第 61 回岩手大学 COEフォーラム

岩手大学 21 世紀 COE プログラム「熱ー生命システム相関学拠点創成」では、関連分野において国内外で活発に研究をされている方をお招きしてフォーラム（セミナー）を開催しています。今回は、ハスやフィロデンドロンの発熱現象の発見者であるオーストラリア・アデレード大学の Seymour 教授に植物の発熱に関わる全般的なお話しをしていただくことにしました。多くの方々にご参加いただきますようお願い申し上げます。

第 61 回担当・農学部附属寒冷バイオシステム研究センター
伊藤 菊一（kikuito@iwate-u.ac.jp）

****

日時：2008 年 3 月 7 日（金）16:45～18:15
場所：岩手大学農学部 2 番教室

Prof. Roger S. Seymour

(Environmental Biology, University of Adelaide, Australia)

Hot plants: the physiology and behaviour of thermoregulatory flowers

The flowers, inflorescences and cones of several groups of early seed plants produce heat during blooming. Some species are able to regulate heat production and maintain relatively constant floral temperatures in widely variable environmental temperatures. This presentation explores temperature regulation in plants from its initial discovery to current experiments. We have examined the phenomenon at different levels of organization, from the molecular control of heating to its ecological significance. Respiration rates can be extraordinarily high, and floral temperature can reach 35 ºC above the air. The control mechanism is still unknown, but investigations on gene expression, selective inhibitors and isotope fractionation reveal involvement of the alternative oxidase (AOX) and uncoupling protein (UCP), depending on the respiratory substrate (carbohydrate—AOX; lipid—UCP). Oxygen is supplied by diffusion, and the morphology of the pathway is described in *Philodendron selloum*. Thermogenesis is associated with scent production in most species, but temperature regulation continues past the attractive phase and is associated with insects (chiefly endothermic beetles) that reside for a day in a floral chamber, where they eat, digest and mate. Measurements of the energy costs of insect activity show that as little as 4 ºC elevation in floral chamber temperature in *Philodendron solimoesense* can reduce the costs of activity 5-fold. Floral temperatures (ca. 32 ºC) in the Amazon water lily *Victoria amazonica* approximate preferred activity temperature of its scarab beetle pollinator (*Cyclocephala* sp.). Thus thermogenic flowers can provide a direct energy reward to insect visitors, and temperature regulation may be associated with it.