

Investigation and Analysis of Poisonous Plants in Landscape Plants of a Residential Area in Hefei

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Abstract: This paper lists the common poisonous flowers and poisonous plants in landscaping, and explains the matters needing attention in landscape design, which should consider their toxicity and functionality in landscape design, and use the design to play the aesthetic feeling of plants in landscape design. In this paper, the methods of field investigation and consulting data were used to investigate the poisonous plants in a residential area of Hefei. The family name, species name, poisonous parts and toxicity of these poisonous plants were listed, and the problems existing in the application of landscape plants in a residential area of Hefei City were discussed and the solutions were put forward.

Keywords: Landscape Plants; Poisonous Plants; Greening; Hefei City.

1. Introduction

Landscape plants are plants used in landscaping, including woody and herbaceous ornamental plants, as well as some protective plants and economic plants that can be profitable. In landscape design, the selection of appropriate garden objects can give full play to its landscaping function and ornamental characteristics, which is an important part of landscape design. There are many poisonous plants in many plant species, and there are also a certain number of poisonous plants in garden plants. Poisonous plants are generally defined as plants that can produce harmful effects on humans and livestock. [1] Poisonous ornamental plants refer to plants whose branches, leaves, flowers, fruits and postures have certain ornamental value. [2]

LiveScience recently ranked the top ten ornamental poisonous plants: small leaf rubber tree, wood vine, hydrangea, candle, foxglove, chrysanthemum, oleander, Lily of the valley, azalea and daffodil. [3] These plants are often used in the design practice of landscape design. If these ornamental plants are eaten carelessly, they are likely to cause vomiting and coma. If they are eaten too much, they may threaten human life. There are about 1300 species of poisonous plants in China, which are distributed in 40 families. Among them, the poisonous species of Liliaceae, Ranunculaceae, Euphorbiaceae, Solanaceae, Ericaceae and Leguminosae account for a large proportion. [4] The plants of these families are often used in landscaping. The common plants in gardens, such as azalea, oleander and lantana, can cause poisoning if eaten by mistake. With the improvement of living standards and the improvement of material level, people pay more and more attention to the landscape greening design of residential areas. The richness of landscape design in residential areas will gradually increase the opportunities for residents to contact garden plants. In recent years, there are more and more incidents of residents or animals poisoning caused by residents contacting or eating poisonous plants by mistake. In order to better understand the poisonous landscape plants and reduce the occurrence of poisoning incidents in the landscape design of residential areas, the author carried out field investigation and analysis of poisonous plants in the landscape greening plants of a residential area in Hefei City,

Anhui Province.

2. Overview of Hefei City

Hefei, abbreviated as Lu or He, was called Luzhou, Luyang and Hehe in ancient times. It is one of the important birthplaces of Chinese civilization. It is named for the origin of the East Feihe River and the South Feihe River. Hefei is located in East China, the central part of Anhui Province and the western wing of the Yangtze River Delta, surrounded by Chaohu Lake, between 30° 57' ~ 32° 32' north latitude and 116° 41' ~ 117° 58' east longitude. The annual average precipitation in Hefei is about 1000 mm, with a large proportion in summer and an average relative humidity of about 77%. Hefei is a prefecture-level city, provincial capital and mega-city under the jurisdiction of Anhui Province, and was rated as a new first-tier city in 2023. At the same time, it is also an important research and education base, including the University of Science and Technology of China, the National Defense University of Science and Technology, Hefei University of Technology and other well-known institutions, while Hefei is also a modern manufacturing base and a comprehensive transportation hub, with listed companies such as IFLYTEK and the United States.

3. Survey Methods

The author uses the combination of literature research method and field research method.

3.1. Literature Research Method

This paper summarized the relevant literature, books, conferences and research reports of poisonous plants, looked for the theoretical support, collected the research results and works of experts and scholars at home and abroad, studied the relevant concepts, development process and theoretical methods, and further explored the utilization of poisonous plants on this basis.

3.2. Field Research Method

Visit the site for research and analysis, analysis of the park's landscape planning status of poisonous plants, other parks for comprehensive data collection and summary.

