

## USE OF PLASTIC MULCH

Black plastic mulch laid before planting aids in weed control, reduces root pruning, and gives profitable increases in early yields of warm-season crops. Wavelength-selective and clear mulches typically lead to greater early yields than black plastic, but weed growth under the mulches may be a problem. This is particularly true for clear mulch. Because leaching is retarded, less fertilizer is lost, and nitrogen sidedressing is often unnecessary with the plastic mulch. If nitrogen needs to be added, it can be applied later through the irrigation system.

Try to lay the plastic as early in the season as possible, such as from mid to late April. It should be laid as soon as the ground can be worked after a heavy rain. Plastic mulch

should be laid over moist soil. If the plastic is laid over dry soil, it will actually delay subsequent transplant growth. It is better that the plastic be laid at midday so that it can be stretched tight. Do not overstretch because cool nights may actually cause the plastic to tear.

The seedbed should be as fine as possible so you can get a good covering; rototilling is preferred. The plastic is laid by burying about 6 inches of each edge.

A disadvantage of plastic mulch is disposal at the end of the season. Many landfills do not accept plastic mulches. Photodegradable plastic mulches are available. They degrade into small pieces of plastic that remain in the environment. Biodegradable plastic mulches are not yet widely available.

## IRRIGATION AND WATER MANAGEMENT

Vegetables require an adequate supply of moisture throughout their entire growth. While the frequency and amount of water may vary depending on the individual vegetable crop, the age of the crop, current soil moisture, and type of soil and weather conditions, generally 1 to 1.5 acre inches of water are required each week.

### Effective Rooting Depth of Selected Vegetables

<u>Shallow</u> (6-12")	<u>Moderate</u> (18-24")	<u>Deep</u> (> 36")
Beet	Cabbage, Brussels Sprouts	Asparagus
Broccoli	Cucumber	Lima Bean
Carrot	Eggplant	Pumpkin
Cauliflower	Muskmelon	Squash, Winter
Celery	Pea	Sweet Potato
Greens & Herbs	Pepper	Watermelon
Onion	Potato	
Radish	Snap Bean	
Spinach	Squash, Summer	
	Sweet Corn	
	Tomato	

<u>Crop*</u>	<u>Most Critical Period</u>
1. broccoli, cabbage, cauliflower, lettuce	head development
2. carrot, radish, beet, turnip	root enlargement
3. sweet corn	silking, tasseling, and ear development
4. cucumber, eggplant, pepper, melon, tomato	flowering, fruit set, and maturation
5. bean, pea	flowering, fruit set, and development
6. onion	bulb development
7. potato	tuber set and enlargement

\*For transplants, transplanting and stand establishment represent a most critical period for adequate water.

## IRRIGATION AND WATER MANAGEMENT (CONT.)

The total available water holding capacity (AWHC) for a given location depends on the soil texture, organic matter, and rooting depth. Irrigations should be initiated for most crops before 50 percent of the available water is removed by the plants in the active root zone. A majority of the roots for most vegetable crops, however, are usually within the top 6 to 18 inches. AWHC estimations are best obtained from the county soil survey or the local Soil and Water Conservation District office. **Table 1** shows AWHC estimations for some typical soil textures in the upper Midwest.

Soil Texture	Available Water Holding Capacity	
	Inch Per inch of Soil	Inch Per Foot of Soil
Loamy fine sand	.08 - .12	0.96 - 1.44
Sandy loam	.10 - .18	1.20 - 2.16
Loam	.14 - .22	1.68 - 2.64
Silt loam	.18 - .23	2.16 - 2.76
Clay loam	.16 - .18	1.92 - 2.16

### Soil Water Monitoring

Two common ways of estimating soil water deficit to assist an operator in irrigation scheduling are (1) soil water tension with soil moisture sensors and (2) the feel and appearance method with the soil probe.

