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## EC61-717 Watering and Fertilizing Lawns through Sprinklers

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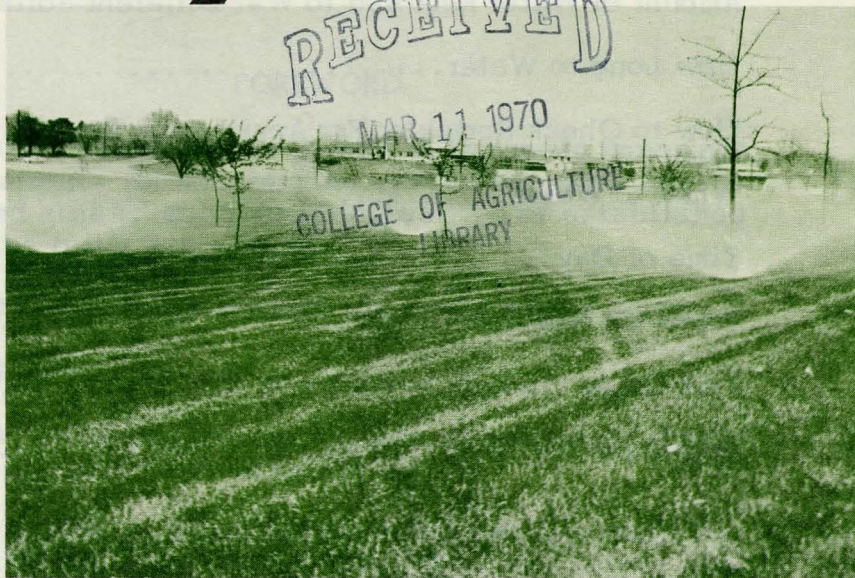
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Watering and Fertilizing Lawns  
through  
SPRINKLERS



EXTENSION SERVICE  
UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE  
AND U. S. DEPARTMENT OF AGRICULTURE  
COOPERATING  
E. F. FROLIK, DEAN      E. W. JANIKE, DIRECTOR

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# Watering and Fertilizing Lawns



by

H. R. Mulliner & H. W. Temple<sup>1/</sup>

## FOREWORD

Proper use of water is one of the most important requirements for maintaining attractive, cool-season grassed areas, such as bluegrass. For established turf, the rules are simple:

- (1) Irrigate only when the grass needs water.
- (2) Water deeply.
- (3) Avoid the common mistake of sprinkling lightly every day just "to cool things off."

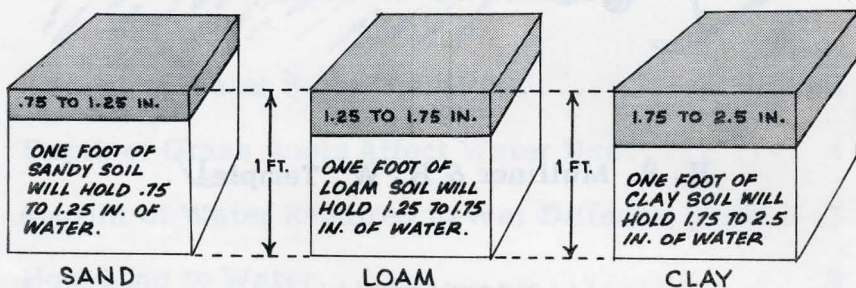
By following these simple rules you can avoid unfavorable soil conditions, save fertilizer, reduce disease, insect, and weed problems, and improve the quality of the turf.

<sup>1/</sup>Assistant Professor, Agricultural Engineering (Agricultural Extension), Assistant Extension Agriculturist, respectively.



