When the relatedness of your neighbour matters: kin selection through facilitation in trees

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Abstract

Studies on plant behaviour, including positive interactions, are increasing in number and importance. One particular focus is kin recognition and kin selection, a mechanism involved in positive intraspecific interactions. A parallel of this in ecology is facilitation (positive biotic interactions). Our aim is to demonstrate the link between kin selection and intraspecific facilitation in a natural setting. *Nothofagus pumilio* is a dominant tree species in the southern Andes that shows a high frequency of multi-stemmed trees at the forest-prairie ecotone of second-growth forests. Facilitation (via lowering of detrimental wind effects) occurs at several stages in the life of trees with merging involving different but highly related genets. We studied the relatedness of 8-years old surviving seedlings of *Nothofagus pumilio* that were planted in clusters. We show that relatedness among facilitated seedlings growing in clusters was significantly greater than in the original stock, due to higher survival of related seedlings in the clusters. This provides novel evidence for kin selection in plants and for the linkage between facilitation (positive ecological mechanism) and kin selection (positive evolutionary mechanism). It also moves facilitation from a passive ecological phenomenon (impacting neighbours randomly) to an active phenomenon providing the conditions for kin-selection to operate.

Keywords: cooperation, Nothofagus pumilio, Patagonia, positive interactions, relatedness

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