TECHNOLOGY AND WEED CONTROL: WHERE WE CURRENTLY STAND AND WHERE WE MIGHT BE GOING

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• NY AGRICULTURE
  • Number of Farms – 33,400
  • Land in Farms – 6.9 million acres
  • Gross Income – $5.7 billion
  • Agricultural Employees – 55,000 workers

• WEED CONTROL
  • Reduce competition/preserve yields
  • Improve crop protection
  • Increase harvest efficiency
  • *Primarily achieved using herbicides*
Why Reduce or Eliminate Herbicides?

• Herbicide Resistance
  • 513 unique cases worldwide
  • 267 species and 165 herbicides

• Injury Potential/Environmental Concerns

• Consumer Perceptions/Regulatory Hurdles

• Growing Organic Industry
  • New York State Ranking in 2019
  • >$298 million in sales of organic products
  • #1 in number of certified organic dairy farms
  • #2 in acres of certified organic field crops
  • #3 in total number of certified organic farms
Alternatives to Herbicide-Based Weed Management

• Tillage and cultivation
• Cover cropping and mulching
• Tarping
• Soil disinfestation
• Hand-weeding
• Stale seedbed practices
• Altered planting dates
• Altered seeding rates
• Crop variety selection
• Other practices
• Technology
WEED ZAPPER™ IS A TRACTOR-TOWED, PTO-DRIVEN GENERATOR THAT PRODUCES 100,000+ WATTS OF ELECTRICITY CHARGES A FRONT-MOUNTED COPPER BAR

WEEDS ABOVE THE CANOPY THAT CONTACT THE BAR ARE ELECTROCUTED
THE ANNihilator SERIES

The Weed Zapper Annihilator is a revolutionary piece of equipment that is unlike any other weed elimination solution. With at least 100,000+ watts of electricity, your weeds won’t know what hit them.

PRODUCTS

Equipment powered by Zasso’s disruptive technology proves that the future of weed management is electric and chemical free.

TECHNOLOGY

Systemic effect: with the use of high-power electric discharges, Zasso is enabling the destruction of invasive plants down to their roots.

ACTIVE EWC UNIT SALES OR EWC RESEARCH

Not all in the US
“SMART WEED CONTROL”

- **Propulsion**
  - Autonomous
  - Tractor-mounted
- **Detection**
  - Differentiate the weeds from soil
  - Differentiate the weeds from the crop by size differences, crop row pattern, and/or machine learning
- **Actuation**
  - Physically remove or otherwise damage weed tissue (non-chemically)
  - Spray weeds with herbicides
STOUT
MECHANICAL WEED CONTROL | SOLUTIONS ORGANIC WEEDING | SMART CULTIVATOR (STOUTAGTECH.COM)
• Self-tuning AI vision system, quick seed line adjustments
• Precision seed line tracking allows for tight machine to plant spacing
• Automatic bed height control eliminates bed pressure
• Built in shock absorbers for rocky soil
• Advanced actuator motion control to limit dirt movement
• Floating 3-point hitch allows machine to move independent of tractor
OTHER VISION-GUIDED MECHANICAL WEEDING TECHNOLOGY

RISE OF THE ROBOTS

https://www.farmwise.io/


Cornell CALS College of Agriculture and Life Sciences
WEED-IT (WWW.WEED-IT.COM)

WEED-IT Quadro

WEED-IT Quadro once again sets the standards for precision spraying. Effective weed detection and elimination is becoming increasingly important in today's growing environment with less precipitation, limitations on herbicides usage and resistant weeds. To help growers combat weeds more effectively, precision spraying specialist Trimetro introduces WEED-IT Quadro: the next generation spot spraying.

- Green on brown by detecting chlorophyll fluorescence
- No image processing
- Detection information is relayed to solenoids that operate nozzles
- Not selective, use for pre-plant/emergence or post-harvest
- See also: Trimble weedseeker 2
  WeedSeeker 2 - Get ready to weed out the competition (trimble.com)
Building on the vision from our founders - to solve monumental challenges in agriculture with technology - we believe in creating end-to-end products. Combining decades of agriculture industry knowledge with deep expertise in enabling technologies, our focus is delivering products that enable customers to work efficiently, sustainably and profitably.

Verdant Robotics
Hi-resolution cameras feed imagery in real time to an onboard supercomputer that runs deep-learning computer vision models to identify crops and weeds.

Targeted 150W CO2 lasers then kill weeds at the meristem.

Lasers can fire every 50 milliseconds.

Bed-top lighting (from unit) allows operation day or night, in all weather conditions.

https://carbonrobotics.com/laser-weeding-technology
TECHNOLOGY AND OTHER NEEDS

- Optimization of systems for discriminating between crops and weeds at speed in vision guided systems
- Reduce energy inputs to power implements
- Battery development
- Cellular/broadband service improvement and expansion
- Regulations built for and adapting with autonomous systems
- Adequately trained labor pool for engineering and manufacturing, service providers, data management and processing