

Greenhouse Cooling
 Brian Krug, Univ. of New Hampshire

e-GRO Electronic Grower Resources Online

Greenhouse Cooling

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Cooling Systems

- Summer
- Winter
- Passive
- Active



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Seasonal

- Summer
 - High temps inside
 - High temps outside
- Winter
 - High temps inside
 - Low temps outside

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Cooling Systems

- Passive Cooling
 - Little to no energy inputs


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Passive Cooling

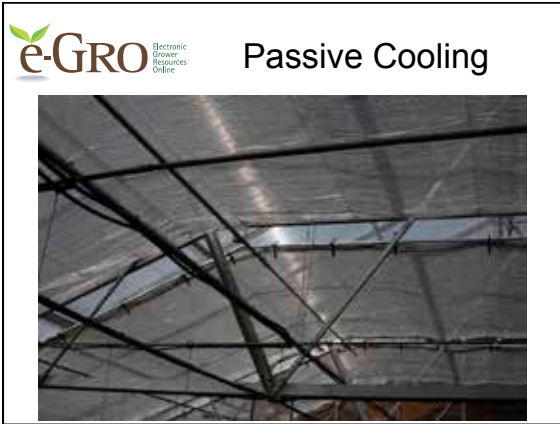


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Passive Cooling



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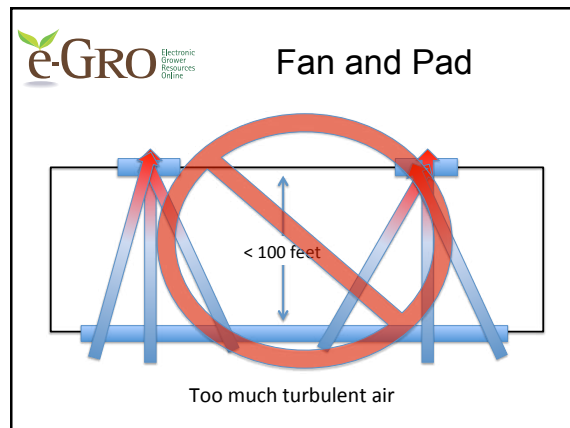
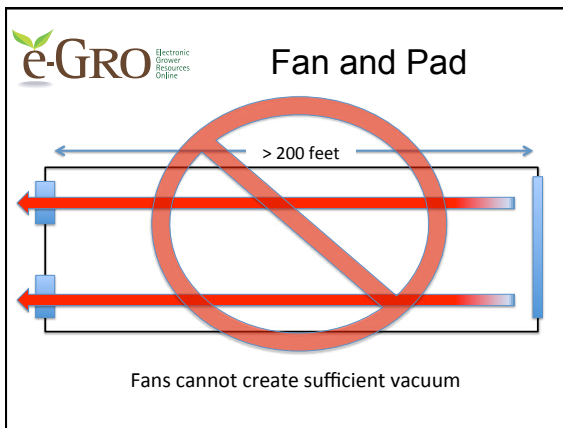
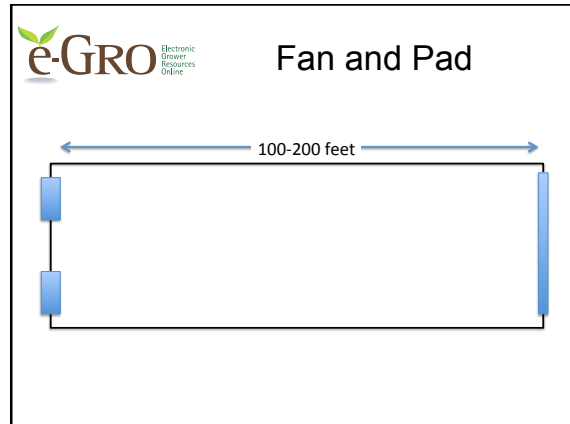
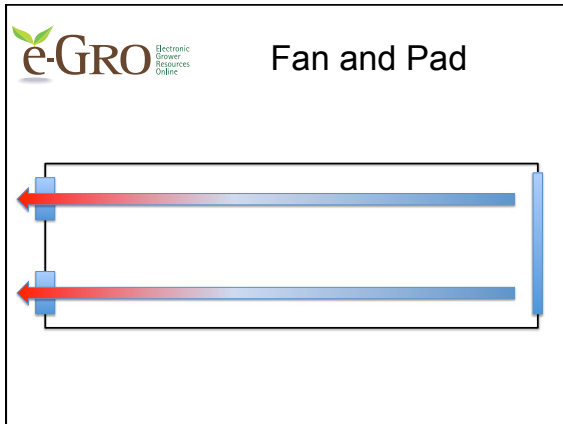
e-GRO Electronic Grower Resources Online **Cooling Systems**

- **Passive Cooling**
 - Little to no energy inputs
- **Active Cooling**
 - Energy required



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- e-GRO** Fan and Pad Considerations
- Air Flow
 - Fan number and size
 - 8 cfm/ft² (some correction for altitude and light)
 - 0.1 static water pressure
 - No more than 25 feet apart
 - Vent/Pad size
 - Based on fan size
 - 4" thick pad requires 0.5 gal water/min/linear foot
 - 6" thick pad requires 0.75 gal water/min/linear foot



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- Both winter and summer systems in same greenhouse
- Both active and passive systems
- Multiples of systems to increase efficiency

