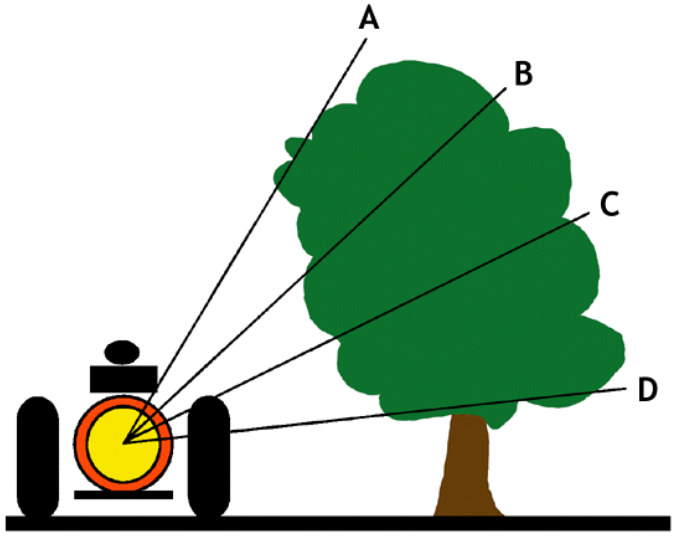
Towards more targeted pesticide application…



Jon Clements

UMass Extension

New Hampshire Fruit Growers, March 25, 2010

- EPA/FQPA/Strategic Agriculture Initiative (Region 1, New England)
  - Growers significantly reduce or eliminate OP, carbamate or other pesticides impacted by FQPA
  - Collaborative work with scientists, farmer, commodity groups, state partners
  - Demonstration, extension, education on integrated or sustainable practices
  - University technical support on alternatives and pest management practices

Objectives

Toward more targeted pesticide application…
a pilot sprayer testing, calibration, and automation project

1. Voluntary sprayer inspection/calibration service to Massachusetts and New England (Eco Apple) apple growers
2. Demonstrate orchard sprayer inspection procedures during meetings, newsletters, website, etc.
3. Outfit select sprayers with automation technology

Outcomes

1. More efficient and accurate application of pesticides to orchards using ‘tested’ sprayers
2. Education about sprayer performance and calibration to improve pesticide application
3. Catalyst to consider sprayer automation as way to simplify and improve application, particularly when adjusting for block-to-block differences

What affects sprayer output?

- Travel speed
- Pressure
- Nozzle output
- Target shape and size
- Andrew Landers on YouTube
- Other considerations
  - Tree row volume
  - Pesticide application rate
  - Weather

Objective 1

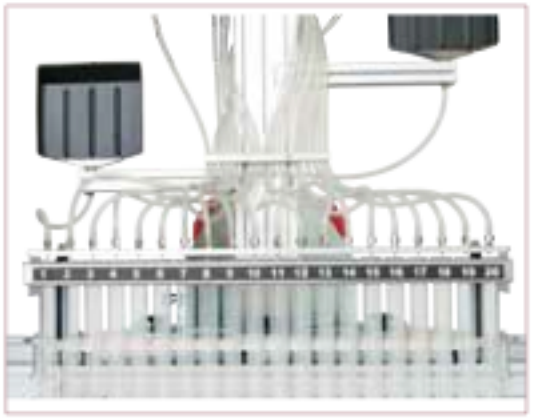
- Voluntary orchard sprayer inspection
  - Components of sprayer ‘test bench’ purchased in 2009
    - Bench-quality manometer (pressure test gauge)
    - Flow rate measurement
    - Vertical atomizer test table (vertical ‘patternator’)

Pressure gauge tester

Guess which one is deemed correct?

Flow rate measurement

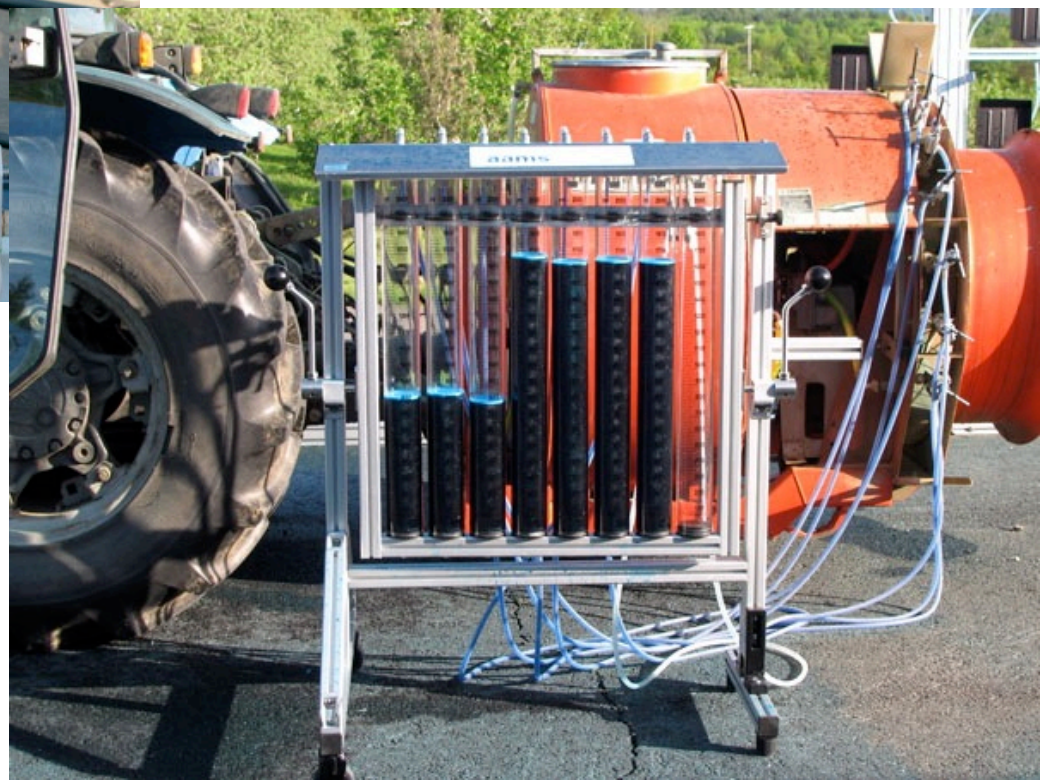
Vertical ‘patternator’



