

EMERGENCE PATTERN OF *AMARANTHUS* SPP. AND IMPACT ON GROWTH AND REPRODUCTION

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ABSTRACT

Amaranthus species such as common waterhemp (*Amaranthus rudis*) and Palmer amaranth (*A. palmeri*) are troublesome annual weeds in cropping systems throughout the Midwest. Seedlings can emerge throughout the growing season impacting crop yields and produce prolific amounts of seed. Studies on the effect of tillage timing on emergence and emergence timing's influence on *Amaranthus* vegetative and reproductive potential were conducted to optimize management practices and minimize re-charging the soil seed bank. Natural emergence of waterhemp and Palmer amaranth was recorded over a two-year period from spring through fall. Germination was observed as soon as April 22 and as late as October 30 (252 day period). In another study in central (common waterhemp) and southeast (Palmer amaranth) MO, seedlings were established at five emergence timings from mid-May through mid-September in 2013 and 2014. Weekly through plant senescence, plant growth was recorded from six plants in each of five replications. By season's end, mean height of waterhemp and Palmer amaranth emerging in April was in excess of 2 m. Plants emerging in early spring produced up to 803,400 and 179,640 seeds for waterhemp and Palmer amaranth, respectively. As a percentage of overall plant weight, seed weight per plant increased from 12 to 28% and 7 to 12% for late April to late July 2014 emerging waterhemp and Palmer amaranth plants, respectively. Tetrazolium assays revealed seed viability ranged from 10 to 52% and 4 to 83% for waterhemp and Palmer amaranth plants, respectively. Following flowering initiation of waterhemp and Palmer amaranth, plants produced viable seeds in as little as six days. Growth and reproductive data suggest that crop producers should implement management systems for *Amaranthus* species for the majority of the growing season. Later emerging *Amaranthus* plants may be shorter and less competitive with crops compared to spring emerging plants. However, a greater proportion of plant dry weight is seeds; suggesting late season *Amaranthus* can add significantly to the soil seed bank.