

## Landscape Perception of Takao Quasi-National Park Using by Visitor-Employed Photography and Spatial Information Technologies

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### 1. Introduction

Mt. Takao is, a famous natural tourist site, designated as Quasi-National Park. For landscape planning such as natural parks, it is important to understand how users percept and evaluate landscapes. The relationship between viewpoints and a viewing object has been regarded important in the landscape perception model which has been studied in landscape architecture, Geography and some sciences. One of the study methods to understand such landscape perception uses a camera called "Visitor-Employed Photography (VEP)", and this method is considered effective in extracting visual images of a space. However, while existing VEP is effective in understanding viewing objects, it still has shortcomings. It requires interviews and descriptions separately in order to extract viewpoints. Certainly, using a Global Positioning System helps effectively pinpoint photographed locations. Providing GPS logger (hereafter GPS) to visitors and gathering geospatial information offers the possibility of thoroughly understanding each photo's location. Additionally, GIS analysis enables to give the spatial distribution, other characteristics of the photos locations. This study conducted a survey combining VEP and GPS in order to understand landscape perception in Takao Quasi-National Park, in Hachioji, Japan.

### 2. Method

A survey was conducted with 30 respondents, and the Inariyama trail of Takao QNP in the suburbs of Tokyo, was selected as a site. The respondents were instructed to use their own cellphones or digital-camera and take over 15 photos of landscapes which respondents prefer. They were also instructed that carrying GPS. Following this activity, respondents selected 15 photos, and noted down 15 photos profile (contents of photos). Each 15 photos were evaluated four item 1) aesthetic, 2) naturalness, 3) rareness, 4) atmosphere by five scale. From the collected photos and geospatial information, we analyzed the places which visitors prefer and its landscape types in Takao Quasi-National Park by using GIS. To identify the place that were particularly popular area called hot spots, whole of trail was divided 5m lines. Then, the number of viewpoints (location where photos were taken) within each line was calculated. After this, Getis-Ord  $G_i^*$  statistic was used (chosen for its superior ability to extract locations with distance damping), so as to identify statistically significant hot spots.

### 3. Results

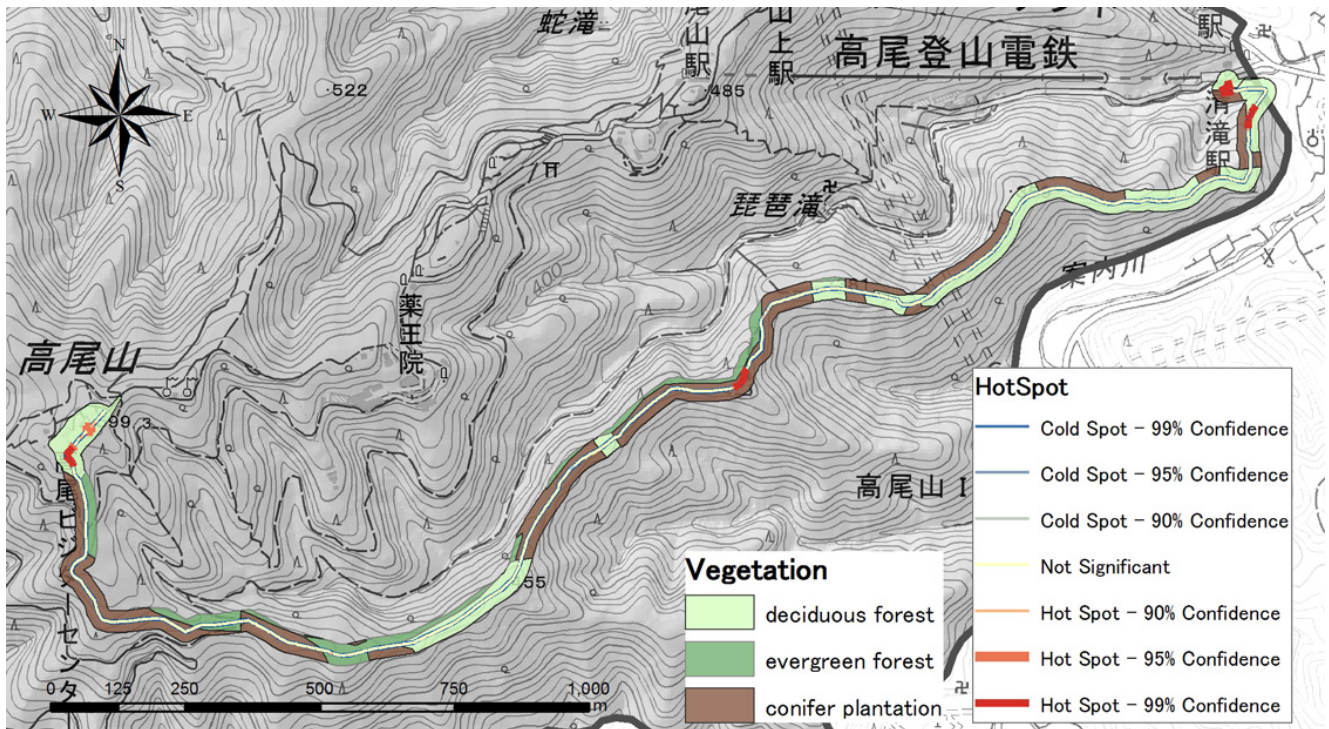
450 photos were collected from 30 respondents. These photos were categorized based on the viewing objects and viewing way. As a result, based on the trail as a viewpoint, "surroundings" (the photos of sceneries within the woods) counted most with 117 photos. "Panoramic views" (82 photos) were also common. We analyzed the collected geographic information with the Getis-Ord  $G_i^*$  statistic and identified the viewpoints of visitors' preference (Fig. 1). The results showed that three highly preferred locations called hot spot were extracted ( $p < .001$ ). This result was combined with the categorized viewing subjects for further analysis, and it was found that photo shooting density tends to be high at the following locations: 1) panoramic view at the top of the mountain, 2) panoramic view at the perspective field on the way, 3) locations with a shrine, and 4) around entrance of the trail.

### 4. Conclusion

In this research, we clarified the places which visitors prefer and its landscape types in Takao

Quasi-National Park by the survey combining VEP and GPS. By extracting the places and its landscape types which visitors prefer, the spatial condition which visitors prefer can be found by using GIS in future study. Lastly, the necessity of an on-site survey, including spatial analysis, was discussed in order to analyze landscape experience at natural landscape area.

Keywords: Landscape, GIS, GPS



## Winter landscape imageries of the city in Sapporo and Rovaniemi

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Focusing on the snow culture and customs as new tourist resources, culturally different meanings of snow and winter landscape need to be understood. In this study, Ways of seeing the winter landscape in Sapporo and Rovaniemi was represented by using Landscape Image Sketching Technique. Students of the Lapland University, Department of Art and Design (n=93) and of Sapporo City University, School of Design (n=116) were asked to make a landscape imete sketch of an imagery of their favorite winter scenery in Rovaniemi or in Sapporo and to include keywords and text.

As a result, landscape image sketches revealed differences in characteristics between respondents in Finland and Japan. The typical landscape images of winter scenery were represented as natural landscapes from a long distance in Rovaniemi and as urban landscapes from a medium distance in Sapporo. The result suggested their different whole concepts of 'winter city' as well as their leisure activities in winter season.

Keywords: Landscape Image Sketching Technique, Winter scenery, Northern regions, Finland

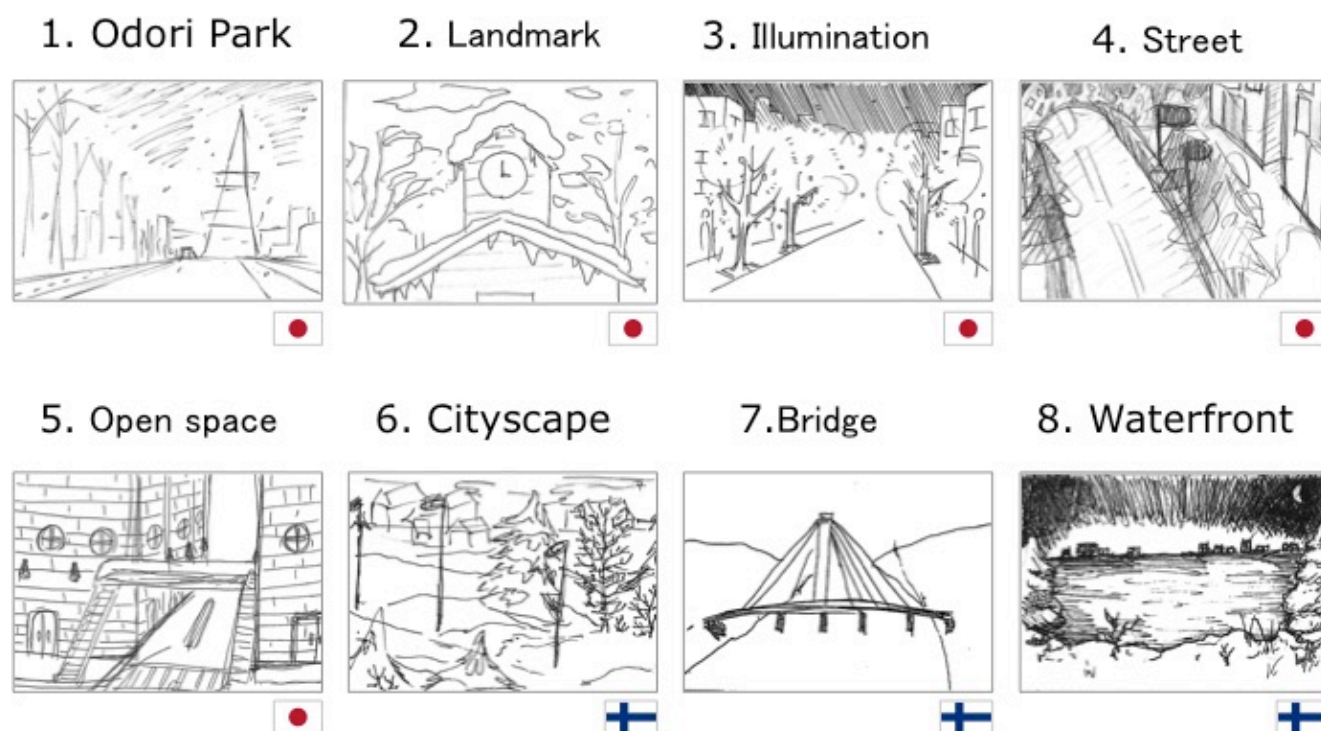


Fig1. Examples of winter landscape imageries categorized in 'City'

## Tourists' Attitude toward Nature Preservation Activities at Hulun Lake Nature Reserve in Inner Mongolia

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### Introduction

Nature reserve system is employed in China as effective measures to protect an ecosystem, diversity of natural creatures, natural resources, and sceneries. China's Western Development Program, which started in 2000, implemented tourism development in the nature reserve in Inner Mongolia, and its economic effect has been recognized. However, one of the efforts expected in regard to tourism management within the nature reserve is to induce tourists' understanding of ecosystem and to promote nature preservation activities by converting tourism usage to eco-tourism. It is also required to understand tourists' attitudes in order to promote their nature preservation activities. Hulun Lake Nature Reserve is a national nature reserve located in Hulun Buir City in Inner Mongolia. In this study, the purpose thus has been set to understand tourists' attitude toward nature preservation activities at Hulun Lake Nature Reserve, and to identify key factors for them to participate in such activities.

