



Cold Hardiness

Freeze Protection (Passive and Active)

- Plant on a hill with a south or southwest slope.
- Avoid low lying locations.
- Do not fertilize after early August.
- Microjet irrigation for freeze protection.
- Tree wrap or soil mounding for freeze protection.
- Tree covers if dealing with a small number of trees.

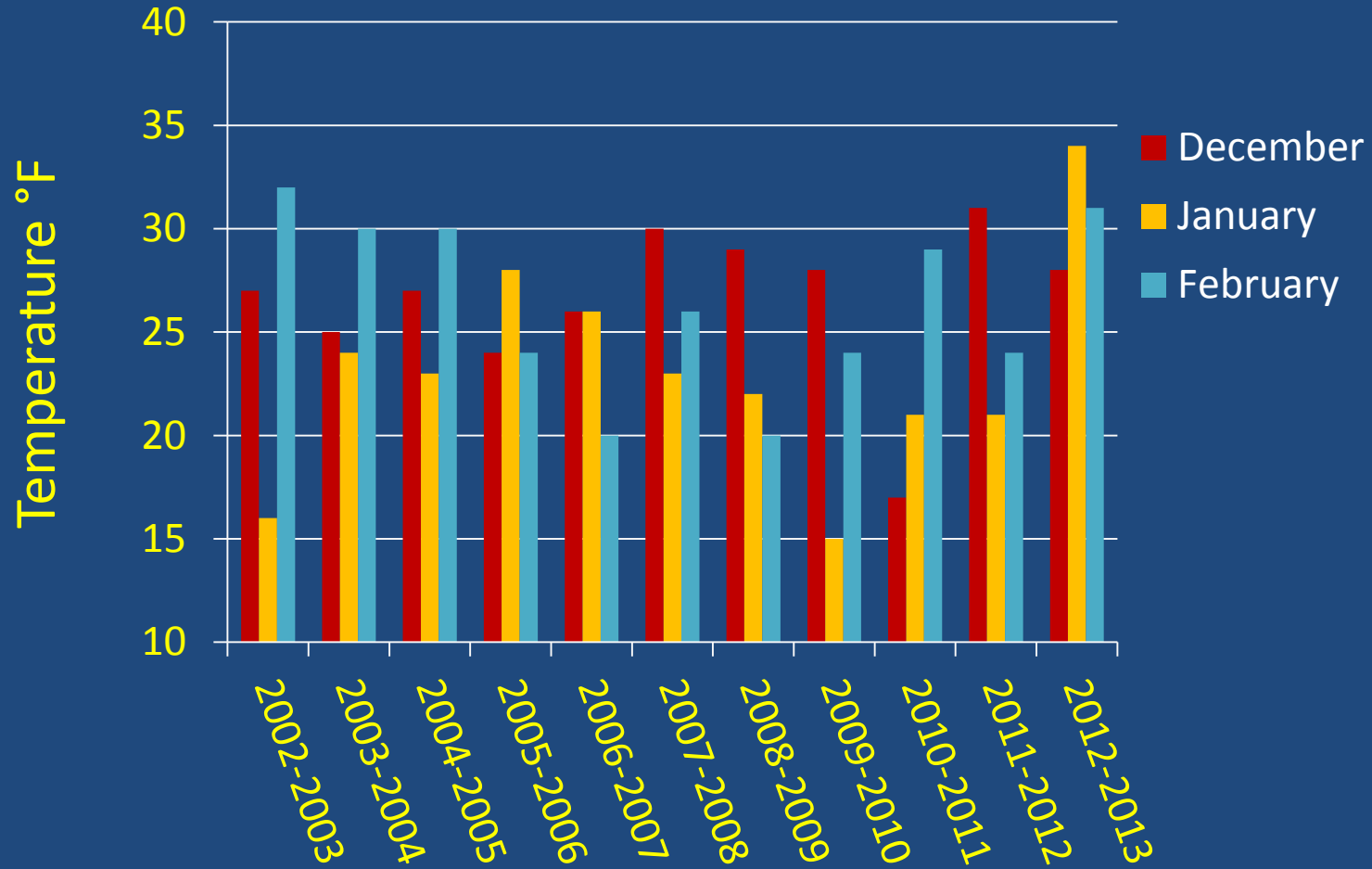
Microjet issues

- Filters required. The smaller the orifice size the more plugging.
- Can combine microjet with soil mounding or tree wraps.
- Microjets can be your sole irrigation system. Direct spray to trunk and major limbs of tree. After freeze period redirect spray to soil.
- Available patterns 90, 180, 270 or 360 degrees
- Can attach to stake if desired.

