20th FEFCO

Forest Ecosystem Function Colloquium (FEFCO) は、地域や地球全体のレベルで森林生態系の機能とその持続的活用法を統合的に理解することを目的とし、研究者間の学術交流を推進します。

第20回森林生態系機能コロキウムは、Zhejiang大学のGenXuan Wang先生にご講演いただきます。どなたでも参加できますので、多くの皆様のご参加をお待ちしております。京都大学農学研究科森林利用学研究室がホストを務めます。

20th FEFCO

2015/4/24 16:30 - 17:30

Faculty of Agriculture Main Building, S174

GenXuan Wang

(Professor of Ecology, Institute of Life Sciences, Zhejiang University)

Studies on the physical, physiological and biochemical quantitative rules of the metabolic ecology changed with effective water in plants

The metabolic theory of ecology (MTE) that derived from the scaling relationships between physiological traits and body size in animals and physical temperature factors, which ignored physiological and biochemical mechanisms and effects of water in habitats, has been extended to characterize ecological and biological processes from cellular to global levels. Most debates that claim to validate or invalidate MTE have focused on testing its predictions, which showed that it should be improved. We have found that the quantitative relationship among allometric scaling exponents of the body size, stature and coverage-density, all of them are regulated by hydro-physiological-ecological processes; the dynamics of metabolic coefficients changed with effective water for metabolism following Michaelis-Menten equation. A hypothesis had been preliminarily proposed that metabolic ecological processes may be jointly regulated by physical, physiological and biochemical laws and organism's size and stature, based on which a novel quantitative models was also developed. The main predictions was planned to test by measuring and analyzing the traits of structure, metabolism, productivity and habitat temperature and moisture etc. at levels from organs, individuals, populations to communities and ecosystems under conditions of control and field gradient of moisture and temperature in plants with main living forms, metabolic and ecological types. The identity and/or difference of the coefficients of the equations will be found and improved among species and types of metabolism and living forms. It is the points of innovation that introduce of the Michaelis-Menten equation from the biochemistry to quantify the effect of effective water, the effect of stature and coverage on the regulation of scaling exponent and ability to predict the dynamic of metabolism changing with the temperature and moisture 2 dimensions. A novel theory and quantitative model for metabolic ecology based on physical, physiological and biochemical laws was hoped to be developed. The famous metabolic theory of ecology may be expected to be expanded and improved to be better for suiting the actual mechanisms of metabolic regulations in organisms especially in plants, which may improve the predictions for the responses of metabolism and distribution patterns changed with temperature, moisture and climate in vegetation.

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Forest Ecosystem Function Colloquium

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