

# Seed Removal From Young Water Oak Seedlings

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*Seed removal at the emergence stage is detrimental to survival and growth of young water oak seedlings. Removal during initial emergence resulted in high mortality. Removal at the two-leaf stage resulted in reduction in most of the growth components.*

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In 1979, a nursery planting of water oak (*Quercus nigra* L.) seed was made in Ruston, La. The seeds were not treated with repellants; and from past experience, little predator damage was expected. As the seeds began to germinate, birds of several species (primarily redwing blackbirds (*Agelaius phoeniceus*)) began to feed on the seeds attached to the emerging seedlings. Feeding removed the seeds, leaving the emerging seedlings in the soil.

Preliminary observations indicated that, while a large number of the seedlings died when the seed was taken, some did not. Of those that survived, some produced an acceptable seedling while others did poorly.

A controlled study was conducted to determine the effects on seedling growth of seed removal at emergence.

## Materials and Methods

A group of water oak seeds was taken from a collection made in the winter of 1978-79 from a large number of trees located in north central Louisiana. The seeds were mixed to provide randomization and a sample of 240 seeds was taken from the group. Seeds were held in cold storage until planting in July 1979.

The seeds were planted in large (350 ml) Spencer-Lamaire roottrainers. Soil was a 1:1 ratio (by volume) of vermiculite and peat moss. The filled roottrainers were placed in ranks of 40 cavities each and treatments were assigned to the six ranks.

Three treatments were used. Treatment A was a check. Treatment B was seed removal at the two-leaf stage of seedling development. Treatment C was seed removal at emergence.

Removal of the seeds was done with tweezers and a knife to duplicate the cutting and tearing action of the birds. The soil removed from around the seedling root collar was not replaced. Fifteen days were required for sufficient treatments.

Seedlings were watered and fertilized on a regular schedule for 45 days following the last seed removal. The seedlings were then removed from the roottrainers, and measurements for height, diameter (2 cm

above groundline), number of laterals, width of laterals, dry weight above ground, and dry weight below ground were taken.

## Results and Discussion

**Survival.** Seedlings in treatment C (emergence stage) had a 9-percent survival rate. The surviving seedlings were small and did not develop as did the seedlings of the other treatments (table 1). Seedlings in Treatment B (two-leaf stage) had 85-percent survival and generally appeared to be healthy. The check had no mortality during the study period. Poor survival of treatment C eliminated the treatment from the study.

**Seedling performance.** A T-test was used to evaluate treatments A and B. Significant differences between the two seedling groups were detected for height, top diameter, root diameter, dry weight above ground, and dry weight below ground (table 1). A more practical finding was 16-, 22-, and 30-percent increases of the check over treatment B for height, top diameter, and root diameter respectively. More striking are the above- and below-ground dry weights, which were 52 and 62 percent greater in the check.

**Table 1.—**Mean values for seedling performance after seed removal

	Two-leaf stage	Control	Emergence stage <sup>1</sup>
Height (cm)	9.80	11.70**	6.10
Top diameter (mm)	1.40	1.80**	1.30
Root diameter (mm)	1.80	2.70**	.20
Number of laterals	17.90	15.20	26.00
Lateral width	7.80	5.70	3.00
Dry weight below ground (mm)	.11	.23**	.07
Dry weight above ground (mm)	.18	.48**	.08

<sup>1</sup>Significant at the 0.01 level of probability.

<sup>2</sup>Only four seedlings (9%) survived the treatment. This column contains the mean values for those four survivors. The smallness of this sample precluded relevant statistical analysis.

These data indicate that severe damage can occur if the seeds supplying the initial food reserves are lost to the young

oak seedling. The extent of the damage varies with the age and development of the leaf surface and early production of food.

Early seed removal before the two-leaf stage is fatal in most cases. Seed removal after the development of the initial leaves results in better survival than seed removal at emergence. However, seedlings are much smaller and less vigorous than seedlings held intact.

A practical solution is to use an effective chemical or mechanical means to repel the predators. However, if damage does occur, a significant reduction in survival and growth of water oak seedlings can be expected.