## AMOUNT OF WATER SOILS CAN HOLD

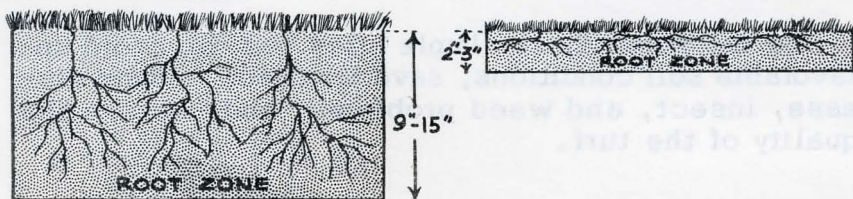
The amount of water a soil can hold depends upon its texture, or size of soil particles, and its depth. The illustrations below show why grass on sandy soils must be watered more often. Too much water is as much a problem as too little. Air in the soil is as important as water for the growth of grass.



Sand particles are much larger than clay particles; thus sands have less area on which to store water.

## DEPTH OF GRASS ROOTS AFFECTS WATER USE

The plant can use soil moisture only to the depth the roots have penetrated. The deeper the grass roots, the longer the period between irrigations. On deep clay soils, bluegrass roots have been known to use most of the available soil moisture to a depth of 2.5 feet.<sup>1/</sup>



Normal bluegrass lawn root development under good irrigation practices.

Root depth when too frequent and too light waterings are used.

<sup>1/</sup>Robert M. Hagen, Chairman, Department of Irrigation, University of California, Davis, California.

## WATER REQUIRED TO WET DIFFERENT SOILS TO DIFFERENT DEPTHS

Dry Soil  
(Grass Wilted)

Half of Moisture Removed  
(Grass in Excellent Condition)

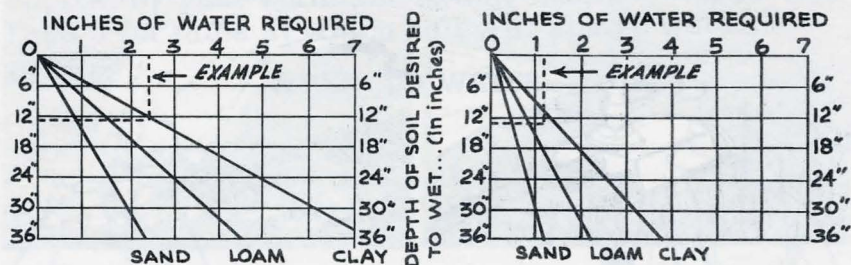


Figure I

Figure I shows that 2.5 inches of water is required to wet a dry clay soil to a depth of 12 inches. But a clay soil that has half of the available moisture removed requires only 1.25 inches of water to wet it to a depth of 12 inches.

The rates at which soils with grass cover will absorb water are:

- Sands - 0.7 to 0.9 inches per hour
- Loams - 0.3 to 0.5 inches per hour
- Clays - 0.15 to 0.25 inches per hour

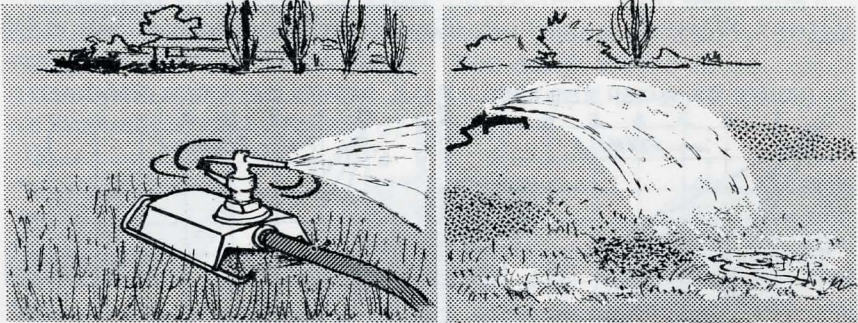
### HOW LONG TO WATER

Water to a depth of 9 to 15 inches. This will include the root penetration of most lawn grasses. Shrubs and tree roots in grassed areas will use any moisture which penetrates below this depth. Assuming that  $\frac{1}{2}$  of the water in the first foot of soil has been used by the grass, watering to this depth will take approximately the following time: (Figures are based on a sprinkler which puts out  $\frac{1}{3}$  of an inch per hour)

