



# CDB SEMINAR

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<http://www.ksu.edu/tribolium/start.html>

Title: “ Changes in the developmental system which have contributed to the evolution of beetle wings “

Date: Thursday, October 27

Time: 16:00 P.M. ~ 17:00 P.M.

Place: Auditorium of Building C, CDB

## Summary

The Coleoptera (beetles) are the largest order in the Insecta, and in fact the most successful animal group on the planet (over 20 percent of extant animals belong to the Coleoptera). An important trait driving the successful radiation of beetles is the presence of highly modified and sclerotized forewings called elytra. Elytra serve as body covers to protect beetles against mechanical pressure or dehydration, helping beetles adapt to a variety of environments. To better understand how novel structures such as elytra arise, we are trying to uncover the molecular basis of how elytra evolved from more typical insect wings. Insect wing development is best understood in the dipteran *Drosophila melanogaster*, in which a large number of genes important for wing development (wing genes) have been characterized. Using these studies as a framework and basis for comparison, we have analyzed the expression pattern and loss-of-function phenotypes of wing gene homologs in the elytra and hindwings of the red flour beetle, *Tribolium castaneum*. We have identified several changes in the developmental system that have contributed to the evolution of elytra in beetles: i) An apparent loss of vein diversity ii) The acquisition of a unique, intercalating mechanism of parallel vein formation iii) Several independently regulated co-options of the sclerotization pathway. We will present data supporting these conclusions, and discuss the evolutionary implications of our work.