### Study Methods

An attitude research was conducted from the end of August to the middle of November in 2015, with the tourists who visited Hulun Lake Nature Reserve as a study subject. The research was administered with a questionnaire survey, which obtained 1,536 effective responses. The questionnaire included questions to ask respondents' demographics and attitude toward nature preservation activities with four-scale answers ("strongly agree", "agree", "do not agree", and "do not agree at all").

### Results

The respondents' demographics were 749 male and 787 female, and 72% of the respondents had educational qualification of high school and above. The largest number of respondents was from 30's and 40's, which counted 45% of the total respondents. Regarding the occupations, office workers, such as public servants, counted 43%, which was the largest group, followed by students 29%, and unemployed and agro-pastoralists together 38%. As for the races, 69% of the respondents were Han, 24% Mongolians, and others including the Russians and the Evenks 7%. Fifty-five percent of the respondents were domestic tourists from outside Inner Mongolia.

With the result of the top two boxes ("strongly agree" and "agree"), "1. Importance of nature and open green space can be communicated to other citizens through the activities" scored highest (98%), followed by "5. It is refreshing with soothing effects by animals and vegetation" (81%), "2. My hobby, such as observation of animals and vegetation can be satisfied" (81%), "6. Quality green space can be preserved for scenery or play grounds" (80%), and "3. Local economy will be stimulated with increased employment in the area" (78%). The total score of "do not agree" and "do not agree at all" among tourists was the highest with "4. Knowledge about and technology for nature and green space conservation will be enhanced" (34.6%)

In this research, tourists' attitude towards nature preservation activities at Hulun Lake Nature Reserve in Inner Mongolia has been clarified.

Keywords: Nature Reserve, Nature Preservation Activities , Tourists, Attitude

## Motives for climbing Mount Fuji: A Comparative Study of Domestic and International Climbers

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The increasing number of international climbers at mountainous destinations necessitates monitoring of the demographic profile and motivation of existing and emerging visitor segments. This paper compares domestic and international climbers descending from Mount Fuji in the summer 2015 season. An intercept survey was conducted over five days near the 5<sup>th</sup> station trailhead on Yoshida, which has the highest footfall of Fuji's four trails. In total, 989 questionnaires were collected from domestic (n=408) and international (n=581) climbers. Findings revealed international climbers to be younger, with lower annual income. Most international climbers were tackling Fuji for the first time (95%), whereas 42% of Japanese had climbed before. The two segments showed common and unique motives. Amongst commonalities, the challenge of reaching the highest peak in Japan dominated both segments, but Japanese were less likely to seek solitude or meeting new people. This research identified variance in climbing motivations. These findings have applications for segment-based monitoring research, and implications for targeted management strategies.

Keywords: mountain climber segments, comparative study, motivation, Mount Fuji

## A Study on Landscape Assessment with Photo Classification Method: Focusing on Bukhansan National Park

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'Subjectivity' is one of the important factors of assessing the landscape cognition. However, the earlier studies were focused on finding out the objective and unified values rather than the subjective viewpoints from respondents. The purpose of the study is to find out the ways of appreciation of the landscape by analyzing and classifying subjective values and cognition of natural landscape using Q-method with the photographic medium to complement the problems of the earlier studies. The research focuses on Bukhansan National Park in Korea, collects the 1,738 pictures from hikers and extracts 25 representative landscape pictures of the whole. Second, The research classifies of 25 photographs by using Q-method with 5 factors which are naturalness, diversity, coherence, exotic feelings and preference. Lastly, the study analyzes the detailed reasons of evaluation by interview to participants.

In conclusion, green landscape with various vegetation is highly rated for naturalness. The landscape with various natural factors and seasonal change got high points on diversity. There are narrow variations of interpreting naturalness, but there are wide variations of interpreting diversity. The landscape which is stable and harmonious rated highly on consistency, and the unusual landscape with huge scale got a high points on exotic feelings. As a result of correlation between preference and assessment factors, the landscape which has a strong naturalness is highly preferred. The study indicates that people preferred the landscape with natural factors rather than man-made facilities on the landscape of Bukhansan National park. We may conclude that this study would be used as basic data to compare the ways of appreciation of the landscape between countries.

Keywords: cognition of landscape, Q-method, classification of photos, naturalness, preference

## Analysing visual landscape preferences of trails in Bukhansan National Park

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Bukhansan National Park is one of the national parks where the most people visit per year. Bukhansan National Park's 'Dulle-gil' is a trail that is constructed along with the boarder of the national park. The role of the trail is to conserve the national park ecosystem absorbing the demand for visiting the other trail that is made to the top of the mountain, and to provide new experiences for visitors. Following the results of the visitor satisfaction investigation, the effects on Dulle-gil have been insignificant yet.

The study purpose is the comparison analysis of visual landscape characters between a typical trail and Dulle-gil. Visitor-employed photography (VEP) has been used to select the most preferred landscape photos in two national park's trails. Visual concepts which is naturalness-man made, coherence-diversity, vusial scale, imageability are used to decribe different characteristics of visual landscapes in the trails.

The results is that naturalness is related to visitor's preference in the typical trail, while the character does not have the relationship with the preference in the Dulle-gil. The new trail has been experienced of what is more various types of visual landscape than the other one. It could be possible to get to the trail easily and to provide rich experience of visual landscape for visitors.

Keywords: Visual landscape assesement, Visitor-employed photography, Visual Charactors, National parks

## A Study on Urban Image of Ulsan and Ulsan Grand Park

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### 1. Introduction

Ulsan, South Korea, is designated a special industrial district. It has developed rapidly and become a pillar of the national economy. However, negative images such as "Polluted Factories" have insidiously arisen and become representative of the word "urban".

Thus, Ulsan has tried various projects, such as establishing parks, to minimize an anti-sentimental image of the urban area. Subsequently, the city has formed Ulsan Grand Park, which is an urban park of the highest scale, throughout the country. This effort is only one part of this project.

### 2. Method

In order to obtain information about Ulsan, this study utilized numerous newspaper articles for two reasons:

The articles are a good way to preserve information from the past and transfer it to the present. They make it easy for the public to reference date.

The period of referenced information is 1962 to 2013. The articles have been gathered by including the word "Ulsan" in the title. The collected materials describe the frequency of the contents in order. Then after deriving observations about how the image of the city has changed, I conducted a survey of the inhabitants.

### 3. Result and considerations

The main results and conclusions of this essay are as follows:

First, the urban image of Ulsan, which was analyzed in newspapers, has changed from an anti-sentimental image into a sentimental image. In addition, 85.6% of respondents say that Ulsan has changed over time.

Second, the most drastic change in people's image of Ulsan is that it is green, which proves the significance of Ulsan Grand Park's influence. Additionally, there are now seven major parks in Ulsan.

Third, the cultural thirst of Ulsan inhabitants is satisfied by the huge festival in the main field of Ulsan Grand Park.

Fourth, the evaluations of Ulsan inhabitants about Ulsan Grand Park have exceeded the normal viewpoint about neighborhood parks. Accordingly, their psychological viewpoint about Ulsan has improved.

### 4. Conclusion

In modern times, local governments want to enhance their urban image by establishing public spaces such as parks. Unfortunately, many established urban areas do not receive support from their inhabitants, which results in a difficult problem.

Therefore, when establishing urban parks, they need to be researched in conjunction with urban development procedures, according to urban inhabitants' viewpoints. Instead of simply making functionally oriented plans for urban infrastructures, they need to review what the potential requirements of urban inhabitants are, as well as how interactive the relationships with urban development procedures are.

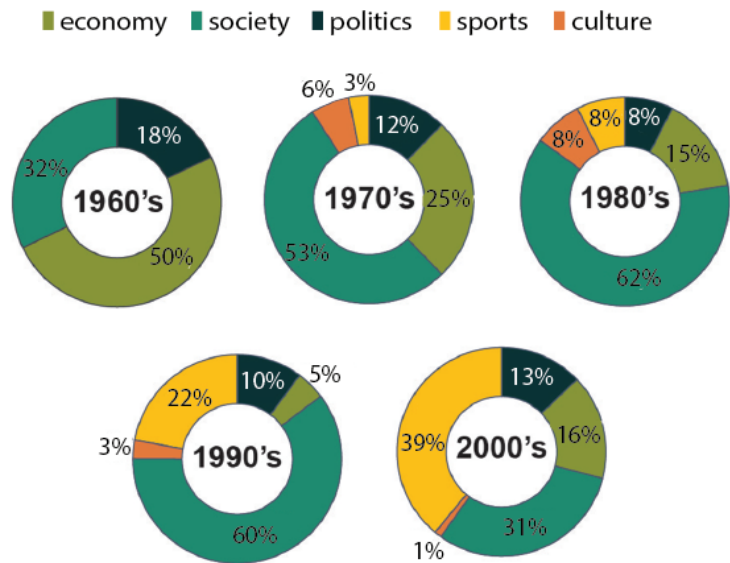
Keywords: Urban Image, Ulsan, Ulsan Grand Park



