

SAVE HEAT WITH CO₂

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Does carbon dioxide (CO₂) enrichment of greenhouse atmospheres save fuel? In most every circumstance, the answer is yes! Where CO₂ is being used, day temperatures are generally allowed to increase an extra 5° F or so when the sun is shining before the vents are opened.

With chrysanthemums, a decrease in growing time of two weeks with equal or better quality may be achieved. This in itself saves fuel. But in addition, the vents may remain closed until interior temperatures are 5° F higher than without CO₂. The greenhouse acts as a solar collector. Structural members, plants, soil and walks warm up, storing heat. When the sun sets, this stored heat reduced the demand on the heating system.

With snapdragons the quality is improved in late fall and early winter crops. The growing time is decreased for spring crops. But, in addition, the heat stored by virtue of higher day temperatures reduces the demand at night.

Carnations do not exhibit much of an increase in productivity until late spring. Most of the benefit is in better quality. But again, the higher day temperatures permitted allow the storage of solar heat.

For practically all crops, better quality and decreased production time are effects in addition to reducing heating costs with solar heat storage.

One might conjecture that for each hour of 5° elevation in temperature during the day, a commensurate saving in heat will be attained. Or, for each hour of elevated temperature, a 5° decrease in heating load would be achieved.

For example, assuming three hours of elevated temperature and an outside temperature 30°F lower than inside at night, one sixth of the heat would be saved for the equivalent of three hours. Assuming a 50 BTU/ft²/hour load in a 10,000 ft² greenhouse, this would be 500,000 BTU \times 3 \div 6 = 250,000 BTU, or roughly 2 1/2 gallons of oil, or \$1.00 per day. Peanuts? Every little bit helps.

Another thought. Providing 1000-1500 BTU CO₂ for 10,000 ft² will cost roughly \$300 per year. About half of this (\$150) is recovered as heat from the CO₂ generator if using propane or natural gas. If solar radiation storage is utilized, another \$100-\$150 may be saved. The CO₂ costs next to nothing. And the benefits in reduced cropping time and increased quality may be considered to be free.

Editors Note: It should be emphasized that the figures used in this article are hypothetical and not based on actual data. Any readers possessing actual data or differing views are invited to contact the author.