- Sands - 1 to 2 hours
- Loams - 2 to 3 hours
- Clays - 4 to 5 hours



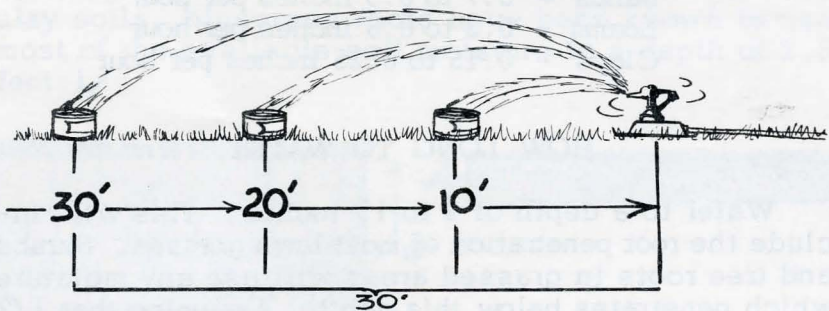
Choosing a Sprinkler: Select a sprinkler which will not cause too much runoff and one that will cover the lawn evenly with water.



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### HOW TO CHECK YOUR SPRINKLER FOR APPLICATION RATE

1. Place rain gauges or coffee cans as shown in illustration. Space cans equally from sprinkler to outer edge of wetted area.
2. Run sprinkler at full force for one hour.
3. Measure amount of water in each can. This measurement is equal to the amount of water in inches that has fallen at this point.

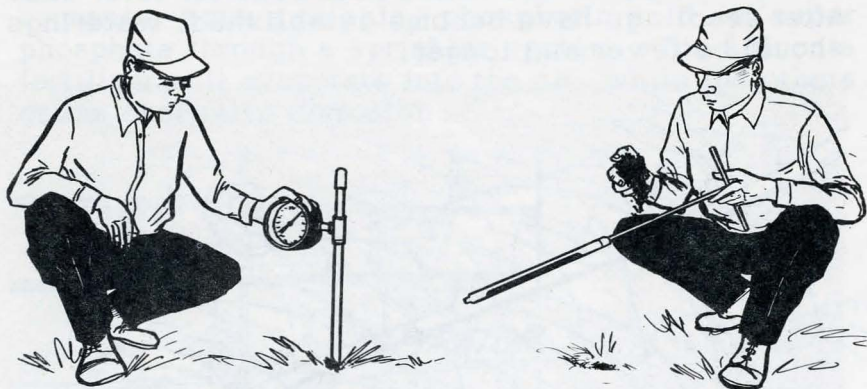


### How to Use This Information

1. Average lawns should be watered to a depth of approximately 12 inches.
2. Refer to Figure 1, page 5, for information on how much water is needed to penetrate your particular soil one foot.

3. Divide inches of water required to wet one foot of soil by the amount of water your sprinkler will apply in one hour. This will give you the approximate number of hours needed for watering one area of your lawn. (Be sure that your soil will absorb the amount of water applied by your sprinkler in that length of time. See Page 5 for rates at which soil will absorb water.)

### WHEN TO WATER



#### Check soil, not condition of grass, for moisture

Soil moisture needs can be learned in two ways: (1) By using a soil probe and feeling the soil with the hand, or (2) by using gauges which give a soil moisture reading, such as tensiometers. Water when  $1/2$  to  $3/4$  of the available soil moisture has been used by the grass. This will keep the lawn green and growing. Grass with some deep roots can show considerable wilting with little risk of losing the stand. In most of the state, watering will be needed in addition to rain during the growing season.

### TIME OF DAY

#### Early Morning Watering Best in Mid-Summer

In most cases, the time of watering makes little difference. In mid-summer, however, certain fungus diseases may be aggravated by keeping the grass blades wet for long periods at a time. Thus, it is best to water early and let the sun dry the grass quickly.

