

Origins of a Sierran tetraploid manzanita

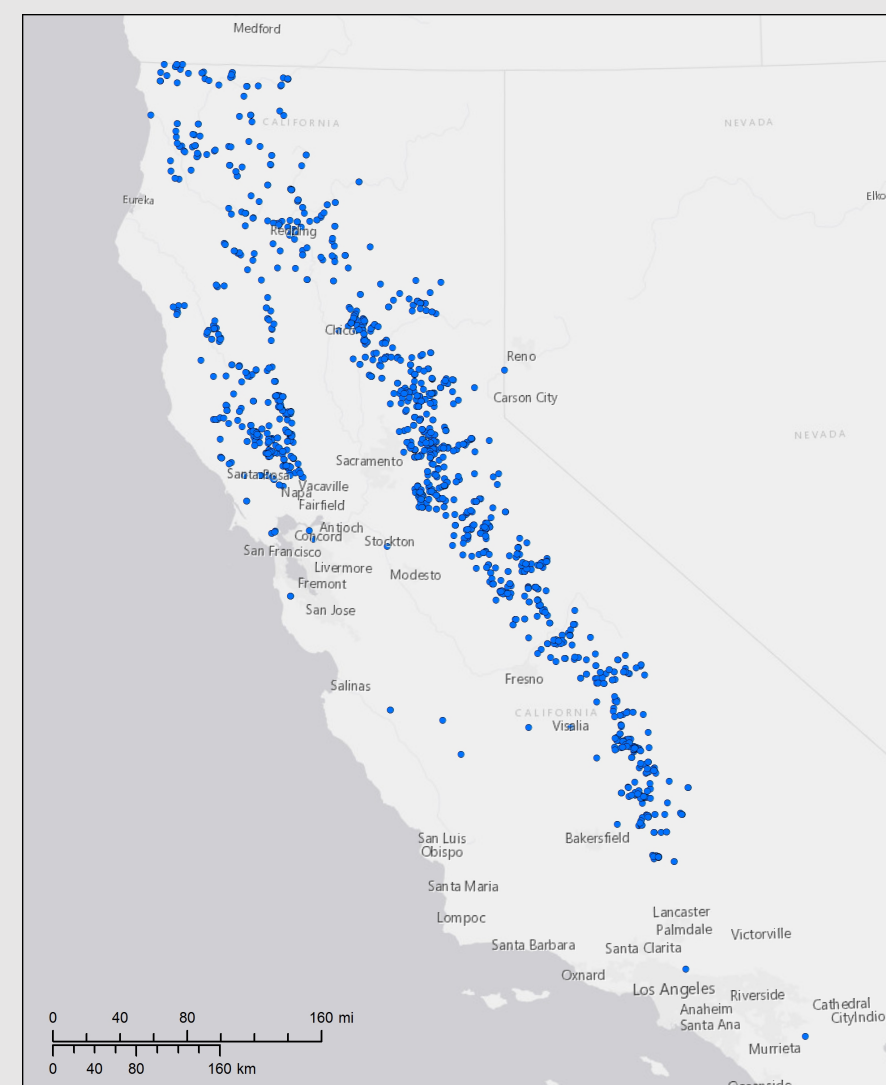
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Taxa under investigation

