

Agricultural Biotechnology Program

Agronomy 3 (Crop Production) AG 0103

(3 CREDIT HOURS)

LECTURE 2 (Maize or Corn)

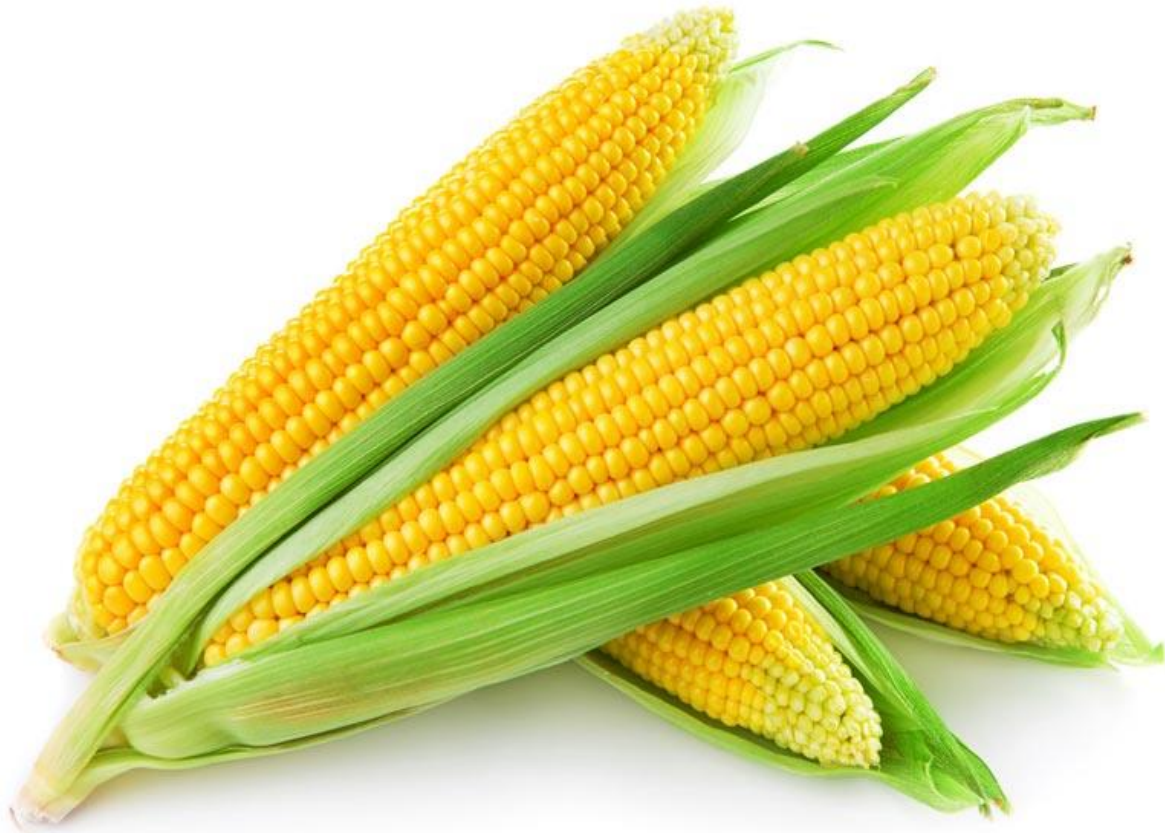
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Rules



Quiz

- **The “Three Sisters” are...**

- a) Corn, beans, and squash
- b) Rice, beans, and lettuce
- c) Squash, corn, and tomatoes
- d) Wheat, rice, and corn

- **Which crop will make more oil in the seed?**

- a) wheat
- b) corn
- c) soybean

Student Learning Objectives

- Identify corn and its uses.
- Identify areas where corn is grown.
- Describe the different types of corn.
- Describe the soil and climatic requirements of corn plants.
- Explain the cultural practices of corn production.



What is corn and
what are its
uses?

Corn or Maize

Maize (*Zea mays* L.) is one of the most important cereal crops grown principally during the summer season in Egypt. It ranks the third position among cereal crops after wheat and rice, which ranked as first and the second, respectively. Maize agronomists continually search for methods that help them increase grain yield and net return of producing the crop. It is often referred to as the “king” of the grain crops.

what are its uses?