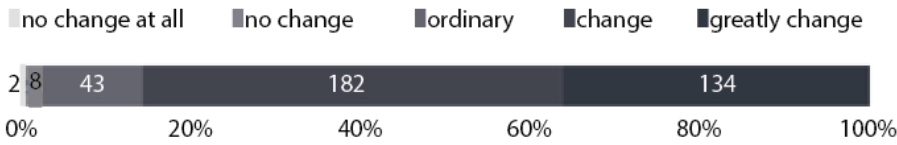
● Site location



● Chronological distribution of articles

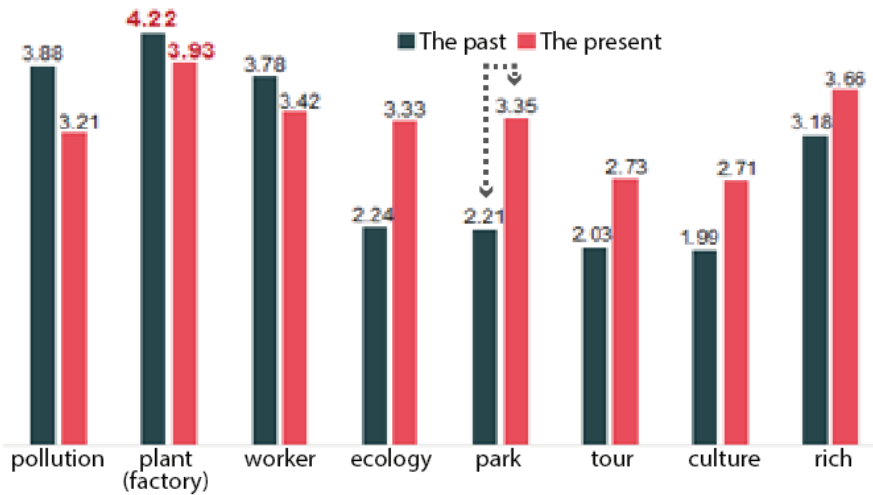


Q) Do you think Ulsan's image has been changed from the past?



Urban Image of Ulsan **has changed** compare to the past **85.63%**(316people)

Q) What do you think about Ulsan image of the past and the present?



comparison of two independent samples (changing image from the past and the present) about **'park'** is the best

## Comparing the visual perception and aesthetic evaluation of natural landscapes in Russia and Japan

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Japan and Russia have deeply rooted cultural traditions regarding natural landscape appreciation, share a common border, and have areas with similar natural environments. They differ, however, in cultural, historical, and economic aspects. The purpose of this study was to reveal the similarities and differences between Russian and Japanese respondents regarding the visual and emotional evaluation of landscapes based on ethno-cultural and regional differences. We asked respondents at universities in Russia (Moscow, Irkutsk, and Kamchatka) and Japan (Hokkaido, Chiba, and Miyazaki) to group and rate 70 color landscape images. Unlike theoretical concepts that explain landscape preferences within an evolutionary framework or according to individual and cultural differences, we found that these factors interact in more complicated ways. Cultural traditions and features of the natural environment that were familiar to respondents influenced their visual perception and aesthetic evaluation of landscape. Russian respondents seemed more emotional while Japanese respondents tended to be more restrained in their assessments. However, there was a rather strong correlation between their estimates of landscape attractiveness, which might confirm the existence of universal human concepts of landscape aesthetics. The most attractive for both Russian and Japanese respondents were waterfalls, mountains, and lakes; but the least attractive were waterless plains. At the same time, we found cross-cultural and regional differences in assessing seacoasts, rivers, forests, and swampy plains. There was practically no correlation between Russian and Japanese respondents in their appreciation of exotic/familiar landscapes. For the Russian respondents, the most exotic landscapes were also the most attractive, although we did not observe such a tendency for the Japanese respondents. All the Russian and Japanese respondents appreciated certain familiar landscapes that were symbols of native nature as very attractive. Unlike "geoscientific" landscape classifications, in the visual and emotional grouping of landscapes by respondents the most important feature appeared to be the presence/absence of water and the type of water basin (river, lake, and sea); for Russian respondents (especially for Moscow respondents), topography was also important, while the Japanese respondents mostly used visual and seasonal characteristics in their classifications. All Japanese respondents assessed the attractiveness and exoticism of landscapes almost identically, while there were some differences among Russian respondents from different regions.

Keywords: visual landscape classification, aesthetic evaluation, attractive landscape, exotic landscape, traditional landscape appreciation, influence of natural environment

## A study on students' recognition of words that represent alun-alun, Indonesia's traditional open spaces

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### 1. Introduction

To increase the value of an open space, it is important to clarify the current situation, especially what kind of images people have. This study focuses on alun-alun, which are traditional open spaces in Java, Indonesia. Alun-alun have spread all over Java. Generally, one alun-alun has been set in each city. It's usually located in the city center, and it serves as a precious open space.

It has been said that alun-alun have a strong relationship with Java's history. One could also say that alun-alun have a high historical and cultural value. The most famous alun-alun is located in Yogyakarta. This alun-alun has a strong relationship with the palace.

The objective of this study is to clarify the current situation of alun-alun through the key words that youth consider. The purpose of revealing the current situation is connected to understanding the kind of planning and designing that are needed.

### 2. Study Methods

In this study, the subjects are students of Universitas Gadjah Mada, located in Yogyakarta. The research method involved questionnaires. These questionnaires asked key words that the students associated with alun-alun. They were asked to write down keywords—a minimum of one and a maximum of six. The survey was conducted in September 2015. Regarding respondents' attributes, the number of valid responses was 202, with 105 males (52.0%) and 84 females (41.6%).

### 3. Results

Respondents were spread across all of Java. 12 people came from the province of Banten, 7 came from the province of West Java, 63 came from the province of Central Java, 54 came from the Special Capital Region of Yogyakarta, and 15 came from province of East Java. 1,242 keywords were collected from 202 respondents.

Key words were divided into four groups: emotion, utilization, existence, and space configuration. The emotion group had words that represented people's feelings about alun-alun (429 key words or 34.5%). The utilization group had words that represented people's activity in alun-alun (290 key words or 23.3%). The existence group had words that represented alun-alun's status from past to present (145 key words or 11.7%). The space configuration group had words that represented what constituted alun-alun (349 key words or 28.1%). In the emotion group, there were some words that involved bad emotions like "dirty" and "crime." But most of them were words that express good emotions like "cozy," "clean," and "relax." In the utilization group, the most common activities were playing sports, gathering people, and buying something; there were also more unusual activities like tourism, courtship, and festivals.

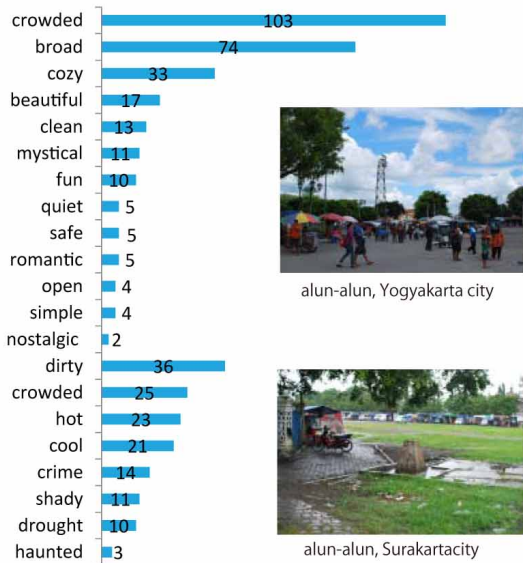
One could say alun-alun have two types of activities: daily use and extraordinary use. In the existence group, there were some words about the past, such as "culture," "history," "palace," and "king"; there were also some words from the present, such as "fields" and "park." Alun-alun have some historical aspects, but they're also used as open spaces in the present. The space configuration group revealed that ficus benjamina (a special kind of tree), other trees, and grass are thought of as components for alun-alun, and the land mass is huge. Most people think of alun-alun as mainly consisting of trees and grass, but there are other components, such as lights, flagpoles, and benches.

4. Conclusion

From this research, one could say that alun-alun are historical and cultural places that are used for extraordinary events. However, for some people who answered these questions, alun-alun are places where people spend their daily time for gathering, eating, and playing sports. Therefore, this study reveals that alun-alun are open spaces for urban people.

Keywords: Indonesia, Java, open space, alun-alun, questionnaire

<The emotion group>



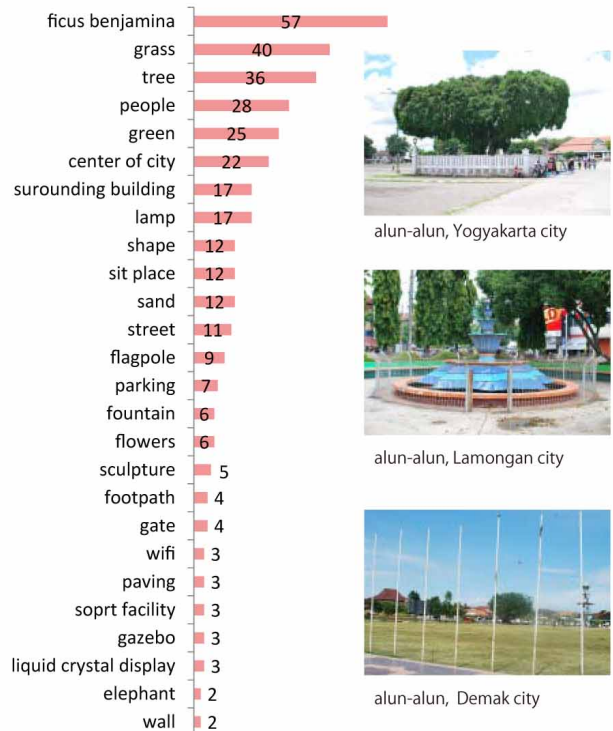
<The existence group>



<The utilization group>



<The space configuration group>



## The Chinese Poetry of Soseki Natsume: An Analysis of Nouns and Adjectives Related to the Features of Scenery

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### 1. Introduction

Soseki Natsume is a famous literary scholar well known in East Asia such as in China, Taiwan Area, and Korea. Soseki's excellent writing was deeply influenced by Chinese literature. Chinese poetry accounted for a large proportion of Soseki's work, even larger than Haiku. In this study, the objective is to examine the features of scenery depicted in his Chinese poetry by analyzing the relevant nouns and adjectives.

### 2. Study Methods

Soseki Natsume wrote a total of 208 Chinese poems. The poems that were selected for analysis featured in Soseki Shichu (Poetry Note) by Kojiro Yoshikawa in 1967. Nouns and adjectives related to scenery were the primary focus. In my other research, mainly nouns were analyzed. But in this research, adjectives related to scenery in the following categories were included:

Positive adjectives, such as "high," "full," and "bright"

Negative adjectives, such as "alone," "desolate," and "empty"

Neutral adjectives, such as "green," "distant," and "red"

Only those adjectives that appeared twice or more were counted. The percentages mentioned in the article indicate the frequency of appearance of the adjectives in the 208 poems. A cluster analysis (Ward's Method) was performed for the further analysis of nouns, and JMP software was applied for statistical analysis.