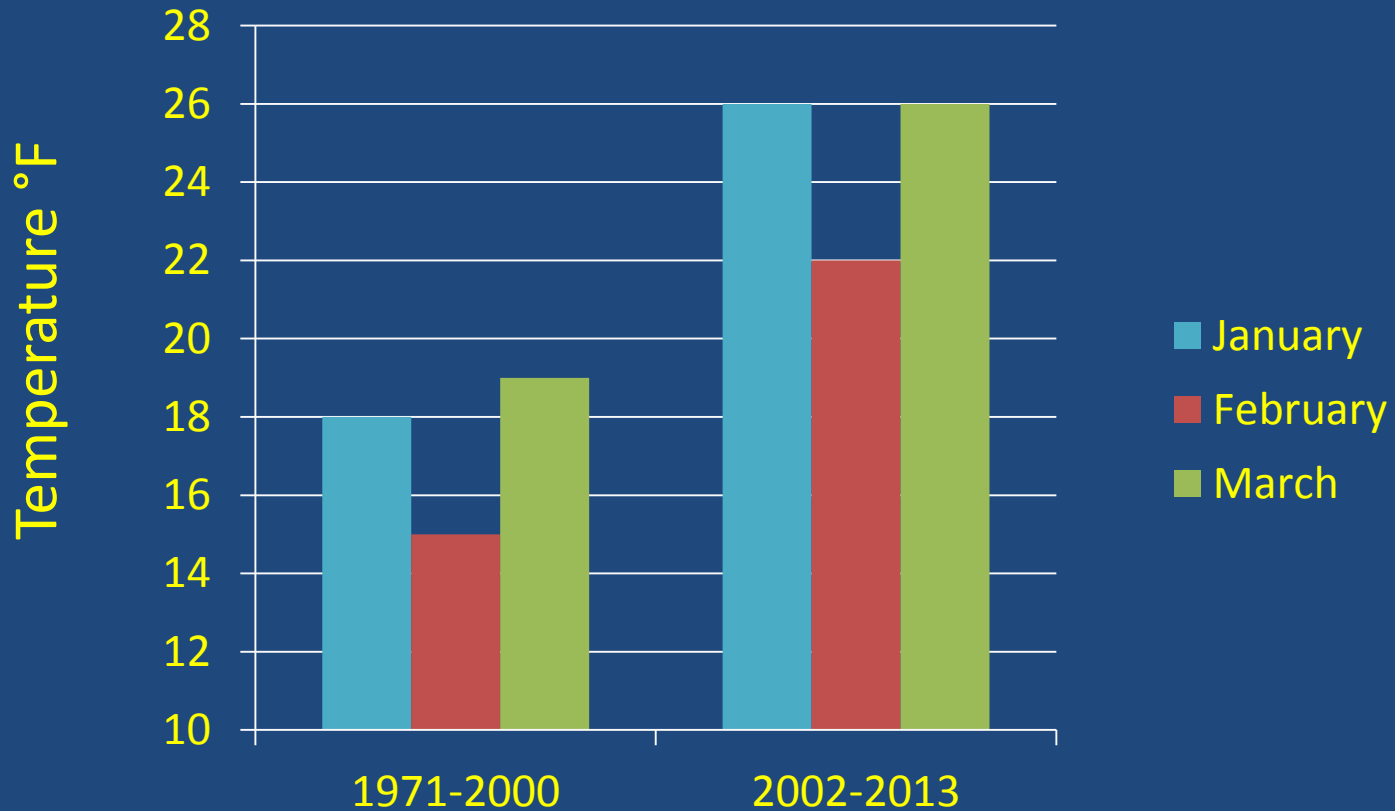
Microjet irrigation frost protection

- Black 0.8 mm 8 gal/hr
 - Blue* 1.0 mm 14 gal/hr
 - Green 1.3 mm 22 gal/hr
 - Red 1.5 mm 33 gal/hr
 - White 2.3 mm 58 gal/hr
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- *Most popular.

Minimum monthly Temperatures at NFREC-Quincy (2002-2013)



Minimum monthly Temperatures at NFREC-Quincy (1971-2013)





**Minneola
Honeybell**



**Sugar Belle
Mandarin hybrid**



**Tango
Mandarin**

A photograph of an orchard with rows of young trees in a field with tall grass. A black irrigation pipe runs along the rows. The sky is blue with scattered clouds, and a line of trees is visible in the background.

**Early Pride
Mandarin Hybrid**

Cost of Well

Diameter	gal/min	Cost of Install
• 4	50	\$9,000
• 6	200	\$22,000
• 8	500	\$35,000
• 10	700	\$85,000
• 12	1,200	\$130,000

What Happened When the Pump Failed

- Conditions
- Microjet irrigation started 5:30 pm. Temp = 35 F
- Irrigation ran all night. Wind speed = 10-15 mph. Minimum temp. = 18 F
- Pump failed at 9:30 am. Temp. = 21 F
- Entire irrigation lines frozen in 15 minutes
- Ice remained on trees until Wednesday afternoon





Owari/Trifoliate Orange



Owari/Flying Dragon



Xie Shan Satsuma



Navel



Navel



Minneola Honeybell



Sugar Belle



