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### G83-659 Irrigating Onions

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## Irrigating Onions

**This NebGuide outlines the onion's water requirements as it develops through the season and how to best meet them to assure marketable grade and optimum yield.**

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Growing an irrigationd crop of onions is a very involved process. This is because the onion is a shallow rooted biennial that depends on daylength and temperature for the development of the marketable product—the bulb.

The onion growing season starts in April and continues through early September. The plant establishes roots at the rate of five per week from germination until mid-July when a peak number of 50 to 55 roots are present. The number of functioning roots decreases after this time at a rate of five per week until harvest. The maximum number of leaves is reached by early July. Bulb formation starts in mid- to late June.

The onion irrigator needs to maintain an adequate supply of available soil moisture during the *entire* growing season. Because onions have a shallow root system and climatic conditions vary from year to year, schedules for exact amounts and dates for applying water are not feasible. Thus, irrigation decisions based on soil moisture content return the most to management.

Soil moisture content should be at field capacity, to a depth of at least two feet at planting time. Onion seed is planted about one inch deep; therefore moisture must be continually available within an inch of the soil surface until germination and stand establishment have occurred. Uniform germination and stand establishment are important because both are directly related to the marketable grade and ultimate yield of the onion crop.

If the soil is dry at planting time, irrigation is needed to provide moisture to germinate the seed. If using surface irrigation, have the field bedded and irrigationd before planting. Furrows made after planting expose soil which has not been treated with herbicides. These furrows will be shallow and water will have to be run slowly in them. Water running over these furrows will cause washouts and puddling of the soil in the seed row. When these soils dry, the surfaces develop a crust which will crack as drying continues.

Sprinkler irrigation is a good method of irrigating onions and will eliminate the problem of furrowing. It also provides a sure way to activate preemergence herbicides. Regardless of the irrigation method used, make provisions for irrigation before or just after planting to assure good germination and early growth.

If water is withheld, young plants will continue growth until all available soil moisture within the reaches of

their shallow root system has been used. When this happens, the root hairs begin to die, the plants respond by wilting, and if drought conditions persist, the plants cease to grow. Absorption of soil water and nutrients for plant growth take place through the outermost cells of the root hairs. Therefore, moisture stressed plants must reestablish functioning root hairs before normal growth will resume.

Plants stressed prior to bulb formation result in reduced bulb size with many not large enough to make grade. Those stressed after bulb formation are prone to regrowth problems, such as thick necks and scallions, which reduce grade and increase storage problems. Plants that do not develop regrowth problems are unthrifty and mature early. The duration of the moisture stress determines the degree of yield and grade loss.

The depth of soil penetration by roots is known as the root zone. The root zone for onions increases during the season to a depth of 30 inches on a deep soil. Seventy five percent of the total water used by the onion is extracted from the top 12 inches of the root zone.

The peak water use of onions occurs during an eight-week period from late June to mid-August and is about 0.20 inch of water per day. Therefore, nearly 1.5 inches of water from rainfall or irrigation is needed each week for top production. It is best to irrigate onions at the point when about half of the moisture *in the root zone* has been used. The amount of water available will vary with the depth of the root zone and the texture of the soil.

To determine available water in the soil, use any one of the following three methods:

1. Use a soil tube or auger and feel chart to check the soil moisture conditions within the root zone.
2. When using a tensiometer, place one at the 8-inch depth in the onion row and irrigate at 40 centibars tension on a fine sandy soil.
3. Place an electrical resistance block at the 8-inch depth in the onion row and irrigate when the meter reading indicates that half of the moisture is gone for a sandy loam or finer-textured soil. (See NebGuide G77-340, *Scheduling Irrigations by Electrical Resistance Blocks* for more information).

These soil moisture measurement methods can indicate when the soil becomes too dry or if excess irrigation water is being applied.

A good rule to follow in checking for irrigation need is to examine the soil around the root plate of the onion. This soil should be moist but not wet, and never dry. Onions require light but frequent irrigation. For successful production, the onion grower needs an ample and readily available supply of water for irrigation throughout the *entire* onion growing season.

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