

Identification of Glyphosate Resistance in Russian Thistle in Northeastern Oregon

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Farmers in the low-rainfall region of eastern Oregon rely on repeated applications of non-selective herbicides, predominately glyphosate, to control Russian thistle in no-till fallow systems. Reports of poor glyphosate effectiveness have increased in recent years. Reduced efficacy is often attributed to dust, water stress, or generally poor growing conditions during application. Inadequate control also may be the result of the evolution of glyphosate resistance. Therefore, studies were undertaken to determine if glyphosate-resistant Russian thistle populations occur in Oregon. Results from dose response studies confirmed glyphosate resistance in three of ten Oregon Russian thistle populations. The ratio $I_{50\text{Resistant}}/I_{50\text{Susceptible}}$ from dose-response curves was on average 3.1 for the relative dry biomass per plant and 3.2 for the percent of surviving plants per pot in these three populations. Plant mortality at recommended glyphosate doses for the resistant populations was less than 30% three weeks after treatment. Glyphosate resistance in Russian thistle highlights the imperative need to diversify weed control strategies to preserve the longevity and sustainability of herbicides in semi-arid cropping systems of the Pacific Northwest.

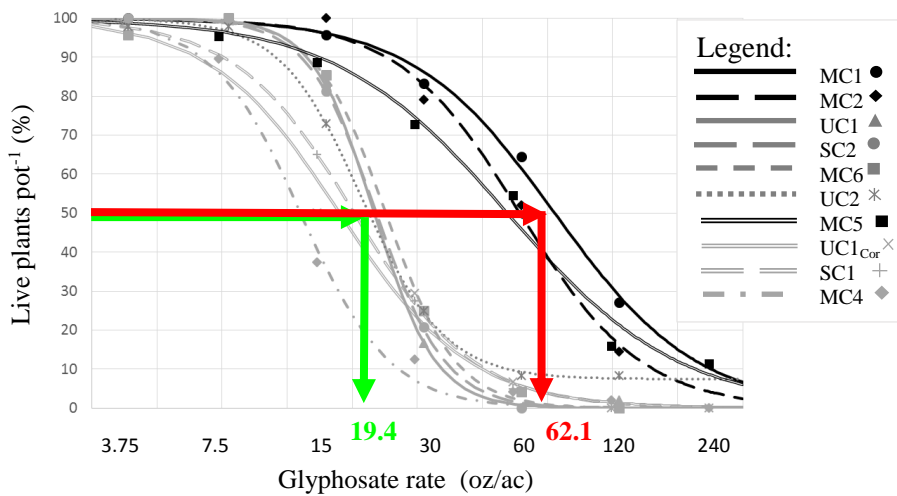


Figure 1. Dose-response curves of percentage of Russian thistle live plants per pot 3 weeks after treatment. Points indicate mean of the experimental data and lines fitted models. Green and red arrows indicate the average glyphosate rate to kill 50% of the susceptible and resistant populations respectively. UC1 and UC1_{Cor} refer to the same population that was tested in both greenhouses (CBARC and campus) as the control population.

Figure 2. Photos of the seven treatments 0 oz/ac (white label), 3.75 oz/ac (yellow label), 7.5 oz/ac (blue label), 15 oz/ac (green label), 30 oz/ac (pink label), 60 oz/ac (orange label), and 120 oz/ac (red label) sprayed on a) a susceptible population in Umatilla County and b) a resistant population in Morrow County.

