

Palmer amaranth emergence, growth, and fecundity is influenced by crop

Jonathon Kohrt, Christy Sprague, and Karen Renner

The rapid growth rate, extended emergence period, and prolific seed production are characteristics that contribute to Palmer amaranth's competitiveness with field crops. Understanding the effects of cohort emergence time in different crops on Palmer amaranth growth and fecundity may be one strategy to help eradicate this problematic weed. Field studies were conducted near Middleville, MI in 2013, 2014, and 2015 to evaluate the growth and development of Palmer amaranth in corn, soybean, and wheat. Growth parameters evaluated included emergence, relative growth rate (RGR), time to reproductive stages, and seed production. Total emergence was determined by weekly counts in two permanently established 0.25 m² quadrats per plot. Three cohorts (2-3 weeks after planting of corn and soybean (WAP), 4-5 WAP, and 6-7 WAP) were established by marking 10 plants per plot on 2-week intervals from initial Palmer emergence, additional plants were marked in wheat after harvest. Plants were measured and visually evaluated for reproductive structures biweekly in 2013 and weekly in 2014 and 2015. Aboveground biomass for each cohort was harvested at plant maturity; male plants were harvested when pollination ceased and females were harvested 3-weeks after the onset of black seed. Seed number was determined by hand threshing all female reproductive structures and generating an average seed weight per sample to calculate seed production per plant. The duration and pattern of Palmer amaranth emergence was similar between corn and soybean; emergence started at the end of May and continued until early September. Seed production, biomass, and RGR was greater in soybean than corn for the 2-3 WAP cohorts in two of three years. Palmer amaranth seed production was 56-88% greater in soybean than corn when combined over cohorts. Seed production, biomass, and RGR decreased for cohorts that emerged 4-5 WAP and later compared with the first cohort. The majority of Palmer amaranth emergence in wheat was after harvest; only 20% emerged in June through mid-July. Palmer amaranth seed production and biomass in wheat was greatest with plants that emerged 2 weeks prior to harvest producing greater than 70,000 seeds per plant. Incorporating wheat into a crop rotation will suppress Palmer amaranth emergence, however management strategies for Palmer amaranth that emerge at or after harvest must be implemented. Effective eradication strategies in corn and soybeans require controlling Palmer amaranth for at least 6 WAP to minimize seed production.

Kohrt, J. R., C. L. Sprague, and K. A. Renner. 2016. Palmer amaranth emergence, growth, and fecundity is influenced by crop. Weed Science Society of America annual meeting. San Juan, Puerto Rico. (369)