AN ASSIGNMENT ON

GROWTH STAGES OF MAIZE PLANT

Submitted to

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Level-4, Semester- 1
Session: 2018-2019
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Maize

Maize, also known as corn, is a cereal grain that belongs to the grass family Poaceae. It is one of the most important staple crops in the world, cultivated for its edible seeds and as a feed for livestock. Maize is widely grown in many countries and serves as a significant source of food, livestock feed, and various industrial products. Maize was first domesticated by indigenous peoples in southern Mexico about 10,000 years ago. It spread to other parts of the Americas and eventually became a major food crop for various civilizations, including the Maya and the Aztecs. After Christopher Columbus's voyages to the Americas, maize was introduced to Europe and later to Africa and Asia, becoming a staple crop in many parts of the world.

Scientific classification	
Kingdom:	Plantae
Clade:	Tracheophytes
Clade:	Angiosperms
Clade:	Monocots
Clade:	Commelinids
Order:	Poales
Family:	Poaceae
Subfamily:	Panicoideae
Genus:	*Zea*
Species:	***Z. mays***
Binomial name	
Zea mays	

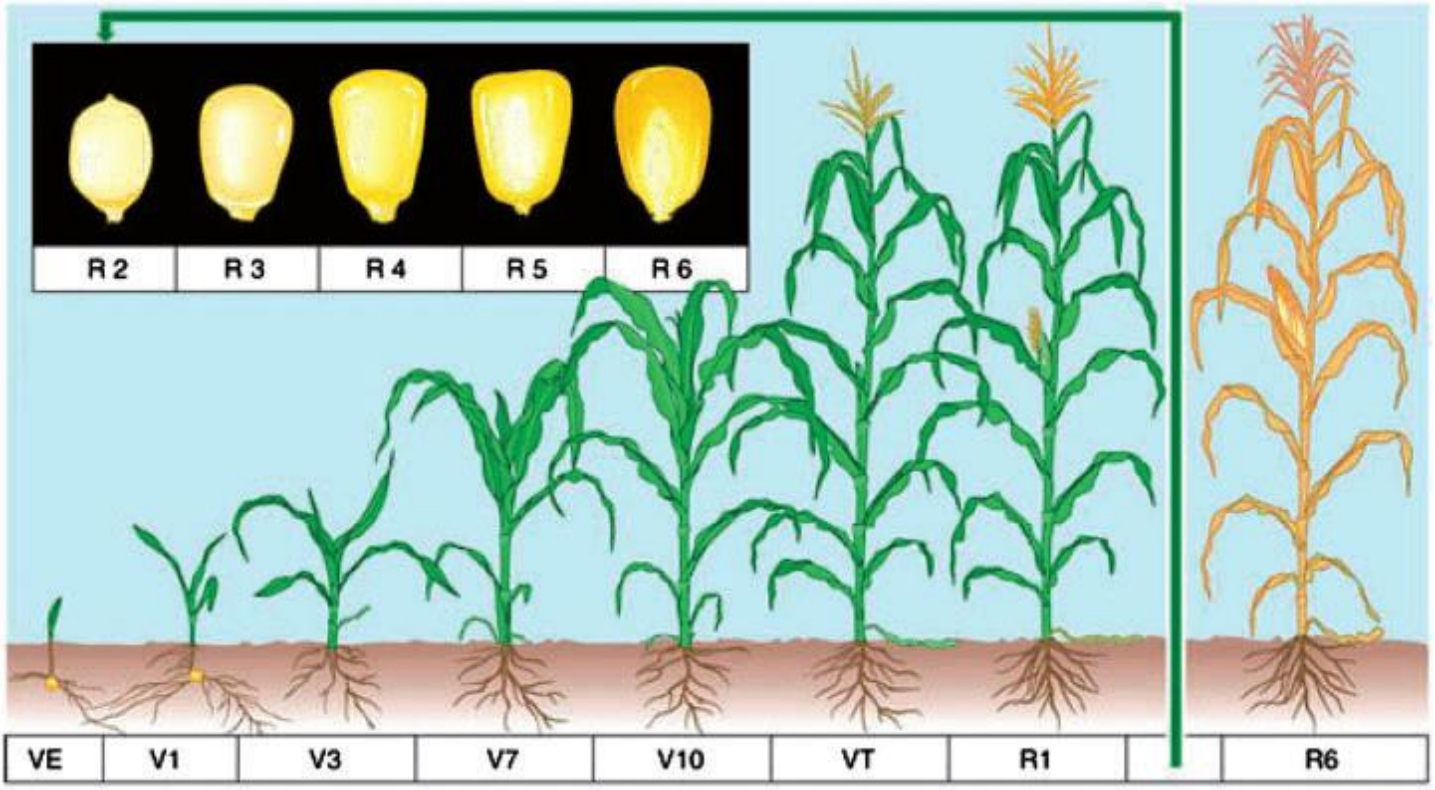
Common morphological features of maize:

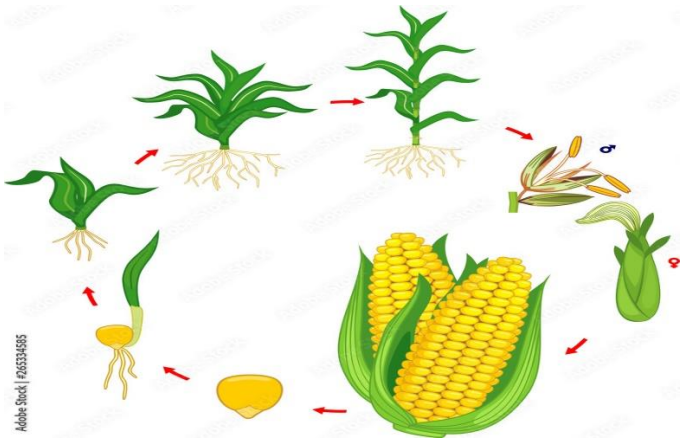
1. **Stalk (stem):** Maize plants have tall, sturdy, and upright stems, which can vary in height depending on the variety. The stem is typically composed of nodes and internodes.
2. **Leaves:** Maize leaves are long, flat, and typically lanceolate (narrow and tapering to a point). They are arranged alternately on the stem and have a prominent midrib (central vein).
3. **Roots:** Maize has a fibrous root system, which means it has numerous small lateral roots. The primary (tap) root system can be deep, which aids in anchoring the plant and absorbing water and nutrients from the soil.
4. **Tassel:** The tassel is the male reproductive structure of the maize plant. It is typically located at the top of the plant and consists of a central stalk with many small branches, each bearing pollen-producing anthers.
5. **Ear (cob):** The ear is the female reproductive structure of maize. It develops at the leaf axils on the main stem and is covered by several layers of modified leaves called husks. The ear contains rows of kernels attached to a central core or cob.
6. **Silk:** Maize plants produce silks, which are long, thread-like structures that emerge from the tip of each ear. Silks are the female flower structures, and they catch pollen released from the tassel for fertilization. Each silk corresponds to a potential kernel on the cob.
7. **Kernels:** Kernels are the individual seeds of maize and are typically arranged in rows on the cob. Each kernel is composed of the endosperm, germ, and outer pericarp layers. The color and size of the kernels can vary depending on the maize variety.
8. **Husks:** The husks are the outer protective layers that surround the ear of maize. They are composed of modified leaves and help protect the developing kernels.
9. **Cob:** The cob is the central structure to which the kernels are attached. It contains the receptacle tissue where fertilization and kernel development occur.
10. **Glumes:** Maize kernels are enclosed within glumes, which are the two specialized leaves that cover each kernel. These glumes help protect the kernel during development.
11. **Culm (leaf sheath):** The lower part of the maize plant's leaves wraps around the stem forming leaf sheaths, which help support the plant.

These are the primary morphological features of maize plants, and they play important roles in the plant's growth, reproduction, and seed production. Different maize varieties can exhibit variations in these features.

Different Growth Stage of Maize

1. **Germination:** The first stage of maize growth begins with germination. The seed absorbs water and swells, cracking its seed coat. A radicle (embryonic root) emerges, followed by a shoot which grows upward, eventually breaking through the soil surface.
2. **Seedling Stage:** During this stage, the maize plant develops its first set of leaves (cotyledon leaves) followed by several true leaves. The seedling grows rapidly and establishes a strong root system.
3. **Vegetative Stage:** In this stage, the plant enters a period of rapid growth. More leaves develop, and the plant increases in height and girth. The number of leaves increases, and they are arranged alternately along the stem. The plant focuses on building a strong vegetative structure.
4. **V12 to V18 Stage:** These stages are denoted by the number of leaves with visible collars (where the leaf joins the stem). V12 represents 12 leaves with collars visible, and so on up to V18. During these stages, the plant is actively growing and preparing for reproduction.
5. **Tasseling (VT Stage):** The tasseling stage is a crucial reproductive phase. The tassel, located at the top of the plant, produces pollen, which is essential for fertilizing the female flowers on the ears.
6. **Silking (R1 Stage):** Simultaneously with tasseling, the ears produce silk, the female flower parts. Each silk represents a potential kernel. The silks are the receptive part of the plant where pollen lands, leading to fertilization.
7. **Kernel Development (R2 to R6 Stages):**
    - **R2 (Blister Stage):** Kernels are filling with a milky fluid, and the cob is getting thicker.
    - **R3 (Milk Stage):** Kernels are mostly filled with a milky fluid. This is the stage when sweet corn is typically harvested.
    - **R4 (Dough Stage):** The milky fluid in the kernels begins to solidify, and the kernels are in a doughy state.
    - **R5 (Dent Stage):** The kernels are hardening, and a dent appears at the top of each kernel.
    - **R6 (Physiological Maturity):** The kernels have reached maximum dry weight and moisture content. The plant and kernels are fully mature. This is the stage at which field corn is harvested for grain.


