



# MANAGING FRUIT LOAD IN HIGH TUNNEL TOMATOES

Jacques Thériault agr. M. Sc.

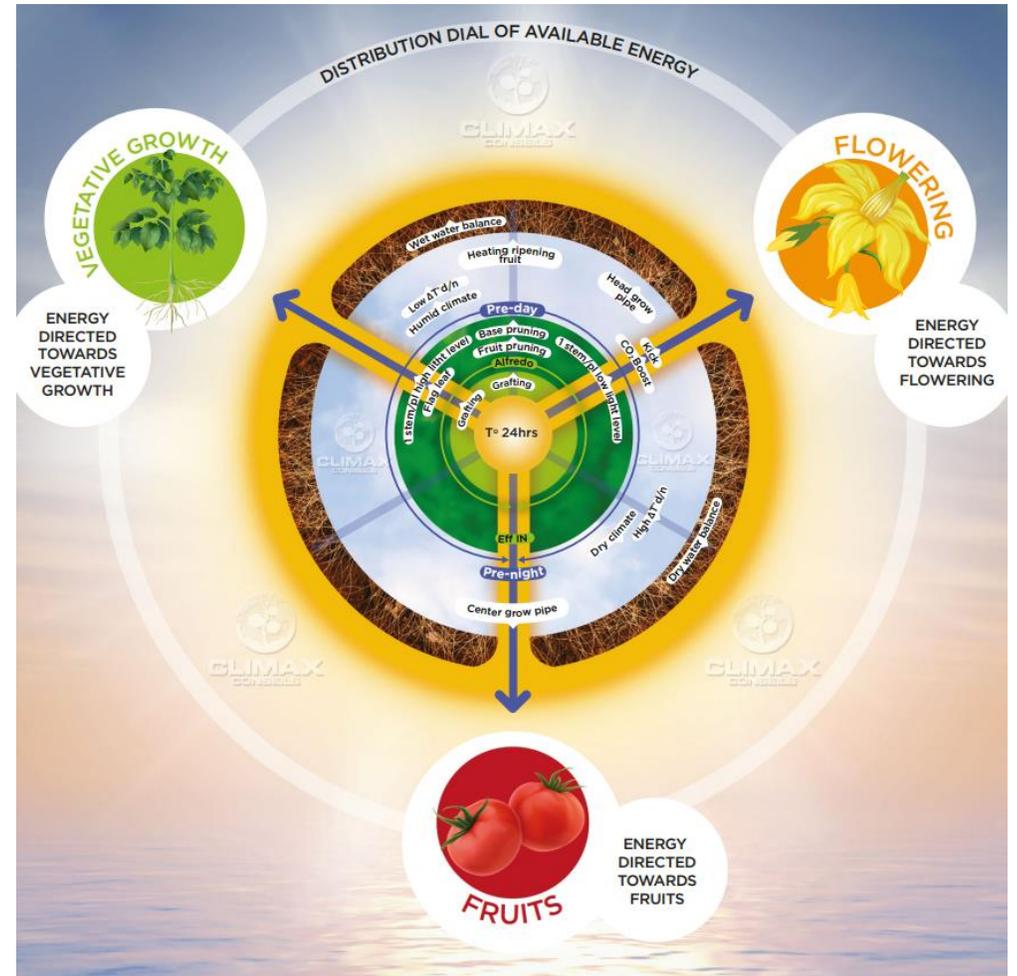
Greenhouse vegetable crop specialist

Climax Conseils

# Managing fruit load = managing energy availability vs energy requirement

Energy availability = Sunlight X CO<sub>2</sub> = photosynthesis

- Sunlight
  - June :
    - 3000 joules/cm<sup>2</sup>/day on a sunny day
    - Average of 2200 j/cm<sup>2</sup>/day
- CO<sub>2</sub> : Outside level (380ppm)
  - Assumed stable
- Once your energy requirement exceed light availability, you create competition between organs



