

2014 Cooper Award

S.L. Wing, C.A. Strömberg, L. J. Hickey, F. Tiver, B. Willis, R. J. Burnham, & A.K. Behrensmeyer



The William Skinner Cooper Award is given to honor an outstanding contributor to the fields of geobotany, physiographic ecology, plant succession, or the distribution of plants along environmental gradients, the fields in which W.S. Cooper worked. The award is for a single contribution in a scientific publication (singly or multiply authored).

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For decades, it has been recognized that flowering plants very rapidly radiated after their first appearance in the Cretaceous. What was not appreciated was that overwhelming phylogenetic diversity is not the same thing as ecological dominance. Twenty years ago, Wing and co-authors (*Nature* **363**, 342-344 [1993]) first reported on a remarkable Late Cretaceous (~73 Ma) fossil locality at Big Cedar Ridge in Wyoming, where the entire vegetation was entombed in a volcanic ash flow. This allowed them to census the groundcover and demonstrate that angiosperms were ecologically dominant at the site.

In their current *Ecological Monographs* paper, they provide a richly detailed analysis of this fossil flora, elaborating on those early results. Additionally, they realized that the top of the ash would have been level and that measuring down from the top of the ash to the underlying horizon would be a measure of paleotopography and this—when combined with measurement of grain size and organic content of the underlying rock—provided a highly detailed understanding of the spatial distribution and microenvironment of each fossil sampled. This analysis, combined with the *in-situ* preservation of the plants, allowed them to reconstruct fine-scale spatial gradients in plant community structure and species distributions. Ferns dominated organic substrates, and the distribution of ferns vs. angiosperms has few modern analogs. The study thus provides a unique insight into the ecological structure of a local community at a time of transition between pteridophyte and angiosperm-dominated vegetation at a global scale. This work demonstrates an amazing ability to find the one right outcrop in order to understand large-scale evolutionary, ecological, and biogeographic patterns from a single point in space and time.