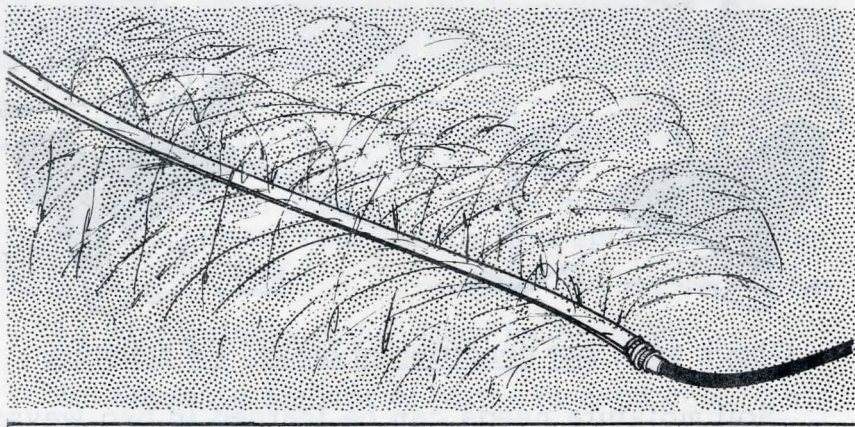


## WATERING NEW LAWNS

### Frequent Light Waterings Until Germinated

Water new lawns lightly with a fine spray twice a day until all grass germinates.

Watering before seeding a new lawn helps firm the seedbed and fills the future root zone for later use. After seedlings have become established, waterings should be fewer and longer.



## FERTILIZING THROUGH IRRIGATION WATER

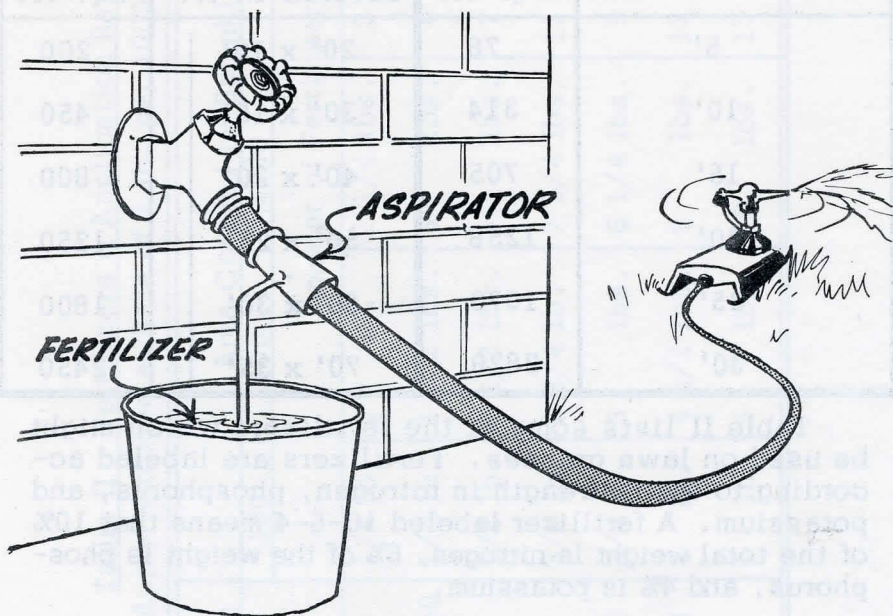
### Applying Fertilizer Through Water Saves Labor and Time

Nitrogen is the element most needed by turf grasses. Phosphorus also helps growth and should be used where soil tests show a need. The application of from 1 to 2 pounds of available nitrogen per 1000 square feet of lawn is recommended two to four times per year. Suggested dates and rates are:

1. Top Lawn - Two pounds of nitrogen per 1000 sq. ft. on April 1, then one pound each on May 15, July 1, and August 15, then a two pound application on October 1.

2. Average Lawn - Two pounds of nitrogen per 1000 sq. ft., March 1 to April 1, then two pounds around September 15 to October 15.

Run the fertilizer through the sprinkler system (see drawing). Then allow water to run an extra 10 minutes to flush the system and wash the fertilizer off the grass. Fertilizer solutions can be drawn into the sprinkler system with an aspirator. This device usually is attached to the water faucet and then the hose attached to the aspirator. Aspirators reduce water pressure, therefore, be sure to have one which will allow the sprinkler to operate properly. Do not apply anhydrous ammonia, aqua ammonia, phosphoric acid, or super phosphate through a sprinkler system. The ammonia fertilizer will evaporate into the air, while the others cause excessive corrosion.



