

ARMSTRONG¹, J. S., R. J. DREGSETH² AND A.W. ANDERSON², ¹Department of Plant and Soil Science, Texas Tech University, Lubbock, TX 79407 and ²Department of Entomology, North Dakota State University, Fargo, ND 58105. **Lethal Dose Values For Neonate Sugarbeet Root Maggot *Tetanops myopaeformis* (Roder) Larvae Exposed to Terbufos, Chlorpyrifos and Aldicarb,**

Sugar Beet Root Maggot (SBRM) *Tetanops myopaeformis* (Roder), remains the most economically devastating insect pest of sugar beets in the Red River Valley since it was first discovered feeding on sugar beets in the Auburn-St. Thomas area in 1947. Granular Organophosphate insecticides were registered and available for SBRM control in the early 1970's. Granular carbamate (aldicarb) was used on significant sugar beet acreage from the late 70's to the mid 1980's followed by limited use because of efficacy problems. The reason for control failures following granular carbamate use was not clear at the time. Two possible reasons were insecticide resistance or accelerated microbial degradation of aldicarb in the soil. If insecticide resistance was the cause for control failures, base-line mortality data were needed to determine the degree of resistance. This study was designed to establish dose mortality relationships for aldicarb, chlorpyrifos and terbufos for evidence as to whether the SBRM was resistant. Mortality assays were conducted from 1987 to 1994. If resistance was found not to be the cause of control failures, it could eliminate the need to conduct soil degradation research. Neonate, first instar larvae were used in determining LC₅₀ and LC₉₀ values in these assays. Twenty five neonate larvae were placed on filter paper treated with dilutions of technical grade aldicarb, chlorpyrifos and terbufos in acetone. The acetone was allowed to dissipate for one hour before placing the larvae on the filter paper. Aldicarb and chlorpyrifos dilutions were 0.0625, 0.125, 0.165, 0.205, 0.3075 ppm. Terbufos dilutions were 0.0156, 0.0234, 0.03125, 0.0469, 0.0625 ppm. After placing the larvae on the filter paper, mortality was assessed at 3 hr by observing for any movement when stimulated by a camel hair brush. If no movement was noted after stimulation, the larvae were considered dead. The data are analyzed with probit analysis where LC₅₀ and LC₉₀ values were calculated. The slopes and lethal concentration values were compared across the years in which the mortality assays were conducted. Aldicarb, Chlorpyrifos and Terbufos mortality data showed no evidence that insecticide resistance exists when the data are compared across all years of this study (1987-1994). The slopes do not differ significantly and the LD values are consistent across years. This data indicates that control failures in the field are due to aggressive soils where the active ingredient is rapidly broken down to the point where effective control is not achieved.