Detect thy family: mechanisms, ecology and agricultural aspects of kin recognition in plants

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Abstract

The phenomenon that organisms can distinguish genetically related individuals from strangers (i.e. kin recognition) and exhibit more cooperative behaviors towards their relatives has been documented in a wide variety of organisms. But its occurrence in plants has only been recently considered. What emerges is that, while concerns remain about some methodologies used to document kin recognition, there is sufficient evidence to state that it exists in plants. Effects of kin recognition go well beyond reducing resource competition between related plants, and involve interactions with pollinators, pests and diseases as well as symbionts (mycorrhizal networks). It thus likely has important implications for diversity of plant populations, ecological networks and community structure. Such effects need to be further explored. Moreover, as kin selection may result in less competitive traits and thus greater population performance, it also holds promise for crop breeding. However, one would need to consider that (i) growing crops of strongly related plants will evidently forego advantages of crop diversification and (ii) outcomes of kin recognition tend to depend on environmental conditions. Therefore, the primary questions that need to be answered are: when, where and by how much kin recognition improves population performance.

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