Microirrigation for Sustainable Water Use

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Microirrigation, fertigation and managements trials

- Field trials at research station
  - Avocado - Oxisol
  - Pineapple - Oxisol, Inceptisol
  - Citrus – oranges - Ultisol
- Field trial at private farms
  - Pineapple - Oxisol
  - Citrus – Tahiti lime - Ultisol

Avocado at research station

- Simmonds (grafted on Gripiña)
- 9.1 x 9.1 m (30´x 30´)
- Microsprinklers installed on 1.9 politubing line
- Tensiometers installed at 30 and 45 cm depth
- Planting date = 4 October 2001
- Canopy volume, fruit weight, and fruit number, ETc
- 6 years data set published (Román-Paoli, et al., 2010)

Avocado at research station

New Experiment (2 x 2 factorial)

- Factor 1 - microirrigation level
  - 10-15 kPa; T2 = 40-45 kPa
  - soil-based - tensiometers
- Factor 2 – fertilization application method

  (20 lbs 15-3-19-2.47/tree)
  - fertigation – once monthly (urea, phosphoric acid, potassium sulphate, Mg sulphate)
  - slow release fertilizers – twice per year

Pineapple at research station

Fertilization and microirrigation treatments on Pineapple M-D-2 Del Monte (Results published on Proc. CFCS 2010)

1. Granular fertilizer at a rate of 150-150-120-45 kg/ha at planting plus 16 foliar applications of N and K 50 kg/ha every two weeks (check).
2. Same fertilization rate than treatment 1 but with the addition of drip irrigation (60 mm per month)
3. Same fertilization rate than treatment 1 applied twice monthly throughout fertigation.
4. Fifty percent than treatment 1 through fertigation.

Response of pineapple before (first harvest) and after flowering induction with etephon (second harvest) for average fruit weight and brix.

	First Harvest		Second Harvest	
TRT	Brix	Fruit weight, g	Brix	Fruit weight, g
TRT 1	12.9	1191 b	13.06	1242
TRT 2	12.2	1371 a	14.08	1303
TRT 3	14.4	1308 a	14.07	1199
TRT 4	12.3	1371 a	12.37	1335

Conclusions

- Results indicated that plant submitted to fertigation and conventional fertilizer with drip irrigation be likely to produce larger and heavier fruits.

-Brix values tend to be increased with drip irrigation and fertigation.

-The results obtained in this research are not conclusive to disregard conventional granular fertilization, but some fruit characteristics tend to be improved, so the use of drip irrigation and fertigation can not be ignored.

- An unknown factor was causing a high variation. Total foliar N content was less than 1.0; normal values ranges is 1.5 to 2.5 %. A new experiment is recommended to study which factor (s) is reducing N use efficiency.

Pineapple at research station

New Experiment

1. Check – granular fertilizers, no drip irrigation
2. Granular fertilizer at a rate of 150-150-120-45 kg/ha at planting plus 20 foliar applications of N and K 50 kg/ha every two weeks.
3. Same fertilization rate than treatment 2 but with the addition of drip irrigation (60 mm per month)
4. Same fertilization rate than treatment 2 applied twice monthly throughout fertigation.
5. Slow release fertilizers – three times


Tratamiento
#2

Citrus at research station

Ongoing (2 x 2 factorial)

- Rhode Red Valencia
- Factor 1 - microirrigation level
  - 10-15 kPa; T2 = 30-35 kPa; T3 = rainfed
  - soil-based - tensiometers
- Factor 2 – rootstock
  - Swingle
  - Sunky-Benecke

Others

- Studying the relationship between soil moisture and stem water potential on avocado.
- Víctor Hugo Ramírez-Builes and Eric W. Harmsen. Water Vapor Flux in Agroecosystems Methods and Models Review, Part I and II. Chapters accepted for publication in the book "Evapotranspiration" (ISBN 978-953-7619-X-X), IN-TECH Education and Publishing, Vienna, Austria,