

Intrinsic and Extrinsic Drivers of Intraspecific Variation in Seed Dispersal Are Diverse and Pervasive

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Abstract

There is growing realization that intraspecific variation in seed dispersal can have important ecological and evolutionary consequences. However, we do not have a good understanding of the drivers or causes of intraspecific variation in dispersal, how strong an effect these drivers have, and how widespread they are across dispersal modes. As a first step to developing a better understanding, we present a broad, but not exhaustive, review of what is known about the drivers of intraspecific variation in seed dispersal, and what remains uncertain. We start by decomposing “drivers of intraspecific variation in seed dispersal” into intrinsic drivers (i.e. variation in traits of individual plants) and extrinsic drivers (i.e. variation in ecological context). For intrinsic traits, we further decompose intraspecific variation into variation among individuals and variation of trait values within individuals. We then review our understanding of the major intrinsic and extrinsic drivers of intraspecific variation in seed dispersal, with an emphasis on variation among individuals. Crop size is the best supported and best understood intrinsic driver of variation across dispersal modes; overall, more seeds are dispersed as more seeds are produced, even in cases where per seed dispersal rates decline. Fruit/seed size is the second most widely studied intrinsic driver, and is also relevant to a broad range of seed dispersal modes. Remaining intrinsic drivers are poorly understood, and range from effects that are probably widespread, such as plant height, to drivers that are most likely sporadic, such as fruit or seed color polymorphism. Primary extrinsic drivers of variation in seed dispersal include local environmental conditions and habitat structure. Finally, we present a selection of outstanding questions as a starting point to advance our understanding of individual variation in seed dispersal.

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