrant leaf	Fragrant leaf refers to a type of plants whose leaves deliver intense fragrance.	Camphor tree, acorus calamus and cajeput, etc.
Fragrant root	Fragrant root refers to woody or herbal plants that deliver fragrance.	Juniper, asarum sieboldin and vetiver grass, etc.
Fragrant wood	Fragrant wood refers to aromatic plants whose trunks and timber can deliver fragrance.	Phoebe bournei, cinnamon camphora, aquilaria, agallocha, etc.
Fragrant fruit	Fragrant fruit refers to aromatic woody or herbal plants whose fruits deliver fragrance.	Citrus, vanilla planifolia, mango, grapefruit, lemon and kumquat, etc.
Fragrant tree	Fragrant tree mostly refers to aromatic woody plants, which deliver fragrance through two or above organs.	Camphor tree, cinnamon, algum, etc.

4. Creation of Sensory Environment with Aromatic Plants in Healing Garden

4.1. Creation of olfactory environment with aromatic Plants

As a real part of the garden, visual landscape delivers the most intuitive feeling. Relatively speaking, olfaction is the virtual part of the garden. In the landscaping of aromatic plants, olfaction can be utilized to supplement the visual feeling. The combination of virtual and real landscape can leave tourists wonderful fanciful thoughts. The substances delivered by aromatic plants include a great deal of

substances under the category of alcohol, ketone and lipid. Under the photosynthesis of plants, a lot of volatile aromatic grease will be decomposed. After entering the human body in the form of gas, the grease can stimulate human brain and the respiratory system, which makes people highly energetic and quick-witted [15]. Different fragrances determine different ambience. In such relaxing and lively activity space as the playground, plants that can agitate people, such as jasmine, grapefruit and Lily should be adopted. On the contrary, in quiet recreation area, plants that can tranquilize and allay excitement, such as orchid, sandalwood, lavender and violet, should be adopted. Meanwhile, the fragrance of aromatic plants can be utilized to create the artistic conception of garden. The Osmanthus Fragrance Pavilion of the Lingering Garden is an excellent example here. See Figure 1.



Figure 1: *Osmanthus Fragrance Pavilion of the Lingering Garden*

4.2. Creation of Visual Environment with Aromatic Plants

As a type of landscape plant, which uniquely bears the aromatic and ornamental property, it can aromatize and beautify the environment. Due to their ornamental characteristic, aromatic plants have been considered as an industrial crop that's extensively utilized in garden appreciation and courtyard afforestation in European and American countries, as well as Korea and Japan for quite a long time [16]. A key point in the creation of visual environment with aromatic plants is the sense of balance and harmony of the colors of flowers. Please see Figure 2. There is a great variety of aromatic plants. Although aromatic plants are mainly fragrant flowers, leaf, fruit, trunk and even bark can manifest different colors, other than the gorgeous colors presented by flowers. Hence, diversified experience of appreciation is generated. For example, warm-toned aromatic plants (such as orchid, monthly rose, crown daisy, marigold and milkweed, etc.) bring vivid, warm and exciting imagination. On the contrary, cold-toned aromatic plants (such as jasmine, lavender, mint, sophora flower and Mona lavender, etc.) can calm people down, and bring a quiet, peaceful and sedated state [17]. Designers can divide the plants by colors in accordance with the demands of different groups, so

as to adjust people's mood and influence their health condition.



Figure 2: *Color Matching of Aromatic Plant Garden*

4.3. Creation of Auditory Environment with Aromatic Plants

Aromatic plants will deliver their own unique sound in the nature. While having a rest and indulging themselves in the nature, tourists can hear the rattle of raindrops drummed rhythmically against the banana leaves, the rustle in the air generated by the mutual friction of leaves, and the sound of birds stopping on the trees. All these can help people experience the natural breath and aesthetic feeling, which can further help them relieve their mood and eliminate any distracting thoughts. Please see Figure 3.



Figure 3: *"Auditory landscape" of aromatic plant garden*

4.4. Creation of Tactile Environment with Aromatic Plants

Among the five feelings, tactile feeling is unique and direct. The leaf, fruit, texture, bark and flower of different varieties of aromatic plants are also widely different. There are fleshy, leathery and downy leaves; fuzzy and branchy trunks; smooth, whiting and rugged fruits. All these are the target of the tactile feeling and the source of tactile experience. Under the tactile feeling of aromatic plants, people can experience the nature and all living things on earth, reinforce their ability of identification, and cultivate their ability of observation and patience. Tactile feeling is especially important to the blind, whose visual sense is already gone. As to those people, their tactile feeling is more developed than the ordinary

people. This is scientifically called compensation or commutation. The creation of the tactile environment can help them perceive the objects around them proactively, and fit into the nature to relieve their mood and intensify their confidence in life. Please see Figure 4.



Figure 4: Touch flowers and trees

4.5. Creation of Gustatory Environment with Aromatic Plants

Generally speaking, the creation of gustatory environment with aromatic plants is integrated with picking and tasting activities. Within a certain area in the garden, edible plants or aromatic plants that can be utilized as raw-food material can be adopted to create “fragrant” landscape. In other words, the gustatory enjoyment can be realized through self-farming garden, fruit-picking garden or fruit-tasting garden [18]. The plantation of fragrant fruits, such as grapefruit, plum-leaf crab, persimmon, orange and apple, can play the role of playing and tasting, and satisfy the function of landscape viewing and health care maintaining. Please see Figure 5.



Figure 5: Pickup of fragrant fruits

5. Form of Applying Aromatic Plants in Healing Garden

Aromatic plants bear gorgeous colors, graceful gesture, delicate fragrance and unique effects, which means significant value in the utilization in healing garden. Generally speaking, there are several forms in which aromatic plants can be utilized in healing garden.

