

Landscape design of green autumn winter plant in northeast region planning to adapt to climate

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Abstract. Based on the research of plant resources in Daqing City and the analysis of plants landscape in winter, the paper discusses the plant landscape pattern which can represent landscape characteristics of Daqing in winter and sums up the principles and strategies which are suitable for winter plants landscape construction in Daqing. Assessment method for public aesthetic is designed by landscape assessment method theories of psychology. After an essence study on the color of plants landscape in winter by color breakup methods in color composition theory has been made, it can be known that the aesthetic essence of plants landscape in winter is color factor; the application rule of color created by plants landscape in winter is summed up by the analysis of public preference. An in-depth research is carried out for branch of deciduous tree in winter condition by plane constitution method in constructivism. Based on the analysis of public preference for plants landscape in winter, combining with the aesthetic ideology of traditional painting and calligraphy in china and modern constitutive theory, it is concluded that the formal beauty and artistic beauty of the lines are the main factors to form the plant landscape in winter. Combining with the results of research and analysis of typical plants landscape in winter in Daqing City, three principles of ecology, artistry and culture of plants landscape construction in winter and the construction methods of regional characteristic winter plant landscape in Daqing are concluded. On the basis of ecological and artistic features, the cultural features of plants landscape in Daqing will be prominently built.

Key words. Plants landscape, Landscape design, Cold climate, Winter plants, Assessment

1. Research methods and survey steps

The traditional garden culture in China has been focused on the construction of winter plants landscape long ago. A plenty of researches have been carried out by many scholars in theoretical side.

(1) Research methods

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Field survey method: Survey the landscape plant species of characteristic plants landscape in winter on site. Take photos and record the data of the typical landscape. The wild plants with graceful winter leaf or winter condition in natural forests will be recorded by taking photos and the specimen will be collected, after the comparison and identification, data will be recorded to analyze the application value in plants landscape.

Comparative analysis method: The first-hand data obtained by field survey will be compared with relevant data, and the data of relevant plants resources will be improved. Analyze the data of plant resources and classify the plant materials with winter ornamental value.

Expert consultation method: the plant resources will be selected, classified, analyzed and concluded discussing with experts and scholars to make sure the plant resources of winter plant landscape in Daqing City.

Public preference assessment method: the plant landscape will be assessed according to average aesthetic of public and the winter plant landscape will be drawn into a representative composition picture to be played to experimental subjects by slide made by PPT software. Each picture is sorted according to the pros and cons by experimental subjects according to personal aesthetic preferences and objective quantitative results is acquired by data statistics using Excel and intuitive chart will be made.

Case analysis method: analyze the outstanding winter plant landscape in Daqing City and conclude referential valuable experience of winter plant landscape construction to better inherit and spread the garden culture of Daqing City.

(2) Survey steps

Field survey: make field survey for garden plant species used for constructing characteristic plant landscape in winter in Daqing City. Take photos and record the data of the typical landscape with a good landscape effect. The wild plants with graceful winter leaf or winter condition in natural forests will be recorded by taking photos and the specimen will be collected, after the comparison and identification, data will be recorded to analyze the application value in plants landscape.

Comparative analysis: The first-hand data obtained by field survey will be compared with relevant data. Improve data of relevant plant resources and analyze data of plant resources.

2. Analysis for constitution form of plant landscape in winter

Table 1. The composition form of plant landscape mass preference in winter

No.	Sort I	Sort II	Sort III	Sort IV	Sort V
Fig. I	44	26	44	22	41
Fig. II	30	49	40	33	23
Fig. III	67	50	27	14	18
Fig. IV	10	22	33	55	55
Fig. V	25	29	32	52	39