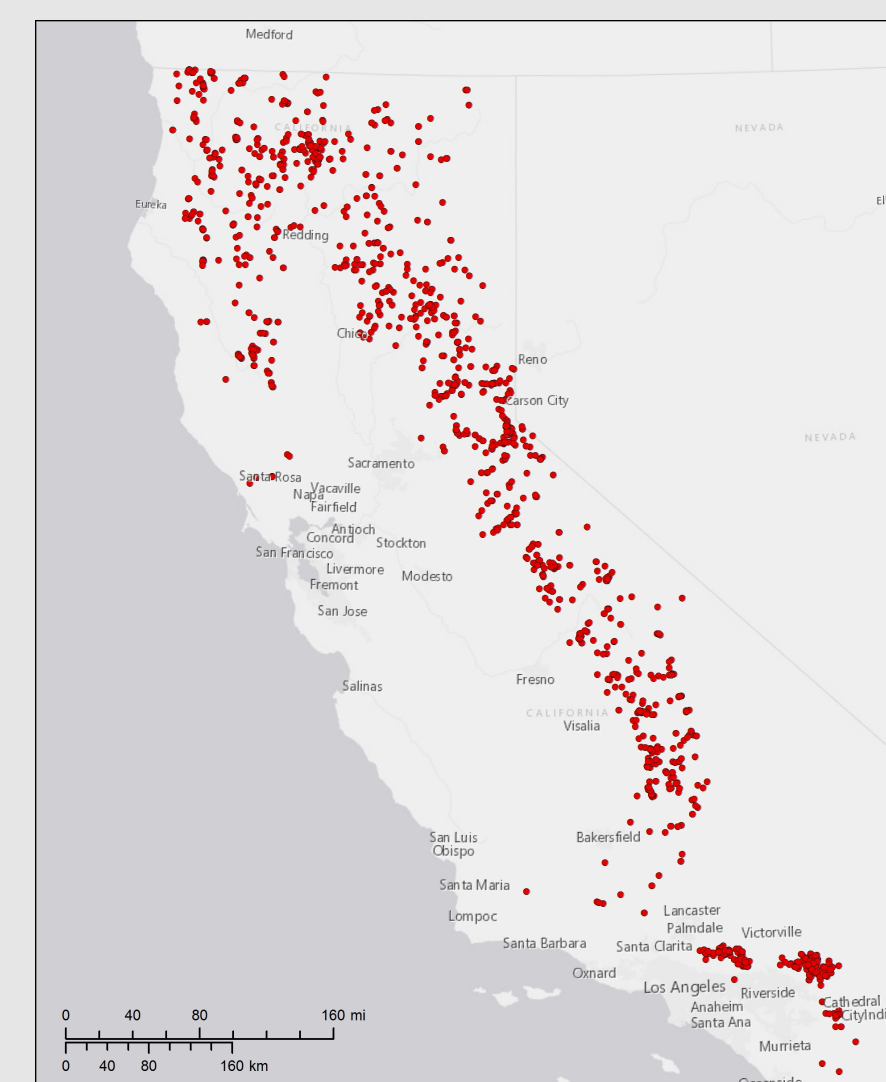
Arctostaphylos viscida Parry (whiteleaf manzanita)

- xeric sites at lower elevations (100-6,500ft.)
- white-glaucous leaves
- sticky and glandular inflorescence
- lacks burl
- diploid ($2n=2x=26$)



Arctostaphylos patula Greene (greenleaf manzanita)

- higher elevation (2500-11,000ft.) conifer forests across western United States
- bright green leaves
- burl present in most populations
- diploid ($2n=2x=26$)