- It is used for both human and animal consumption and its by-products can be used to make numerous non-food products.(fuel, plastic)

Where is corn grown?

Where is corn grown?

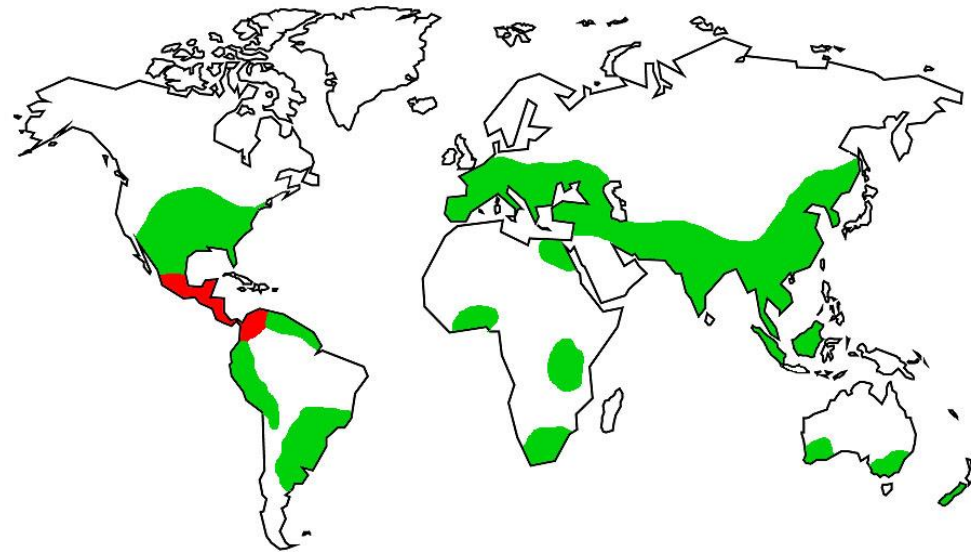
- Corn was domesticated in Mexico around 9000 B.C.
- It is the most important grain crop in the United States and is one of the leading grain crops world-wide.
- Most of the US corn crop is grown throughout the Midwest, the region is known as the corn belt.



