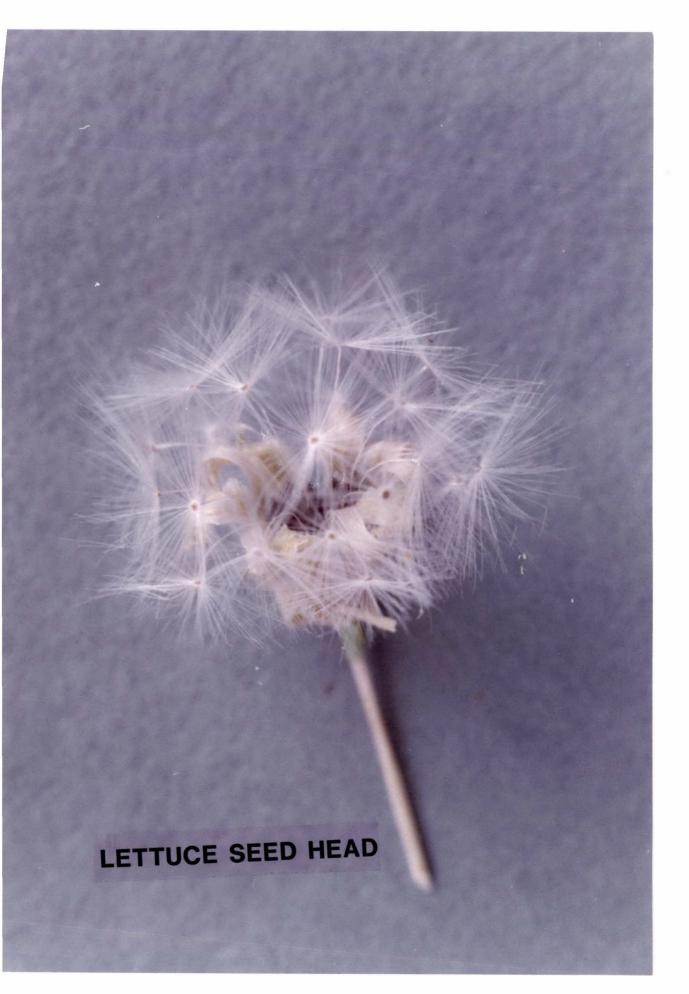
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A STUDY OF THE EFFECTS OF TEMPERATURE AND PHOTOPERIOD ON VEGETATIVE GROWTH AND SEED PRODUCTION OF LEAF LETTUCE (LACTUCA SATIVA L.)

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ABSTRACT

Three leaf lettuce (Lactuca sativa L.) cultivars, Thai, Grand Rapids and Slobolt were grown in a controlled environment at either 25/15°C or 30/20°C day/night temperatures and at 10, 12 or 14 hours daylength. Leaf fresh weight, dry weight, leaf area and leaf number all increased with increasing temperature and photoperiod. Slobolt produced a higher vegetative yield than Thai and Grand Rapids. Long days and high temperatures hastened stem elongation. Flowering in Thai and Grand Rapids was mainly influenced by high temperature whereas Slobolt required both high temperatures and long days. Slobolt however, was considerably delayed in bolting and flowering compared with the other two cultivars.

Lettuce plants showed two definite flowering peaks over a 50 -day flowering period. Slobolt produced only one peak at $25/15^{\circ}$ C due to its slow bolting character.

Seed development studies were carried out on plants grown in both the 25/15°C and 30/20°C temperature regimes and at 12 hours daylength. The higher temperature regime hastened seed maturity, germination and shattering. Lettuce seed reached physiological maturity 11 days after anthesis at 30/20°C and 13 days after anthesis at 25/15°C, when the seed head had just begun to turn brown-green. Germination capacity also reached its maximum at this stage. Shattering however, occurred about two days after seed maturity at 20% moisture content at 30/20°C and 4 - 5 days later at 25/15°C.

The three lettuce cultivars used in this study produced seed successfully in all treatments. Optimum time of harvest was found to occur when the majority of seed heads had turned slightly brown in colour and was also reduced by higher

temperatures and longer daylengths due to earlier bolting and flowering. Highest seed yield was obtained under long days (14 hours). Grand Rapids produced higher seed yields than Thai and Slobolt.

High seed yield was related to increased branch and flower numbers, percentage of seed set or seed numbers per head and time of harvest. Good seed set was obtained only under longer daylengths at high temperature while at 25/15°C, daylength was relatively unimportant. Final seed germination was unaffected by temperature or daylength. Practical application of the results which are relevant to Thailand conditions are discussed.

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