

# Identifying Genes Related to Stomatal Anatomy: An Approach to Predict Drought Tolerance in Sagebrush, a Keystone Species of Northwestern America.

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## Introduction

- Drought, heat waves, and fire have become more prevalent in northwestern North America threatening the sustainability of sagebrush (*Artemisia tridentata*) populations.

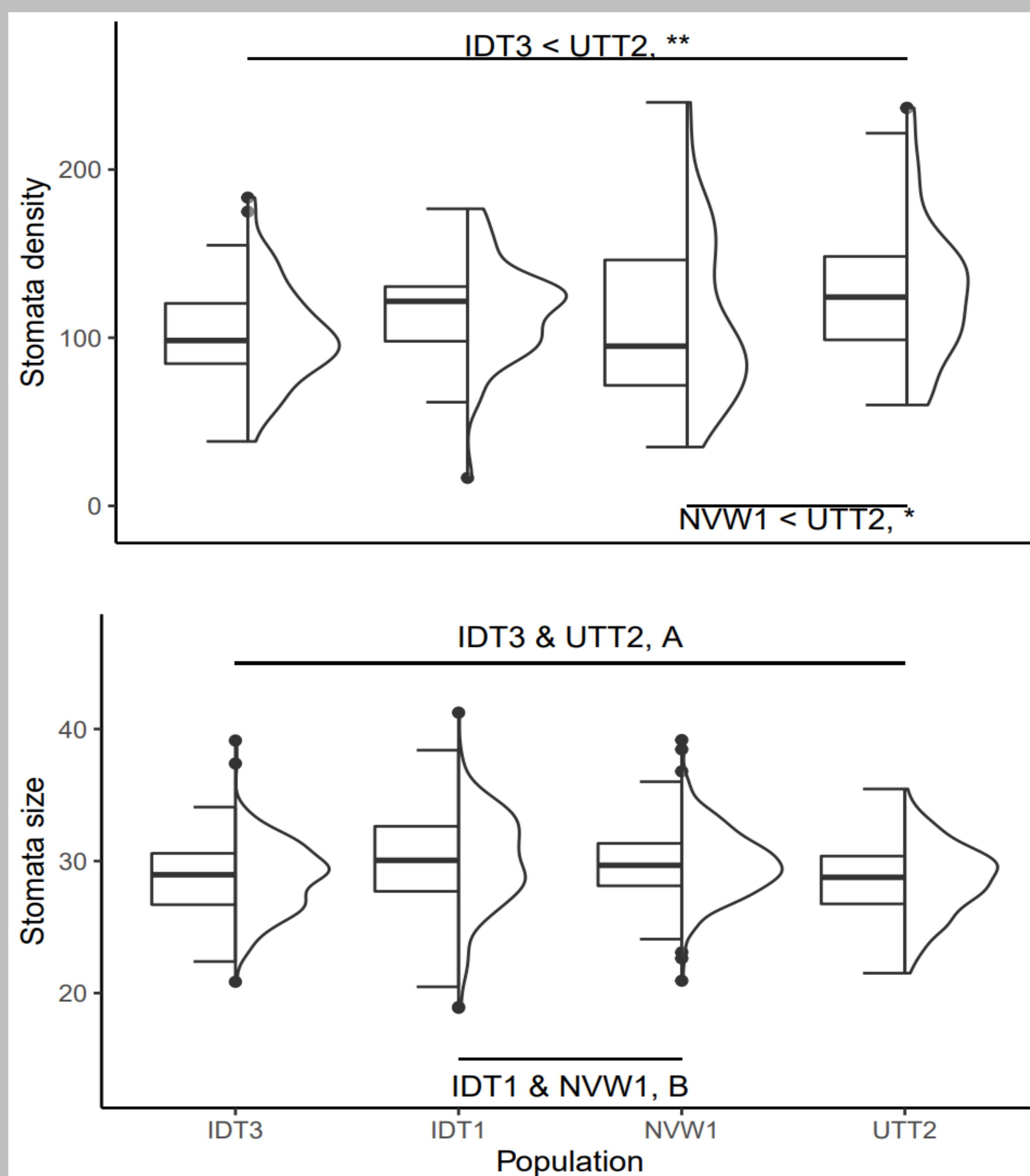


Figure 1. Plot of stomatal size and density phenotypic variance in four populations of *Artemisia tridentata*.

