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CHANGES IN INHIBITOR LEVELS, STOMATAL APERTURE, AND GROWTH OF
PISUM SATIVUM L. SUBJECTED TO WILTING STRESS CYCLES DURING
DIFFERENT DEVELOPMENTAL STAGES.

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A C K N O W L E D G E M E N T S

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A B S T R A C T

Plants of Pisum sativum L., grown under controlled environmental conditions, were subjected to wilting stress cycles at different developmental stages and analyzed for changes in inhibitor levels, stomatal aperture, water status, and effects on final yield.

As leaf water potential decreased past a critical level, stomatal aperture decreased markedly and, at the same time, inhibitor levels increased rapidly. The maximum inhibitor levels attained, as determined by several different methods of assessment, approximately halved with each later wilting cycle, whilst the degree of stomatal closure was approximately the same for each cycle. During the recovery phase, plant water status recovered to normal 24 hours after rewatering. At this time inhibitor levels had decreased markedly and, in the later cycles, had apparently declined to normal levels. However stomatal aperture had only recovered slightly at this point in all cycles and by 4 days after rewatering stomata had generally regained normal apertures.

Results of the final yield analysis were confounded somewhat by the shooting of basal buds, particularly on plants subjected to wilting cycles during the preflowering and flowering stages, and a possible explanation for this lateral growth is discussed. However the pod swelling stage was more sensitive to water stress than other stages.

Changes in inhibitor levels alone, did not appear to be related directly to stomatal responses or any sensitivity of particular growth stages. Some possible reasons for these observations are presented on the basis of evidence available in the literature.