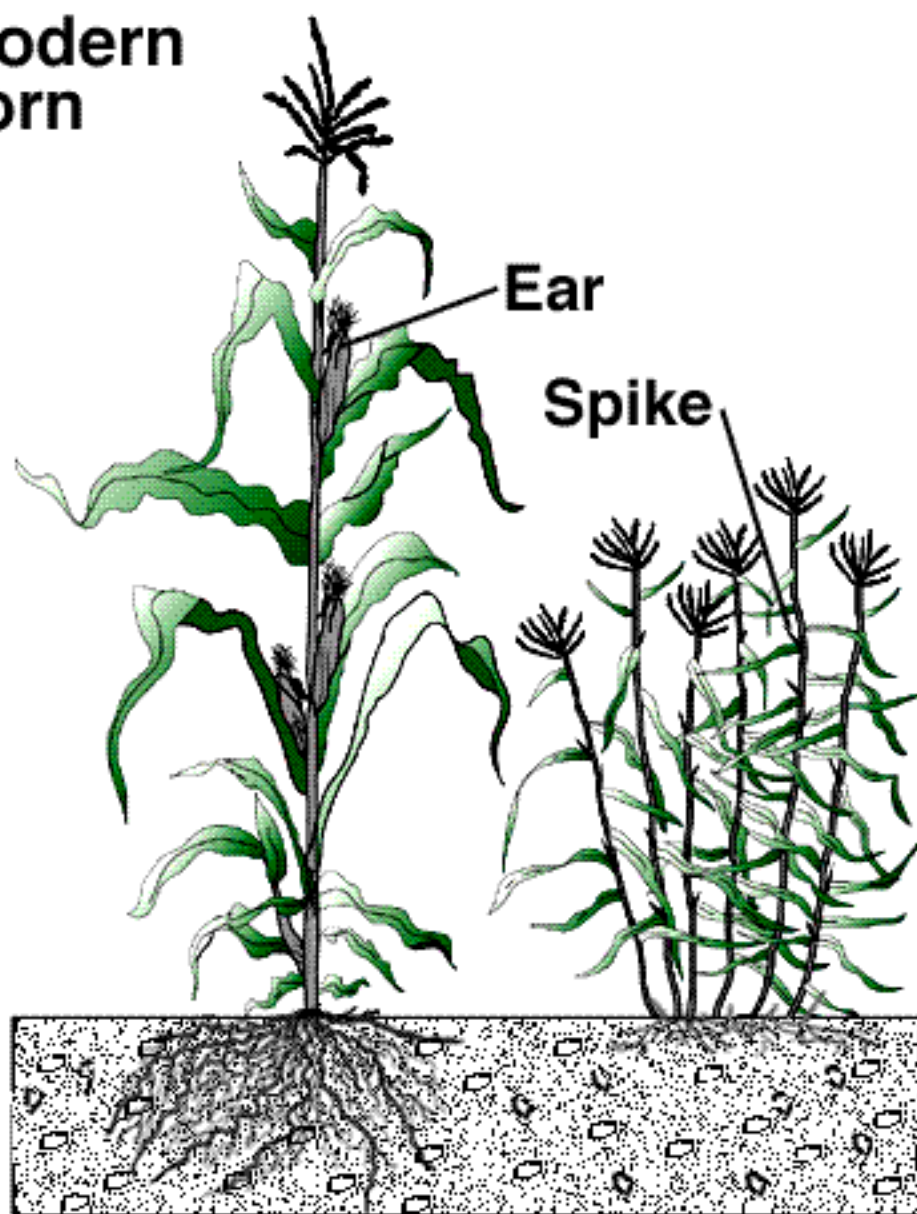
Maize



Origin: Mexico



**Modern
corn**



Teosinte

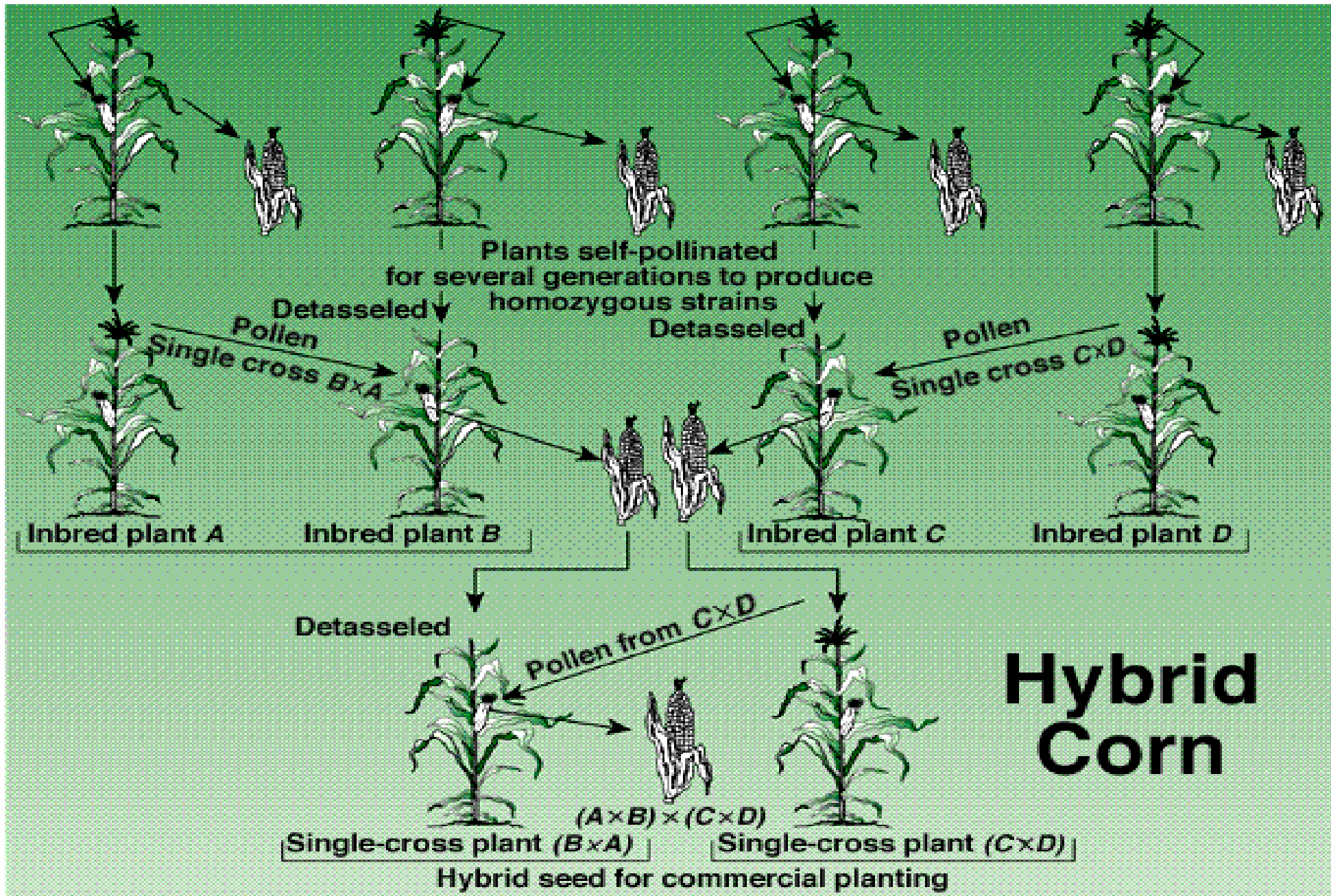
**Evolution of
Modern Corn**

Vegetative and Reproductive

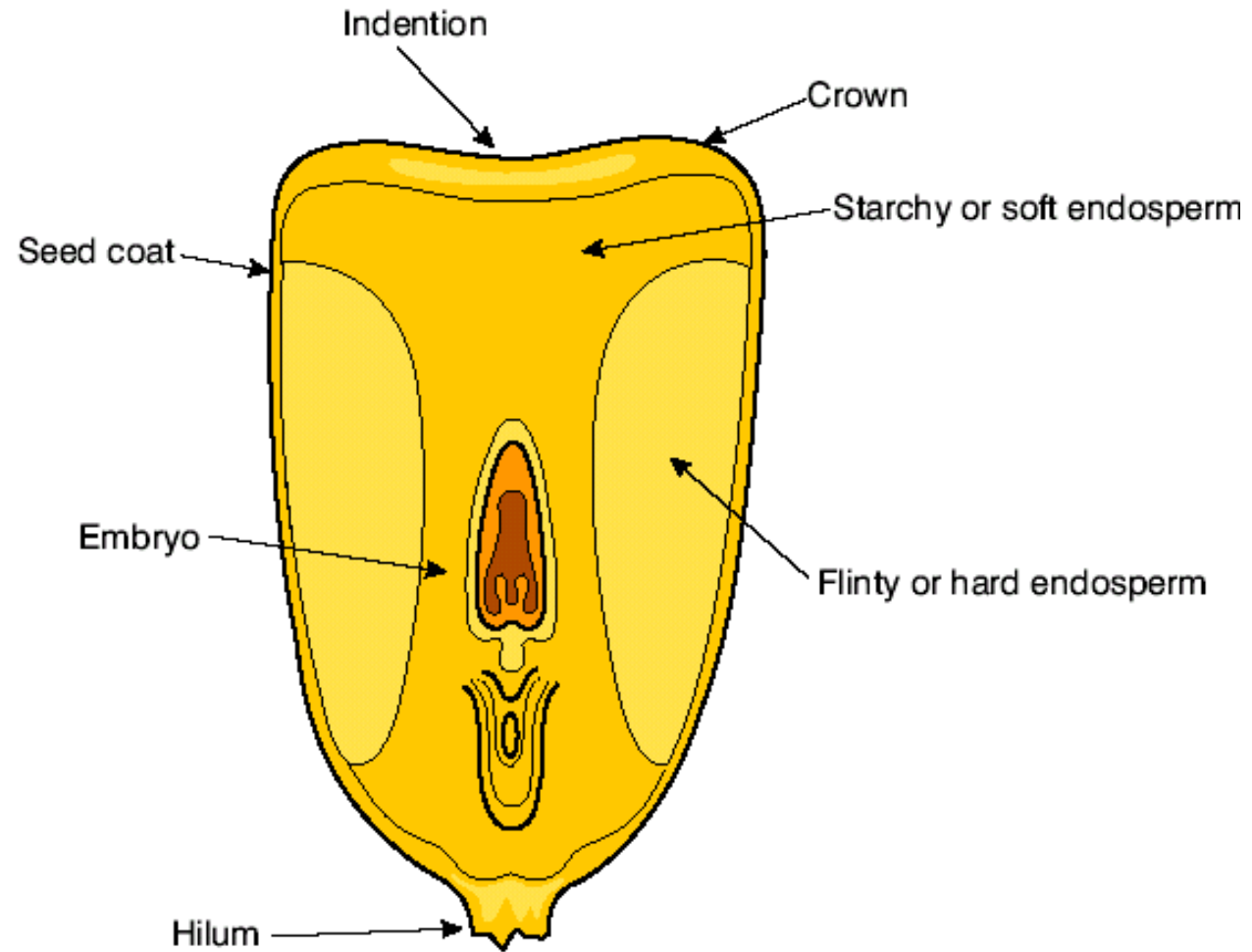
Table 1-1. Vegetative and Reproductive Stages of a Corn Plant	
Vegetative Stages	Reproductive Stages
VE emergence	R1 silking
V1 first leaf	R2 blister
V2 second leaf	R3 milk
V3 third leaf	R4 dough
V(n) nth leaf	R5 dent
VT tasseling	R6 physiological maturity

