

NOTES

Seed Germination in Spatterdock (*Nuphar advena* Ait.)¹

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INTRODUCTION

In 1984 Else and Riemer (1) reported that crowding of seeds of fragrant waterlily (*Nymphaea odorata* Ait.) enhanced germination and that this enhancement was due to endogenously-produced ethylene. In an attempt to obtain seedlings of spatterdock (*Nuphar advena* Ait.) for experimental purposes, the author crowded the seeds, reasoning that since they were in the same family (Nymphaeaceae) as fragrant waterlily, they might respond in a similar manner. Because none of these seeds germinated, experiments were conducted on seeds gathered in 1980 and 1983 to determine the effects of crowding and ethylene concentration on germination in this species.

MATERIALS AND METHODS

All seeds used in these studies were obtained from mature fruits collected from Carnegie Lake in Mercer County, New Jersey on 20 September 1980 and 9 September 1983. Following collection, the fruits were allowed to rot undisturbed in water for several weeks, after which periodic washing was begun to remove the decomposing fruit walls.

All germination experiments were conducted in 35 ml glass vials measuring 2.5 cm in diameter and 10.5 cm in height. Seeds were counted and placed into these vials with 20 ml of tap water and the vials were then arranged on a laboratory bench in a completely random pattern at room temperature. Screw caps were set loosely on top of the vials but were not screwed on. Illumination was provided by Vita-Lite® fluorescent light bulbs suspended approximately 45 cm above the tops of the vials, with alternating 12 hour periods of light and darkness.

The experiments were begun on 9 November 1980 and 17 October 1983, respectively. In each case, seeds germinated slowly and sporadically over a long period of time and the experiments were arbitrarily terminated one year after placing the seeds in the vials, although the remaining seeds were still firm and sound and some germination was still occurring. During the course of the year, germinated seeds were periodically counted and removed from the vials.

In the 1980 experiment, ten seed densities were used. These densities were 10, 30, 60, 90, 120, 150, 180, 210, 240, and 270 seeds per vial. In 1983, two experiments were conducted. In the first one, which was designed to confirm the effects of crowding observed in 1980, seven seed densities were used. These densities were 5, 10, 20, 40, 80, 160, and 320 seeds per vial. In the second 1983 experiment, the effect

of ethylene on spatterdock germination was tested by adding ethephon at five concentrations (0, 0.1, 1.0, 10.0, and 100.0 ppm) to vials containing uncrowded seeds (10/vial) or crowded seeds (160/vial). The use of ethephon to determine the response of seeds to ethylene has been well established (2). All experiments were conducted with four replications of each treatment.

RESULTS AND DISCUSSION

Figure 1 represents the average percent germination for each of the various levels of crowding in 1980 and 1983. It is obvious from this graph that increased crowding does not enhance germination in spatterdock as it does in fragrant waterlily. Percent germination actually decreased with increasing seed numbers except for the lowest density tested (5 seeds/vial), where no germination occurred. No explanation can be offered for this apparent anomaly.

In the ethylene experiment, the response of seeds to varying ethephon concentrations was erratic and will not be discussed further in this paper. It is of interest to note, however, that the overall mean germination in this experiment, averaged across all replications and all levels of ethephon, was 9.4% for vials containing ten seeds and 0% for vials containing 160 seeds. These figures agree almost exactly with the crowding experiment of that year, where the corresponding figures were 10% and 0%.

The low germination percentages attained in these experiments and the extended period of time over which germination occurred, indicate that spatterdock seed is dormant when freshly-harvested. It is quite clear from the

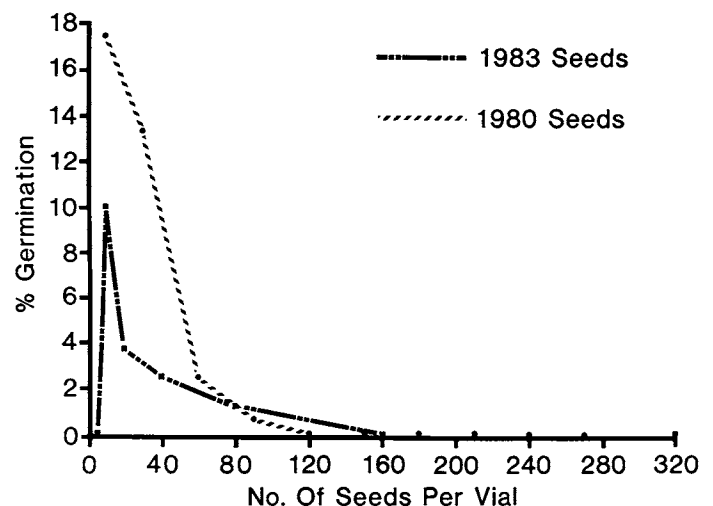


Figure 1. Percent germination of two lots of *Nuphar advena* seed over periods of one year each, at various levels of crowding. (Each data point represents an average of four replications).

¹N.J. Agr. Expt. Sta. Pub. No. D-15180-1-84, supported by State and Hatch Act Funds.

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results reported herein that crowding of the seed (and any resulting accumulation of ethylene that may occur), does not break dormancy as has been reported for fragrant waterlily.

LITERATURE CITED

1. Else, M. J. and D. N. Riemer. 1984. Factors affecting germination of seeds of fragrant waterlily (*Nymphaea odorata*). *J. Aquat. Plant Manage.* 22:22-25.
2. Globerson, D. 1978. Germination and dormancy breaking by ethephon in mature and immature seeds of *Medicago trunculata* and *Trifolium subterraneum*. *Austr. J. of Agric. Res.* 29:43-49.