

ENVIRONMENTAL AND BIOLOGICAL FACTORS OF PERENNIAL WEED ESTABLISHMENT IN KENTUCKY NO-TILL FIELDS. Chad L. Brommer and William W. Witt. Graduate Research Assistant and Professor, Department of Agronomy, University of Kentucky, Lexington, KY 40546.

Conservation tillage practices have increased in row crops across the United States and no-till agriculture makes up 50% of the total row crop acreage in Kentucky. These tillage practices have many benefits to producers over the use of traditional tillage practices. There are problems associated with no-till fields in Kentucky and one of these is higher relative population of perennial weeds. The perennial weed population establishes primarily because of the lack of preplant tillage to disrupt the taproots of many broadleaf perennial weeds. Extension personnel and producers alike have noticed that perennial weed communities establish in similar areas in many different fields. These areas may include low or bottom portions of fields and in places where water would be more available. Producers also face the problem of having more acreage to manage to stay solvent. The added land area decreases the amount of time a producer can scout fields and make herbicide applications. With these observations in mind, a study was established to try and correlate the terrain attributes of no-till fields with occurrence of perennial weed populations.

One of the University of Kentucky's agricultural research farms, located in Calloway Co., was used as a site for these studies. A field was selected which had been in no-till production for several years and was currently planted in corn. Populations of hemp dogbane and trumpetcreeper were located and their position documented with a Starlink<sup>®</sup> GPS backpack unit. Digital elevation maps (DEM) were created using survey grade GPS receiver. From the DEM a series of hydrological and terrain maps were created using ARC/INFO. Data from these maps were used in conjunction with regression modeling to monitor the correlation between hydrology, terrain factors and perennial weed population. Terrain factors included slope gradient, profile curvature, plan curvature, tangential curvature, specific catchment area, upslope length, distance to local depression, elevation above local depression, and secondary terrain attributes of compound topographic index, stream power index, sediment transport capacity, and depression proximity index.

A correlation was drawn between the location of Trumpetcreeper and catchment area (0.40). All correlation values were at the 0.01 level. These values are indicators of run off and topography in a field. These correlations indicate that these weeds would be found in areas that are prone to run off and water collection areas in a clay loam soil with similar topographical characteristics. Future research will also include topsoil and subsoil characteristics and the relation to perennial weed occurrence. Also, each weed population within the study fields will be sampled for DNA to determine the mechanism of weed propagation.