# Energy requirements : (Veg + Fruits) X 24hrs Temperature



Rebelsky light requirement (8.11once(230g))				
(Joule/fruit/day)				
Stage	Topped plant		Whole plant	
	≈70%		100%	
Temperature	64,5°F (18°C)	77°F (25°C)	64,5°F (18°C)	77°F (25°C)
J/fruit/day	17,57	33,60	25,10	42,42
Factor		1,91		1,69

# Energy requirements : (Veg + Fruits) X 24hrs Temperature



Maximum fruit load (Fruit/m <sup>2</sup> (10.76ft <sup>2</sup> ))					
	Stage	Topped plant		Whole plant	
	Temperature	64,5°F (18°C)	77°F (25°C)	64,5°F (18°C)	77°F (25°C)
Month	DLI (J/cm <sup>2</sup> /day)				
April	1604,4	91	48	64	38
Mai	2000	114	60	80	47
June	2250	128	67	90	53
July	2162	123	64	86	51
August	1888	107	56	75	45
Septembre	1500	85	45	60	35

DLI : Daily Light Integral

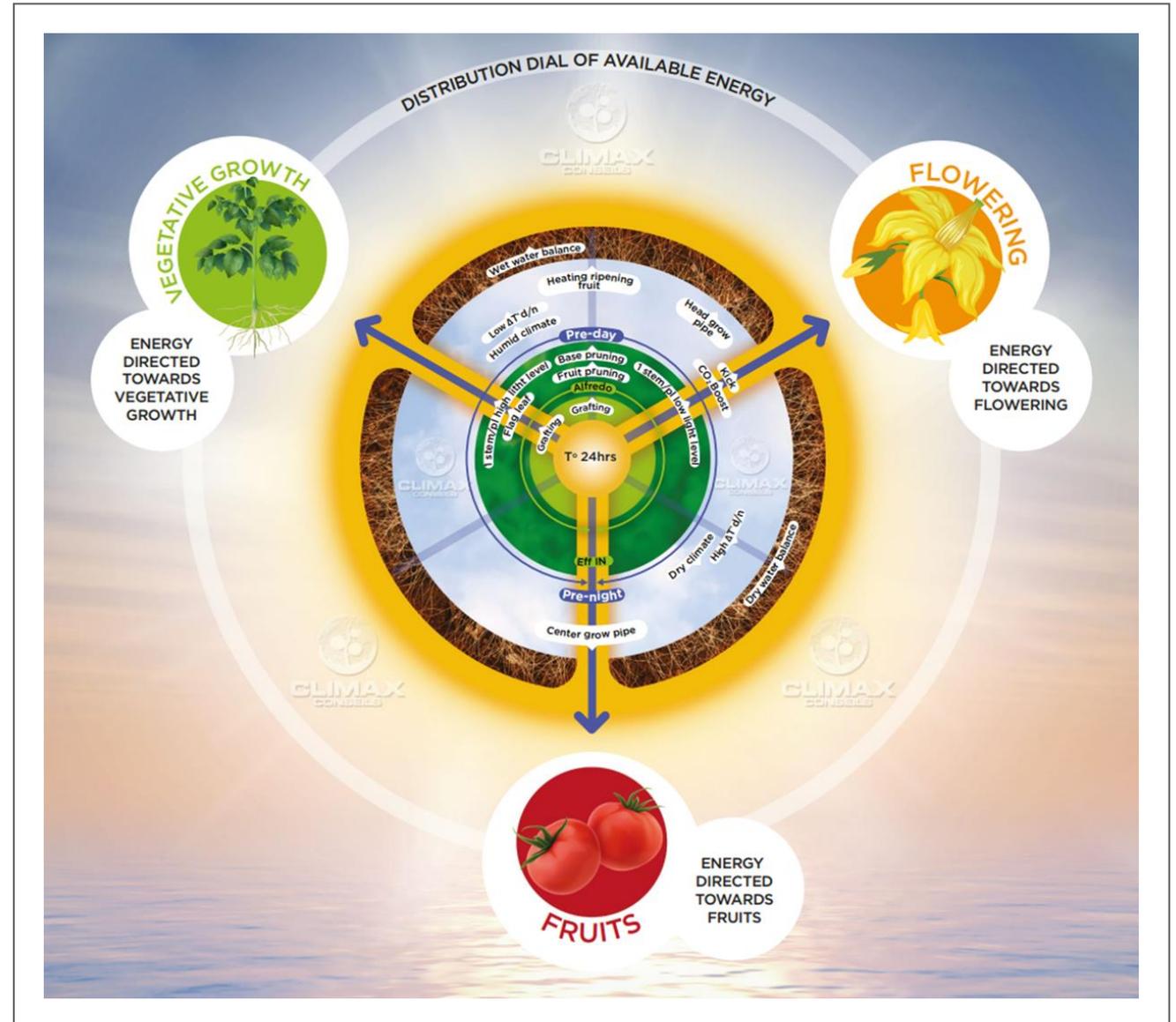
# Energy requirements : (Veg + Fruits) X 24hrs Temperature



