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Agronomy 12

TECHNICAL NOTES

TOLERANCE TO FLOODING OF GRASSES AND LEGUMES

by

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Experimental evidence is meager on this subject. Winter floods on dormant plants will cause less permanent injury than summer floods in warm weather. Similarly, moving water will cause less damage than stagnant water. This apparently is an expression of the need of oxygen by plants and the speed with which it is supplied - especially to the roots and to the germinating seeds.

From "Scientific Agriculture", published in Canada, comes this information:

Range in Days of Tolerance to Early Spring Flooding (12" deep)

Species	Mature Plants[1/]	Seedlings[2/]	Seeds[3/]
Alfalfa	14-21	-	7-14
Sweet Clover	10-14	-	7-14
Alsike	14-21	-	7-14
Brome grass	24-28	49-63	35-56
Creeping Red fescue	21-35	21-35	-
Meadow fescue	35-63	49-63	21-42
Orchard grass	14-21	-	-
Reed Canary	49+	35-49	35-56
Timothy	49-63	21-35	21-56

1/ - Spring seeding 2/ - Early fall seeding 3/ - Late fall seeding

All flooded following spring

(over)

AC, WU

Here is another report in the same Journal:

	No. of days flooded without permanent injury	
Alfalfa	10-14	
Birdsfoot trefoil	20-30	(M. Weaver reports 14-20 on muck soil in Central N.Y.)
Bluegrass, Kentucky	25-35	
Bromegrass, smooth	24-28	
Clover, Ladino	10-20	
Clover, Red	7-10	
Clover, sweet	9-12	
Corn	4- 6	(if not over 2" deep)
Field brome	20-30	
Orchard	15-25	
Redtop	25-35	
Reed Canary	49	
Rye	3- 6	
Ryegrass	15-20	(in winter)
Sorghums, grain	14-28	(Plants over 12" high)
Soybeans	5- 8	(if water is moving)
Tall fescue	24-35	
Tall oatgrass	15-20	
Timothy	49	
Wheat, oats, barley	3- 6	

This second group of figures evidently was gathered slightly later in the spring than the first group - at least, the tolerance is less.

In Oklahoma, SCS studied the tolerance to flooding by plants in fluctuating shore lines of impoundments. Of 19 species observed, only 4 grow in New York. The probable period that survival could be expected during the spring with cool water is:

Species	Average number of days
Barnyard grass	30-60
Switch grass	15-30
Tall fescue	10-20
Weeping lovegrass	3- 6

Alfalfa had good survival in winter-spring, but no survival in summer when inundated for 48 hours. It will not survive silting above the crown.

From these results, it is evident that corn, soybeans and small grains (all annuals) are least able to tolerate flooding. Legumes are injured more than grasses, among the forage species. Yet, it is significant that the legumes do stand at least 7 days of flooding in early spring without permanent injury. Of the grasses, Reed canary grass, timothy and tall fescue are the most tolerant of spring flooding, with orchard grass the least tolerant.

In New York State, there are not many conditions where water from a spring flood will stand 12" deep for more than a week. The data indicate our flooding conditions should not seriously injure well-established grass and legume stands. This situation should not be confused with the considerable damage done by ice sheets.

After growth starts in the spring and in later summer weather, the survival decreases very fast.

When predicting the approximate period of safe inundation for a plant, many factors associated with satisfactory survival should be considered. With no particular order of importance, they include: water temperature, duration of submergence, species, age, frequency and depth of flooding, kind of soil, oxygen requirements for root growth, and the rate at which the plant is carrying on transpiration, respiration and photosynthesis.

The foregoing information may be useful in the planning and use of land on the temporary flood plain area above a detention reservoir.

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