

P1115. The analysis of transition between two *Primula vulgaris* subspeciesY. V. Kosenko¹, P. A. Volkova¹, A. B. Shipunov²;¹Moscow State University, Moscow, Russian Federation, ²Institute of Information Technologies, Moscow, Russian Federation.

The common primrose (*Primula vulgaris*, Primulaceae) consists of several subspecies, two of them (subsp. *vulgaris* and subsp. *sibthorpii*) form a transitional zone in the Russian Black Sea coast, near Tuapse and Sochi. These two subspecies are growing together and even sometimes produce mixed populations, but generally subsp. *sibthorpii* (with violet or pink flowers) grows in lower altitudes than subsp. *vulgaris* (with yellow or white flowers). To test the hypotheses about geographical and spatial distribution, the morphometric material (more than 2310 plants were measured) is collected. We found that there is significant trend to increase the proportion of violet and pink-flowered plants in the populations from north-east to south-west. It is possible to divide populations on "north" and "south" forms. The length of transitional zone is about 30 km along coastal line. However, there is no significant morphological differences between colour forms. There is also the weak correlation between flower color and altitude.

P1116. Marcgraviaceae: resolution of interspecific and intergeneric differences in unresolved molecular polytomies using flavonoid distributionsD. E. Giannasi¹, N. M. Ward²;¹University of Georgia, Athens, GA, United States, ²California Native Plant Society, Sacramento, CA, United States.

Marcgraviaceae is a distinctive neotropical family in the Ericales with approximately 130 species distributed from the Caribbean and southern Mexico to northern Bolivia. Previous *ndhF*, *trnL-F*, and *rbcl* sequence comparisons resolved two major lineages within Marcgraviaceae corresponding to subfamilies Marcgraviaceae and Noranteoideae. The monogeneric Marcgraviaceae is united by both morphological synapomorphies and molecular data. In contrast, subfamily Noranteoideae appears to be delimited by plesiomorphic morphological characters but is supported as monophyletic by molecular data. Despite considerable morphological differences among taxa of Noranteoideae, cpDNA sequence data do not resolve some currently recognized genera as monophyletic groups. This study examines flavonoid distributions in an attempt to resolve molecular polytomies in the family. Preliminary data reveal flavonoid patterns that provide some resolution of intergeneric and interspecific relationships.

P1117. Establishing *Eschscholzia californica* as a model plant for basal eudicotsA. Scholz, B. Melzer, S. Gleissberg;
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Studies in model plants show considerable variation of developmental mechanisms that are attributable to evolutionary changes. In our attempts to elucidate development and evolutionary patterns of dissected leaves, we are establishing *Eschscholzia californica* as a model organism for basal eudicots, in order to help bridging the gap between well investigated monocots such as *Zea* and *Oryza*, and core eudicot model plants. Our previous *in situ* expression studies in *Eschscholzia* indicated that leaf dissection may be under redundant control of *FLORICAULA* and *KNOX* genes in basal eudicots, and that redundancy may have been reduced in specific core eudicot lineages. To further explore *Eschscholzia* leaf development, we attempt to modulate gene expression through *Agrobacterium*-mediated transformation and through Virus-induced gene silencing (VIGS). Furthermore, we are investigating the role of hormones in leaf development of *Eschscholzia* since auxins and gibberellins are known to interact with both *FLORICAULA* and *KNOX* genes in core eudicots.

P1118. Phylogenetic Study of Menispermaceae

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The family Menispermaceae, a major group of basal Eudicot, is mostly represented by tropical climbers belonging to about 500 species. Its phylogeny is very badly understood since there is no recent revision of the group. We therefore provide here the first results of a morphological study tending to fill this lack. Characters of leaves, inflorescences, flowers, fruits and pollen were used. A special attention was given to the endocarp, that are traditionally

used as a discriminating character of the different tribes. We described the endocarp structure through morphometrics and questioned homologies such as the condyle (a cavity of endocarp). We also begun a large-scale study of Menispermaceae wood anatomy on specimens from all around the world. The large fossil record of this family, quite rich in the Early Tertiary of northern hemisphere temperate regions, brings palaeobotanical information in this study. A parsimony analysis allows us to process the whole dataset. It appears that some reassessments have to be made; The new phylogeny permits study of character evolution and biogeographical considerations.

P1119. Patterns and Rates of Nucleotide Substitution in AngiospermsM. E. Sparks, J. A. Udall, V. Brendel, J. F. Wendel;
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We have reliably aligned reciprocally closest homolog pairs for two eudicots (*Gossypium*, *Arabidopsis*) and two members of the Poaceae (*Oryza*, *Zea*). Using reciprocal outgroups to polarize molecular evolutionary events, we demonstrate that patterns of nucleotide substitution differ between eudicots and the Poaceae at fourfold degenerate codon sites (FDCS's). While base composition of FDCS's in *Gossypium* and *Arabidopsis* closely parallels that of introns from the same genes, *Zea* and *Oryza* exhibit FDCS composition distinct from that of introns, suggesting operation of a cryptic mode of selection. Our analysis provides the first robust estimates of neutral rates of transition and transversion substitutions in angiosperms, as well as variance in rates among a large set of genes. These data permit us to address the divergence of the Poaceae from eudicots as well as other divergence events.

P1120. Monophyletic origin and Adaptive Radiation in Hawaiian Chamaesyce (Euphorbiaceae) based on ITS and 5S-NTS sequence variationC. W. Morden¹, T. J. Motley²;¹University of Hawaii, Honolulu, HI, United States, ²New York Botanical Garden, New York, NY, United States.

Chamaesyce is a cosmopolitan genus of ca. 250 species. The Hawaiian complex constitutes 16 endemic species that have radiated from a herbaceous weedy colonist into a spectacular assemblage of small shrubs to trees. Habitats include coastal strand, dry shrubland and forests, and rainforests up to 2000 m elevation. All species manifest the C₄ photosynthetic pathway, and are the only such plants to occur in tree form or in wet, understory habitats. Phylogenetic analysis indicates species from Kauai (the oldest island at 5.5 my) are basal and that taxa have followed the stepping stone model of dispersal across the younger islands. Clades include species from all islands suggesting back dispersal or later speciation events. The eight varieties of *C. celastroides*, the most variable species, is paraphyletic and in need of taxonomic revision. Intrapopulation variation of some species has been also been examined and with variation that exceeds that found in any other Hawaiian radiation.

P1121. Pollen morphological trends in EuphorbiaceaeC. Khunwasi¹, K. Pyramarn¹, K. Kasetsinsombat²;¹Chulalongkorn University, Bangkok, Thailand, ²Mahidol University, Bangkok, Thailand.

Pollen materials obtained from fresh and herbarium specimens of 68 genera and 216 euphorbiaceae species found in Thailand were acetolysed. Measurement and morphological observations were made under a Nikon AFX 35, using a x10 eyepieces and x100 immersion objective. All measurement was based on at least 10 pollen grains. External ultrastructures of pollen grains were observed by scanning electron microscope. The SEM micrographs were taken using a JEOL JSM 5410 LV. The permanent slides of the pollens were kept in Kasin Suvatabhandhu Herbarium, Department of Botany, Chulalongkorn University. A conspicuous morphological diversity of euphorbiaceae pollen was evident from 61 pollen types constructed in the present study. They were mainly based on the various types of apertural system and ornamentation. Based on these diverse pollen types, nineteen morphological trends were proposed.