Vegetative and Reproductive

Growth Stage	Approximate days after emergence	Significance
V3	8 - 10	Leaves and ear shoots determined. Flooding could kill the corn plant if conditions persist for a few days.
V6 – V8	21 – 36	Growing point above ground. Plants are susceptible to wind and hail damage. Moisture and nutrient stress should be prevented.
V12 – V17	36 – 60	The number of rows per ear and ear size are determined. Moisture and nutrient stress may result in unfilled kernels.
VT – R1	54 – 62	Tassel and ears shoots visible. Considerable yield loss will result from water stress at this stage.
R2	66 – 74	Blister stage. Kernels moisture is about 85 percent. The cob is close or at full size.
R3	76 – 86	Milk stage. Kernel moisture is 80 percent. Stress at this point can still reduce yields.
R4	84– 88	Dough stage. Kernel moisture is 70 percent. Kernels have accumulated close to half of their mature dry weight.
R5	90 – 100	Dent stage. Kernel moisture is about 55 percent. Stress may reduce kernel weight.
R6	105 – 120	Physiological maturity. A black layer has formed. Kernels have attained their maximum dry weight.



PARTS OF A CORN KERNEL



What are the different types of corn?

III. There are six common types of corn.

- Corn types are classified based on kernel characteristics.
- These characteristics are amount, quality, and arrangement.

Types of Corn

Differences: mainly related to types of starch (hard vs. soft) in grain.

1. Pod corn (husklike glumes)
2. Dent corn (soft center)
3. Flint corn (all hard)
4. Popcorn (core of soft)
5. Flour corn (all soft)
6. Sweet corn (sugars remain)

