

**-41-SUMMARY OF**

**SOME PHYSIOLOGICAL AND BIO-CHEMICAL CHANGES IN  
ECONOMIC CROPS CAUSED BY EXPOSURE TO THE AIR  
.POLLUTANT OZONE**

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## ENGLISH SUMMARY

To document possible effects of ozone on four bean cultivars, four clover cultivars and one alfalfa cultivar, Five physiological and biochemical parameters were assessed through five experiments.

Using the sensitivity screening test, clover cultivars were ranked descending as follows: Helali, Local, Serow and Giza 6. The alfalfa cultivar (Local) was highly tolerant to ozone and showed no symptoms. While bean cultivars descending ranking was: Nebraska, Paulista, Bronco and Contender.

Cell membrane damage in clover plants was higher in five weeks old compared with four weeks old. Electrolyte leakage in Helali cultivar was the highest on all the sampling times. No significant differences were observed on alfalfa cv. Local. In contrast of clover, bean plants showed higher e-leakage in four weeks old compared with five weeks old. Nebraska showed the highest e-leakage at all the sampling time tested.

Histo-chemical staining for the localization of  $H_2O_2$  accumulation sites showed that clover cultivars could be ranked in order of decreasing sensitivity as follows: Helali, Local, Giza 6 and Serow. In alfalfa very few  $H_2O_2$  production sites were detected.

**Results of bean cultivars revealed that Paulista produced more  $H_2O_2$  in response to ozone treatment than Nebraska, Bronco and Contender come third and fourth respectively in this descending order.**

**According to the detection of  $O_2^{\cdot -}$  accumulation on clover leaf tissue; the more sensitive cultivars Helali and Local showed the highest accumulation, whereas the intermediate cultivars Serow and Giza 6 showed less accumulation. Alfalfa cv. Local showed very few accumulation of superoxide despite showing no visible symptoms. For bean cultivars Nebraska and Paulista were clearly the least tolerant to oxidative burst by superoxide. While Giza 6 and contender showed less sensitivity respectively.**

**The rate of net photosynthesis was measured in all the species and cultivars under study. In clover cultivars Helali and Local showed a significant decrease in net photosynthetic activity more than Serow and Giza 6. Alfalfa cv. Local showed a significant decline in  $CO_2$  assimilation occurred immediately after the end of the fumigation session followed by a very marked recovery to the level of control. Bean plants exhibited more tolerance than clover and the highest decrease was in Nebraska followed by Paulista, Bronco and Giza 6 respectively.**

**These results suggest that sensitive cultivars of clover (Helali and Local) and bean (Nebraska and Paulista) could be used as bio-indicators for O<sub>3</sub> pollution, Tolerant and intermediate cultivars of clover, bean and alfalfa are preferred to be cultivated in areas polluted with O<sub>3</sub> and they may be utilized for further breeding programs to improve these traits in combination with other desirable cultivars.**