Response of common ragweed (*Ambrosia artemisiifolia* L.) to soil salinity

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Introduction

Common ragweed (*Ambrosia artemisiifolia* L.) tolerance to limited growing conditiones along with disturbance facilitate spreading of this invasive species specially along the roadsides. From there it is migrating further on the agricultural surfaces and wastelands. In central Europe the vegetation on the road verges is subjected to large quantities of deicing salt, however ragweed seems to be adapted to increased salinity in the soil. The aim of the pot experiment conducted at Agricultural institdifferent growth stages of ragweed.

Material and Methods

Pot experiment was conducted in a random block design with 10 treatments (2 growth stages × 5 salt concentrations), where the main plot was weed growth stage and sub-plot was a salt concentration. The experiment was replicated eight times. The growth stages of common ragweed were based on number of leaves (-L). Salt concentration were calculated on the basis of pot mixture weight data and applied at planting and V6 growth stage in the concentrations of 0, 20, 40, 100, 200 and 400 mg/kg Na^+. Common ragweed aboveground mass was clipped at physiological maturity from each plot to collect dry weight data. Significant differences were determined using one-way Anova and means were compared with Duncan MRT test at the 5 % level of probability.

Results and discussion

Growth stage and salt addition significantly influenced ragweed dry matter production ($P<0.001$, Table 1), however common ragweed response to salinity varied among growth stages and salt concentrations.

Table 1. One-way Anova of the effects of salt concentration applied at planting.

Source	*Sum of Squares*	*Df*	*Mean Square*	*F-Ratio*	*P-Value*
Between groups	833.534	5	166.707	**309.38**	**0.0000**
Within groups	28.02	52	0.538845		
Total (Corr.)	861.554	57			

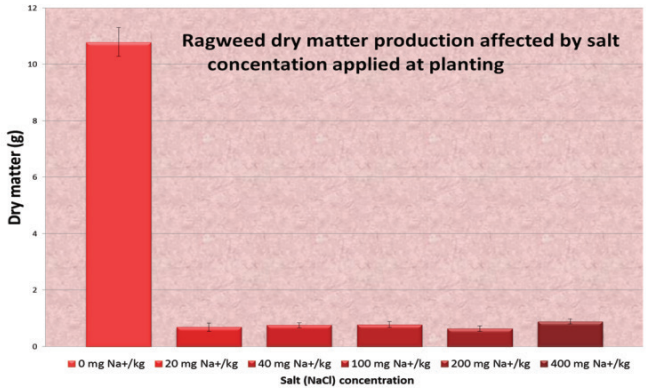

Fig 1. Effect of salt concentration applied at planting on ragweed dry matter production at physiological maturity . Values presented are means with ±SE.

Susceptibility of ragweed to salt decreased with increasing growth stage. When salt was applied at planting, significant reduction of dry matter (82-94 %) regardless of salt concentration, was observed (Fig. 1).

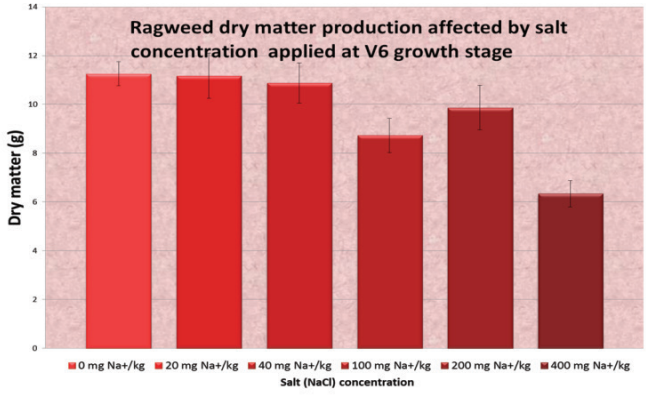

Fig 2. Effect of salt concentration applied at V6 growth stage on ragweed dry matter production at physiological maturity. Values presented are means with ±SE.

At later V6 growth stage, significant dry matter reduction (23-44 %) was observed only when higher concentration of of salt was applied (100 and 400 mg Na^+/kg, Fig. 2). Based on experiments conducted at the Agricultural Institute of Slovenia it was concluded that common ragweed is very susceptible to salt at germination and early growth, whereas inreasing tolerance to moderate salinity at vegetative growth stage (V6) was observed. These authors performed their experiments with seeds from arable fields like Leiblein *et al.* (2013). Their findings correspond to those of Di'Tommaso (2004) who found that only roadside populations were less susceptible to saline conditions but not agricultural populations.

References

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Di'Tommaso A., 2004: Germination behavior of common ragweed (*Ambrosia artemisiifolia*) populations across a range of salinities. Weed Science, 52:1002–1009.