# *ALLIUM* SPP. AMENDMENT, TEMPERATURE, AND TIME AFFECT WEED SEED VIABILITY IN SOIL

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A microcosm study was conducted during 2000-01 to evaluate soil-incorporated *Allium* spp. amendments for effects on weed seed populations. Ground and dried residues of onion (*Allium cepa*) and garlic (*A. sativa*), at concentrations of 1% and 3% w/w, were evaluated at soil temperatures of 23 C and 39 C, and exposure times of 0, 2, 4, and 7 days for their herbicidal effects on seeds of barnyardgrass (*Echinochloa crus-galli*), common purslane (*Portulaca oleracea*), London rocket (*Sisymbrium irio*), and black nightshade (*Solanum nigrum*). The 2000 experiment was conducted as a completely randomized split-plot design. Treatments consisted of the amendment concentrations described above and were replicated four times. Plots were split by soil temperature 23 C vs. 39 C. The second experiment was performed in 2001 with modifications: the design was changed to a randomized complete block design and sample number and size were increased.

Results indicated consistently deleterious effects of warm (39 C) soil temperature on seed survival as opposed to ambient temperature (23 C). Significant reductions in seed viability were common when weed seeds were exposed to soil-incorporated onion and garlic residues. No differences in weed seed viability due to soil amendment with onion versus garlic were found in the 2000 experiment, and only in barnyardgrass and black nightshade in 2001. Seed viability differences due to amendment concentration were found in barnyardgrass, black nightshade, and London rocket in the 2000 experiment, but only small viability differences related to concentration were found in the 2001 experiment. In both experiments, barnyardgrass, common purslane, and London rocket seeds were less viable after longer incubation in the microcosms, while black nightshade was not significantly affected by exposure time.

A number of interactions among the tested factors of time, temperature, amendment, and rate produced significant differences in seed viability both years. Interactions of higher temperature x increasing amendment rate and higher temperature x longer exposure time had the most consistently deleterious effects on seed viability.

The results indicated that *Allium* spp. soil amendments, especially at elevated soil temperature, may contribute to decreased populations of viable weed seeds in soil.

## REFERENCES

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