

# The American Dahlia Society

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## ADS Genome Project Update November 2024

**From:** Alex Harkess

### **Quarterly Board Report for the American Dahlia Society**

We are pleased to report significant progress across three major initiatives supported by the American Dahlia Society. Your generous funding has been instrumental in enabling our success, and we are excited to share these updates with you. Each project is advancing our understanding of dahlia genetics, phylogeny, and floral trait development, which will ultimately enhance breeding programs and the cultivation of these beautiful flowers.

1. **Genome Project:** The assembly of the dahlia genome is now complete, marking a major milestone in our research. We have successfully “locked” the chromosome structure, establishing a finalized genome assembly that will serve as a stable reference for future studies. Currently, Zach is sequencing RNA to annotate genes within this genome, allowing us to better understand gene functions and expression patterns. Intriguingly, our findings suggest that cultivated dahlias may be tetraploid, contrary to the longstanding belief that they are octoploid. This has potential implications for breeding and evolutionary studies, although further research, especially with additional genomes, may provide a more comprehensive view.

2. **Dahlia Phylogeny Project:** We have made excellent strides in our phylogenetic study, with nearly 200 individuals from across the Dahlia genus successfully sequenced through bait capture techniques. This ambitious effort, undertaken in collaboration with an international network of nearly 15 research partners, has yielded high-quality sequencing data. Preliminary phylogenetic trees are consistent with many previously hypothesized relationships between dahlia species, offering a robust foundation for understanding the evolutionary history of the genus. Zach is now conducting a more detailed analysis to trace the likely ancestral species of the cultivated dahlia, a discovery that could illuminate the origins of many of its beloved characteristics.

3. **Floral Gene Identification and Breeding Program:** With a focus on floral traits, Zach has submitted a proposal for a USDA NIFA predoctoral fellowship that, if awarded, would support his research and training through the remainder of his PhD. This project centers on identifying genes responsible for dahlia floral traits through two main approaches: a genome-wide association study (GWAS) on specimens collected from national dahlia shows and a comprehensive transcriptome analysis across major floral forms. If successful,

these efforts will lay the groundwork for a molecular-assisted breeding program, ultimately enabling breeders to select for desired floral traits with greater precision and efficiency.

We are grateful for the American Dahlia Society's support, which has been invaluable to our progress. These projects are setting a strong foundation for future dahlia research and cultivation improvements, and we look forward to continuing this momentum in the coming quarters. Thank you for your continued partnership in advancing dahlia science and horticulture.