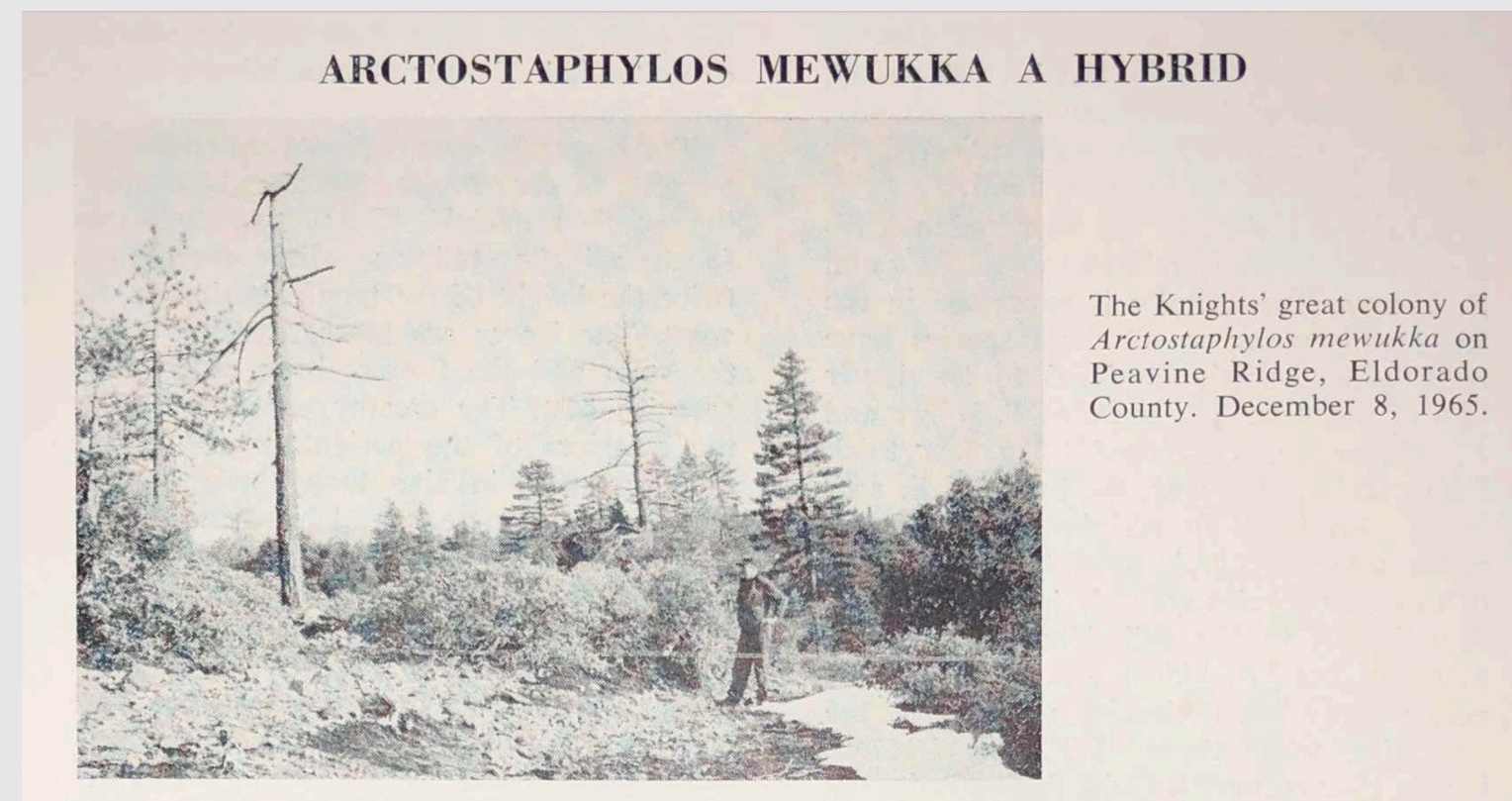


Arctostaphylos mewukka Merriam (Me-Wuk manzanita)

- Mid-elevation Sierra, often where *A. patula* and *A. viscida* overlap
- gray-glaucous leaves
- two subspecies: *A. mewukka* Merriam ssp. *mewukka* (burled); and *A. mewukka* Merriam ssp. *truei* (W. Knight) P.V. Wells (lacks burl)
- transgressive phenotypes (dark colored fruit and large, gray-glaucous leaves)
- tetraploid ($2n=4x=52$)