Fig. I



Fig. II



Fig. III



Fig. IV



Fig. V

Fig. 1. The composition form of plant landscape in winter

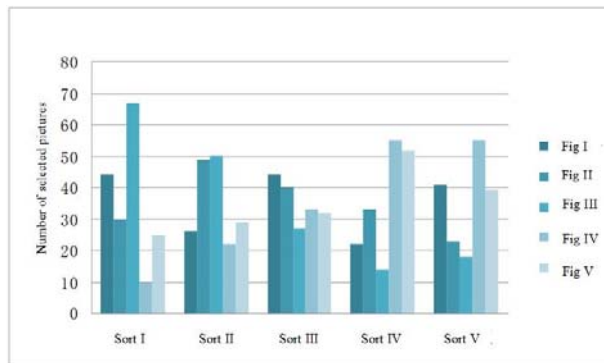


Fig. 2. The comparison of composition form of plant landscape mass preference in winter

From the pictures of plant landscape in winter, we select five winter plant landscapes of different composition forms (see Fig. 1), and it can be seen from the data of mass preference in Table 1 that Fig. III is highly preferred by the masses. Se-

lection sort of pictures is in normal distribution, indicating that assessment data is reasonable and available for analysis; by comparing with mass preference, it can be seen that composition form has a significance influence on the masses (see Fig. 2). Fig. III is a winter plant landscape mainly with *pinus tabuliformis* var. *mukdensis* which is shot in Daqing Beiling Park; the landscape is composed of towering *pinus tabuliformis* var. *mukdensis* and a small number of deciduous tree and shrub, in which *pinus tabuliformis* var. *mukdensis* is with pretty posture, impressive appearance and in a proper proportion with deciduous tree and shrub, thus forming a balanced structure.

3. Analysis for arrangement form of plant landscape in winter

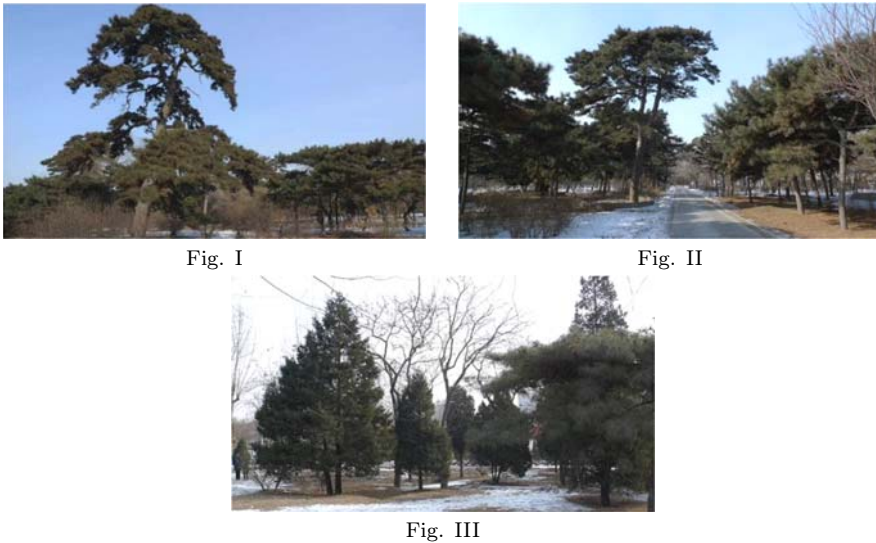


Fig. 3. The plant arrangement form of plant landscape in winter

Table 1. The composition form of plant landscape mass preference in winter

No.	Sort I	Sort II	Sort III
Fig. I	44	55	77
Fig. II	100	48	28
Fig. III	32	73	71

We select three plant landscapes with different arrangement forms from those pictures of plant landscape in winter (see Fig. 3). It can be seen from Table 2 that most people select Fig. II and accounts for 57% of the total, indicating that the plant landscape in Fig. II is highly preferred by the masses. The number of selected pictures at each sort position is in normal distribution, indicating the