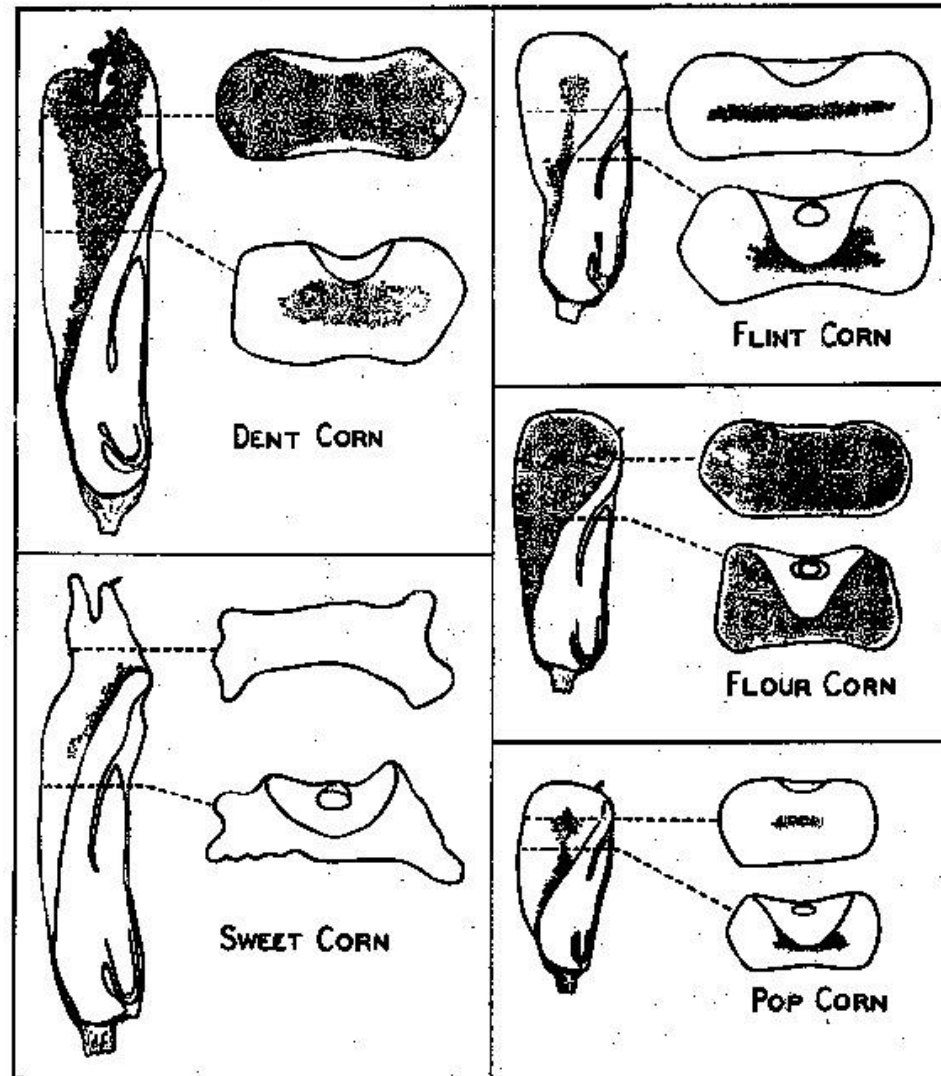


Fig. 63. Diagrammatic sections of grains of corn to show arrangement of flinty and floury parts in principal endosperm types. The stippled areas represent the floury parts.

Hybrid corn

- Hybrid corn is superior to open pollinated varieties in that it:-
 1. Produce better quality grain and forage
 2. Produce 20-30 percent higher yields than the opened pollination varieties.
 3. Has greater resistance to disease and certain insects
 4. Is more resistant to lodging
 5. Can resist drought better.
 6. The plant often have two large ears.
 7. Produces ears with higher numbers of rows of kernels.
 8. Produces similar plants in height and maturity.

Hybrid corn

- **White**

- S.C 10 ,122 ,124 ,125 ,126 ,128 ,129 ,130 ,131
- Wtania 6 ,4
- Hytic 2031 , 2030
- Pioneer 30 K 8

- **Yellow**

- Giza 176 , 173 , 169 , 168 , 167 , 166 , 164 , 162
- Pioneer 3084 ,3062
- hytic 2066 , 2055
- Nile .1009 , 1005 , 1001

Climatic requirement:

The temperature required for corn growth varies from one growth stage to another. Generally, The optimum temperatures for corn growth are 70° - 86° Fahrenheit.

The temperature affect both the vegetative growth and tasseling in corn plants.

Soil requirement:

- Soil fertility is important in corn production. Under Egyptian conditions both loamy and light clay soils are ideal for corn production. Corn plants are sensitive to salinity.

Corn in the rotation:

- Corn may be grown after grains or legumes. Growing corn after legumes is better than that after grains. Under Egyptian conditions corn is grown after clover, broad bean or fenugreek and wheat or barley.
- Corn is followed by cotton in fertile soil or by clover and broad bean.

Seeding rates:

- Planting rates vary according to different factors, i.e. variety, planting method, soil fertility, time of planting and purpose of production. Seeding rates are reduced when corn is grown on soils lacking in fertility and moisture.
- Rates of planting are often increased when corn is grown as a forage crop.
- Generally, the amount of 15-20 kg of seeds per fed.
- Planting corn as a forage crop, higher amounts of seeds are used 40-50 kg/fed.