Maximum fruit load (Fruit/plant, 4sqft/plant)					
	Stage	Topped plant		Whole plant	
	Temperature	64,5°F (18°C)	77°F (25°C)	64,5°F (18°C)	77°F (25°C)
Month	DLI (J/cm2/day)				
April	1604,4	34	18	24	14
Mai	2000	42	22	30	18
June	2250	48	25	33	20
July	2162	46	24	32	19
August	1888	40	21	28	17
Septembre	1500	32	17	22	13
DLI : Daily Light Integral					

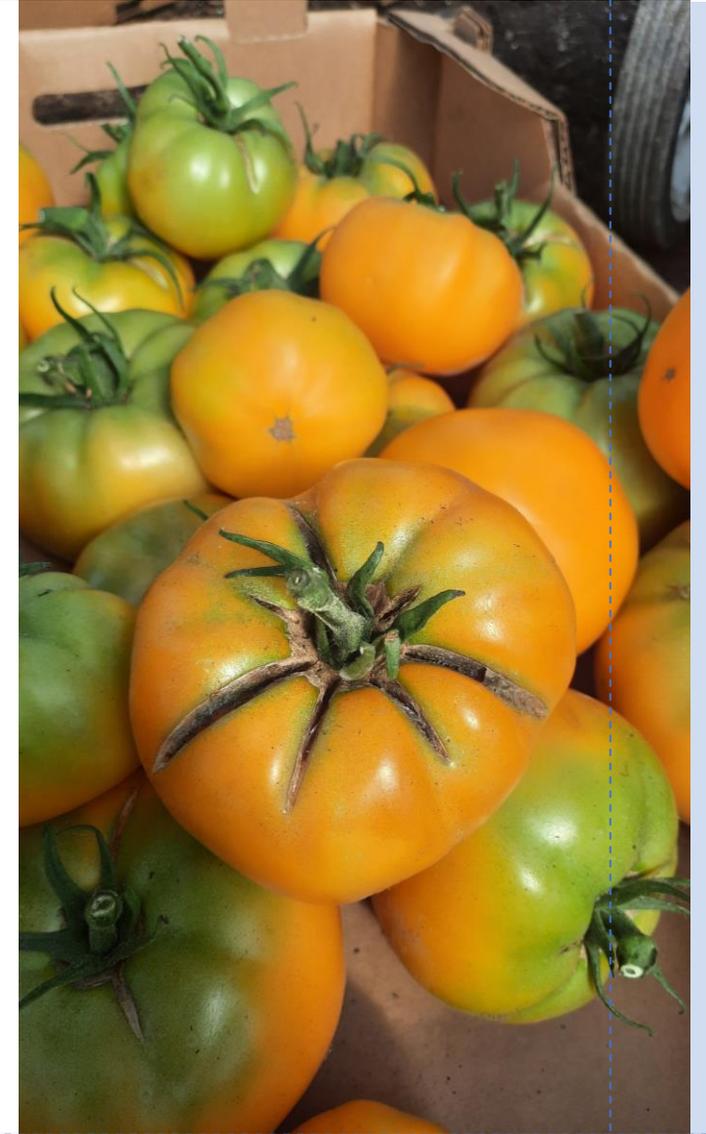
# Energy requirements : (Veg + Fruits) X 24hrs Temperature

