

# Estimating and Interpreting Heritability for Plant Breeding: An Update

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## I. THE MEANING OF HERITABILITY

Heritability was originally defined by Lush as the proportion of phenotypic variance among individuals in a population that is due to heritable genetic effects (Nyquist 1991, p. 248). This definition is now termed “heritability in the narrow sense” and is designated  $h^2$  (Nyquist 1991, pp. 248 and 250). Variations on this idea are often also referred to as heritability of one kind or another, such as heritability of family means ( $h_f^2$ ), the proportion of the phenotypic variance of family means that is due to family genetic effects, and “heritability in the broad sense” ( $H$ ), the proportion of phenotypic variance that is due to all genetic effects (Nyquist 1991, pp. 239, 312–313; Falconer and Mackay 1996, pp. 123, 232). Whereas Lush’s definition was based on his experience as an animal breeder, in which the basic unit of observation and selection is nearly always the individual animal, plant breeders deal with a great diversity of observational units and mating systems. This complicates both the procedures for estimating heritability and the meaning of heritability itself. As Nyquist (1991, p. 238) observed,