

# 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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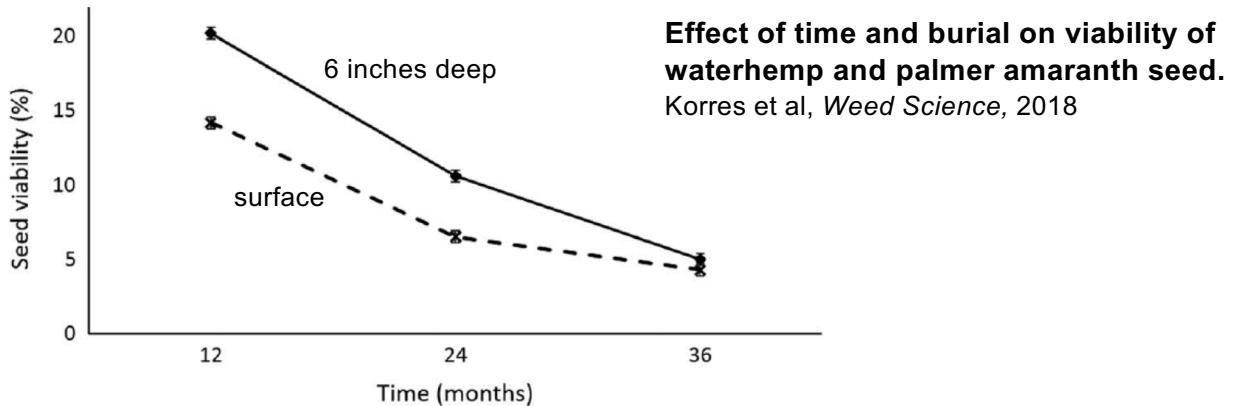
[u.osu.edu/osuweeds/](http://u.osu.edu/osuweeds/)  
[youtube.com/osuweeds](https://youtube.com/osuweeds)

### 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.



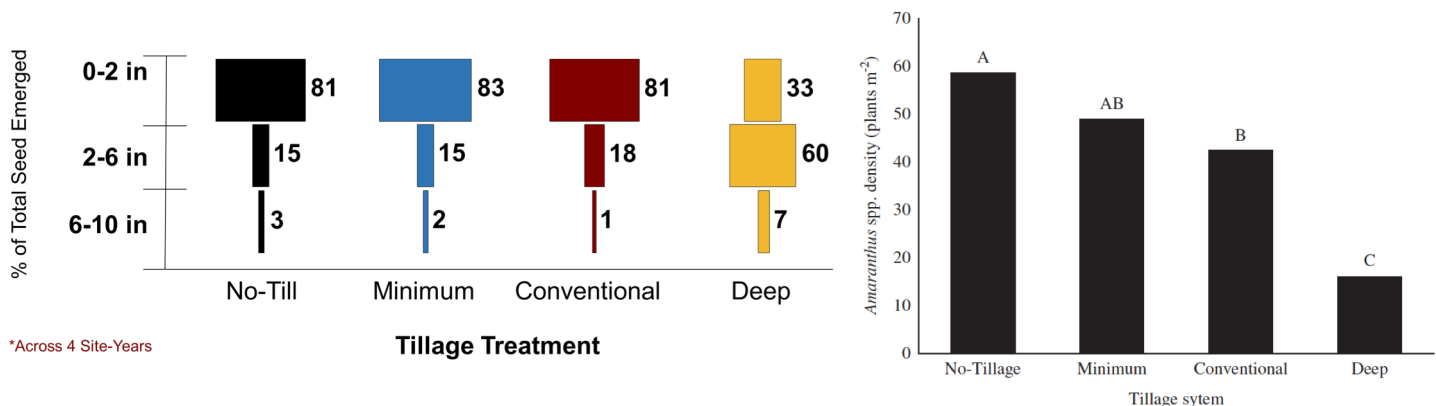
### What is the effect of tillage on seed distribution and next year's population?

- 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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