4. Findings

Through many field investigations of landscaping plants in

a residential area in Hefei, it was found that there were 24 kinds of poisonous greening plants (see Table 1 for details).

Table 1. Characteristics of 24 Poisonous Plants in a Residential Garden in Hefei

Species name	Section name	Poisonous parts	Toxicity	Planting methods
Buxus sinica M.Cheng	Buxaceae	Leaves, stems	Moderately toxic	Solitary planting, Solitary planting, piece planting, Katashiki
Nandina domestica	Berberidaceae	Whole plant	Moderately toxic	Solitary planting
Hydrangea macrophylla	Hydrangeaceae	Whole plant	Poison	Solitary planting
Amaryllis vittata	Amarryllidaceae	Whole plant	Poison	Solitary planting
Lycoris radiate	Amarryllidaceae	Whole plant	Moderately toxic	Katashiki, Cong Zhi
Camellia japonica L.	Theaceae	Seeds	Poison	Solitary planting, Katashiki
Platycladusorientalis Linn.	Cupressaceae	Branches and leaves	Poison	Solitary planting, piece planting
Pinica gyanayum Linn.	Piniaceae	Root bark and stem bark	Moderately toxic	Solitary planting
Oxalis comiculata	Oxalidaceae	Whole plant	Poison	Katashiki, Cong Zhi
sinica M.Cheng	Euphorbiaceae	Juice, leaves, fruit	Moderately toxic	
Euphorbia pulcherrima Willd	Euphorbiaceae	Juice	Moderately toxic	Katashiki
Salix babylonica L.	Salicaceae	Peel, leaf	Poison	Solitary planting
Impatiens epilobioides	Balsaminaceae	Whole plant	Poison	Katashiki, Cong Zhi
Eriobotrya ponica Thunb.	Roseceae	Seeds, leaves	Poison	Solitary planting
Cassia tora L.	Roseceae	Seeds, leaves	Poison	Solitary planting
Narcissus tazetta	Liliaceae	Whole plant	Moderately toxic	Katashiki, Cong Zhi
Robinia pseudoacacia L.	Leguminosae	Stem, bark, leaf, seed	Poison	Katashiki, Cong Zhi
Wisteria sinensis Sweet	Leguminosae	A pod, see, skin, etc	Moderately toxic	Katashiki
Ligustrum vicaryi	Oleaceae	Root, stem and bark	Poison	Katashiki, Cong Zhi
Ligustrum lucidum Ait.	Oleaceae	Root, stem and bark	Poison	Katashiki, Cong Zhi
Ligustrum quihoui Carr.	Oleaceae	Root, stem and bark	Poison	Katashiki, Cong Zhi
Hedera nepalensis var. sinensis	Araliaceae	Leaves, stems	Poison	Katashiki, Cong Zhi
Lyonia ovalifolia	Ericaceae	Whole plant	Moderately toxic	Cong Zhi
Mahonia fortune(Lindl.)Fedde	Berberidaceae	Whole plant	Moderately toxic	Cong Zhi

According to the results of the survey, there are 24 kinds of poisonous plants classified according to their toxicity, of which Oleaceae is the most, with three kinds, and the poisonous parts are branches, leaves, seeds, fruits, juices and so on.

5. Classification of Poisonous Plants

For the classification of these poisonous plants, we can generally carry out from two dimensions: according to the size of plant toxicity, it can be divided into small toxicity, medium toxicity, large toxicity, highly toxic, cancer-promoting, etc. According to the toxic parts of plants, it can be divided into five categories.

1: The whole plant is poisonous: The whole plant of some plants contains toxins, such as Datura stramonium, Chaiteng, etc. Contact with any part of these plants may cause poisoning. Poisonous elements in stems and leaves.2:The stems and leaves of some plants contain toxins, such as oleander, Day Lily, etc. Contact with or ingestion of these parts may cause

poisoning. 3: Poisonous flowers and fruits: The flowers and fruits of some plants contain toxins, such as evening primrose, hyacinth, etc. Eating or touching these parts by mistake may cause poisoning.4:Poisonous seeds: The seeds of some plants are highly poisonous, such as acacia beans and castor beans. Eating these seeds by mistake can lead to serious health problems and even death, poisonous juice and so on. Poisonous stems and leaves.5: The stems and leaves of some plants contain toxins, such as oleander, Day Lily, etc. Contacting or eating these parts by mistake may cause poisoning. In general, the safety will be considered in the landscape design of residential areas. There will be no toxic, highly toxic and cancer-promoting plants in the landscape greening of residential areas, so as to prevent casualties caused by eating by mistake.