R2
R3
R4
R5
R6
VE
V1
V3
V7
V10
VT
R1
R6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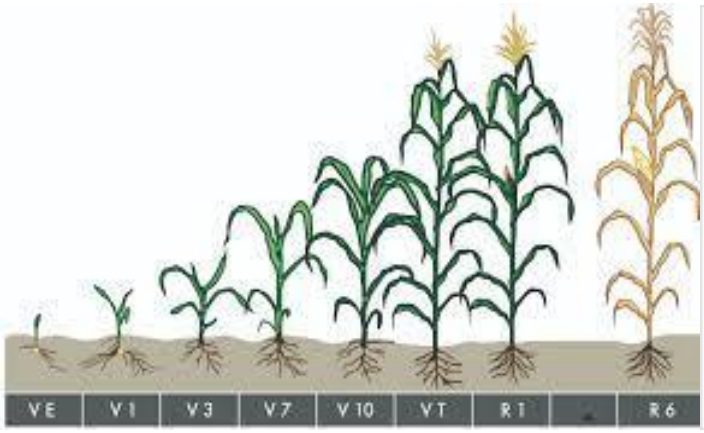
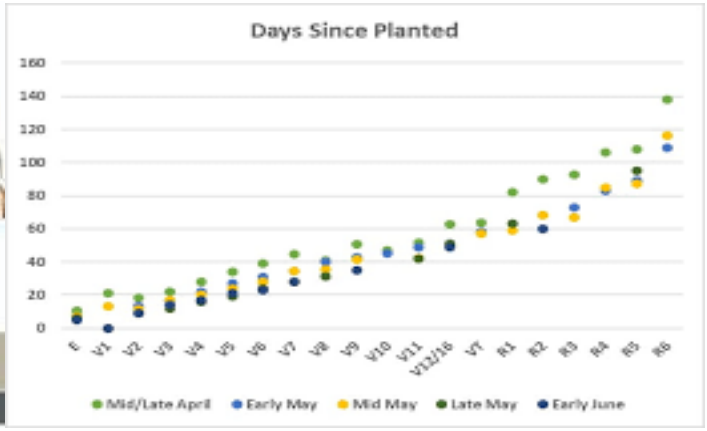
Understanding these stages is crucial for farmers as it helps them make decisions regarding irrigation, fertilization, pest control, and ultimately, the timing of harvest. Each stage has specific characteristics and requirements, ensuring the successful growth of maize crops.

Growth degree days:

Growing Degree days are a daily accumulation of heat for crop growth. Corn does not grow when temperatures are below 50°F, and temperatures above 86°F do not increase plant growth rate. The hybrid seed tag GDD ratings are determined from planting to black layer formation. Hybrids typically use about 200 fewer GDD's to mature in PA compared to some Midwestern locations. Corn Growing Degree Day Formula (Daily High + Daily Low) / 2 – 50 If the number from this equation is a negative number we use "0" GDD's for Corn. Also a daily high temperature above 86°F is entered as 86°F, above that temperature we do not get significant growth. Examples (51°F Daily High + 29°F Daily Low)/2-50 = (80)/2=40-50 = -10 A negative number is recorded as 0 Corn GDD for that day or 0 Corn daily heat units. (76°F Daily High + 40°F Daily Low)/2-50 = (116)/2=58 -50 = 8 8 Corn GDD's for that day or 8 Corn daily heat units. (94°F Daily High + 67°F Daily Low)/2-50 = in this case we enter 86°F as the high (anything over 86°F is entered as 86) so this will be (86+ 67) = (153)/2=76.5-50 = 26.5 So we have 26.5 Corn GDD's for that day or 26.5 Corn daily heat units. Each day we add the daily heat units from the time the corn has emerged and accumulate them day after days.





Treatments	Emergance		50% Tasseling		50% Silking		Dough stage		Physiological maturity	
	2012	2013	2012	2013	2012	2013	2012	2013	2012	2013
Subsoil compaction levels										
C0	195.8	245.8	1067.6	1182.1	1181.6	1268.7	1688.4	1596.7	1956.9	1894.1
C1	191.7	186.4	1119.2	1223.4	1216.0	1339.2	1627.2	1564.5	1909.5	1844
C2	187.6	182.0	1143.2	1276.8	1261.0	1362.7	1573.3	1501.8	1847.7	1774.5
Mean	191.7	204.7	1110.0	1227.4	1219.5	1323.5	1629.6	1554.3	1904.7	1837.5
Nitrogen levels										
N0	189.6	204.3	1134.5	1256.1	1245.3	1356.2	1598.6	1518.6	1873.0	1804.0
N1	193.7	204.3	1114.1	1219.6	1219.7	1320.4	1634.6	1554.2	1906.0	1826.8
N2	191.7	209.8	1084.3	1203.6	1193.3	1292.8	1661.6	1594.7	1935.2	1881.3
Mean	191.6	206.1	1110.9	1226.4	1219.4	1323.1	1631.6	1555.8	1904.7	1837.3