Background

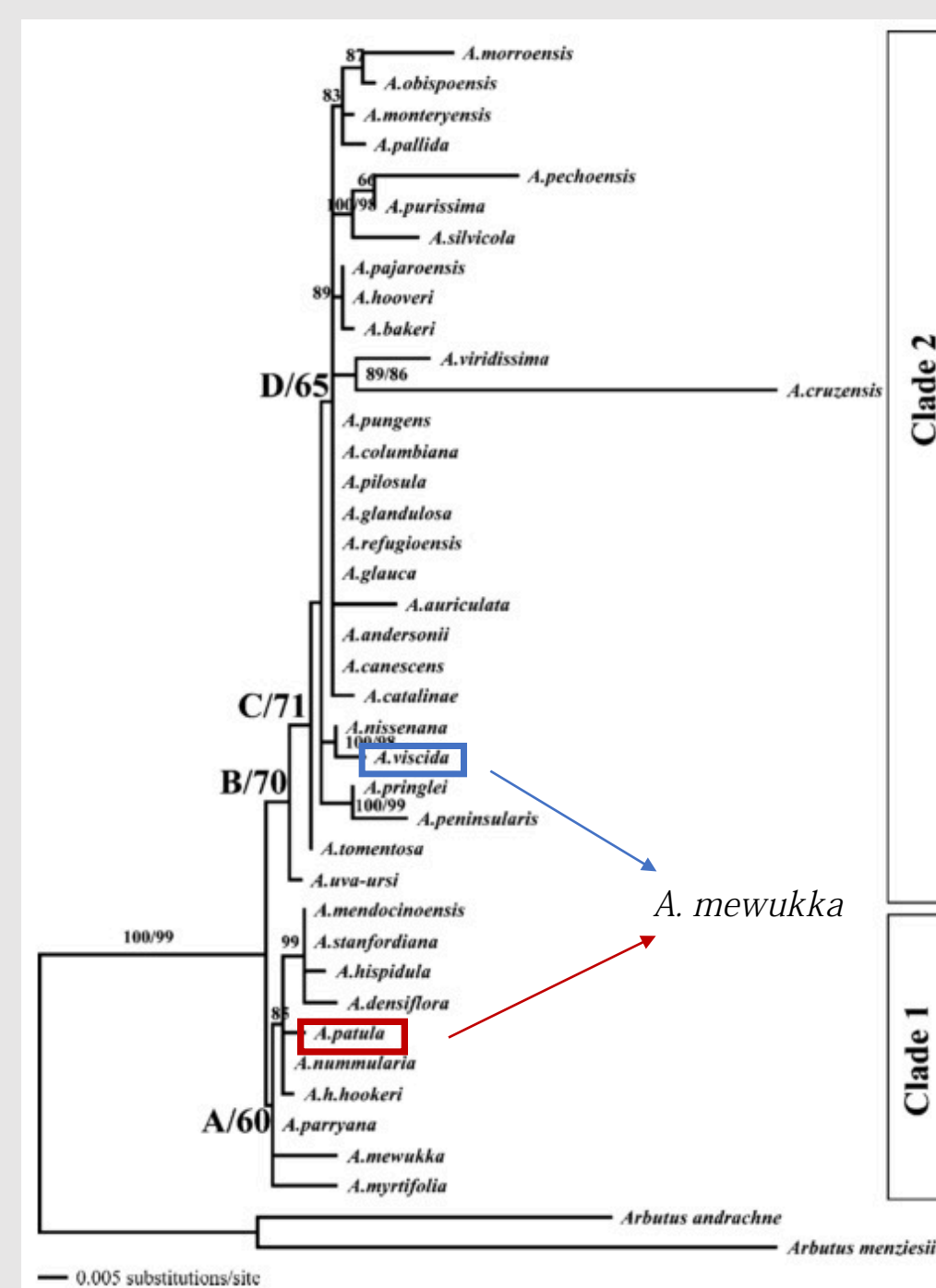
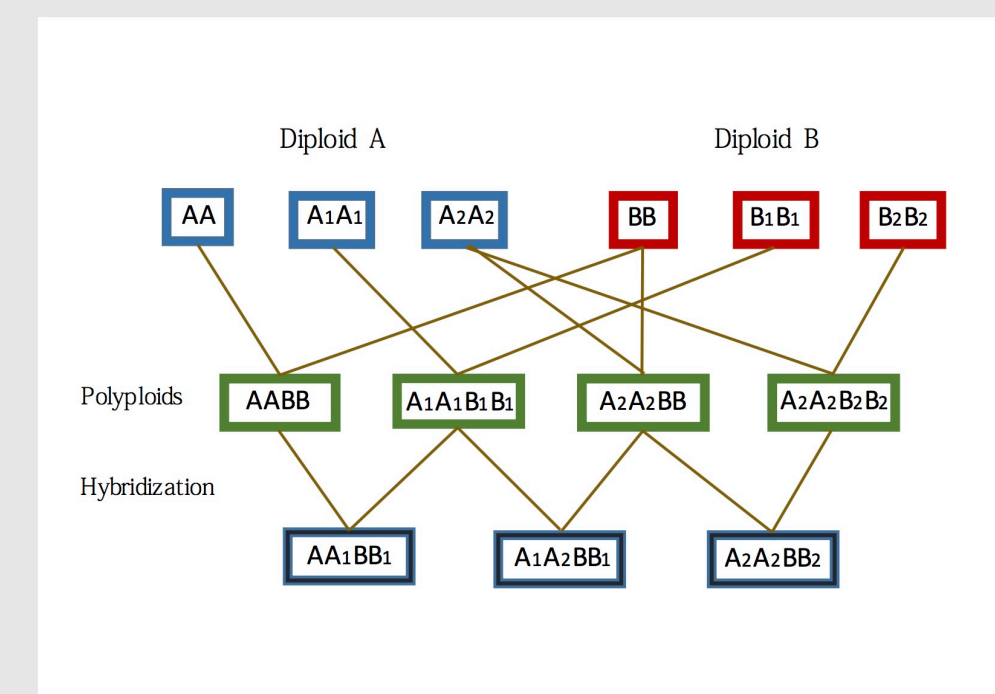


-Genome duplication through polyploidization is a profound mechanism for reproductive isolation and hybrid speciation in sympatry (1,7).

-37/105 minimum rank taxa are documented tetraploids, indicating a strong relationship between genome duplication and species richness in the group.

-Schierenbeck et al. (1992) demonstrated that *A. mewukka* is the resulting allopolyploid from hybridization between *A. patula* and *A. viscida*.

*Allopolyploids typically arise from repeat and reciprocal hybridization events, resulting in separate and compatible individuals with distinct genotypes.



