

New England Botanical Club – Minutes of the 1036th Meeting
May 2nd, 2008

Bryan Hamlin, Recording Secretary

The 809th meeting of the New England Botanical Club, being the 1036th since its original organization, was held in the education center of the New England Wild Flower Society at Garden-in-the-Woods in Framingham, MA.

It was announced that Dr. Garrett Crow of the University of New Hampshire is retiring and moving to Michigan. Dr. Lisa Standley announced the winners of the Graduate Student Research Awards: Sydne Record of the University of Massachusetts at Amherst and Kelsey Glennon of George Washington University.

Vice-President Kanchi Gandhi introduced the speaker – Dr. Ihsan Al-Shehbaz, head of the Department of Asian Botany at the Missouri Botanical Garden in St. Louis. Dr. Al-Shehbaz was born and grew up in Iraq and is a world authority on the Brassicaceae, with field experience in many parts of the world. His presentation was titled “Diversity, systematics, and phylogeny of the Brassicaceae (Cruciferae).”

Dr. Al-Shehbaz started by reminding us of the economic importance of this family, beginning with the many varieties of *Brassica oleracea* (cabbage, broccoli, Brussels sprouts, cauliflower, kale, kohlrabi, collards, etc.). The U.S. government's agricultural department lists 96 taxa of vegetables from this family. *Brassica rapa* -- turnip and Chinese cabbage, *Raphanus sativus* – radish, *Nasturtium officinale* – watercress, *Eruca sativa* – arugula. Then there are those harvested for the oil obtained from their seeds, in particular *B. napus* – rapeseed. Canola vegetable oils from *Brassica* species rank first among the world's tonnage production. Then there are the mustards: *B. juncea* – table mustard, *Sinapis alba* – white mustard, and *B. nigra* – black mustard; then horseradish – *Armoracia rusticana*, and Japanese horseradish or wasabi in the genus *Eutrema*. Other Brassicaceae are used as ornamentals – such as wallflowers, sweet alyssum, rock cress, candytuft, and honesty or money plant. Finally, there are more than 120 species of weeds beginning with the ubiquitous *Capsella bursa-pastoris*.

In 2000 the genome of *Arabidopsis thaliana* was mapped. Comparing with other species of the genus this indicated that *A. thaliana* evolved in Europe. The Brassicaceae has, according to some experts, 338 genera and 3790 species. Regional distribution is such that North America has 850 species (but 105 are introduced), South America 387 species, and the Irano-Turanian floristic region has 900 species in 150 genera. Turkey has 560 species while the whole of Russia has only 274, indicating that the family originated in southwest Asia. One species is endemic to Greenland – *Boechera holboellii*.

Big changes in our understanding of the phylogeny of the family have resulted from recent DNA studies. This is especially true for our understanding of the relationships among genera. These studies also helped in determining which morphological features are reliable for the delimitation of genera and which ones are not. Historically, we have relied on the cruciform (cross-shaped) corolla and tetradynamous stamens (four of the six long and two short) for the easy identification of mustards, but many species have no corolla or only two stamens, and one species in the Himalayas has 24 stamens. There is also tremendous diversity in fruit and trichome morphology, which have often been used as diagnostic tools.

Dr. Al-Shehbaz counts more than 280 genera in the family while other authors go as high as 370. Just 16 genera account for 50% of the family's species, in particular the genera *Draba*, *Lepidium*, *Cardamine*, and *Alyssum*. *Draba* and *Lepidium* alone have 370 and 230 species, respectively. *Draba* species are found throughout the world and vary in size from plants 1 cm tall to other species that grow to 1 m tall in the Páramo of Venezuela. It has been determined that the genus *Coronopus* has evolved from *Lepidium* more than once, and should therefore be united with it. Until recently the Brassicaceae was thought to have originated in the New World, but through DNA work it is now shown to have originated in the Old World. Another large genus – *Arabis* has now been divided into more than a dozen genera and, as it occurs in North America, the genus *sensu* Rollins (1993) consists of species now assigned to *Arabis*, *Arabidopsis*, *Boechera*, *Streptanthus*, *Pennellia*, and *Turritis*.

The Brassicaceae is grouped in the order Capparales along with other families such as Capparaceae and Cleomaceae. They have in common the production of glucosinolate or mustard oil, as well as several morphological characteristics.