Minneola Honeybell





Tango



Ranking of Freeze Tolerance

- For mature trees ranking:
 - Satsuma (Trifoliate orange rtsk) most tolerant - No damage.
 - Mature Navel and Honeybell (Carizzo rtsk)- Tip burn.
- For young trees (All Swingle rtsk) ranking:
 - Satsuma - little or no damage.
 - Sugar Belle - 9 of 16 survived. Trunk sprouts. Slight leaf burn.
 - Tango - 2 of 16 trees survived. Trunk sprouts. Most trees killed above soil mound.
 - Minneola Honeybelle - 0 of 16 survived. Some trunk sprouts. Trees killed above soil mound.
 - Early Pride - 0 of 16 survived. Some trunk sprouts. Trees killed above soil mound.

Cold Hardiness of Rubidoux versus Flying Dragon

• <u>Scion/Rootstock</u>	<u>4 Dec.</u>	<u>24 Feb.</u>	<u>17 Mar.</u>
• BS/FD	8.5	7.6	6.3
• BS/RB	9.3	7.9	7.7
• OW/FD	7.7	6.8	5.7
• OW/RB	8.4	7.7	7.3
• Statistics (lsd)	0.7	NS	NS

New Citrus Cultivars at NFREC-Quincy

- Orlando Tangelo
- Glen Navel
- Bud Blood
- Nova
- USDA 6385
- USDA 6377

New UF Fast Track Mandarins (All are Sweet, Easy to Peel and Seedless)

- **UF 900** - Early season (Sept./ Oct.).
- **Kids Favorite** (UF C4-15-19) - Early to Mid Season (Oct./Nov.). Very Sweet, Excellent Color.
- **Seedless Snack** (UF N40W-6-3) - Mid Season (Late Oct./Nov.).
- **UF 950** - Late Season (Dec./Jan.).
- **Cold Hardiness is unknown.**