Followup and New Challenge for Coming Generations

The Sustainable Forest Management and Planning of Jingu Forest: A Case Study for Periodic Rebuilding of a Traditional Japanese Shrine

Toru Nakajima, Satoshi Tatsuura, Satoshi Tsuyuki and Norihiko Shiraiishi (The University of Tokyo, Japan)
The Jingu Shrine is a traditional Japanese shrine, located in Mie Prefecture. The “Shikinen Sengu Ceremony”, the periodic rebuilding of the shrine, has been carried out every 20 years since the seventh century using timber harvested from natural forests outside Mie Prefecture. However, the Forest Administration Department of Jingu Shrine has decided to obtain its own supply for the next Shikinen Sengu Ceremony in 2013. To obtain a self-supply of large timbers for rebuilding the Jingu Shrine, it is necessary to develop a harvesting plan for plantations that allows the sustainable use of forest resources. Then, we spatially allocated the optimum clear cutting area calculated by previous study in Jingu Shrine forests. Using local area wind energy prediction system, we predicted the wind speed in the study site with the digital elevation model (DEM) and climate data in Jingu Shrine forest. We also calculated the average wind speed per wind hazard area. Based on the wind speed calculated in the disturbed stands, we estimated the wind hazard probability. Finally, we analyzed the difference in wind hazard risk among harvesting strategies based on the dynamic programming. As a result, the optimum clear cutting area would reduce the expectation value of the stand volume that will suffer from wind hazard to less than approximately 50%. This study proved that it is possible to suggest spatial-temporal sustainable forest management strategies to improve the supply rate of timber given a situation where the demand for forest resources is fixed, on a regular, quantitative basis.

Additional keywords: Robinia pseudoacacia, growth analysis

Structural Equation Modeling in Analyzing the Relationship between Urban Forest and Medical Care Use

Kwangsoo Lee (Eulji University, Korea)
This study evaluated whether urban forests had relationship with medical care use in respiratory disease. Data were obtained from (1) forest information from the Korean Forest Service, (2) air pollution data from the Ministry of Environment, and (3) medical care use for respiratory disease, population information, and medical care provider information from the Korean Statistical Information Service. Study dataset comprised 143 cities and administrative districts in seven metropolitan areas in Korea. A structural equation modeling was applied to test whether the extent of urban forest is negatively related to medical care use for respiratory disease after controlling the effects of degree of air pollution, population, and availability of health care providers. Forest extent and medical care use showed significant negative associations (estimates = -0.07, p-value = 0.00). The structural equation model showed good model fit to the sample data. Urban areas with larger forests had direct significant effects on medical care use. These study findings supports that urban city forests could mediate harmful effects of the external environment and improve health status.

Additional keywords: forest and human health, urban forest, medical care use, structural equation model

POSTER PRESENTATION

A: General issues in forest planning
Clarifying the Condition Determining the Applicability of Airflow Model to Wind Hazard Risk Assessment
Naota Tanigawa, Tsuyoshi Kajisa, Shigejiro Yoshida, Tetsuji Ota and Nobuya Mizoue (Kyushu University, Japan)
Wind hazard in forest is one of critical risks of forest management in Europe, the U.S. and Japan. For efficiently and effectively coping with wind hazard in forest, it is necessary to assess the wind hazard risk in each forest land in advance. Application of an airflow model to the wind hazard risk assessment is expected these days. Therefore we studied the condition that determines the applicability of the airflow model to the wind hazard risk assessment. We constructed the wind hazard prediction models using airflow model for the wind hazard caused by typhoon 19 in 1991 in Oita Prefecture and that caused by low pressure system in 2006 in Hokkaido, respectively, and discussed the causes that influence the applicability of the airflow model. It is implied that the difference of factors mainly causing wind hazard strongly influences the applicability. We considered that the airflow model can be applied to the risk assessment of wind hazards triggered by rare and stronger storms and it is difficult to apply the airflow model to wind hazards triggered by the poor resistance of forests to strong winds.

Additional keyword: wind hazard, risk assessment, airflow model, typhoon

Growth and Volume Distribution Analysis of Robinia pseudoacacia Riparian Forests along the Chikumagawa River in Japan
Keisuke Toyama (The University of Tokyo, Japan)
We investigated the growth of riparian forests of nonnative Robinia pseudoacacia along the Chikumagawa River in Japan assuming their use as biomass resources, and analyzed the volume distribution among trees or within one tree. Stem analysis in 4 plots with total 0.4 ha showed that the growth speed of stand stem volume was high when the stand age was ca. 15 years or more. Volume distribution among trees indicated that targeting only larger trees will easily increase the average volume of harvested trees. Genetic analysis showed that there were cases where DBH of trees of genets with bigger population were significantly larger. The volume of branches often occupied considerably large ration of the whole standing tree volume. The definition of wood part available as biomass resources seems to be important for appropriate volume measurement.

Additional keywords: Robinia pseudoacacia, growth analysis