### 3. Results

#### 3.1 The frequency of the appearance of adjectives related to scenery

Within the 208 poems, the following adjectives related to scenery were used, in order of frequency of appearance: green (27%), distant (13%), alone (12%), desolate (11%), empty (10%), red (9%), old (9%), high (9%), idle (9%), cold (9%). The sum total of adjectives related to scenery was 541. Positive adjectives resulted in the following percentages: high (9%), full (8%), bright (7%), vast (6%), huge (6%). The total number of positive adjectives was 159, and they constituted 29% of all the scenery-related adjectives. As for negative adjectives, the total number was 236 (44%), with the following breakdown: alone (12%), desolate (11%), empty (10%), old (9%), idle (9%), cold (9%), silent (8%), and secluded (8%). The neutral adjectives totaled 146 (27%): green (27%), distant (13%), red (9%), yellow (5%), natural (5%). Lastly, 122 adjectives were related to color (23%), and 27 were related to sound (5%).

#### 3.2 A cluster analysis of the combination of nouns related to scenery

As a result of a cluster analysis of the combination of nouns related to scenery, we divided 208 Chinese poems into 13 groups. Group 1 included 17 poems, 94% of which had content about water, clouds, and mountains. All 15 of the poems in Group 2 had content about mountains (100%). 60% of them included water, and 40% of them included wind. In Group 3, the percentage of poems (15) that included content about the moon was 100%, and 67% of the poems included content about water. As for other groups, please see the chart at the end of this paper.

### 4. Considerations

The nouns and adjectives that were related to scenery in Chinese poems written by Soseki Natsume were analyzed. Negative adjectives accounted for a large proportion (44%) of his Chinese poems. We can therefore draw the conclusion that Soseki Natsume preferred scenery with negative elements,

such as desolate places, empty houses, and secluded gardens. Positive adjectives also appeared in his Chinese poems to some degree (29%). He depicted beautiful things, such as bright moons, new grass, and splendid flowers. Soseki was good at using adjectives related to color and sound. According to the result of the cluster analysis, the particular scenery that can most frequently be imagined is a vast view of water in the foreground with steep mountains in the distance and clouds floating above them. A bird flying in the vast sky among several leisurely clouds can also be imagined.

Keywords: Chinese poetry, Scenery, Soseki Natsume, Adjective

Group	1	2	3	4	5	6	7	8	9	10	11	12	13
poem number	17	15	15	6	12	18	13	12	15	8	16	13	12
2water	94%	60%	67%	0%	25%	33%	54%	0%	13%	0%	0%	0%	100%
3cloud	94%	13%	7%	83%	100%	100%	23%	0%	0%	0%	19%	0%	25%
4mount.	94%	100%	27%	17%	0%	17%	31%	0%	0%	0%	25%	0%	0%
5flower	6%	0%	27%	50%	75%	0%	23%	25%	7%	0%	0%	100%	75%
6rain	53%	0%	13%	33%	25%	0%	0%	8%	7%	0%	100%	8%	50%
7moon	47%	0%	100%	17%	50%	6%	15%	25%	0%	0%	13%	8%	8%
8autumn	18%	7%	20%	17%	25%	0%	100%	25%	20%	25%	19%	0%	8%
9willow	12%	13%	27%	0%	8%	6%	15%	33%	0%	13%	0%	38%	50%
10bird	0%	7%	13%	100%	8%	11%	23%	0%	0%	0%	13%	54%	33%
11sky	41%	0%	13%	100%	0%	6%	46%	17%	0%	0%	0%	15%	8%
12spring	24%	20%	13%	0%	0%	0%	8%	8%	20%	13%	0%	46%	25%
13bamboo	0%	7%	13%	17%	0%	17%	0%	0%	0%	100%	19%	15%	17%
14sunset	24%	13%	13%	0%	8%	17%	8%	0%	27%	0%	0%	15%	25%

Study on the reduction of environmental disputes risk on the scene of wind farm.

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In recent years, conversion of renewable energy from fossil fuels is tackled to worldwide, particularly wind power generation has been introduced on a large scale. On the other hand, since the environmental dispute that causes the negative impacts such as noise, degradation of scenic value, bird strike, etc., also been reported, it has become a major burden for both businesses and residents. In particular, although the degradation of the scenic value by the wind turbine has been pointed out in a number of countries, it is not sufficient in the Japanese guidelines corresponding to the scenic value. In this study, to clarify the factors that affect the preference of the landscape with a windmill, aimed to reduce the environmental dispute risk on the scene of wind farm.

We selected five survey sites for questionnaire survey from coastal area in Hokkaido prefecture, which were with the highest potential for the construction of wind farms, depend on their relationships with wind farms, i.e. with or without wind farm, operation type, experience of environment dispute, etc.

The results showed that the key factors that affect the preference of the landscape with a windmill were the knowledge of wind power generation, operation types of wind farm and the history of environment dispute. To reduce the environmental disputes risk on the scene of wind farm, the appropriate information provision and consensus building that can dispel the fears and doubts of the residents is important in the site selection stage. And the introduction of the system, such as reducing the benefit to the public is required in construction and management stage.

Keywords: wind power generation, scenic evaluation, information provision, coastal landscape

## Appreciating the non-human landscape? Urban residents' willingness to coexist with animals and plants in Australia and Japan

\*Christoph Rupprecht<sup>1</sup>

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When we think about the urban landscape, we often think of buildings and streets, or natural elements such as mountains, rivers or the sea. But we also share cities with animals and plants, co-inhabiting urban space and interacting on a daily basis. These interactions can lead to wildlife conflicts (e.g., crows looking for food in trash, weeds growing on the sidewalk), because animals and plants are independent actors we cannot control.

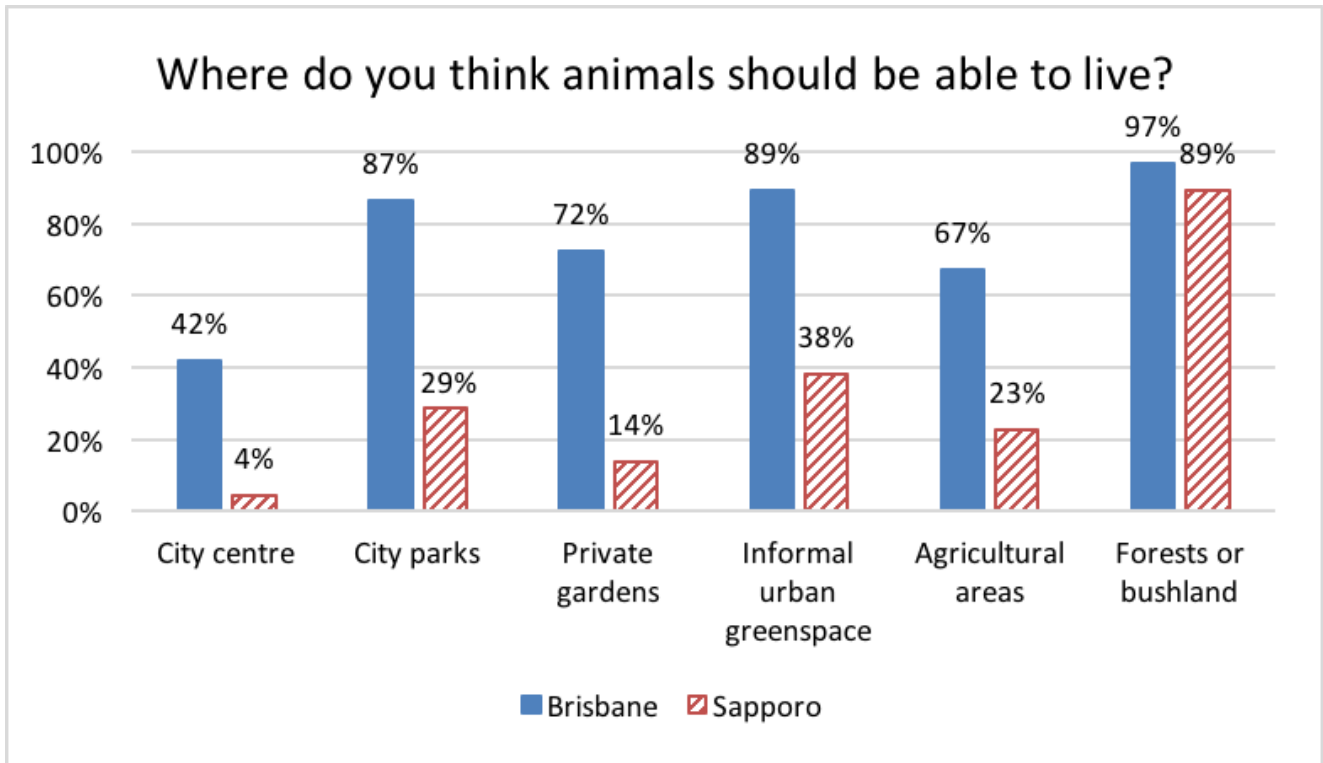
In the context of rapid urbanisation, geographers are calling for embracing non-humans as urban co-inhabitants. To find paths towards more-than-human cities and reduce wildlife conflicts, we need to better understand residents' willingness to coexist with plants and animals. This study used a mail-back survey and quantitatively compared residents' preferences toward sharing their neighbourhood and perceptions of belonging across urban green space in two geographically and culturally distinct cities: Brisbane, Australia and Sapporo, Japan.

Results suggest factors influencing respondents' willingness to coexist were geographical and cultural context alongside educational attainment and age, but not sex and income. Mapping respondents' preferences for animals in their neighbourhood revealed four categories divided by two axes -global-local and wanted-unwanted animals. These categories arose from the way animals contested human notions of control over urban space. Most respondents chose informal green space (e.g., vacant lots, brownfields etc.) as spaces of belonging after forests and bushland.

Drawing upon recent theoretical and empirical research on liminal urban spaces, I argue with Nohl (1990) that informal green space can offer 'provisional arrangements', allowing for conciliatory engagements with animals and plants. I thus propose informal green space as potential territories of encounter -a possible path towards more-than-human cities. Finally, I discuss some implications for planning and management of interspecies interactions.

