

Redroot Pigweed and Powell Amaranth Control With Selected Herbicides

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Pigweeds can be difficult to manage in sugarbeet and numerous fields in Northwest Minnesota have severe late season pigweed infestations. Surveys of sugarbeet, corn and soybean fields in Minnesota in September of 2001 and 2002 found redroot pigweed and Powell amaranth with equal frequency in sugarbeet fields, but Powell amaranth was the more abundant species in approximately two thirds of the fields. In corn and soybean fields, redroot pigweed was found more frequently and in greater abundance. Is Powell amaranth more abundant in a sugarbeet cropping system because it is more tolerant of postemergent sugarbeet herbicides, or are there other factors related to the plant's biology that are contributing to its 'success'? Powell amaranth is reported to be a more competitive plant that is able to germinate over a wider range of temperatures than redroot pigweed. The objective of this research was to determine if Powell amaranth and redroot pigweed are equally susceptible to selected postemergent broadleaf herbicides commonly used in sugarbeet, soybean and corn weed control systems.

Materials and Methods

A field experiment was established at the Northwest Research and Outreach Center Crookston, MN. Powell amaranth and redroot pigweed were each planted in 2 row plots at 4 seeds/inch in 12 inch row spacing on May 29. The experiment was conducted using a split plot arrangement in a randomized complete block design with four replications. The whole plots were pigweed species and sub-plots were the herbicide treatments. Herbicides were applied with a CO₂ backpack sprayer delivering 10 gpa at 30 psi and equipped with XR80015 flat fan nozzles. Information on conditions at application are provided in [Table 1](#).

Table 1 Spray date, weed size and environmental conditions

Date	July 2
Time of day	6 am
Air temp (F)	64
Wind speed (mph)	0-1 NW
Soil moisture	Good
Sky	Cloudy
Pigweed size	4-6 inches

Results and Discussion

Conditions after planting were very dry and emergence of the two pigweed species was uneven. Powell amaranth emerged first and, on average, was somewhat more advanced in stage than redroot pigweed at the time of treatment. Estimates of control were made on plants at equal stages on development. Broadleaf herbicides used primarily on corn and soybean provided equal control of both pigweed species. The average level of control provided by these herbicides two weeks after application was excellent, with the exception of Basagran which needs to be applied on smaller sized pigweeds. Of the broadleaf herbicides commonly used on sugarbeet, only Betanex performed equally on both species. Powell amaranth was more tolerant of Upbeet, Stinger and a single application of a sugarbeet micro-rate treatment than redroot pigweed. The differences in control with these herbicides were not large and these three herbicide treatments are never applied as single applications for pigweed control. This research suggests, however, that Powell amaranth is somewhat more tolerant of postemergent broadleaf herbicides used in sugarbeet and may germinate earlier and be larger at the time of application than redroot pigweed. In situations where the interval between sequential applications of herbicides are extended beyond recommendations, Powell amaranth may be at a competitive advantage and able to recover faster than redroot pigweed in the same field.

Table 1 Control of Powell amaranth and redroot pigweed with selected broadleaf herbicides.

t	Rate/A (product)	July 8		July 15	
		Powell amaranth	Redroot pigweed	Powell amaranth	Redroot pigweed
		-----% control-----			
o Ultra Max	0.8 pt	99	99	99	99
· COC	0.33 oz + 1.5 pt	90	89	96	96
	0.33 pt	71	70	80	77
+ COC	3 oz + 1% v/v	84	85	88	94

1 + COC	1.5 pt + 2 pt	66	70	40	44
+ COC	0.75 pt + 1% v/v	99	99	95	97
	2.5 pt	74	77	52	56
NIS	4 oz + 0.125% v/v	89	86	93	95
	0.5 oz	35	52	19	44
Scoil	1.25 oz + 1.5 pt	84	85	92	93
	1 pt	77	77	82	83
izer + NIS	1 pt + 0.125% v/v	96	96	93	94
	0.5 pt	19	31	9	12
+ Upbeet + Stinger + Select	0.5pt+0.125oz +1.4oz+2oz +1pt	46	59	27	39
5) ¹		6.5		8.5	

¹LSD for comparing Powell amaranth and redroot pigweed % control for the same herbicide treatment

References

Holen, C., B.R. Durgan, and A. Knudsvig. 2002. Powell amaranth and redroot pigweed in Northwest Minnesota. p. *In* 2002 Sugarbeet Research and Extension Reports. Vol. 32.

Weaver, S. 1984. Differential growth and competitive ability of *Amaranthus retroflexus*, *A. powellii* and *A. hybridus*. *Can. J. Plant Sci.* 64: 715-724.