Objective 2

- Extension/Outreach
  - Twilight meeting at UMass Orchard in Belchertown
  - Mass. Fruit Growers' Assoc. Summer Meeting, Tougas Farm in Northboro, MA with Andrew Landers
  - UMass tree fruit class
  - Orchard Equipment and Supply Co. (OESCO)

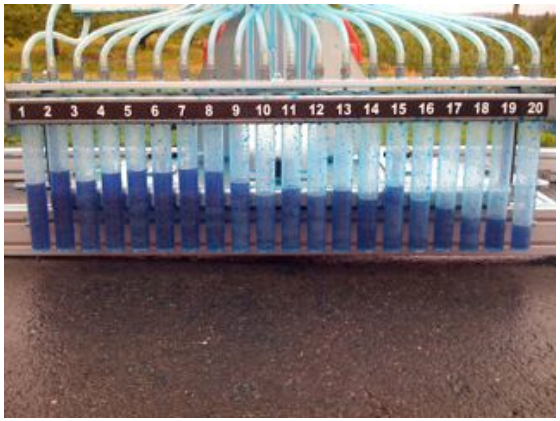
Twilight Mtg., UMass Orchard

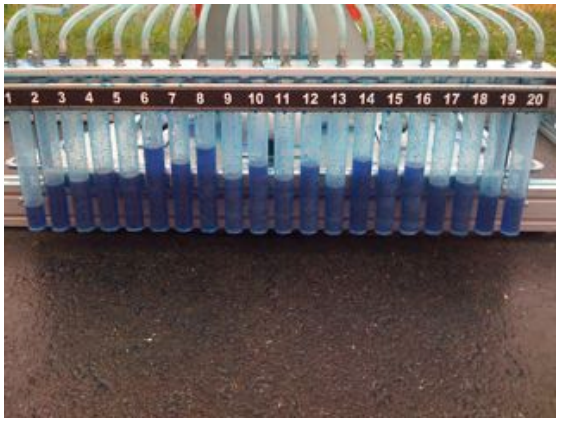


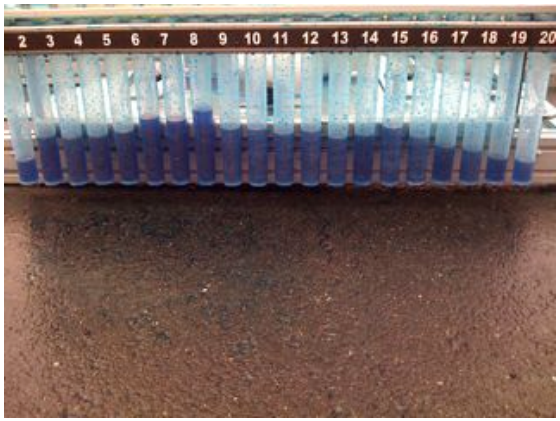
MFGA Summer Meeting

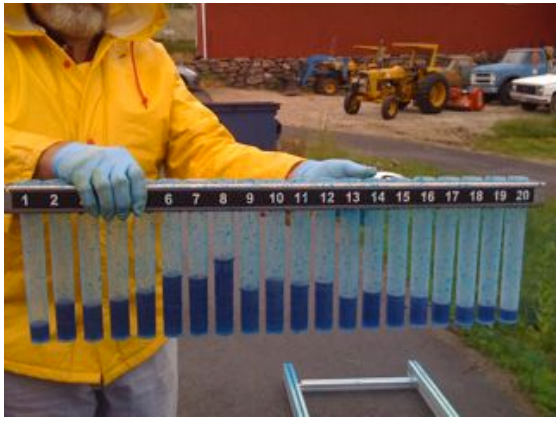
UMass tree fruit class

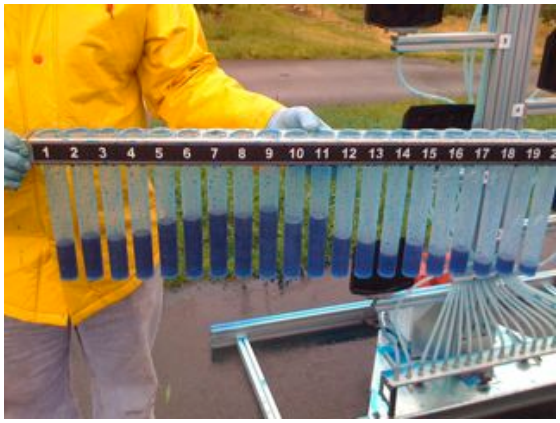
OESCO











Objective 3

- Orchard sprayer automation
  - TeeJet 844-AB
  - UMass Orchard
  - Mo Tougas, Tougas Family Farm
  - 3 more tractor/sprayers in 2010
  - $5,000 + each plus installation

TeeJet 844-AB

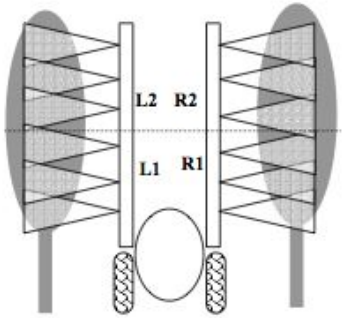
- Individual (4) boom controls
- Automatically adjusts pressure
- Maintains output in auto mode
- Programmable swath widths (row spacing)
- Display shows speed, pressure, GPA, acres covered

Life is never easy…

…never easy

REFERENCE FLOW RATE PER SECTION

The 844-AB console must know what the flow rate is for each section of the sprayer so that it can make the necessary adjustments when boom sections are shut off. The console makes an assumption that the left and right boom sections are symmetrical; therefore it assumes that the