

USING A NET FITNESS APPROACH TO ASSESS INTROGRESSION POTENTIAL: MODELS MEET DATA. Arthur E. Weis* and Amanda Dick; Univ. of California, Irvine.92697.

Risk assessment models rely on realistic estimates of key parameters. In the case of introgression of transgenes out of crops and into wild relatives, the key parameters include the reproductive fitness of crop, relative and their various hybrid generations. Experiments to measure fitness can be prospective or retrospective. In prospective experiments a single generation of the appropriate genetic constructs are raised for a single generation; reproductive output is then quantified as the number of pollen produced or seeds set. These estimates may give an accurate picture of how a transgene will increase or decrease in frequency, but not inevitably so. Actual hybridization and introgression rates will not only be influenced by the number of gametes made or offspring produced, but also by the competitive ability of the gametes in fertilization and by the timing of gamete production. We implemented a net-fitness approach to assess male fitness (fertilization success) and temporal assortative mating. This retrospective method relies on a two-generation study design. Genotype frequencies are determined in both the parental and offspring generations. Maximum likelihood methods are then used to find the most probable values for fitness components and for the levels of assortative mating. The two generation structure in effect allows natural selection to run for a single generation, and thus the estimates are the “pudding” in which the proof lies. A simple example using rapid cycling *Brassica* as a model system for the method will be presented, as well as a discussion of problems in its application.