A New Weapon for Farmers
Inter-row Mowing for Problem Weeds in Row Crops.

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The Problem

- The reliance of farmers on a limited number of herbicides has contributed to weed problems by selecting for exploding populations of glyphosate-, imazethapyr-, and thifensulfuron-resistant water hemp and Palmer amaranth (Horak and Peterson, 1995 and Culpepper et al., 2006).

http://wellcommons.com/weblogs/health-beat/tags/herbicide-resistant-crops/
Palmer amaranth was found to have an economic impact of $17.5 million in one county in Georgia (Slaughter, 2009) and over $100 million was spent on its control by cotton farmers in Georgia in 2010 and 2011 (Culpepper, 2011).

Water hemp and Palmer amaranth plants produce an average of 289,000 and 251,000 seeds per plant per year.

Solutions: Herbicides?
Poor Palmer Amaranth Control with Dicamba
In addition to tillage not being able to sufficiently control amaranthus species, it is well established that tillage is detrimental to soil physical, chemical and biological properties (Karlen et al., 2001; Lal, 2003), thus posing a threat to soil productivity and producers’ economic performance.

Tillage can negatively affect weed seed dynamics and impairs carbon sequestration in soil through oxidation or mineralization, leaching and translocation, and accelerated erosion. (Lal, 2002).
• When soil structure is damaged, water infiltration and plant available water can be greatly reduced.

**Solutions: Cultivation?**

- tilled
- no-till

**Time for New Directions**

- Eliminates tillage
- Reduces erosion
- Conserves soil structure and water holding capacity
- Conserves organic matter
- A new tool in the weed control tool box
- Helps organic and conventional growers

**Why Mow?**
This method can be used in conjunction with any production practice but pairs well with organic and conventional no-till utilizing crimped cover crops.

William Donald, USDA-ARS: Conservation Tillage Research
Used between-row mowing in conjunction with herbicides banded over the rows.


Donald: Corn yield with between-row mowing with a blade, string trimmer or roto-tilling

Donald, W.W., 2000. Alternative ways to control weeds between rows in weeded check plots in corn (Zea mays) and soybean (Glycine max). Weed Technology, 14(1), pp.36-44.
• We use 24 inch blade but with GPS could get much closer
• Current model is run off tractor hydraulics
• Pressure surges dependent on tractor size/power
• Changing to a PTO driven hydraulic motor
• Developing a 6 row prototype
• Approximately $750 per unit??
The first mowing eliminates broadleaves
Subsequent mowings are needed to give continuous grass control
Crimped cover crop coupled with crop shading provides in-row control
The Future

• Seeking a second grant to improve/finalize design

• Need commercialization partners

• Business structure possibilities: Licensing agreements, virtual partnerships, ?, ?.