**Soil water tension** can be monitored at a given point in the active root zone by electrical resistance moisture blocks or tensiometers. Soil tension or suction is a measurement usually expressed in centibars that describes how tightly water is held to the soil particles.

If the soil texture is known, the amount of soil water deficit for a given tension reading can be estimated by the use of **Table 2**. Tensiometers directly read soil tension between 0 and 80 centibars and work best in sandy loam or lighter textured soils. Resistance blocks work in a wider range of soil textures, and some types work as well in lighter textured soils, as do tensiometers.

To obtain representative soil tension readings with any sensor, the sensors should be left installed throughout the irrigation season and preferably at two or more locations in the field. Two depths are generally desired at each location. These depths should be about one-third and two-thirds of the active root zone or at around 6 and 12 inches.

The **feel/appearance** method involves collecting soil samples in the root zone with a probe or a spade. The soil water depletion of each sample can be estimated by feeling the soil and comparing its appearance to the description in **Table 3**. Soil samples should be taken from the top six to 12 inches in the root zone and at several locations in the field. Sum up the estimations from various depths for one location to estimate the total soil water depletion in the root zone. The operator must use this method frequently in order to perfect the art of consistently estimating soil water.

More information on in-field soil moisture monitoring tools may be obtained from your local county Extension office.

Soil Texture	Soil Tension in Centibars						
	10	30	50	70	100	200	1500*
	Soil Water Deficit - Inches Per Foot of Soil						
Coarse sands	0	0.1	0.2	0.3	0.4	0.6	0.7
Fine sands	0	0.3	0.4	0.6	0.7	0.9	1.1
Loamy sands	0	0.4	0.5	0.8	0.9	1.1	1.4
Sandy loam	0	0.5	0.7	0.9	1.0	1.3	1.7
Loam	0	0.2	0.5	0.8	1.0	1.6	2.4

\*1500 cbs refers to the permanent wilting point and the soil deficit value is equal to the soil's total available water capacity

## IRRIGATION AND WATER MANAGEMENT (CONT.)

**Table 3. Guide for Judging Soil Water Deficit Based on Soil Feel and Appearance for Several Soil Textures**

Soil Texture Classification				
Moisture deficiency in./ft.	Coarse (loamy sand)	Sandy (sandy loam)	Medium (loam)	Fine (clay loam)
.0	(field capacity) Leaves wet outline on hand when squeezed.	(field capacity) Appears very dark. Leaves wet outline on hand. Makes ribbon out about one inch.	(field capacity) Appears very dark. Leaves wet outline on hand. Will when squeezed.	(field capacity) Appears very dark. Leaves slight moisture on hands. Will ribbon out about two in.
.2	Appears moist. Makes a short ribbon. Makes a weak ball.	Quite dark color. Makes a hard ball.	Dark color. Forms a plastic ball. Slicks when rubbed.	Dark color. Will slick and ribbons easily.
.4	Appears slightly moist. Sticks together slightly.	Fairly dark color. Makes a good ball.	Quite dark. Forms a hard ball.	Quite dark. Will make thick ribbon. May slick when rubbed.
.6	Appears to be dry. Will not form a ball under pressure.	Slightly dark color. Makes a weak ball	Fairly dark. Forms a good ball.	Fairly dark. Makes a good ball.
.8	Dry, loose, single-grained. Flows through fingers. (wilting point)	Lightly colored by moisture. Will not ball.	Slightly dark. Forms weak ball.	Will ball. Small clods will flatten out rather than crumble.
1.0		Very slight color due to moisture. Loose. Flows through fingers. (wilting point)	Lightly colored. Small clods crumble fairly easily.	Slightly dark. Clods crumble.
1.2			Slight color due to moisture. Powdery. Dry. Sometimes slightly crusted but easily broken down in powdery condition. (wilting point)	Some darkness due to un-available moisture. Hard, baked. Cracked. Sometimes has loose crumbs on surface. (wilting point)
1.4				
1.6				
1.8				
2.0				