flow rate for the lower left section (L 1) is identical to the flow rate for the lower right section (R 1). The flow rate entered for section 1 (-1-) will be a reference flow for either L 1 or R 1.



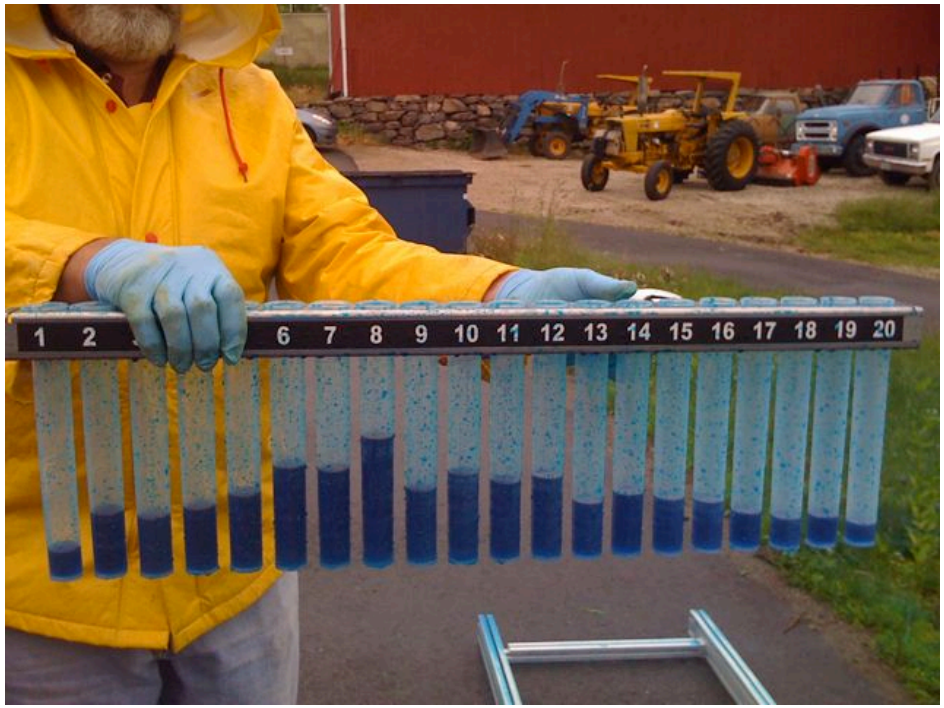
Up to 12 preset flow configurations can be entered into the 844-AB. These presets are represented by the numbers 1-12 at the bottom of the display. The arrow symbol indicates which preset you are currently programming during this step.

First you will select which preset flow configuration you want to program. Use the + or − key to toggle through the 12 presets. Pressing the ↔ Auto/Man key will advance you into the selected preset.

Pressing the P key will advance you to the next program step in the System Setup Mode. It is not necessary to program all 12 presets unless you intend to use them. Simply program the number of presets that you will need, then press the P key to exit this step and move on in the System Setup Mode.

What have we learned?

- Big project!
- Exactly what pattern do we want?
- Sprayer automation sounds good, but real-world application not so easy



- Huge potential to improve application technology if we want to…

NH/MA Twilight Meeting

- April 21, 2010
- Mack's Apples of Moose Hill Orchards, Londonderry, NH
- 1:00 to 4:00 PM
- Hope to see you there…