- Too much fruit load or too warm:
  - Smaller fruit size
  - Abortion
  - Low stem thickness
  - Small leaves
  - Susceptible to root diseases



# Energy requirements : (Veg + Fruits) X 24hrs Temperature

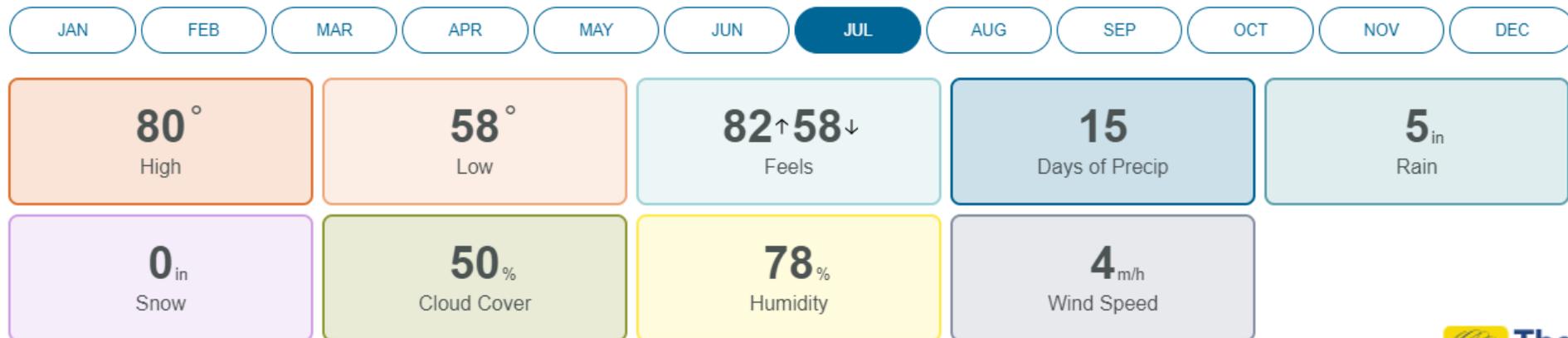
- Too low fruit load or too cold:
  - Too big or dense fruit (russetting and/or craking)
  - Strong vegetative organs/parts
    - Leaves
    - Stem
    - Roots
    - Risk of sterile flowers



# To what temperature will my crop be exposed?

- 1- Where to measure?
  - Between the flowering and the fruit setting cluster
- 2- Local temperatures : Add 3-4°F for greenhouse effect :  $(\text{High} + \text{Low})/2 + 4 = \text{max}$   
24hrs average :  $(80 + 58)/2 + 4 = 73^\circ\text{F}$
- Altitude effect = cooler