*Boykin et al. (2005) revealed a two-clade topology in the nrITS phylogeny of *Arctostaphylos*

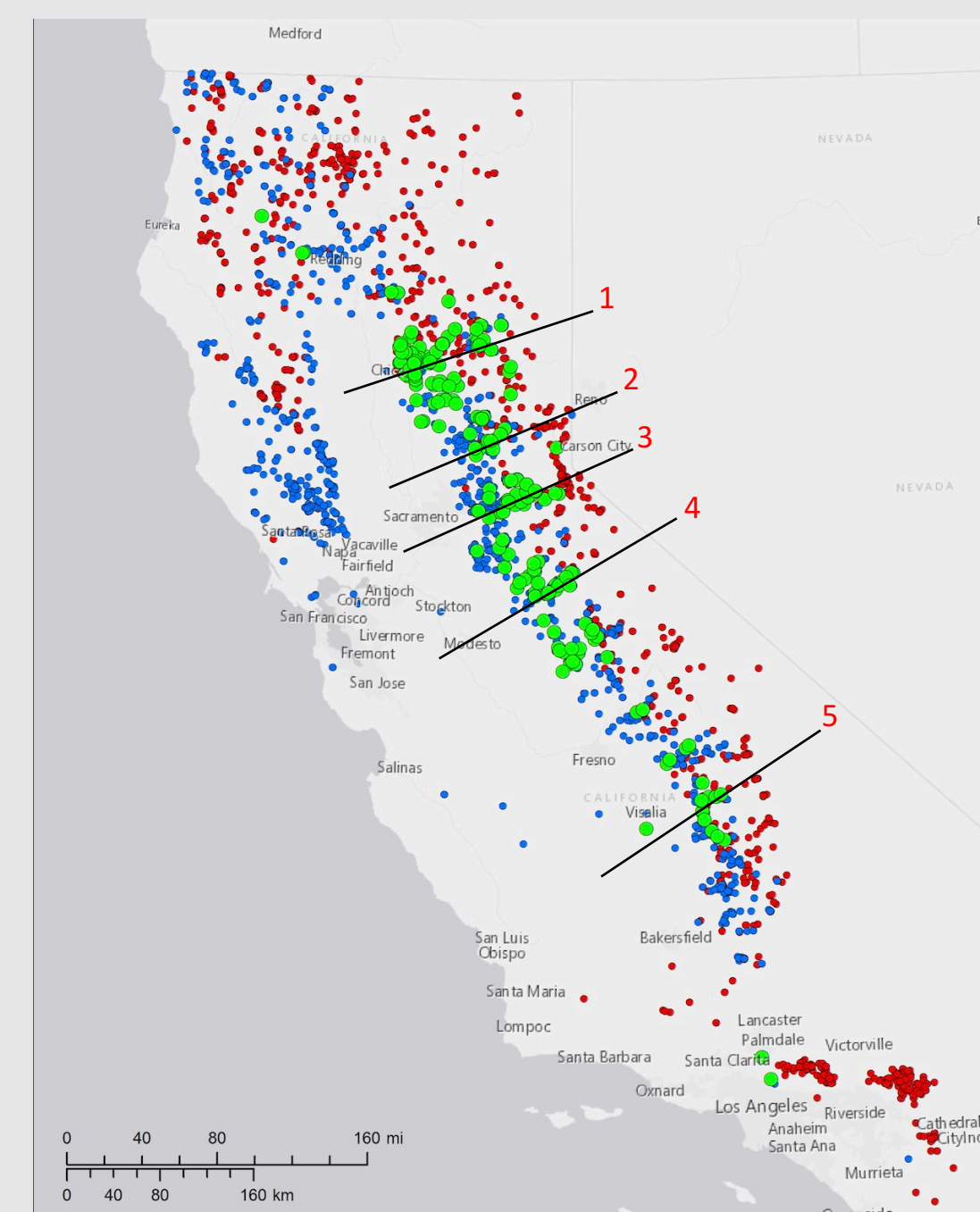
*Progenitors of *A. mewukka* are in separate clades, providing an opportunity to detect signatures of hybridization throughout its range.

