

# Differential interspecific incompatibility in *Populus* breeding

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Interspecific hybrids of *Populus* are valuable in tree production systems. Hybrid vigor is achieved for various traits and is useful for transferring disease and pest resistance. Incompatibility, however, sometimes precludes such combinations. Compatible crosses not requiring embryo rescue between *P. deltoides* Bartr. ex Marsh 'D' and *P. maximowiczii* A. Henry 'M' in previous breeding corroborated the potential advantage of such hybrids, despite low seed set. To explore the range of incompatibility and partial compatibility, we compared seed and seedling production performance of intraspecific and interspecific crosses. Intraspecific D × D and interspecific D × M crosses exhibited success rates of 83% and 100%, respectively. In contrast, M × D crosses exhibited 31% success, with seed production lower than in the D × D and D × M crosses. *Populus maximowiczii* × *Populus nigra* L. 'N' crosses produced fewer seeds per capsule, with some being viable. We observed a variation of seedless capsules to capsules with few viable seeds not requiring embryo rescue. Three-way crosses NM × D were incompatible, while NM × N and NM × T produced viable seedlings (0%, 50%, 100%, respectively). It is possible to exploit the benefits of interspecific crosses involving D and M species.

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