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Highlighted Articles for March 2024

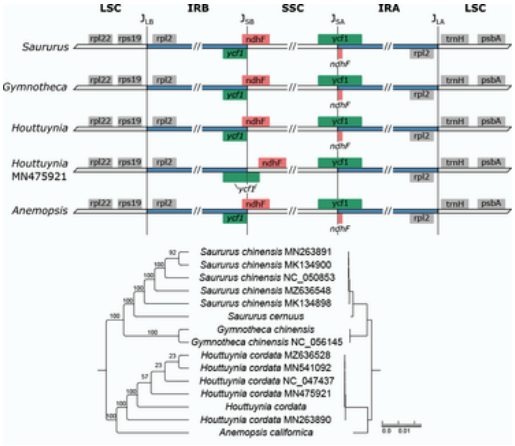
Soil microbiomes play an important role in plant adaptation to abiotic stress

Monica V. Brady and Emily C. Farrer. 2024. The soil microbiome affects patterns of local adaptation in an alpine plant under moisture stress. *American Journal of Botany* https://doi.org/10.1002/ajb2.16304

Soil microbiomes strongly impact plant fitness, as certain mutualistic microbes provide benefits such as help with nutrient acquisition, while pathogenic microbes can cause harm to plant health. Despite the well documented fitness effects of microbes, their role in determining patterns of plant adaptation to the local environment has rarely been tested. **Brady and Farrer tested the effects of microbes on adaptation to dry versus moist environments in *Geum rossii*, an abundant alpine plant, by conducting a greenhouse experiment manipulating plant population, soil moisture, and soil microbiome.** The authors found that dry meadow plant populations were locally adapted to dry environments in the absence of microbes and were also adapted to microbes from dry environments—as they performed better with dry microbes compared to moist microbes. However, moist meadow populations showed no patterns of adaptation to moisture level regardless of the presence of microbes. **This research highlights the importance of microbial mutualists in local adaptation, particularly in dry environments with higher abiotic stress.**

Comparative genomics of Piperales plastomes reveal shortcomings in assemblies and annotations published to open-access databases

Despite the large number of available plastid genomes in open-access databases, their reconstruction is not as straightforward as it may seem. Jost and Wanke analyzed such data for the pepper relatives (Piperales) and supplemented this dataset with new plastomes for all previously missing genera. Using comparative genomics methods, they showed that most Piperales still maintained inverted repeat junctions identical to the proposed ancestral angiosperm boundaries. Several events in which reading frames were disrupted highlighted a dynamic evolution of the *cemA* and *ycf15* genes—indicating their pseudogene-like status. In addition, a plethora of assembly and annotation errors were documented in previously published Piperales plastomes, which, if not corrected, will lead to an artificial increase in perceived diversity. For other flowering plant plastomes available in public databases, a similarly high pseudo-diversity can be postulated. **Based on these observations, the authors proposed a gold standard for the assembly and annotation of high-quality plastomes.**



Matthias Jost and Stefan Wanke. 2024. A comparative analysis of plastome evolution in autotrophic Piperales. *American Journal of Botany* https://doi.org/10.1002/ajb2.16300