#### AMOUNT OF FERTILIZER TO APPLY IN WATER

##### Measure Distance Sprinkler Covers

To find the amount of fertilizer to apply, measure the radius (center to edge) of the area covered by a circular sprinkler, or the length and width of the area covered by a rectangular sprinkler, then refer to Table I for the square feet in the area covered. For the amount of fertilizer needed for this area, refer to Table II.



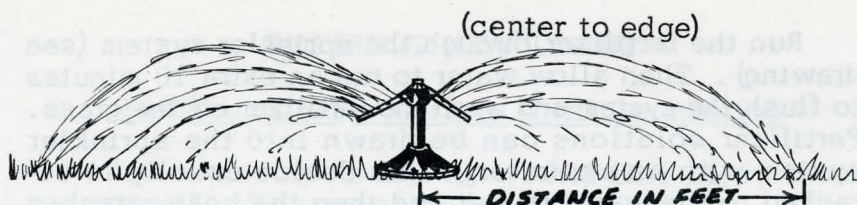


Table I. Area Covered By Sprinkler

Circular Pattern (measure from center to edge)		Rectangular Pattern	
Radius covered by sprinkler in feet	Area in sq. ft.	Length & Width covered in ft.	Area in sq. ft.
5'	78	20' x 10'	200
10'	314	30' x 15'	450
15'	705	40' x 20'	800
20'	1258	50' x 25'	1250
25'	1970	60' x 30'	1800
30'	2820	70' x 35'	2450

Table II lists some of the fertilizers which might be used on lawn grasses. Fertilizers are labeled according to their strength in nitrogen, phosphorus, and potassium. A fertilizer labeled 10-6-4 means that 10% of the total weight is nitrogen, 6% of the weight is phosphorus, and 4% is potassium.

Example: Assume the following: (1) One pound of nitrogen wanted per 1000 sq. ft., (2) Sprinkler covers a rectangular pattern with a length of 50 feet and width of 25 feet, (3) The fertilizer will be Ammonium Nitrate (33.5 - 0 - 0). From Table I, find area of 50' x 25' equals 1250 sq. ft. Next, from Table II, follow Ammonium Nitrate across to the column under 1000 sq. ft. The amount of fertilizer required is 3 pounds. An area of 1500 sq. ft. requires 4 1/2 pounds of fertilizer. Since the area covered by the sprinkler in the example is midway between 1000 sq. ft. and 1500 sq. ft., apply 3 3/4 lbs. of fertilizer during each sprinkler set.



Table II. Fertilizers & Application Rates  
(To Apply Nitrogen at Rate of 1 lb. per 1000 Sq. Ft.)

Name of Fertilizer	Analysis	Area Covered by Sprinkler in Sq. Ft.				
		100	500	1000	1500	2000
		Amount of Fertilizer to Apply				
Urea	45-0-0	1/4 lb.	1 lb.	2 1/4 lbs.	3 1/4 lbs.	4 1/2 lbs.
Ammonium Nitrate	33.5-0-0	1/4 lb.	1 1/2 lbs.	3 lbs.	4 1/2 lbs.	6 lbs.
Ammonium Sulphate	20-0-0	1/2 lb.	2 1/2 lbs.	5 lbs.	7 1/2 lbs.	10 lbs.
Ammonium Phosphate	13-39-0	3/4 lb.	3 3/4 lb.	7 3/4 lbs.	11 1/2 lbs.	15 1/2 lbs.
Ammonium Phosphate	16-20-0	3/4 lb.	3 lbs.	6 1/4 lbs.	9 1/2 lbs.	12 1/2 lbs.
Ammonium Phosphate	11-18-0	1 lb.	4 1/2 lbs.	9 lbs.	13 3/5 lbs.	18 1/5 lbs.
Others	10-6-4 or less	1 lb.	5 lbs.	10 lbs.	15 lbs.	20 lbs.