

Palmer amaranth and waterhemp management – it's all about the seed

Problem – these weeds produce a LOT of seed

- Palmer amaranth and waterhemp are dioecious species, with separate male and female plants. Female plants will bear the seed at end of the season, so populations will have a mix of plants with and without seed.
- Both species can produce over 1 million seeds per plant
- Stop seed to prevent rapid increases in population and slow the development of herbicide resistance

The impact of this much seed – doing the math

- Single female plant produces one million seeds
- Assume 20% of these are viable
- Assume only 25% germination following year = 50,000 plants
- Even if assume 99% control = 500 plants and.....
- 500 female waterhemp plants produce 500 million seed
- Following year = 25 million plants
- Even with 99% control = 250,000 plants

Bottom line

- Use an appropriate herbicide program
- Scout and destroy plants or remove from field before mature seed develop – when seed are absent or still green and soft
- Seedheads with mature seed - turning dark and hard - should be bagged on site and removed



Seedheads of Palmer (above) and waterhemp (below)



Don't let this



Become this



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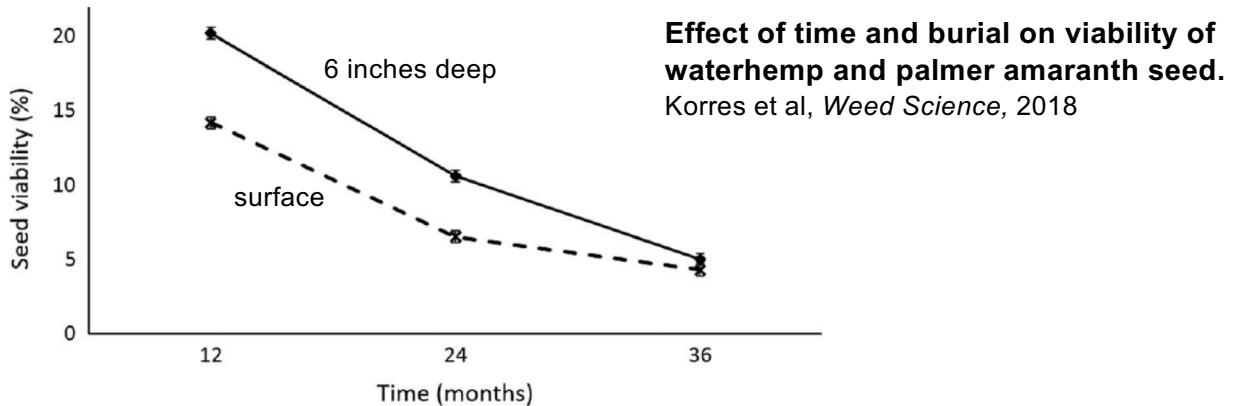
u.osu.edu/osuweeds/
youtube.com/osuweeds

How long does the seed last in soil?

- Approximately 80% of the seeds lose viability within the first 12 months, and about 5% remain viable after 36 months.
- Seed initially lose viability more rapidly when left on the surface, compared with burial 6 inches deep.

Bottom line:

- Viable seed levels will decrease rapidly with several years of effective control, but a small amount of seed can survive more than three years.



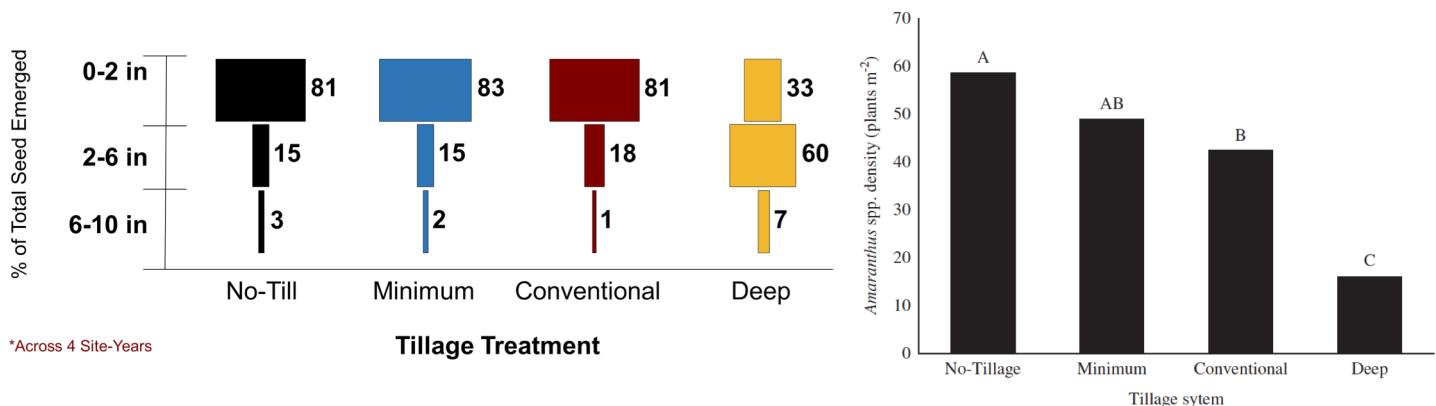
What is the effect of tillage on seed distribution and next year's population?

- A moldboard plow buries much of the seed deep enough that it cannot emerge, greatly reducing population the following year. Other types of tillage result in shallower burial, which causes a slight reduction in the following year's population, compared to no-till where seed remains on the surface.

Bottom line:

- Deep tillage offers the most immediate help with remediation of a new infestation of Palmer amaranth or waterhemp. This can only be used once though.
- Shallow tillage can help with control when integrated with an appropriate herbicide program.

Effect of tillage type on vertical distribution of seed in soil (left) and emergence the following year (right). Farmer et al, *Weed Technology*, 2017.



No pigweed left behind 
Go Rogue! Stop the seed



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