## Goals

- This project aims to understand and predict pathways related to drought tolerance across sagebrush populations by identifying genes related to stomatal anatomy.
- An automated literature review pipeline is designed and implemented to identify genes related to our target phenotype.

- Arabidopsis thaliana* (Thale Cress) can be used to identify genes of interest and relationships between stomatal genes that can then be investigated in *Artemisia tridentata*.

*Arabidopsis thaliana*    *Artemisia tridentata*

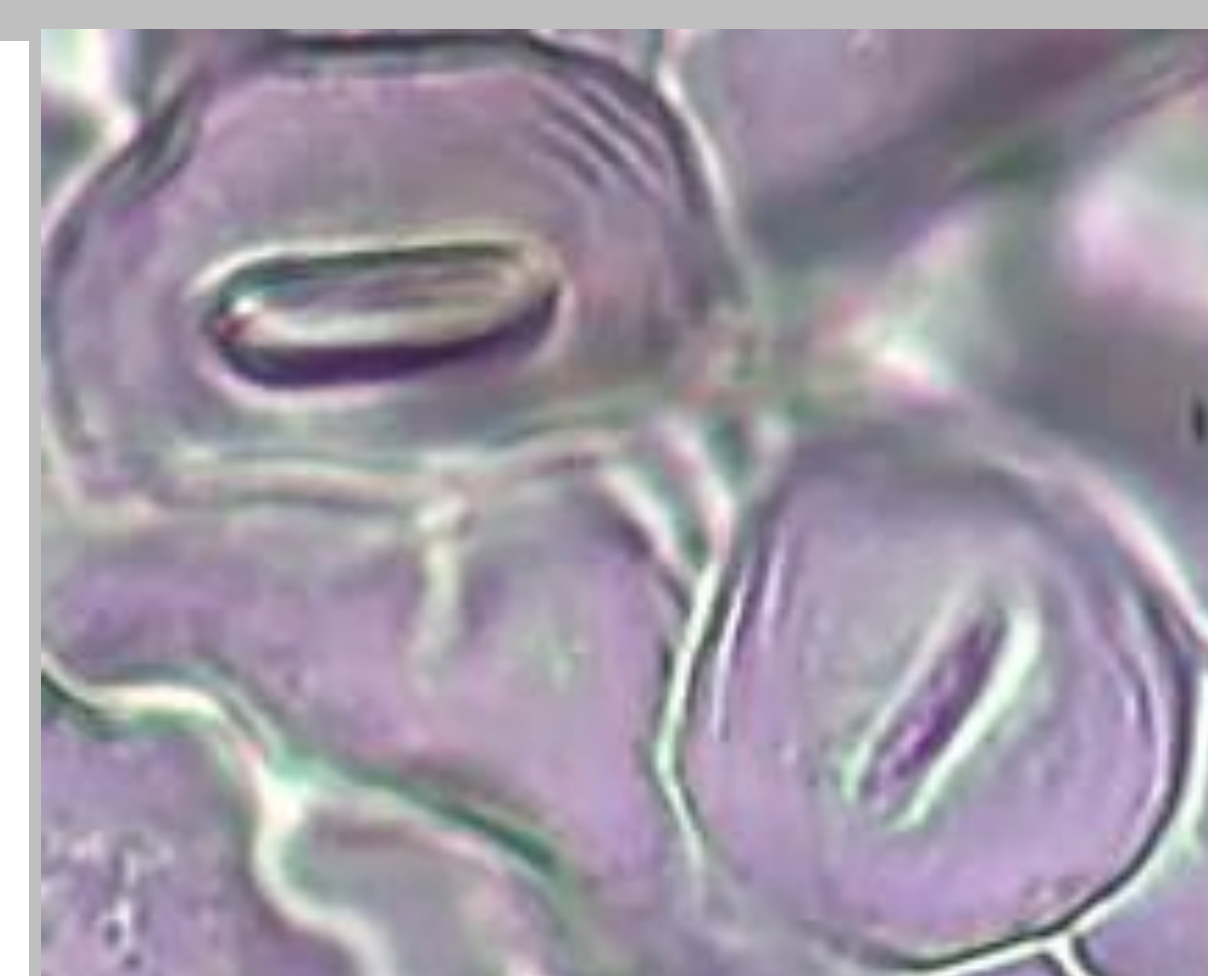


Figure 2. Stomata control transpiration and photosynthesis.



Chromosomes: 5    Chromosomes: 9  
Figure 3. Side by comparison of *Arabidopsis thaliana* (left) and *Artemisia tridentata* (right).