## Historical Monthly Averages in Montpelier

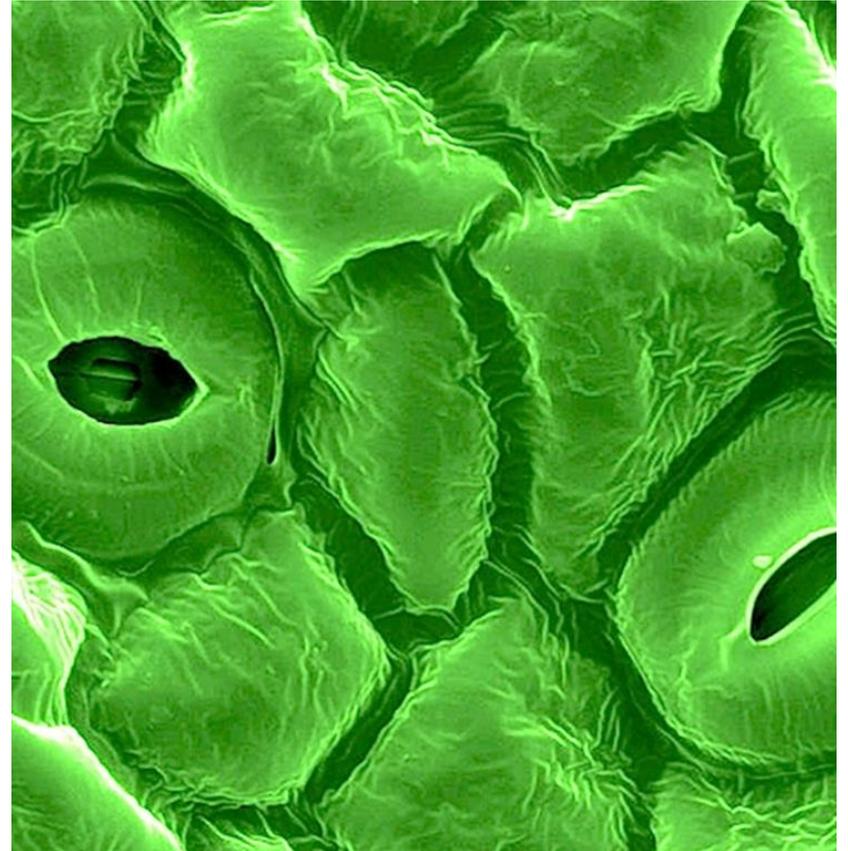


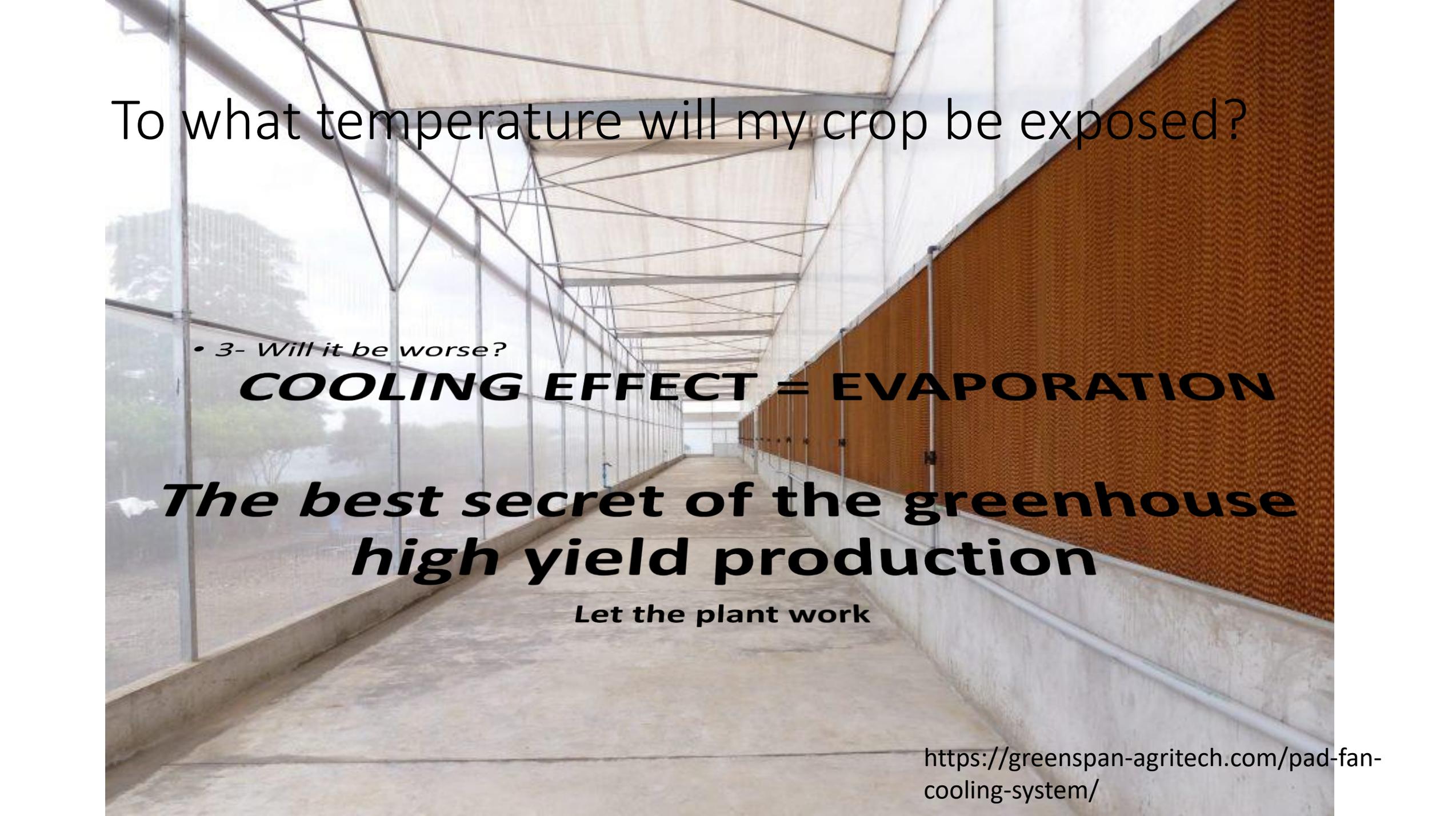
Historical Averages based on data recorded from 2000 to 2024.

# To what temperature will my crop be exposed?

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- 3- Will it be worse?
  - Crop effect : **COOLING EFFECT = EVAPORATION**
    - A good crop canopy **is responsible for 2/3 of greenhouse cooling**
      - Need Leaf Area Index (LAI) of 3-3.6 sqft/sqft ground
        - 5-6 leaves of 18 inches/sqft
      - During the peak of the day (11h00 till 15h00)
        - Never reach RH° lower than 55-60% but stay closed to
          - Higher means less cooling effect
          - Lower means your crop close their stomata
            - Protect himself against wilting
            - Stop photosynthesis (you are losing your joules)
      - Touch your leaves, they're supposed to be cool = Cooling effect = open stomata





To what temperature will my crop be exposed?

• 3- Will it be worse?

