Kin recognition in plants: a plea to consider competitive ability

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Résumé

Numerous studies have recently focused on plant-plant positive interactions in opposition to the classic view that negative interactions between individuals (competition and niche partitioning) are the prevailing mechanism. Among those, studies have interpreted the reduction of biomass or of root expansion in plants growing with kin (related individuals) compared to growing with strangers (unrelated individuals) as an indication of kin recognition (*i.e.* the ability for individuals to distinguish related individuals from unrelated ones) and possibly of kin selection (*i.e.* the reduction of an individual's own fitness to the benefit of the fitness of relatives). However, alternative hypotheses could explain these results but the lack of adequate control treatments in the experiment often prevent to test them. Black poplar (*Populus nigra* L.) is a riparian tree species growing under stressful conditions in densely populated patches on river alluvial bars. We investigated the intraspecific interactions among black poplars seedlings competing with related or unrelated individuals, in well-watered and in a water deficit environment, studying their response through growth, root nitrogen uptake and mycorrhizal diversity. We found that individuals responded differently depending on whether they were grown with related or unrelated individuals, and that water deficit did not change the outcomes of interactions. Differences in competitive ability between kin groups was the most parsimonious interpretation, thus eliminating kin recognition as an explanation. This suggests that results obtained in kin studies must be carefully analyzed and that alternative interpretations, such as differences in competitive ability, must be tested before concluding to kin recognition. Our study also suggests that mycorrhizal communities vary across kin groups and can potentially have impacts on the growth of individuals through the common mycorrhizal network (CMN).

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Mots-Clés: Kin discrimination, Competition, Niche partitioning, Phenotypic plasticity, Black poplar