EFFECTS OF DAYLENGTH ON THE GERMINATION OF SCIADOPITYS VERTICILLATA

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The Japanese Umbrellapine makes a beautiful evergreen specimen. It has dark glossy green foliage that is very dense. It is pyramidal in shape and does not tend to lose its lower branches. The needles are arranged in whorls with twenty to thirty arising from each node; in an arrangement similar to that of the ribs of an umbrella. It is from this similarity that it gets its common name This tree is not susceptible to any serious disease and is for all purposes a highly desirable tree.

Why is it then that in spite of all these favorable characteristics the Umbrellapine is seen very rarely. The following facts may explain why it is so scarce and why only a handful of nurserymen propagate it. Vegetative propagation is highly impractical since cuttings are very difficult to root. Thirty per cent rooting after approximately six to nine months is considered phenomenal and this rarely occurs. The seeds are extremely slow to germinate, taking approximately 100 days, and when germination does occur, only two leaves ½″ long are produced that season. The seedling makes extremely slow growth, for, during the following summer only 4 more leaves are produced, so that one year after germination all that is visible is a seedling 1½″ tall with only 6 leaves present. It is only after the fourth year that a more reasonable rate of growth occurs. Apparently to obtain a salable plant, a great deal of time, space and labor are involved.

In previous experiments it has been shown that daylength markedly effects the growth of many evergreen and deciduous trees and shrubs. The seed of the Umbrellapine was included in these experiments to determine the effect of the length of day on germination

Since the seed, which were to be exposed to various periods of light had to be kept constantly moist, the experiment was carried out in a mist bench In each treatment, 100 seeds were placed on the surface of an eight inch pot filled with coarse sand. The lights, which were suspended above the mist nozzles, were operated individually by time-clocks. There were six treatments which provided the following photoperiods (Table 1): (1) nine hours of light and fifteen hours of un-

Table 1—The effect of various photoperiodic treatments on the percentage germination* of Sciadopitys verticillata seed under intermittent mist

Date	Days in Treatment	9	18	24	9/1	9/2	Normal
4/1/56	0	0	0	0	0	0	0
5/9/56	39	4	0	0	0	0	2
5/25/56	55	18	0	0	0	1	6
6/2/56	63	60	0	0	0	1	12
6/16/56	77	76	1	0	4	1	30
8/6/56	127	84	1	2	30	2	43

* 100 seed in each treatment The figures give the percentage of germinated seeds.

interrupted darkness, (2) nine hours of light plus one additional hour of light placed in the middle of the night, thereby dividing the long dark period in two short dark periods, (3) nine hours of light plus two, thirty minute periods of light spaced so that they effectively divided the long dark period into three shorter dark periods, (4) eighteen hours of light with six hours of dark, (5) continuous light without a dark period, and (6) normal daylength. The latter treatment ranged from 13¼ hours on April 1st to a peak of 16½ hours on June 21st and then down to 15¼ hours upon completion of the experiment on August 6th A black cloth was pulled over each treatment at 5 p m. and removed at 8·00 a.m In each plot a nozzle sprayed a fine mist for seven seconds every two minutes. Two, 60-watt incandescent bulbs were placed twenty inches above the seeds and illuminated the cuttings with an intensity of approximately twenty-five foot candles.

Results of this experiment have shown that both the time and the percentage of germination were definitely influenced by the various photoperiodic treatments. Germination occurred first in seed that were subjected to nine hours of light and in seed exposed to normal daylength. In the daylengths of eighteen and twenty-four hours, germination was almost completely inhibited Out of a total of 100 seeds in each treatment only one seed in the eighteen hour and two in the twenty-four hour treatment germinated after 127 days

The one hour light-break and the two, thirty minute light-breaks were effective in counteracting the long dark period effect. Germination was delayed by the single light-break and practically prevented in the double light-break. Thus, the germination response of Umbrellapine seed to photoperiodic treatment appears to be similar to the flowering response of "short-day" plants We can therefore classify Umbrellapine seed as being "short-day" seed However, in order for the seed to respond to protoperiodic treatment they must be leached. Earlier experiments have shown that germination could be increased by leaching the seed with water before sowing. It may be then, that the delay of germination under natural conditions may, in part, be due to the presence of water soluable inhibitors The mist therefore served a twofold purpose in this experiment by preventing the seed from drying while different lighting treatments were applied and also leaching the seed at the same time.

. Several chemical treatments were also tried and of these the most promising was thiourea. Seed that had been soaked for twenty-four hours in a solution of five grams of thiourea in a liter of water germinated earlier than the controls.

MODERATOR COLE: Thank you, Dr. Waxman. Being short on time we will get on to the next paper by Mr Leslie Hancock, Woodland Nurseries, Cooksville, Ontario. His paper is on "Layering of *Cotinus coggygria atropurpurea.*" (Applause)