5.1. Healthcare-based Greenbelt

Aromatic plants play a certain role facilitating the maintenance of health condition. The effects are

mainly related with the substances that are volatilized. The volatile substances can activate the channel qi, adjust vital energy and blood, and promote the balance between yin and yang. Moreover, they can kill germs, and play the role of diminishing inflammation, sedating and promoting blood circulation to remove blood stasis. Therefore, healthcare-based artificial aromatic plants are mostly adopted in healthcare-based greenbelts. By virtue of the configuration of plants and biology, a certain ecological structure is formed. Thus, the substances secreted and volatilized by plants can be utilized to realize the objective of reinforce health condition, prevent and cure diseases [19]. See Figure 6.



Figure 6: Healthcare-based Greenbelt

5.2. Night Fragrant Garden

The afforestation of night fragrant garden is mainly completed with aromatic plants. With the increase of material and spiritual demands, night fragrant garden, as a form of garden, has become increasingly popular among the tourists because of its characteristics in mystery, romance and quietness. Particularly speaking, with the arrival of summer, recreation and summer heat relieving make night fragrant garden the first choice. As night falls, people's sight is declined when compared with the daytime, even if there is soft and weak light from street lamps. Hence, their sensitivity towards fragrance is unconsciously improved. Other than this, fragrant plants also have the effects of driving away mosquitos, and resisting bacteria and corrosion, which are thoroughly utilized by night landscape. Therefore, night fragrance garden thoroughly manifests the characteristic of aromatic plants in aromatizing. Please see Figure 7.





Figure 7: *Night fragrance garden*

5.3. Aromatic Plant Garden

At present, a large number of aromatic plant gardens have emerged in China and foreign countries. Aromatic plants bear relatively high value of appreciation, and the great varieties of aromatic plants are reasonably matched, which deliver different kinds of fragrance and colorful landscapes. Meanwhile, people have reinforced their living quality and aesthetic judgment in recent years. Based on the theoretical research and the integration of the current situation, the design and planning of aromatic plant garden, which is based on aromatic therapy, are proposed. Upon considering the traditional functions of appreciation and recreation, the aromatic plant garden can undertake the maintenance of health condition, which is innovation of the all-round sensory experience in the application of garden landscapes. Please see Figure 8.



Figure 8: *Fragrant plant garden*

5.4. Hospital Greenbelt

Not only do aromatic plants manifest the characteristics of beautifying and aromatizing, they also play a certain role in maintaining health condition. Aromatic plants deliver volatile chemical

substances, such as terpene, alcohol, phenols, ketone and esters compounds. After the chemical elements are inhaled by human body, they will enter the limbic lobe system of the brain first, and next, the lungs. After they are absorbed by ballonets of the lungs, they will be transferred to blood, which will flow into the heart, and spread all over the body through the circulatory system. Meanwhile, the elements will act as a natural protective barrier of the mucosa of the respiratory system, for example, bronchus, and prevent it from the invasion of bacterial virus. Hence, aromatic plants can start the purification from the surroundings, and exert a subtle influence on improving patients' immunity simultaneously, which is quite simple and feasible to patients. For instance, the fragrance of sweet-scented osmanthus plays a role in cough-relief, antiseptis and anti-inflammation, and alleviation of bronchitis patients' respiratory tract; orchid plays a certain role organizing the mind dispersing cold; tangerine tree manifests significant effect in preventing skin cancer and colorectal cancer; calyx canthus can reduce the amount of mercury in the air. However, those patients that are allergic to the fragrance or pollen of flowers should be taken into consideration during the plantation of these aromatic plants. Please see Figure 9.



Figure 9: *Hospital greenbelt*

5.5. Nursing Home Greenbelt

Aromatic plants are primarily adopted in the greenbelt of nursing homes for afforestation. In this way, seniors can naturally act on different physical functions by appreciating, inhaling and touching these plants during the activities, so as to further improve and recover their health condition. Plants like albizia flower, daffodil, greenish lily flower, jasmine,

chrysanthemum and lotus, which bear beautiful shapes, can help people calm down, and alleviate their insomnia and headache. However, more attention should be paid to the selection of aromatic plants. Those plants that can improve the seniors' physical condition should be selected. In consideration of the physical health issues that generally exist among the seniors, plants that are suitable for most people should be selected. See Figure10.



Figure 10: *Nursing home greenbelt*

5.6. Campus Garden

Graceful campus environment is one of the important constituent part of campus environment. With the allocation of certain aromatic plants, the beautiful and aromatic environment can motivate people's positive and proactive attitude based on the reflection of campus culture, and promote the adjustment of moods, and the establishment of harmonious interpersonal relationship. According to the findings of SONK C. et al. many kinds of aromatic odor can stimulate the brain, alleviate the pressure, allay the tiredness, enhance the confidence, improve the memory and raise the learning efficiency [13]. Undoubtedly, this is a good news to the students. Please see Figure 11.



Figure 11: *Campus garden*

6. Conclusions

Plants are closely bound up with people's life. With the social development, aromatic plants have become an indispensable constituent part in urban settlement. Furthermore, the creation of plant landscape is the crucial point and the core in the design of healing garden. Aromatic plants manifest the characteristic in appreciation and odor in multiple aspects. In light of the functions of aromatic plants, the landscape and characteristics, suitable aromatic plants are selected for different groups of people in hospitals, schools and nursing homes, so as to further exert certain influence on people and facilitate the maintenance of health condition. As a whole, aromatic plants will definitely play a significant role in the construction of healing garden.

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