Methods and Analysis

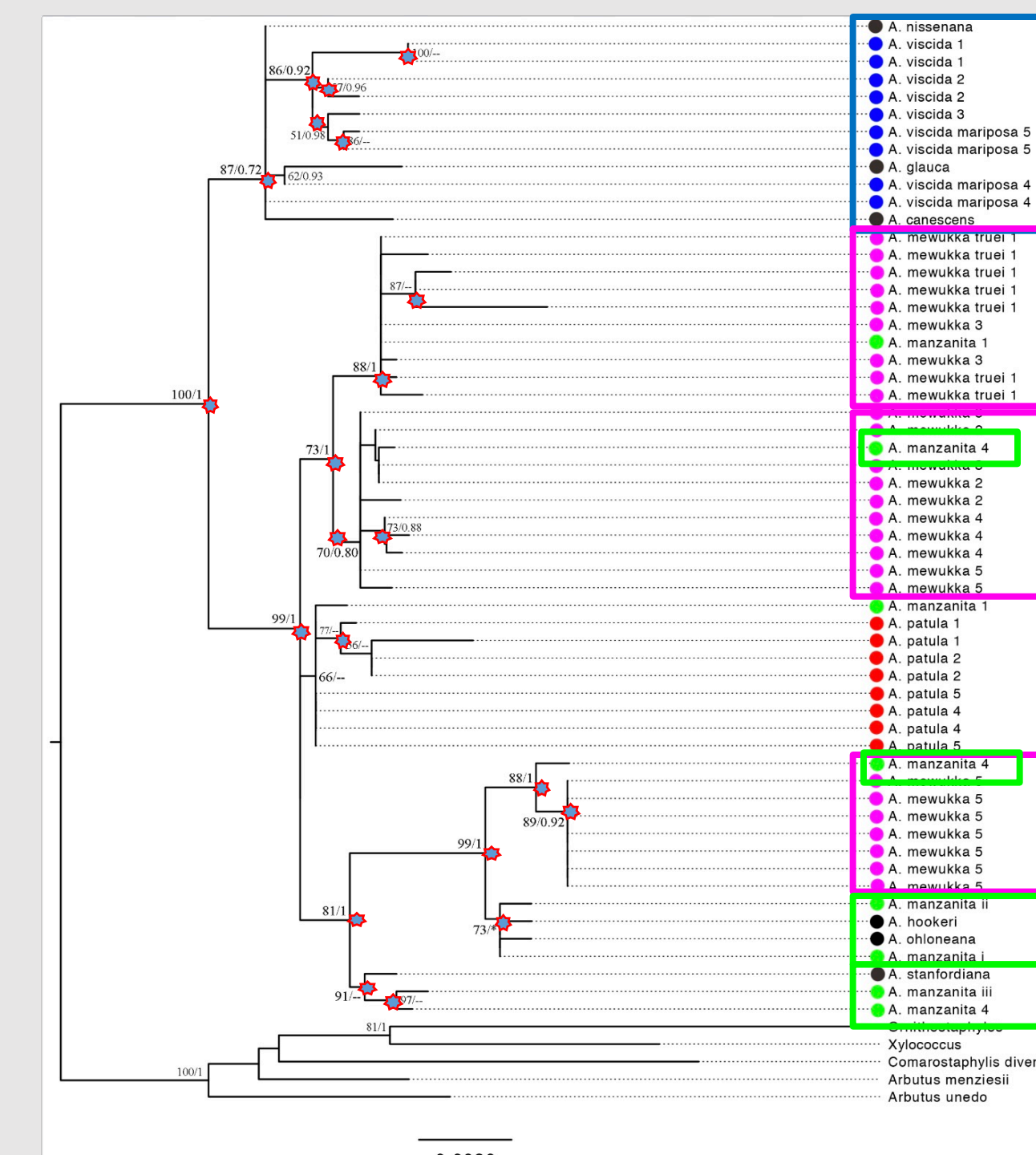
*Five SW-NE transects
NE end (high elev.)=2 *A. patula*
SW end (low elev.)=2 *A. viscida*
Middle= 7-9 *A. mewukka*/site

8 samples of *A. manzanita*, common/widespread tetraploid
Assortment of potential culprits (*A. glauca*, *A. canescens*, *A. hookeri*, *A. stanfordiana*, etc.)

ITS and cpDNA (*trnS-trnG*, *rpl32-trnL*, *petN-psbM*)