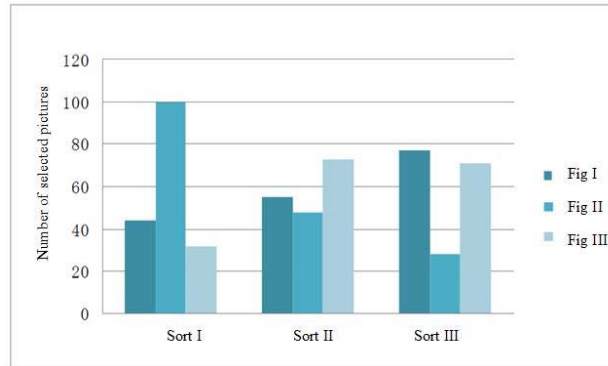


Fig. 4. The comparison of plant arrangement form of plant landscape mass preference in winter

assessment data is reasonable and available for analysis, besides, preference to Fig. I is reasonable in degradation sort, and the mass preferences to Fig. I and Fig. III have little difference. (see Fig. 4) comparing Fig. II and Fig. I, we can get such conclusion that the space shaped by plant landscape is a key factor influencing the scenic beauty of plant landscape. As for the plant landscapes in Fig. II and Fig. I, plant materials and structure forms used are basically similar since both are in a combination form of *pinus tabuliformis* var. *mukdensis* and deciduous shrub in pretty posture. But the plant landscape in Fig. II composes a good half-enclosed space, and it can lead visitors' sights to another far-reaching space. While the plant landscape in Fig. I lacks of space feel, and people can not experience mental pleasure brought about by space changes. Although the plant landscape in Fig. III composes an enclosed plant space, evergreen trees and deciduous trees are disordered in layers, unclear in priorities and in a lack of order, which is a far cry from the plant landscape in Fig. II in sense of rhythm. In constructing plant landscape, evergreen trees and deciduous trees shall be in clear priorities and clear structure with changeable space in arrangement. Due that the winter evergreen pine and cypress are thick with leaves and dense in colors, their volume senses and colors are relatively full; while deciduous trees and shrubs are transparent in branches and light in colors, their volume senses and colors are relatively empty. Therefore, in construction of plant landscape, virtual and real comparisons between trees in winter as well as virtual and real changes in space shall be taken into account.

4. Analysis for line of trees' branches in winter

Our aesthetic senses for lines come into being after long-term aesthetic practices, and are the sedimentations of mentality, physiology and views of people in infinite pursues and explorations of beauty. Due to the differences between eastern and western cultures, we prefer to the aesthetic needs for lines. In traditional culture of China, both painting and calligraphy regard lines as the spirit carrier and they show

line shapes and express emotions through different styles of writing, thus making lines reach the supreme realm of freehand brushwork, emotion expressing and free imagination. In Chinese painting, lines are required to be round, thick and with bone and power to reach “presenting spirit by form”, namely describing the inner spirit of object and expressing artistic emotions of painters with lines in different forms. Besides, in Chinese painting, writing brush shall have many ups and downs in starting and ending operations, including lift and press, pause and inflexion, and all lines shall be returned, thus making spirit at one stretch in lines. If lines are provided with artistic conception, Chinese painting will be provided with feelings, interest and life. So we can say that the beauty of lines is an important factor in aesthetic appreciation of Chinese paintings. Since ancient times, there have been the saying that calligraphy and painting have the same origin in Chinese art; some relatively abstract aesthetics ideas such as spirit, meaning and interest in lines of Chinese painting can also be experienced in calligraphy. Such unique aesthetic taste for lines has made a difference in the formation of our whole aesthetic standard. When we see deciduous trees in winter, we will have a spirit resonance for those twisting, old but strong branches of ancient trees and obtain an incomparable aesthetic pleasure, thus feeling the beauty of artistic conception advocated by classical Chinese gardens.



