NCR-101 Report for 2000
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Research Projects

1. Effects of atmospheric ethylene on growth and development
   We are continuing studies to establish dose/response curves for ethylene effects on wheat, rice, and lettuce. An ethylene concentration of only 0.05 ppm caused a 20% reduction in seed set in both wheat and rice, and 0.75 ppm caused complete sterility.

2. Failure analysis of biological systems in controlled environments
   We have examined the effect of prolonged darkness on lettuce and soybeans. When the plants are kept at 10 C, plants tolerated up to 16 days of continuous darkness with only a 2 day period for full recovery.

3. Effect of high levels of ammonium on plant growth
   Dawn Muhlestein is examining ammonium effects on the growth of wheat. Her data indicate that supplying 85% of the N as NH$_4^+$ did not decrease plant biomass, or yield. compared to controls with a 70/30% NO$_3^-$ /NH$_4^+$ ratio. The key to using high levels of NH$_4^+$ is to maintain a stable pH and to supply high levels of calcium and potassium in the root-zone.

4. Modeling Carbon Use Efficiency using continuous canopy gas exchange
   Jonathan Frantz is beginning studies to determine the factors controlling carbon use efficiency in crop plants. Preliminary data indicate that carbohydrate supply is far more important than night temperature in determining night time respiration rates.

Publications in Refereed Journals 1998-2000 (continued on back)


