Nitrogen Fertigation Frequency for Drip Irrigated Broccoli

• Dr. Jim Walworth
• Dr. Tom Thompson
• Mr. Scott White
• Mr. Greg Sower
Objectives

• Determine effects of nitrogen rate and frequency on
  – yield
  – quality
  – nitrogen use efficiency
of subsurface drip-irrigated broccoli
Experimental Methods

- Field experiments at Maricopa Agricultural Center during 1998-2000 growing seasons
- Drip tubing buried 8” deep in raised beds
- ‘Marathon’ broccoli direct-seeded, thinned to 40,000 plants/acre
- Irrigated to maintain water tension at 8 to 10 cbars
- Nitrogen applied through irrigation system
Nitrogen Treatments

• Nitrogen application rates
  – 1998-1999: 176 or 268 lbs N/a
  – 1999-2000: 223 or 312 lbs N/a
  – 2000-2002: 223 or 312 lbs N/a

• Fertigation frequency
  – Daily
  – Weekly
  – Bi-weekly
  – Monthly
Data Collection

- Broccoli heads hand harvested
  - Trimmed to ‘US Fancy’
  - Graded for diameter, weight, discoloration, hollow stem
- Fertilizer N use efficiency
  - (N uptake in treated plots – N uptake from unfertilized control plots)
Marketable Yield (tons/ac)

N Rate (lb/ac)

1998-99

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Freq: NS

1999-2000

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Freq: NS

N*Freq: NS

2000-01

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Freq: NS

N*Freq: NS

N * *

Freq: NS

N*Freq: NS
Fertilizer N Use Efficiency (%)

N Rate (lb/ac)

1999-2000

2000-01

N * * Freq ** N*Freq NS

N 1 7 14 28
Freq **
N*Freq NS

223 312

Fertilizer N Use Efficiency (%)

N Rate (lb/ac)

1999-2000

2000-01

N * * Freq ** N*Freq NS

N 1 7 14 28
Freq **
N*Freq NS

223 312
Conclusions

• When N was applied daily, weekly, bi-weekly, or monthly to subsurface drip-irrigated broccoli
  – Broccoli yield and quality were affected by N rate, but there were almost no significant effects from fertigation frequency
  – High-frequency fertigation is not an important management variable sandy loam or finer textured soils
• More work is needed on coarser soils and on summer crops