## Automated Literature Review

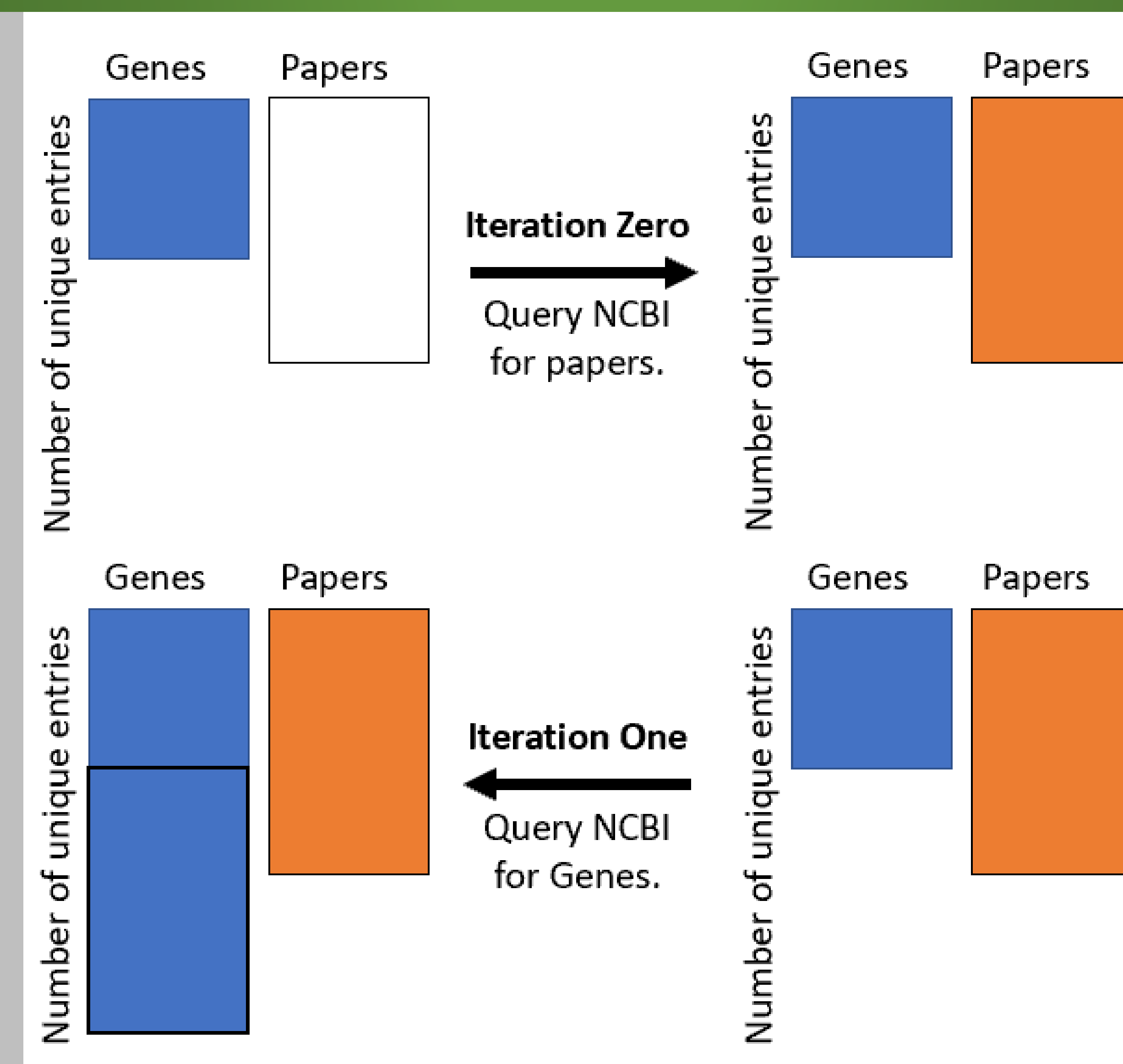


Figure 4. Iteration flowchart for the automated literature review. Each iteration builds off the previous iteration.

## Results

- The filtering conditions for the automated literature review are too broad as genes not related to stomatal anatomy are being added to the data set for *Arabidopsis thaliana*.

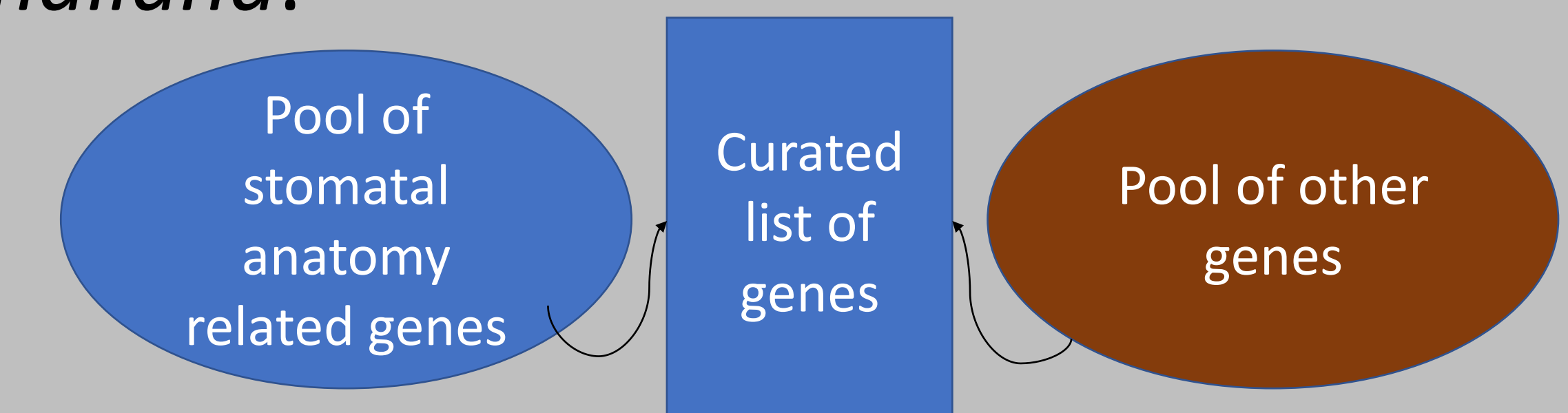


Figure 4. Pools of genes being added to the curated list of stomatal anatomy related genes.

## Discussion

- Before correlating genes in *Arabidopsis* to genes in *Artemisia*, the automated literature review needs to run with the specificity to only include stomatal anatomy genes.
- This could be achieved by filtering abstracts and Gene Ontology by associated words using a word bank or G2PMineR (Wojahn et al., 2021).

## References

- Wojahn, J. M., Galla, S. J., Melton, A. E., & Buerki, S. (2021). G2pminer: A genome to phenome literature review approach. *Genes*, 12(2), 293. <https://doi.org/10.3390/genes12020293>
- Arabidopsis thaliana* by © Marie-Lan Nguyen / [Wikimedia Commons](#) / [CC-BY 2.5](#)

## Acknowledgements

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