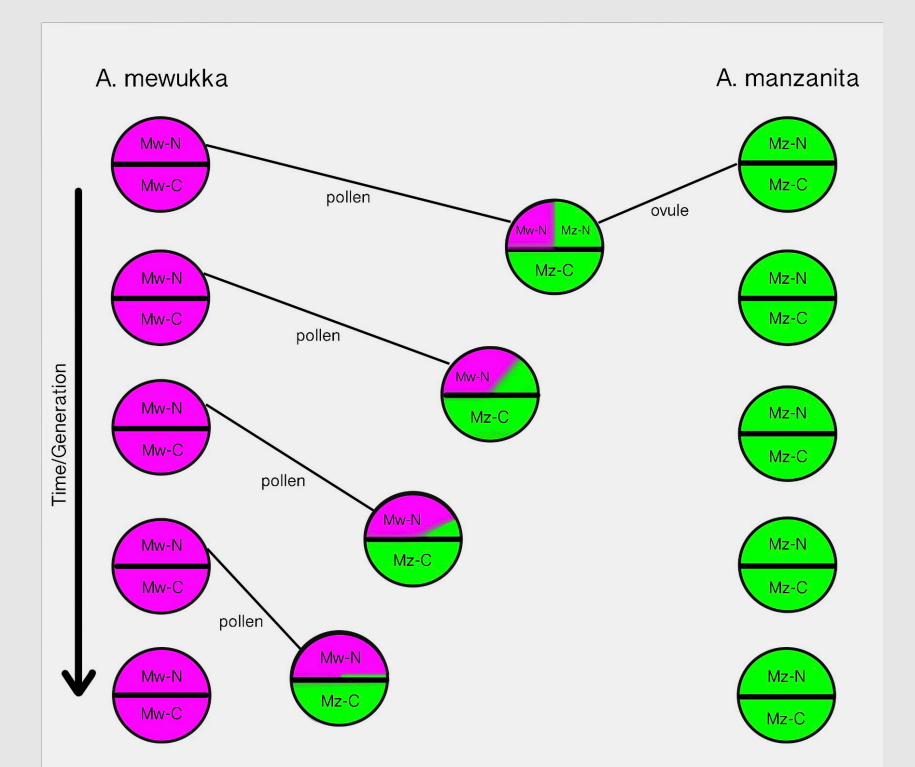


Results

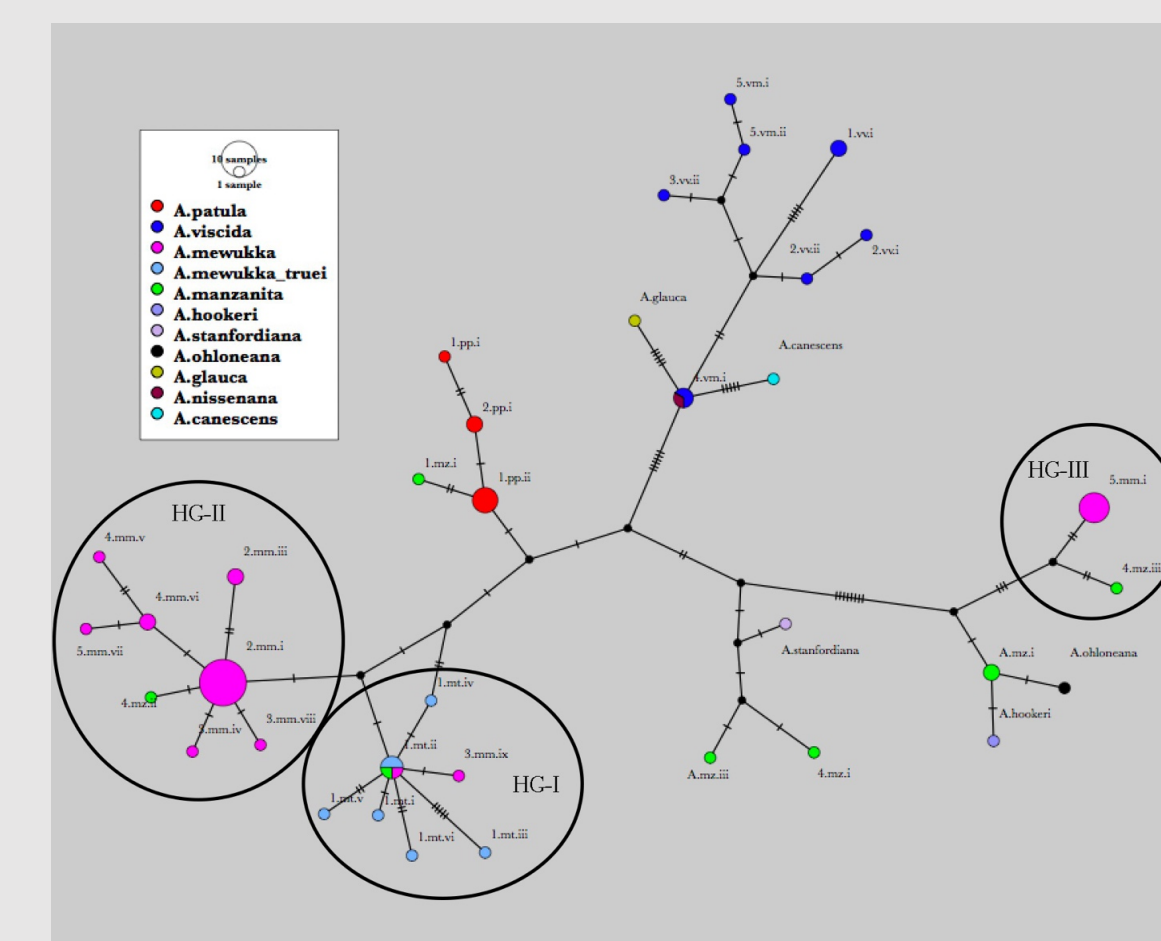


cpDNA (2,389 bp)