5.1. Small Poisons

Small poisonous plants refer to the plants that can cause toxic reactions when people contact or eat them by mistake.

The common plants in residential landscape greening are arborvitae, loquat, hydrangea, etc. These plants belong to small poisonous plants. If you accidentally eat small poisonous plants, you may have abdominal pain, dizziness and other symptoms, and need timely medical treatment.

5.2. Moderate Toxicity

Moderate toxicity refers to plants that pose a threat to the lives of adults at high doses, or that can cause physical discomfort in children at normal doses and may cause death in severe cases. Common plants in residential areas, such as *Sapium sebiferum*, Nanzhu and Daifen taro, are all moderately poisonous plants. If residents accidentally eat moderately toxic plants, vomiting, spasms and other reactions will generally occur, and excessive doses may also cause death.

5.3. Big Poison Category

Big poison category refers to the amount of general Chinese herbal medicine, that is, 5 to 10 grams of plants that can cause human or animal death. [5] Common greening plants in residential areas include *Hemerocallis fulva*, oleander, *Trachelospermum jasminoides*, *Melia azedarach*, *Alocasia macrorrhiza*, *Nerium indicum*, *Lycoris radiata* and so on, all of which belong to poisonous plants. If you eat these plants by mistake, you will usually have vomiting, abdominal pain, respiratory distress and so on, and you need to seek medical treatment in time.

6. Garden Application of Poisonous Ornamental Plants

Poisonous ornamental plants, like other garden plants, have the characteristics of beautiful plant type, beautiful color and perfect leaf shape. [6] At the same time, they also have certain medicinal value, such as *Mahonia bealei*. The root, stem and leaf of *Mahonia bealei* can be used as medicine. The main effect of its root and stem is to clear heat and detoxify. Moderate drinking can promote the metabolism of the human body. It can help remove toxins and harmful substances in the body, improve blood circulation to a certain extent, and assist in the treatment of bacillary dysentery, bronchitis, infectious hepatitis and other diseases, The leaves of *Mahonia bealei* also have the functions of nourishing Yin, reducing fire and moistening lungs, which are suitable for tuberculosis patients and can help protect lung tissues. It has high ornamental value in the application of landscape greening and bonsai modeling, and can reduce the difficulty of landscape maintenance and management. The landscape forms of poisonous ornamental plants are divided into: hedge tree wall, isolated planting, cluster planting, patch planting, potted plants and bonsai. [7]

6.1. A wall of Hedgerows

Hedgerows are densely planted by shrubs or small trees, generally in the form of single-row or double-row planting. Plants with short plants, close branches and leaves, shade-resistant and shear-resistant plants are often selected to be arranged on the roadside, flower beds and the edge of lawns, which have good artistic and ornamental effects. In addition to viewing, the most important function of hedgerows is to partition or divide different functional spaces to achieve a sense of moving scenery. Common plants include *Platycladus orientalis*, Sparrow Tongue Yellow, *Buxus Sinica*, *Berberis thunbergii*, etc.

6.2. Solitary Planting

Isolated planting is a common design form of tree configuration in landscape architecture. [8] In order to show its unique ornamental value, solitary tree planting generally chooses a tree species with tall body and straight trunk, which can also be used to view flowers, leaves or fruits. Isolated plants are usually planted in open landscape areas, such as large lawns, square centers, road intersections or slope corners, so as to ensure that plants have enough growth space and the best viewing distance. The location of isolated tree planting should be considered to be unified with the surrounding environment as a whole. It should not be too isolated and appear blank and monotonous. The background of isolated tree planting can be sky, water, grassland, etc so as to highlight the characteristics of trees in shape, posture and color. The design of isolated tree planting emphasizes that isolated trees are not isolated, that is, trees cooperate with other scenery such as buildings, lawns and other trees to form a unified whole. Commonly used tree species are: *Magnolia*, *Acer*, *Photinia*, *Camphor*, *Liquidambar formosana* and so on.