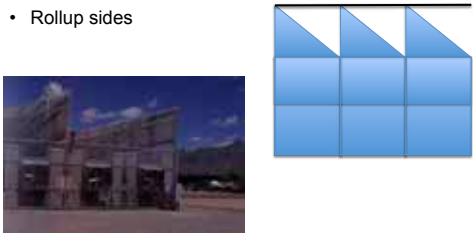
e-GRO Electronic Grower Resources Online **Combinations**

<p>Example 1</p> <ul style="list-style-type: none"> • Roof vent (Winter) • Fan & louvers (Spring/Fall) • Fan and Pad (Summer) • Shade screen 	<p>Example 2</p> <ul style="list-style-type: none"> • Gable vent (Winter) • Rollup sides (Spring/Fall) • Fan and vent (Summer) • White wash (Summer)
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e-GRO Electronic Grower Resources Online **Combinations**

Example 3

- Sawtooth design
- Shade screen
- Rollup sides



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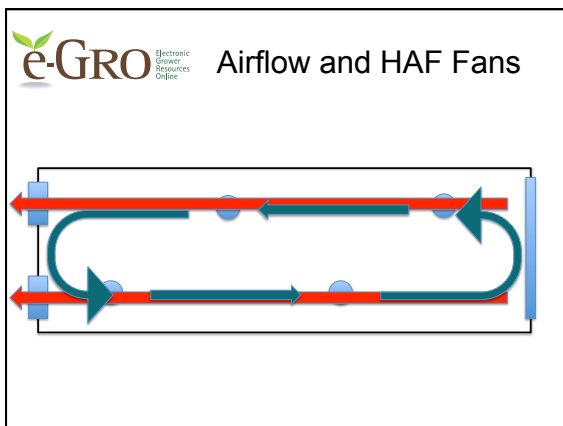
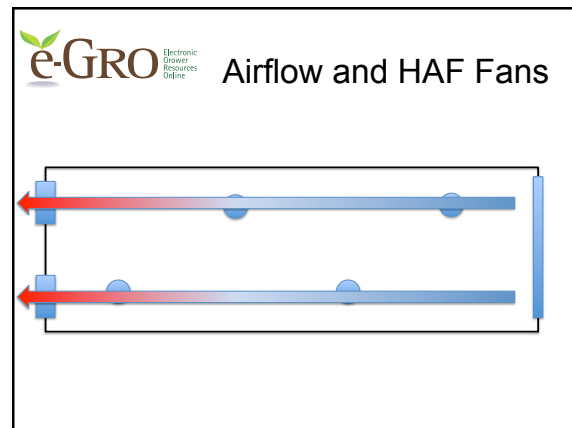
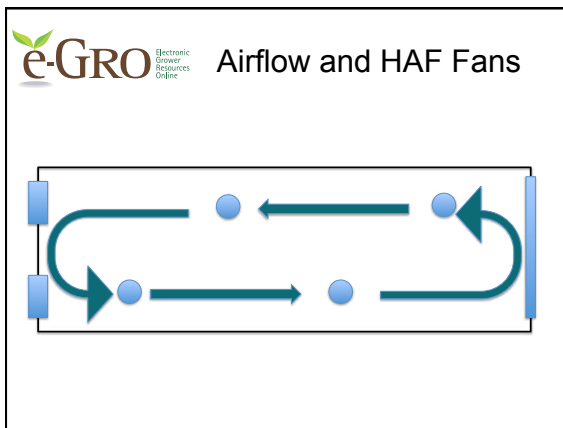
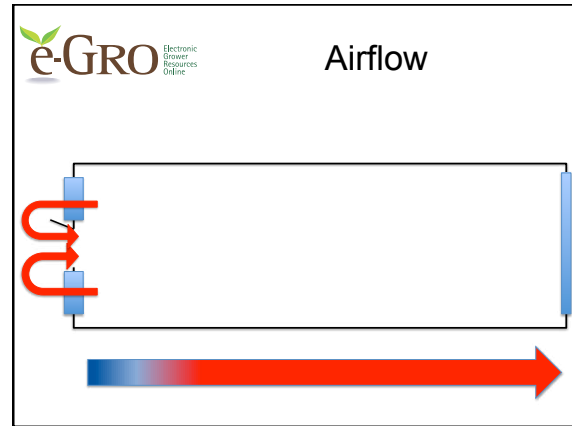
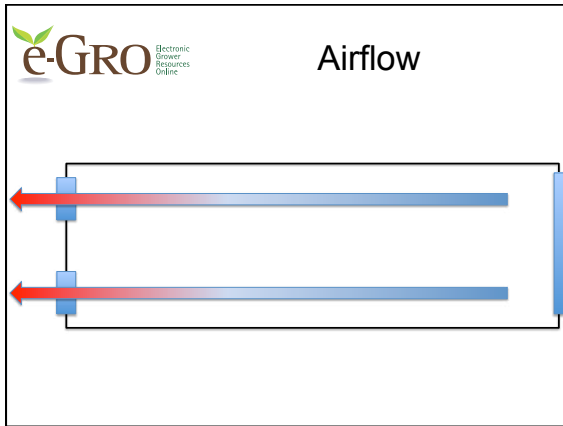
- Air will always take the path of least resistance
- Do not create turbulent air

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- e-GRO** Electronic Grower Resources Online **Other turbulence**
- Exhaust fans and open rollup sides
 - Exhaust fans and open ridge vents
 - Too short of span between fans and vents
 - HAF fans running and open ridge vent
 - HAF fans running with open rollup sides

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Cooling Systems

- Summer
- Winter
- Passive
- Active



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