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Phylogeography and polyploidy in the white-rayed complex of the genus *Melampodium* (Asteraceae)

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Melampodium is an Asteraceae genus of the tribe Heliantheae, with 39 recognized species distributed throughout Mexico, Central America and the southwestern US (Stuessy, 1972). All species have yellow rays except for three taxa of the southwestern US and adjacent Mexico, which have white rays. These three shrubby, xerophytic taxa, *M. leucanthum*, *M. cinereum* and *M. argophyllum* form a special group within the genus Melampodium: the so-called white-rayed complex and mark the northern most limit of the distribution range of the whole genus. The taxonomy of the three species is based on morphological data (Stuessy, 1971). The three taxa of the white-rayed complex are clearly separated by their distributions and ecology and according to our data, their current taxonomy is well supported both in AFLPs and chloroplast haplotype analyses. Based on current molecular phylogenetic analyses (using nuclear and chloroplast markers as well as AFLPs), we hypothesize that the white-rayed complex originated from a yellow-rayed ancestor further South, but not from *M. americanum*, the species that was suggested earlier as putative ancestor (Stuessy, 1971) is not fully supported - either by molecular phylogenetic analyses of the whole genus (using nuclear and chloroplast markers) nor by AFLP and cp haplotype analyses.

Three different ploidy levels have been reported for the white-rayed complex: diploid, tetraploid (with occasionally triploid) and hexaploid. While *M. argophyllum* is uniformly hexaploid, both diploid and tetraploid cytotypes have been reported in *M. leucanthum* and *M. cinereum* (Stuessy et al., 2004). All individuals analysed with AFLPs and cpDNA haplotype data are estimated for their ploidy level, which enables us to test the hypotheses on the origin and evolution of polyploids within the three species. Both in M. leucanthum and in M. cinereum diploid and tetraploid cytotypes prevail in the western and eastern parts of their distribution areas, respectively. Assignment tests clearly showed, that the tetraploids are of autoplolyploid origin and the pollen/ovule ration

strongly indicated xenogamic breeding systems (CRUDEN, 1976). According to the results of the AFLP and cpDNA analysis, the hexaploid *M. argophyllum* is clearly an allopolyploid, with *M. cinereum* being the paternal and *M. leucanthum* being the maternal parent.

References

CRUDEN, R.W., 1976: Breeding systems in plants: 32-46.

STUESSY, T.F., Weiss-Schneeweiss, H. & Keil, D.J., 2004: Amer.J.Bot. **91**(6): 889-898.

STUESSY, T.F., 1971: Brittonia **23**: 177-190.

STUESSY, T.F., 1972: Rhodora **74**: 1-70.

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