6.3. Cong Zhi

Cluster planting, as a way of garden plant configuration, mixes shrubs of different families to form a plant landscape with group beauty and individual beauty. Cluster planting not only shows the beauty of the overall form of plant groups, but also highlights the beauty of individual plants. The application forms of cluster planting in landscaping are rich and diverse, which can be flexibly configured according to different use needs and landscape design, and can create a patchwork and rich landscape. There are various forms of cluster planting. Clump planting with shade as the main function usually adopts a single planting mode and selects trees with dense crowns. Most of the trees used as the main landscape configuration are mixed with trees and shrubs. By configuring some herbaceous flowers and rocks, the best landscape effect can be achieved and a variety of trees can be formed into a group. Poisonous ornamental plants suitable for cluster planting include *Daphniphyllum sibiricum*, *Nandina domestica*, *Camellia japonica*, etc.

6.4. Katashiki

Patch planting is mainly in the form of large area planting, which is mainly reflected in the landscape design of topographic slopes, open lawns, one side of the garden road or one side of the waterscape. The patch planting here is different from the equidistant scattered planting of plain afforestation, but imitates the natural growth of plant groups, just like the feeling in Chinese classical gardens that although it is made by people, it is like the opening of the sky. The common plants planted here are *Platycladus orientalis*, *Rhododendron*, *Buxus Sinica* and so on.

6.5. Potted Plants and Bonsai

Potted plants are a form of greening in which plants are planted in pots. They usually maintain the natural growth form of plants. They are mainly used to appreciate the branches, leaves, flowers or fruits of plants. Common plants are Turtle Back Bamboo and *Dieffenbachia*. Bonsai has high requirements for plant materials. Bonsai plant accessories include plants, rocks, water, soil, etc. After careful combination design and artistic processing by designers, they are arranged in flowerpots to form an artistic epitome of natural landscape. Bonsai is not only a form of greening, but

also a form of artistic expression, with high ornamental value and artistic appeal. Common plants are camellia, boxwood and so on. Poisonous ornamental plants, such as Wisteria, Daphniphyllum and Chinese tallow tree, have good ornamental effect. Poisonous landscape plants have certain toxicity, but if they are well used, they can beautify the environment and purify the air.

In the practice of landscape greening design, designers should understand the design orientation and design one-to-one according to different use spaces. They need to fully understand the toxicity of different plants. For toxic greening plants, they need to be designed in water areas or areas where pedestrians are not easy to enter as far as possible. They can also be listed to warn the toxicity of plants and toxic ingredients. Residents were warned not to touch at will. Small poisonous plants, as long as they do not emit harmful substances to human ornamental plants, can be used as ordinary plants for plant configuration.

7. Conclusion

Poisonous plants in landscape greening should be used appropriately to maximize the ornamental value of plants. It can not be generalized that poisonous plants can not be used in landscape design. Many poisonous plants are not only graceful but also have beautiful branches. Appropriate use of them in landscape greening will play a very good ornamental value. Residents should raise awareness of poisonous plants, and avoid using poisonous plants in the design, or use a small amount of poisonous plants in areas that are not easy to enter, or plants that are easy to cause poisoning when people and animals contact and eat them by mistake. However, for some plants with great ornamental value and little toxicity, which generally do not cause toxic reactions to residents and animals, their due value in landscape design should be brought into full play. For the selective application of poisonous plants, property workers need to set up fences and billboards beside the plants, and at the same time, the community should organize activities to invite botany professionals to introduce poisonous plants and publicize how to treat them after eating them by mistake, so that residents can have a preliminary

understanding of the common poisonous plants in their lives. In order to reduce or avoid the occurrence of poisoning incidents in the daily life of residents. At the same time, as a landscape designer, we should learn plant knowledge, make better use of the double-edged sword of design, let good design fall to the ground, take root and sprout, and better serve human beings.

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