**Using flow cytometry to access the genetic and environmental factors influencing unreduced gamete production in *Brassica***

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Polyploidy, the possession of more than two complete sets of chromosomes, is widespread among angiosperms. The most common mechanism of polyploid formation is believed to be though the union of unreduced (2n) gametes produced through a meiotic non-reduction event during gametogenesis. Although the cytological mechanisms of unreduced gametes formation are well understood, the genetic and environmental conditions promoting unreduced gamete production are unclear.  
Here we test the hypothesis that genetic (hybridity) and environmental (nutrient deficiency, leaf wounding) stressors will disrupt typical meiotic division in plant pollen cells increasing unreduced gamete production. We use flow cytometry to estimate unreduced gamete production on *Brassica napus*, *Sinapis arvensis* and backcrossed hybrids to compare the effects of hybridity, nutrient limitation and wounding treatments from pollen collected in two time intervals (blocks).   
Unreduced gamete formation ranged from 0-4.79% with a mean of 0.84%. Hybrids produced increased amounts of unreduced gametes in the first block only, indicating hybrids may increase polyploidization though unreduced gamete formation early in development, potentially explaining a high abundance of polyploid hybrids. Nutrient limitation and wounding did not affect unreduced gamete production. The second sampling block had increased percentages of unreduced gamete compared to the first, indicating unreduced gamete production may increase with plant age. This study is the first of its kind to measure unreduced pollen gamete production using flow cytometry in a manipulative experiment. These results increase understanding of unreduced gamete production and may further our knowledge of polyploidzation events, providing a more comprehensive background in plant evolutionary biology.