Keywords: urban geography, wildlife conflict, more-than-human, quantitative methods, belonging, posthumanism





## Exotic natural landscape in Japan and Russia

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Exotic natural landscape in Russia and Japan, bilateral project between Russian and Japan  
Yoji AOKI, Elena PETROVA, Yury Mironov, Hajime MATSUSHIMA, Masahiro NAKATANI

### 1. Beginning of joint research

In the evaluation of the natural landscape, Tamura and Honda (1941) suggested the effect of Russian literature in the appreciation of Musashino, the deciduous forests in Tokyo, written by Doppo Kunikida.

In 2006, Aoki visited Moscow to propose a comparative study of the landscape evaluation between Russian and Japanese. Petrova agreed to try a research of Aoki (1983) in Russia. Japanese group collected 500 photos in terms of mountain, forest, lake, waterfall, coast and field. Russian collected similar 431 photos of Russia. And they selected the typical photos of 35 Russian landscapes and 35 Japanese (Aoki and Petrova 2010) to make color photos (17.5x12.5cm) for the investigation. A questionnaire was set to evaluate the preference and exoticism (Petrova et al 2015).

### 2. Investigation

Moscow, Irkutsk, Kamchatka, Hokkaido, Chiba, Minamikyushu, Kyoto Prefectural University, Kuramae haiku club and Nishikamata Onazuka community association were investigated. In this survey, we collected not only from college students but also the general elderly. A longer time interview was required for the elderly. 124 people in Russia and 210 Japanese data were obtained.

### 3. Results

The preference was evaluated in numerical scale 1-5 and averaged. The feelings of exotic were totaled in each photo.

Russian preferred the photos in Caucasus, Altai mountain, the stream of Kola Peninsula and Kamchatka. Japanese waterfall of Nanatsugama was preferred in up to 10. From this result, Russians preferred the mountain and water. Japanese preferred Caucasus, Altai, the North Polar Region and Mt. Fuji. Japanese preferred the mountains. A similar preference of Japanese and Russian was found in the mountain landscape.

Russians felt exotic to Siberia, Kamchatka, Caucasus, North Japan Alps and coast of Ibaraki. Japanese felt exotic to Caucasus, Altai, Kamchatka, Kola Peninsula, the polar region and North Japan Alps. As Japanese are living in rich greenery, they felt exotic to non vegetated landscapes. In Russia, people were asked as daily and non-daily for exotic. So they felt exotic in their own country because of its vast area. Japanese felt exotic to the foreign landscape of Russia.

### 4. Relation between preference and exotic

Exotic is associated with preference in Russia, the correlation coefficient 0.81 (t=11.4) with a statistic significance level of 0.001. So exotic contributed to preference of Russians. The 0.35 correlation coefficient (t=3.08) was found in Japan, the lower significance level with no relation. This difference should be studied in future.

### 5. Effect of age to exotic

The exotics of the elderly (over 60 years) were compared to young students in Japan. A large difference was seen in Coastal landscape of Kamchatka with rough rocks and washed ashore with kelp. The elderly felt it Russia and the students did not by their images of Hokkaido.

To the photo of Oze wetland, the elderly did not felt exotic but students felt. Because the

students found the skunk cabbage (*Lysichiton camtchatcense* Schott) from Russia by their knowledge of vegetation.

These suggested the effect of knowledge by the individual experience and professions. The categories of landscape experience (Appleton 1986) will become a major issue in future.

#### 6. Discussion of Results

Russians preferred the coast of Japan (Petrova et al 2015), because they live away from the coast. Japanese did not show their preference in Kamchatka by the similarity of Hokkaido.

Japanese preferred Putorana, Altai and Caucasus. So Japanese will visit these areas, if the social circumstance will be prepared.

Keywords: appreciation of natural landscape, Exotic, comparison of Russian and Japanese

Table Comparison of exotics on landscape photographs between Russia and Japan

oder	N Photo	State	Location	vegetation	Russia	oder	N Photo	State	Location	vegetation	Japan
1	56	Russia	Siberia, Altai	high mounta	109	1	59	Russia	Caucasus	high mounta	202
2	23	Russia	Siberia, Puto	tundra	101	2	23	Russia	Siberia, Puto	tundra	195
3	48	Russia	Kamchatka,	high mounta	98	3	33	Russia	Siberia, Altai	steppe	193
4	33	Russia	Siberia, Altai	steppe	96	4	16	Russia	Siberia, Altai	steppe	185
5	6	Russia	Kamchatka,	high mounta	88	5	56	Russia	Siberia, Altai	high mounta	180
6	15	Russia	Siberia, Nori	tundra	88	6	7	Russia	Kamchatka,	taiga	174
7	55	Japan	Kurobe Dam	subalpine	88	7	55	Japan	Kurobe Dam	subalpine	165
8	58	Japan	Nanatsugam	deciduous	87	8	20	Russia	Kamchatka,	taiga	163
9	59	Russia	Caucasus	high mounta	87	9	45	Russia	Hibiny	tundra	155
10	19	Japan	Fukuroda fal	deciduous	85	10	46	Russia	Siberia, Puto	tundra	155
11	67	Japan	Onneto, Akai	subalpine	84	11	47	Russia	Siberia, Chit	steppe	153
12	45	Russia	Hibiny	tundra	83	12	64	Japan	Kusasenri, A	deciduous	149
13	65	Japan	Ashinoko an	deciduous	83	13	67	Japan	Onneto, Akai	subalpine	144
14	13	Japan	Mt. Fuji, Yam	deciduous	82	14	54	Russia	Siberia, Bury	steppe	143
15	46	Russia	Siberia, Puto	tundra	81	15	1	Russia	Leningrad re	taiga	136
16	20	Russia	Kamchatka,	taiga	76	16	6	Russia	Kamchatka,	high mounta	135
17	66	Russia	Siberia, Altai	high mounta	75	17	18	Japan	Kamikochi,	subalpine	135
18	16	Russia	Siberia, Altai	steppe	74	18	62	Russia	Pskov region	taiga	134
19	60	Japan	Maryudonota	sub tropical	74	19	48	Russia	Kamchatka,	high mounta	132
20	63	Japan	Kegon fall, N	deciduous	73	20	66	Russia	Siberia, Altai	high mounta	127
			high mountain, subalpine						high mountain, subalpine		
			deciduous, mixed						deciduous, mixed		
			taiga						taiga		
			steppe						steppe		
			ever green						ever green		
			tundra						tundra		

The Original Landscape of Japan in the early Meiji Era (1876) :  
from the Viewpoint of a Russian Geographer, *A. I. Voeikov*.

\*Masahiro Nakatani<sup>1</sup>

1.none

This report will introduce the original landscape of Japan in the early Meiji Era (1876), which was described by a Russian geographer and meteorologist, *Aleksandr Ivanovich Voeikov*.

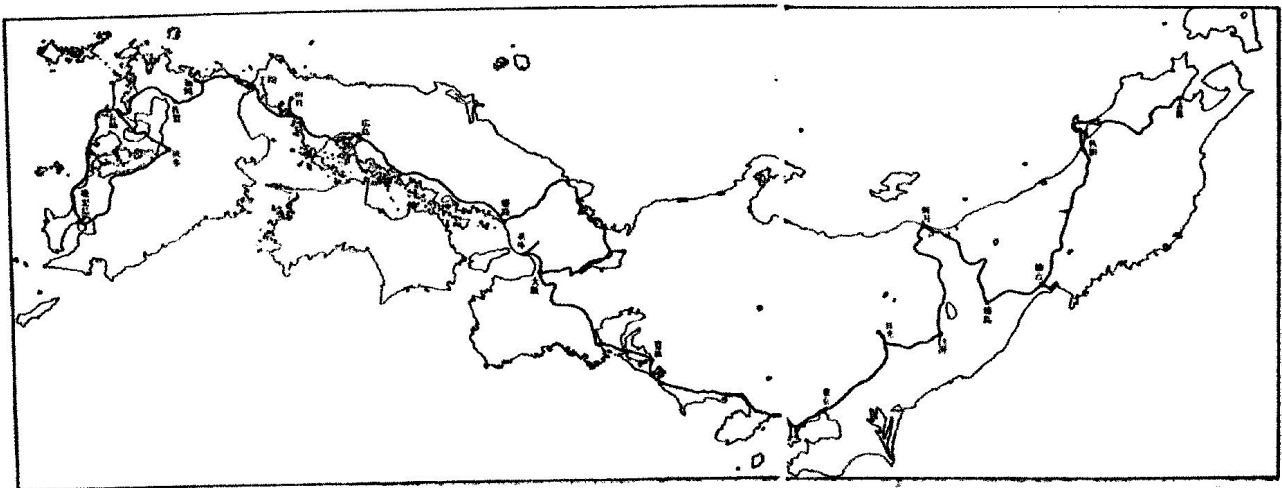
After the conclusion of the *Kanagawa Treaty* ("Japan-US Treaty of Peace and Amity") in 1854, many people began to visit Japan from Europe and America. *Voeikov* was one of them. He came to Japan in 1876 (Meiji 9) and traveled all over Japan (from *Hokkaido* to *Kyusyu*) in only five months. After returning to Russia, *Voeikov* contributed "Travelogue of Japan" (*Puteshestvie po Iaponii*) to the *Bulletin of the Imperial Russian Geographical Society* in 1877.

Talking of "Travelogue of Japan", it is well-known that *Isabella Lucy Bird*, an English explorer and writer, described *Unbeaten Tracks in Japan* in 1880. She came to Japan in 1878 (Meiji 11) and visited the *Tohoku*, *Hokkaido* and *Kansai* regions in seven months. But she didn't visit South-west Japan.

On the other hand, *Voeikov's* "Travelogue" is little known in Japan. An abridged(?) translation was made by *Hidetoshi Arakawa*, a Japanese famous meteorologist in 1961. But *Voeikov* observed Japan from many points of view (not only geography, meteorology, but also politics, economy, history, and culture) and in the "Travelogue" he also described many landscapes, which are now lost in the present day.

In this report I will show where *Voeikov* traveled and what he saw in Japan.

Keywords: The Original Landscape, Meiji Era, A. I. Voeikov



## Research on Construction and Spatial Structure of Religious Space of the Izumo Grand Shrine

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1. Graduate school of Horticulture, Chiba University

### Research on Construction and Spatial Structure of Religious Space of the Izumo Grand Shrine

#### 1. Introduction

In this study, the Izumo Grand Shrine will be discussed, as it is considered one of the most ancient shrines, which is supposedly the original form of a garden in a palace. The purpose is to uncover the following items: the precinct and ancient forms of rituals at the Izumo Grand Shrine, space utilization structure through annual events at the Shrine and related shrines, and history of planting formations in the precinct.

