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Modeling Size-number Distributions of Seeds for Use in Soil Bank Studies

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Abstract

Knowledge of soil seed banks is essential to understand the dynamics of plant populations and communities and would greatly benefit from the integration of existing knowledge on ecological correlations of seed size and shape. The present study aims to establish a feasible and meaningful method to describe size-number distributions of seeds in multi-species situations. For that purpose, size-number distributions of seeds with known length, width and thickness were determined by sequential sieving. The most appropriate combination of sieves and seeds dimensions was established, and the adequacy of the power function and the Weibull model to describe size-number distributions of spherical, non-spherical, and all seeds was investigated. We found that the geometric mean of seed length, width and thickness was the most adequate size estimator, providing shape-independent measures of seeds volume directly related to sieves mesh side, and that both the power function and the Weibull model provide high quality descriptions of size-number distributions of spherical, non-spherical, and all seeds. We also found that, in spite of its slightly lower accuracy, the power function is, at this stage, a more trustworthy model to characterize size-number distributions of seeds in soil banks because in some Weibull equations the estimates of the scale parameter were not acceptable.

Key words: accuracy; power function; seeds shape; seeds size; size-number distributions; Weibull model.

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