Fig. I



Fig. II



Fig. III



Fig. IV



Fig. V

Fig. 5. The line of branch in winter

Table 1. The composition form of plant landscape mass preference in winter

No.	Sort I	Sort II	Sort III	Sort IV	Sort V
Fig. I	38	42	47	26	23
Fig. II	35	27	30	39	44
Fig. III	24	37	30	44	41
Fig. IV	50	33	35	24	34
Fig. V	29	37	34	43	34

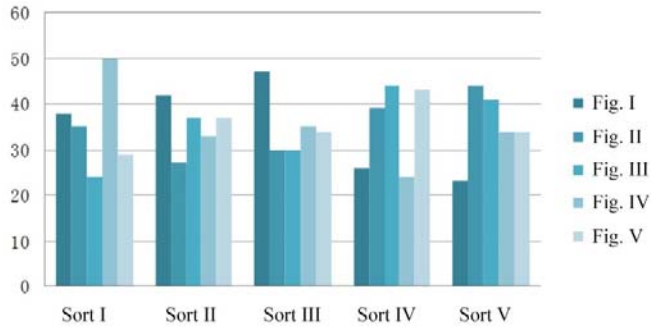


Fig. 6. The comparison of line of branch mass preference in winter

5. Suggestions for construction of plant landscape in winter

(1) Based on ecology, mainly apply native tree species and reasonably apply cultivated species introduced to form the winter plant landscape with outstanding regional characteristics, stable ecological community and rich vegetation species.

(2) By way of artistry, apply formal beauty principle, color beauty principle and spatiality principle to construct a plant landscape meeting people's aesthetic needs in winter.

(3) Aimed at culture, apply plant culture to construct a winter plant landscape filled with beauty of artistic conception and cultural connotations.

Based on the analyses of plant community composition and winter plant landscape of Daqing City, the Paper discusses the arrangement mode of garden plants that can embody the regional landscape characteristics of Daqing, and summarizes the principles and strategies for construction of winter plant landscape of Daqing in the hope of providing a theoretical basis for the practices of designing garden plant landscape in Daqing or even in Northeast region as well as the comparison & selection of design schemes.

6. Conclusion

In terms of composition form of winter plant landscape, the masses prefer to the plant landscape with clear priorities and outstanding characteristics; in terms of the composition form of the same winter plant landscape, the masses preferences are influenced by the posture, proportion structure and layer order of trees: for example, in terms of trees' postures, the masses prefer to trees with branches of strong rhythm and rich rhythm changes. Trees' posture should be an orderly beauty with changes and unity, and such order shall include proper branch size and proportion meeting the composition form of formal beauty principle. Finally, under the circumstance that the composition form and shape structure of plant landscape are basically similar, aesthetic appreciation of the masses is influenced by spiritual level, namely the beauty of aesthetic conception expressed by plant landscape.

Because the deciduous species in different postures and various shapes of branches and stems possess extremely high ornamental value, branches and stems of deciduous trees in winter plant landscape are the main elements of aesthetic appreciation. Deciduous trees in pretty postures can be applied to construct a winter plant landscape. In addition, due to the relatively monotonous color and shape of plant landscape in winter, various plants shall be advised in plant landscape at landscape nodes to make winter plant landscape in richer layers and warmer atmosphere, thus realizing the highlight of landscape effect at the place. While creating the plants landscape themed by *pinus tabuliformis* var. *mukdensis*, single variety planting shall be recommended; to embody the beauty of branches, isolated planting or group planting in three/five can be adopted, or combined with hill stones to form typical turquoise landscape. If planted as border tree and tree mass, the spacing shall be adjusted in accordance with size and form of the tree, thus causing a density change to achieve a group form configuration. While creating the evergreen plants landscape combined with deciduous trees, it shall be in clear priorities and clear structure with changeable space in arrangement. Due that the winter evergreen pine and cypress are thick with leaves and dense in colors, their volume senses and colors are relatively full; while deciduous trees and shrubs are transparent in branches and light in colors, their volume senses and colors are relatively empty. Therefore, during creation of the plants landscape, virtual and real comparisons between trees in winter, as well as virtual and real changes in space shall be taken into account.

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