

FLORAL MORPHOLOGY AND POTENTIAL FOR OUTCROSSING IN TWO EASTERN BLACK NIGHTSHADE BIOTYPES. Dean S. Volenberg, Dean E. Reichers, William F. Simmons, and Patrick J. Tranel, Postdoctoral Research Scientist, Assistant Professor, and Associate Professors, Department of Crop Sciences, University of Illinois, Urbana, IL 61801.

In evaluating progeny plants from a biotype of eastern black nightshade (*Solanum ptycanthum* L.) for resistance to acetolactate synthase (ALS) inhibiting herbicides, it was determined that some plants were heterozygous for resistance. This suggested that this biotype may outcross even though eastern black nightshade is considered to be a self pollinating species. *Solanum* is a genetically and phenologically diverse genus. There are several examples of different populations of a single species having divergent mating systems, from outbreeding to inbreeding systems. In some instances, these divergent mating systems have been correlated with floral morphology. Therefore, we examined two biotypes of eastern black nightshade for differences in floral morphology. The biotypes originated from central Illinois (IL) and southern Indiana (IN) and both biotypes are resistant to ALS-inhibiting herbicides due to an ALS mutation. Additionally, the biotypes have different fruit colors, with the IL and IN biotype having purple and green fruits, respectively. Five characteristics were examined in relation to floral morphology: anther, filament, and pistil (combined length of style and stigma measured from the junction of the style and ovary) length; style angle; and pistil exertion beyond the anthers (combined length of style and stigma measured from the terminal tip of the anthers). Additionally, anther dehiscence was quantified over time. Twenty flowers from five separate greenhouse-grown plants of each biotype were examined. Measurements were performed with the aid of a dissecting microscope, equipped with a digital imaging camera and computer software that allows measurement of digital images. Preliminary measurements of floral characteristics from ALS-resistant or -sensitive plants showed no differences and so measurements were combined between ALS-resistant and -sensitive plants within each biotype. The two biotypes differed in four floral characteristics. The IN biotype had a longer pistil and the pistil exerted beyond the anthers farther, compared to the IL biotype. Additionally, the style angle of the IN biotype was greater compared to the IL biotype. Only the anther length was greater in the IL biotype compared to the IN biotype. The literature has reported that anther dehiscence in eastern black nightshade occurs immediately after the flower opens. This was observed in the IL biotype; however, anther dehiscence in some flowers of the IN biotype had not occurred after 7.5 hours of flowering. Additionally, the IN biotype produced flower buds in which the pistil protruded through the petals, and the stigma was receptive at this time. These physical and temporal separations of male and female function in the IN biotype may predispose it to higher rates of outcrossing compared to the IL biotype. A field study is currently addressing whether this is the case.