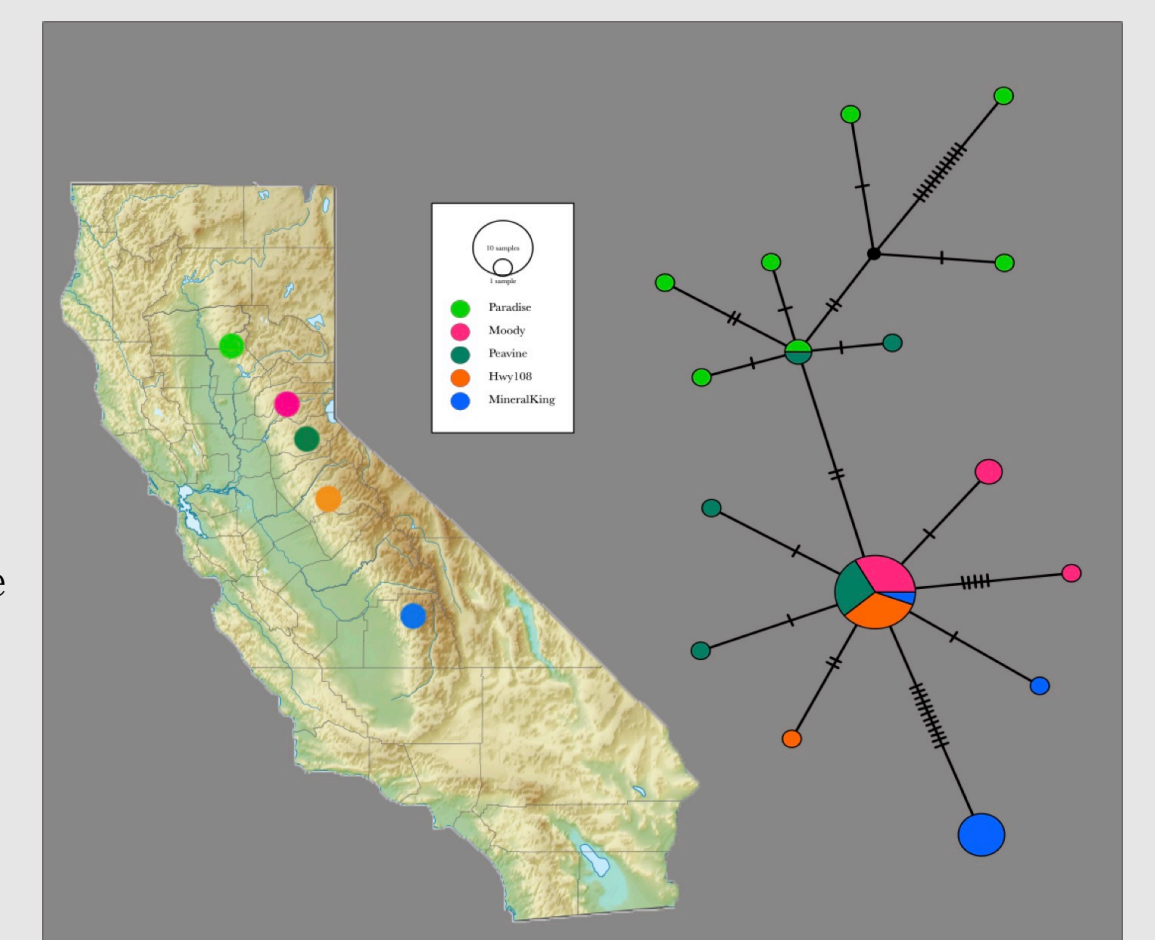
- *A. viscida* (diploid)
- *A. patula* (diploid)
- *A. mewukka* (allotetraploid)
- *A. manzanita* (tetraploid)



cpDNA capture



All taxa included



Mewukka alone



nrITS: concerted evolution. Chimeric sequences can be seen in allopolyploids. Single repetitive sequence-type recovered. Stabilized allopolyploid?

Literature cited

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