#### 2. Study Methods

In this article, in order to clarify space utilization structure at the Izumo Grand Shrine and related shrines, and history of planting formations in the precinct, the following methods have been applied: Topographic maps, sectional views, and soil layer charts were studied together with analysis of paintings to apprehend the process of scenery changes and soil layers of each time.

#### 3. Results and Considerations

##### i. From Yayoi Period until the end of the 10<sup>th</sup> Century

Based on the excavation report of Izumo Precinct remains, a flow path originating from the south of the current front shrine has been detected, and its shape was assumedly Y-shaped. There is also a record that weapon-type bronze ware and jewels (green jade jewel) from the Yayoi Period were excavated during the construction in the Kanbun Era from the east of Inochi-Nushi-No-Yashiro (one of the smaller shrines attached to the Grand Shrine).

##### ii. From the beginning of the 11<sup>th</sup> Century until pre-construction of the Hoji Era

Since Year 4 in the Chogen Era (1031) until the ritual transfer of the main building in Year 2 in the Hoji Era (1248), the building fell five times. The average period between a transfer until a fall was 31 years. Okano (2010) stated that it was reasonable to expect that a building without a foundation would slant due to an uneven settlement and the liquefaction phenomenon.

##### iii. From the construction of the Hoji Era until another construction of the Keicho Era

According to a painting which is assumed to have captured the ritual transfer of the main building in Year 2 in the Hoji Era (1248), embankment construction was completed on the east side of the precinct; therefore, the building is believed to have been constructed on the elevated ground.

##### iv. From the construction of the Keicho Era until another construction of the Kanbun Era

Excavation research (Year 12 of the Heisei Era) unveiled that the structure of the main building was not earth-fast construction called Hottate-bashira, but was the first trial of the cornerstone method. The design is heavily influenced by Buddhism.

##### v. From the construction of the Kanbun Era until another construction of the Enkyo Era

More effective equipment has been completed in order to protect the shrine from flood and debris flows. The ground was gradually elevated with stone masonry as measures to flooding and landslides. The stones used for the masonry were carved out from a giant rock behind Inochi-Nushi-No-Yashiro.

##### vi. After the construction of the Enkyo Era

From the construction of Kizuki Taisha, the current Izumo Grand Shrine, in the Enkyo Era until the present, construction methods have been based on construction from the Kanbun Era. A new building was constructed in the first year of the Enkyo Era (1744) with partial modifications with a new placement, and the building still remains the same shape until now.

#### 4. Conclusion

In this paper, history of three items around Izumo Grand Shrine have been clarified: its construction, spatial structure of religious space, and planting formations in the precinct.

Keywords: Shrine, transition, spacial structure

## Research on Spatial Structure of the Izumo Grand Shrine

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Keywords: Shrine, transition, spacial structure





## Conservation of Biodiversity and Natural Landscape in Urban Area: An Adjustment for Urban Space between Nature and human use

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There are a few wildlife-living environments, etc. greenspace or water area in urban area. Many people live in urban area and are getting concerned about symbiosis with nature and conservation of biodiversity. The Ministry of Land, Infrastructure and Transport has considered conservation of biodiversity is as an important issue for regional construction. The Government is supporting planning and construction of biotope space as maintenance and regeneration of natural environment, protect the environmental quality, ecological network establishment, building for monitoring or appropriate management.

Regeneration of satoyama (managed woodlands or grasslands near human settlements), tidal flat, river which regions are richly endowed with nature is important. However, it is important to create natural environments in urban residential area.

Urban space is artificialness. Human existences interfere with habitats for wildlife. Therefore, it is difficult to maintain biodiversity in urban space. Nevertheless, plants grow and many birds appear in stormwater reservoir for food control. The reservoir is covered with concrete. It is an artificial ground in urban residential area.

Stormwater reservoir for flood control are placed with large-scale housing land development in the 1960s. The reservoir become surrounded by chain link fence for prevention from water accidents. It is forbidden someone to enter. Shape of the reservoir is concave shape. In the case of chain link fence, people can view inside of the reservoir. It is considered that off limits area produced nature inside space and view natural landscape. In other words, receive the view of nature is a symbiosis with nature in urban area.

The purpose of this study is to organize use adjustment of space and consider conservation of biodiversity and natural landscape. I'll focus on perceptual constraint. Off limits area produce view of natural landscape in the reservoir. However, it restricts to get a touch. I think perceptual constraint is one of use adjustment.

It was attempted to gather information on the habitat of vegetation and avian species in stormwater reservoir for flood control and residential cognition living in the reservoir. The results show that urban artificial ground has potentiality of create natural environments. It was clarified features of perception for nature in the reservoir an advantages and disadvantages for symbiosis of nature. Moreover, it is shown that nature inside the reservoir is attributed to sense of the season in urban residents. It is important to hold discussion for border between nature and human.

Keywords: Natural Landscape, Biodiversity, Use Adjustment, Perceptual Constraint

## Landscape classification and mapping for Irkutsk city in Siberia region

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Traditional landscape approach is an important part of land-cover mapping in Russia. Since different regions have different landscape's hierarchy, it is impossible to use one classification for all the regions. We tried to analyze the correlation of such concepts as: land cover, landscape, geosystem, ecosystem, habitat, and biotope. Biotope is defined as a complex of factors, which determines physical conditions of existence (abiotic part) of a community (biotic part) to define geographical units (Connor et al., 2004). Habitat is terrestrial or aquatic areas distinguished by geographic, abiotic and biotic features, whether entirely natural or semi-natural (EEA, 2014). Ecosystems can be regarded as groupings of habitat types (EEA, 2014). Geosystem is a unity, which consists of interrelated components of nature, controlled by regularities, which operate in geographical shell and landscape sphere (Sochava, 1974a). It is an organized integrality, which interacts with cosmic sphere and human society (Sochava, 1972). The term "landscape" is controversial and may be interpreted in different ways. However, landscape is a part of the Earth's surface, which is shaped by natural conditions and formed by human influences to a different extent (Bastian et al., 2014). Since the terms have close meanings, it is necessary to specify which term needs to be taken for certain aim. So, we defined land-cover as the complex of biotic, abiotic and cultural components on the Earth's surface (Monsin et al., 2014). The aim of this study is to compile the landscape classification of terrestrial units for Irkutsk city urban area which can be used for complex and narrow purposes, for example, for research of soil or vegetation and their changes, as well, for spatial planning. Irkutsk is a large regional center and is located on the South of Eastern Siberia near Lake Baikal. Accepted in European Union CORINE Land Cover and EUNIS habitat classification doesn't have data for the studied area. In our research, we elaborate a synthetic approach with using CORINE and EUNIS database and conception of geosystem to classify the Irkutsk's city terrestrial units. Using QGIS software we analyzed the following data: fieldwork, Digital Elevation Model (SRTM), and remote sensing (Landsat 7, 8).

Keywords: urban landscape classification, landscape approach, geosystem

## Relation between the experiences and contents of a green space conservation volunteering program for university students

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### 1. Introduction

Green spaces, which are a part of the urban landscape, have been conserved by public participation in Japan. However, the advanced age of the participants and the lack of sustained participation hinder the continued existence of these spaces. In an attempt to deal with these problems, a movement promoting the participation of young people in green space conservation has taken shape. It is hoped that a green space conservation volunteering (GsCV) program is provided for students. This study identifies the experiences of students who participated in such a program.

### 2. Methods

The object of this study was a GsCV program provided to students at Takushoku University. In the program, 14 students joined the "Rangers Project" from April to December 2015. This project conserves green spaces in Japan's metropolitan areas. The students were provided with 44 opportunities to participate in conservation activities. Each student chose and participated in four activities. The GsCV program was divided into three parts: 1) maintenance of green space (e.g. weeding and farm work), 2) PR of conservation activity at an event, and 3) fieldwork in a city. KH coder, a free quantitative content analysis software was used to analyze 14 final reports and 56 activity reports by students. Firstly, words concerning experiences were sampled from all reports by KH coder. Secondly, coding rules were set in order to count concepts with contexts which included those words identified. Finally, KH coder created co-occurrence networks that showed potential relationships between the contents of the GsCV program and experiences or on the inter-relationship between experiences.

### 3. Results

Contexts in the reports were classified into 14 concepts from the experiences viewpoint. The main concepts are "understanding conservation groups and CSR activities", "one significant point and one challenge in making an appeal for our activity" and "getting my new idea about conservation". The results of co-occurrence networks showed that 1) maintenance of green space was related to five concepts: "experiencing enjoyment and fulfillment", "the importance of maintenance in the conservation of a good environment", "interest in a conservation activity", "acquiring knowledge about the ecosystem or maintenance methods" and "getting an extraordinary experience" (Figure 1). 2) PR of conservation activity at an event was related to three concepts: "understanding conservation groups and CSR activities", "one significant point and one challenge in making an appeal for our activity" and "getting an extraordinary experience". 3) Fieldwork in a city was related to three concepts "acquiring knowledge about the ecosystem or maintenance methods", "a perception of the ecosystem or the history of each green space", and "a perception of the worth and significance of green spaces".

Additionally, there is a relation between "understanding conservation groups and CSR activities" and "one significant point and one challenge in making an appeal for our activity" when attention was focused on the inter-relationship between experiences. The results of co-occurrence networks also showed that "an interest in a conservation activity" had a relationship with "understanding conservation groups and CSR activities" and "a precious interaction with other people in an activity".

#### 4. Conclusion

The results of this study suggest that an interest in conservation activities is increased by having experience with PR of conservation activity at an event, and that fieldwork provides a chance to understand the worth and significance of green spaces. Therefore, a GsCV program consisting of complex components is more effective than a program consisting only of maintenance of green spaces.

#### Acknowledgments

This work was supported by JSPS KAKENHI Grant Number 15J03276.

