Peer Community In
Evolutionary Biology

Measurement of sexual selection in plants made easier

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doi: 10.24072/pci.evolbiol.100018

Open Access

Cite as: Porcher E and Dufay M. 2017. Measurement of sexual selection in plants made easier. *Peer Community in Evolutionary Biology*. 100018. doi: 10.24072/pci.evolbiol.100018

A recommendation of

Dorken ME, Perry LE. 2017. **Correlated paternity measures mate monopolization and scales with the magnitude of sexual selection.** *Journal of Evolutionary Biology* 30: 377-387. doi: 10.1111/jeb.13013

Published: 16 March 2017

Sexual selection occurs in flowering plants too. However it tends to be understudied in comparison to animal sexual selection, in part because the minuscule size and long dispersal distances of the individuals producing male gametes (pollen grains) seriously complicate the estimation of male siring success and thereby the measurement of sexual selection. Dorken and Perry [1] introduce a novel and clever approach to estimate sexual selection in plants, which bypasses the need for a direct quantification of absolute male mating success. This approach builds on the fact that the strength of sexual selection is directly related to the ability of individuals to monopolize mates [2]. In plants, mate monopolization can be assessed by examining the proportion of seeds produced by a given plant that are full-sibs, i.e. that share the same father. A nice feature of this proportion of full-sib seeds per maternal parent is it equals the coefficient of correlated paternity of Ritland [3], which can be readily obtained from the hundreds of plant mating system studies using genetic markers. A less desirable feature of the proportion of full sibs per maternal plant is that it is inversely related to population size, an effect that should be corrected for. The resulting index of mate monopolization is a simple product:
(coefficient of correlated paternity) x (population size – 1).
The authors test whether their index of mate monopolization is a good correlate of sexual selection, measured more traditionally as the selection differential on a trait influencing mating success, using a combination of theoretical and experimental approaches. Both approaches confirm that the two quantities are positively correlated, which suggests that the index of mate monopolization could

be a convenient way to estimate the relative strength of sexual selection in flowering plants. These results call for further investigation, e.g. to verify that the effect of population size is well controlled for, or to assess the effects of non-random mating and inbreeding depression; however, this work paves the way for an expansion of sexual selection studies in flowering plants.

References

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