**COOLING EFFECT = EVAPORATION**

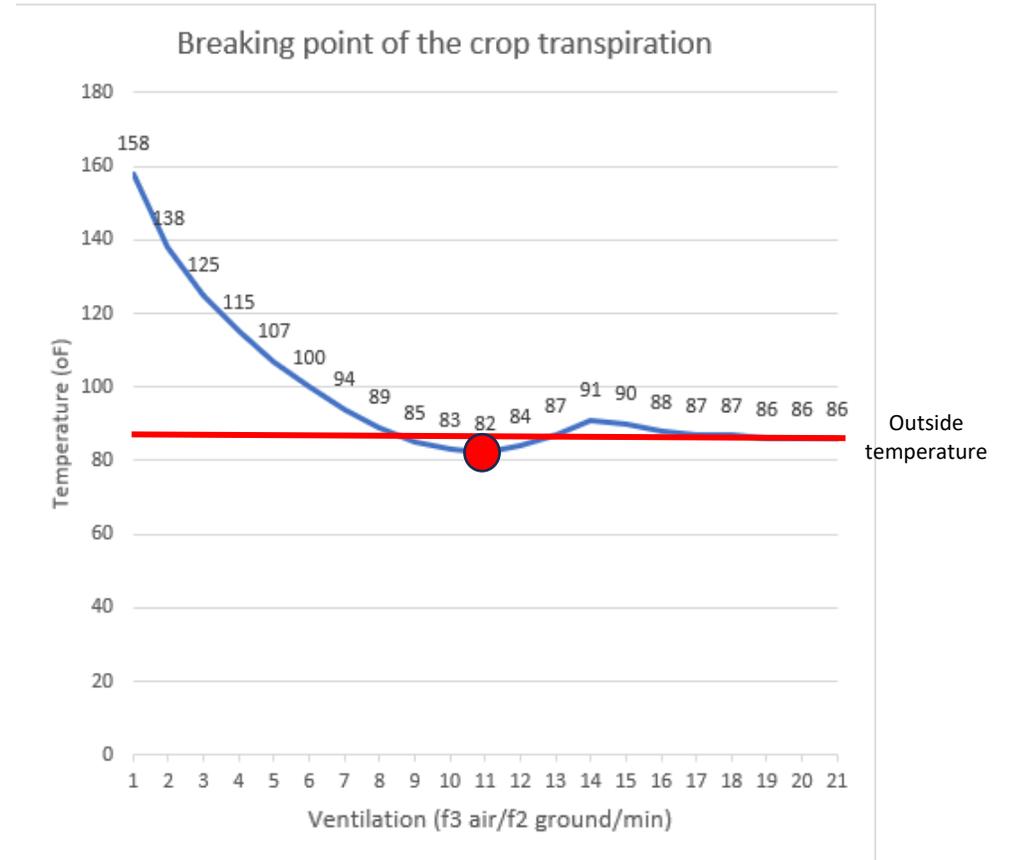
***The best secret of the greenhouse  
high yield production***

**Let the plant work**

<https://greenspan-agritech.com/pad-fan-cooling-system/>

# To what temperature will my crop be exposed?

- 4- Will it be worse?
  - Ventilation :
    - Too less = too warm
    - Too much = too dry
    - Stop venting at maximum, vent to the optimum (55-60% RH°)
  - Watering management must allow maximum evaporation



# To what temperature will my crop be exposed?

- 4- Will it be worse?
  - Height of the crop without ridge vent
    - Warmest spot is in the top
      - Don't keep the head in the warmest zone (desert zone)
        - Weak head
        - Bad quality
        - Mites

# Let's be practical

- 5-6 leaves of 18 inches/sqft X 4 sqft/plant = 20-24 leaves/plant
  - Flag leaf if necessary
  - Humidity concern
    - Prune leaves inside the canopy if too dense.
      - You must see through 2 double rows
    - Always keep at least 18 inches leaf-free above the ground
    - Always keep 16-18 inches leaf-free between the beds (Wires between rows spaced 39-43 inches apart)



Flag leaf

# Let's be practical

- Start adjusting your fruit load 2 months in advance
  - Whole plant
    - From 4 to 3 fruits/cluster
  - Topped plant
    - From 4 to maximum

Maximum fruit load (Fruit/plant, 4sqft/plant)					
	Stage	Topped plant		Whole plant	
	Temperature	64,5°F (18°C)	77°F (25°C)	64,5°F (18°C)	77°F (25°C)
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DLI : Daily Light Integral



## Let's be practical

- Rules of thumb
  - For cherry tomato, add 50% more plant
    - Less leaves per plant

# Thank you

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- Jacques Thériault agr. M. Sc.
- Greenhouse vegetable crop specialist
- Climax Conseils
- Cell : 418-802-4316
- Email: [jacques.climaxconseils@gmail.com](mailto:jacques.climaxconseils@gmail.com)