Keywords: green space, conservation, experience, student, volunteering program

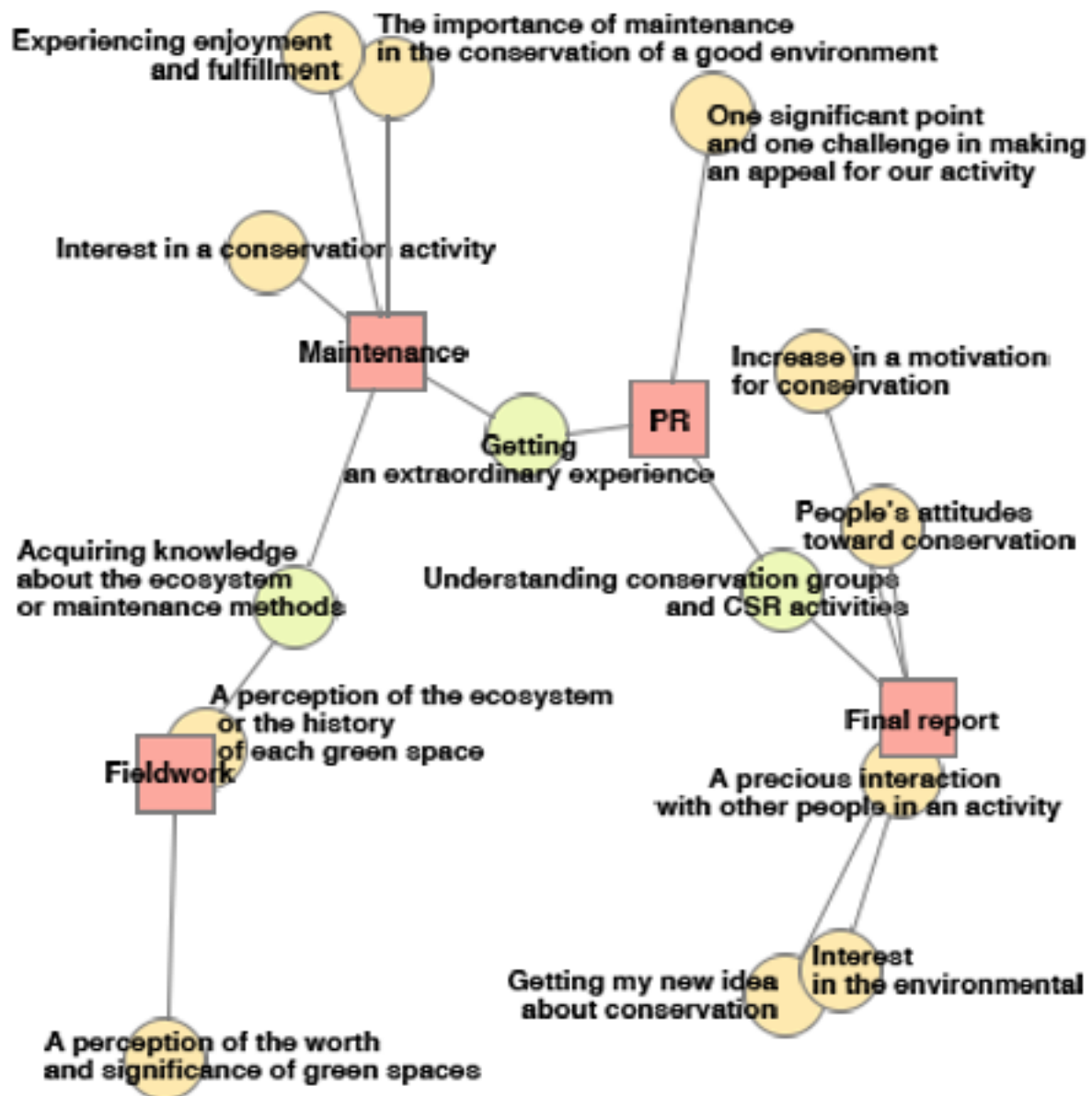


Figure1. Relationships between the contents of the GsCV program and experiences

## Remote Sensing Estimates of vegetation Biomass and Carbon storage in Hulunbuir grassland, Inner Mongolia

\*Yu Hong<sup>1</sup>

1.College of Life science and Technology Inner Mongolia Normal University

The grassland, as one of the most widespread terrestrial ecosystems in the world, plays an important role in regulating regional climate changes and reducing the emission of carbon dioxide. So it is important to do an accurate evaluation of grassland vegetation biomass and carbon storage, and analysis on spatial distribution patterns and environmental factors in the regional scale. Hulun Buir grassland is the study area in this paper. This study constructs grassland biomass model by integrating MODIS EVI data, climatic variables and topographic variables using RBF artificial neural network model. And aboveground biomass, carbon storage during 2000-2013 is simulated further by means of accuracy of the estimation. And with this source, the study estimates the underground biomass, total biomass and carbon storage of the study area by underground / aboveground biomass ratio in different types of grassland. The results are as follows: The ability of RBF neural network model to estimate grassland biomass is better than multiple linear regression model. The spatial distribution of average aboveground biomass has gradually increasing trend from southwest to northeast in Hulun Buir grassland during 2000-2013. Besides the spatial distribution of average aboveground biomass has gradually increasing trend, and increased from 142.857 g/m<sup>2</sup> to 161.436 g/m<sup>2</sup> in the rate of 1.034 / a. The total aboveground biomass, total aboveground carbon storage of study area were 8.26 Tg, 4.14 Tg·C. The total underground biomass, total underground carbon storage were 36.1 Tg, 18.06 Tg·C. The total biomass and total carbon storage were 44.4 Tg, 22.2 Tg·C. Typical steppe has the highest carbon storage, totaling 13.38 Tg·C.

Keywords: Hulun Buir Grassland, RBF artificial neural network, Biomass, Carbon storage

## Seedling growth and photophysiology of *Quercus austrocochinchinensis* under two light levels

\*Die Meng<sup>1</sup>, Katsunori Furuya<sup>1</sup>, Qiansheng Li<sup>2</sup>

1.Chiba University Graduate school of Horticulture, 2.Shanghai Institute of Technology

### Introduction

Protecting endangered species is an important part of conservation. *Quercus austrocochinchinensis* is an evergreen tree of the *Quercus* subgenus *cyclobalanopsis* Oerst. of Fagaceae. *Q. austrocochinchinensis* is an endangered oak species, which has only been identified at two sites in Yunnan province and Hainan province in China. *Q. austrocochinchinensis* is distributed in ravines in southwest China, northern Thailand, Vietnam, and Laos at elevations of 700 to 900 m. Because of tree felling, the distribution and population size of this species are both declining rapidly. At the same time, this species hybridizes with other common species, which might accelerate its extinction. The objective of this study was to compare the growth characteristics of *Q. austrocochinchinensis* seedlings under two light levels.

### Material and Methods

*Q. austrocochinchinensis* seeds were collected from Pu-Er, Yunnan Province, in September 2011. Seeds were kept in a 4°C refrigerator before being sown on October 21, 2011. Seeds were sown in 32-cell plug trays with 60% peat and 40% perlite mix as a substrate. When the young seedlings reached 20 cm in height, they were transplanted into 18-cm plastic pots containing the same potting mixture. These seedlings were separated into two groups and grown under two different light levels in a greenhouse. The maximum PAR(Photosynthetically available radiation) of the high-light and low-light treatments was 530 and 150  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$  respectively. Plant height, leaf number, and stem diameter of seedlings were measured monthly. Leaf chlorophyll content, stomatal density, chlorophyll fluorescence, and rapid light response curves were also measured at the end of experiment.

### Results

*Q. austrocochinchinensis* had a low rate of seedling emergence (21.88%) and some seedlings died during the experiment, which may explain why *Q. austrocochinchinensis* is rare.

Seedlings differed considerably with respect to plant height, number of leaves, and stem diameter, especially the number of leaves under the low-light condition. The growth rate during the winter was slow, and growth started from February onwards. The higher number of lateral shoots on seedlings grown under the high-light conditions was of interest and might be explained by *Q. austrocochinchinensis* being shade tolerant; therefore, high light levels may have adversely affected the shoot growth of dominant seedlings.

The chlorophyll content of *Q. austrocochinchinensis* grown under high-light conditions was 3.17 mg/g for new leaves and was 2.88 mg/g for old leaves. At low light levels, the chlorophyll content of new leaves was 4.01 mg/g and that of old leaves was 3.39 mg/g. Leaf chlorophyll content of seedlings grown under low-light conditions was higher than that of seedlings grown under high-light conditions. In addition, the differences observed between new and old leaves under high light were greater than the differences observed between new and old leaves of seedlings grown under low light.

The stomatal density of *Q. austrocochinchinensis* under low light levels (318.42/mm<sup>2</sup>) was higher than that under high light levels (286.84/mm<sup>2</sup>).

Chlorophyll fluorescence and rapid light curve, ETR raises with the increase of PAR, then reached saturation and remained stable. *Q. austrocochinchinensis* had higher ERT max under low light levels.

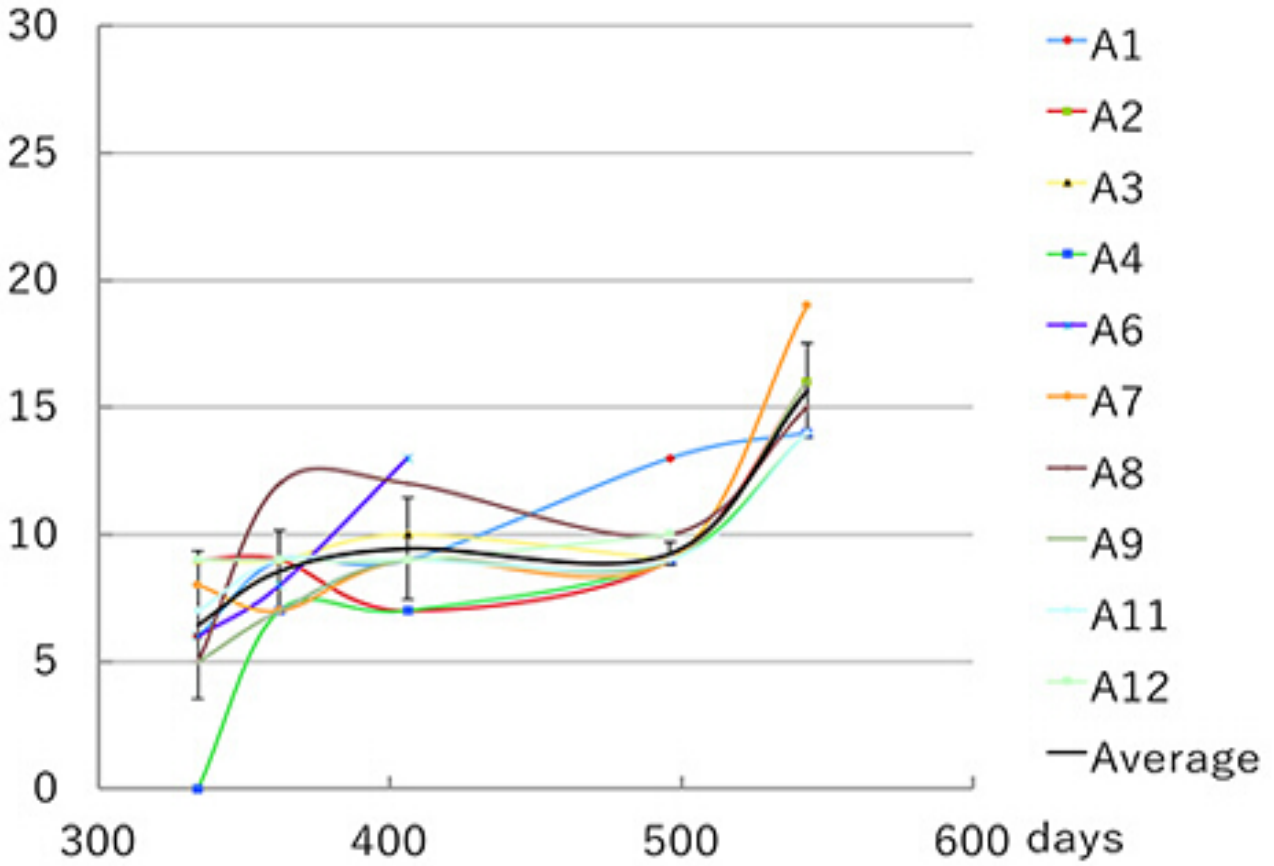
### Conclusion and Discussion

*Q. austrocochinchinensis* had a low seedling emergence rate, and some seedlings died during the experiment. *Q. austrocochinchinensis* presented large differences among its seedlings, suggesting that the quantity of seedlings should be increased.

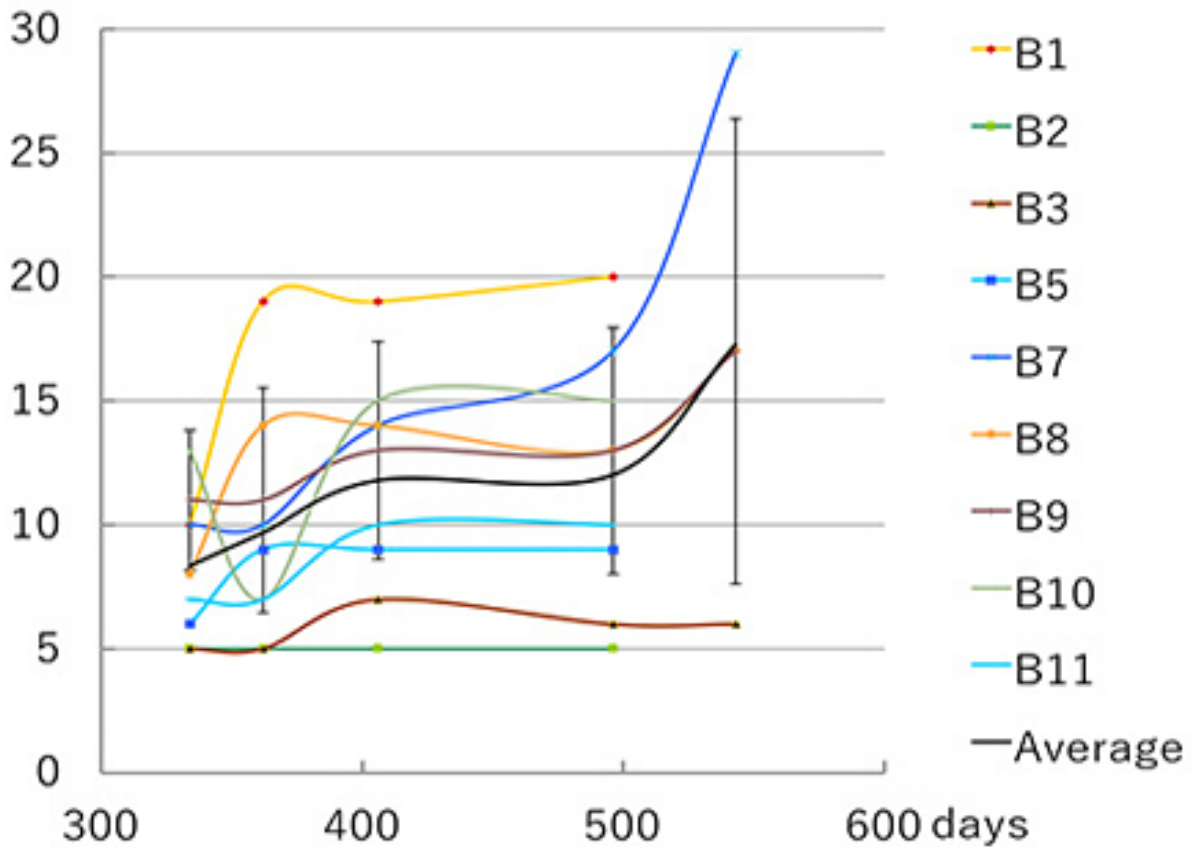
Research on *Q. austrocochinchinensis* in biological engineering and physiology has been lacking. This study presents valuable information on *Q. austrocochinchinensis* and may be helpful in the recovery of this endangered species.

Keywords: *Quercus austrocochinchinensis*, Seedling growth , Photophysiology , Light level

Number of leaves of *astrocochinchinesis* under high light



Number of leaves of *austrocochinchinesis* under low light







## The Effect of Forest Management of Secondary Coniferous forests on User's Landscape Appreciation and Psychological Restorativeness

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**-INTRODUCTION:** We investigated the influence of forest management on landscape appreciation and the psychological restorative effect in an on-site setting by exposing respondents to an unmanaged coniferous forest (U.F.), and a managed coniferous forest (M.F.) for a particular period. The both forests, which consisted of Japanese larch and Japanese red pine (a second-growth forest), were fairly similar in the land cover type and vegetation one another.

**-METHODS:** We considered the experiment in late July. We set the two experimental plots (0.25 ha) in the both forests of Fuji Iyashinomori Woodland Study Center as U.F. setting and M.F. setting. Here, the mean temperature, relative humidity and sound pressure were almost the same during the experiment except illuminance. The respondents were eighteen individuals (eighteen males; aged twenties to fifties) for the experiment. As for eliminating an order effect, the respondents were divided into the two groups (Group A and Group B) in every nine-person. The respondents of Group A were exposed to U.F. setting at first and then were done to M.F. setting. However, the respondents of Group B were exposed to each setting by the opposite order. They were individually exposed to the both settings while sitting for 15 min. In the both settings, the respondents were required to answer the three questionnaires to investigate the psychological restorative effect at before and after the experiment (mood; POMS, affect; PANAS, subjective restorativeness; ROS). For comparison of landscape appreciation, the respondents were required to answer other two questionnaires at after the experiment (scene appreciation (SD), a restorative property of environment (PRS)).

**-RESULTS:** As a comparison result by the statistical test, regarding a restorative property of environment (PRS), M.F. setting had statistically higher property in "Being away" and "Coherence", "Compatibility" than U.F. setting ( $p < .05$ ). About scene appreciation (SD), M.F. were appreciated statistically higher in "brightness," "openness," "comfort," "beauty," "safeness" and "healthiness" ( $p < .05$ ), and "order" and "thin" ( $p < .01$ ). On the other hands, by the result of two-way repeated ANOVA (difference of setting (U.F. -M.F.) x presence of experience (before exposure -after exposure)), there were no statistical relationship with the mutual interaction between difference of setting and presence of experience in "mood" (POMS), "affect" (PANAS) and "subjective restorativeness" (ROS).

Then, as a result of having checked both the main effects, the difference of setting did not seem to raise a psychological restorativeness. Otherwise, the presence of experience could give a statistical influence negative "affect" (PANAS;  $p < .05$ ) and "tension and anxiety" (POMS;  $p < .05$ ). The difference of setting also reduced numerical values for them in M.F. setting. In contrast, before and after exposure could give a statistical influence and raise "vigor" in U.F. setting (POMS;  $p < .05$ ).

**-CONSIDERATION:** Consequently, negative affect, tension, and anxiety might come to decrease because the managed forest setting had a sufficient restorative property of the environment and the better scenic environment. Conclusively, respondents would obtain a psychological restorativeness to some extent by being exposed to M.F. setting. On the other hand, even though vigor rose in U.F. setting, we would consider the reason for it by these three hypotheses as follows;

1) all the respondents were men. 2) the sample group had a tendency toward a relatively low

neuroticism and a high extroversion by the personality traits test which we also conducted as one of the optional tests. 3) if we referred to the Kaplan's landscape preference theory, we could think of the possibility that U.F. setting would bring a sense of mystery and exploration to the respondents who had the trait mentioned above.

Keywords: Landscape appreciation, Psychological restorative effect, Forest management, Coniferous forest, Subjective restorativeness

table 1. summary of questionnaires using the experiment and the result of analysis.

category	Landscape appreciation			Psychological restorativeness		
	abbreviated form	SD	PRS	POMS	PANAS	ROS
official name	Semantic differential method	Perceived restorativeness Scale	Profile of mood states	Positive and negative affect schedule	Restorative outcome scale	
contents	scene appreciation	restorative property of environment	mood	affect	subjective restorativeness	
number of subscales	25	5	6	2	1	
timing of the measurement	after exposure			before and after exposure		
wilcoxon signed rank test	M.F. was statistically higher in "brightness", "openness", "comfort", "beauty", "safeness", "healthiness", "order" and "thin" than U.F. ( $p < .01$ to $p < .05$ ).		M.F. was statistically higher in "Being away", "Coherence" and "Compatibility" than U.F. ( $p < .05$ ).			
two-way repeated ANOVA	mutual interaction		n.s.	n.s.	n.s.	
	main effect		U.F.: vigor ( $p < .05$ ) ↑ M.F.: tension and anxiety ( $p < .05$ ) ↓	M.F.: negative affect (PANAS; $p < .05$ ) ↓	n.s.	



Photo. Unmanaged Forest (U.F.)



Photo. Managed Forest (M.F.)

U. F.: unmanaged forest, M. F.: managed forest, ↑ :increased, ↓ :decreased