Time of planting:

- Corn seeds can be sown from April and May to August.
- It is recommended not to plant summer corn later than May to avoid the reduction in yield,

Plant method:

- Two general methods are common in planting corn under Egyptian conditions. They are commonly referred to as, Herati (wet) and Afeir (dry) methods of planting.
- Afeir (dry) planting: dry seeds are sown in dry land then irrigated.
- Ridging method:

It is the recommended method for planting maize because:

- It require less amount of seed
- Easier cultivation and weed control
- Easier irrigation control.

Thinning

- When the maize plants grow so crowded, the under sided plants are removed leaving only one or two strong plants per hill to enable these plants to grow well.
- Thinning must be done early.



Hoeing

- Hoeing is of great importance in weed control in corn fields.



Fertilizers and manuring:

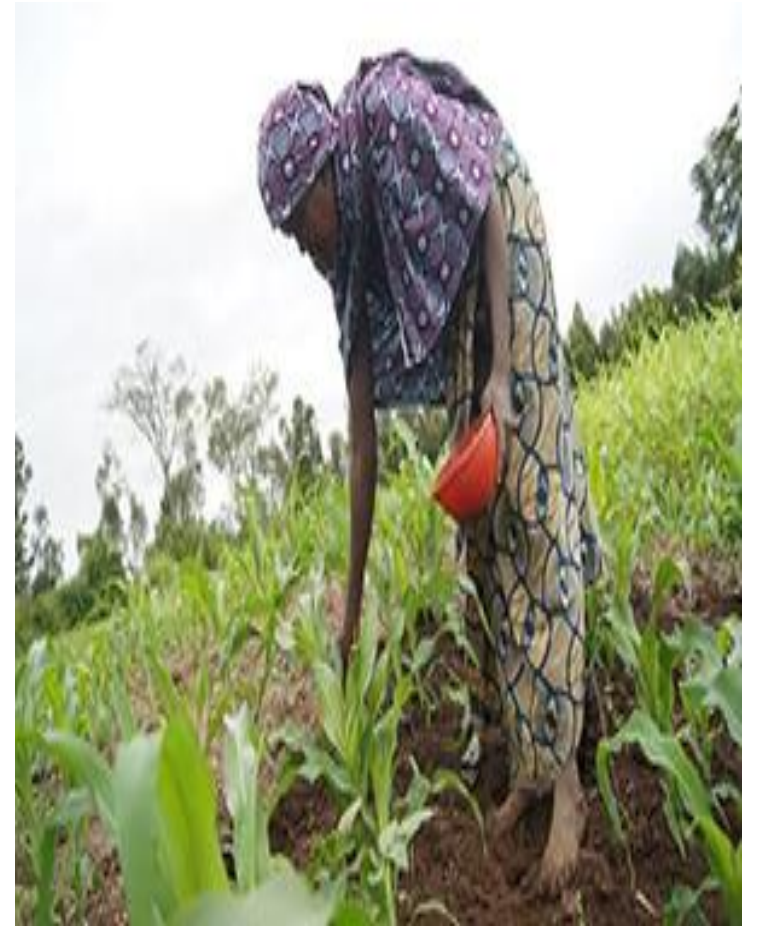
- Egyptian soils are known to be poor in available nitrogen due to their low content of organic matter and the small amounts of organic manures added to them annually.
- Nitrogen is of great importance in maize production because it contributes to:
 - increase root system
 - increase both the dry matter of maize plants and yield of grains.
 - Increase ear size, and weight.

Fertilizers and manuring:

- **El-Gizawy (2000)** found that application of 150 kg N /fed significantly increased plant height, ear height, stem diameter, ear length, ear diameter, number of kernels /row, number of row /ear , ear weight, kernels weight /ear, grain yield /plant, 100- grain weight, shelling %, grain, straw and biological yields/fed. However, the difference between 100 and 150 kg N /fed levels on most characters were not significant. While, application N treatment caused no significant increase in N , GPC % contents in maize grain. Application of 150 kg N /fed gave the lowest values of N agronomic efficiency (AE_N) and N recovery in grain.

Fertilizers and manuring:

- Generally, under Egyptian condition about 40 cubic meter of stable manure is commonly applied at time of preparing the land.



Irrigation:

- Maize plants are sensitive to drought, therefore plant must be irrigated carefully especially at the first stages of growth.
- Plants are given the first irrigation 2-3 weeks after sowing then the succession irrigation must be 14 days intervals.
- Irrigation is prevented 2-3 weeks before harvest.
- Maize plant requires 5-6 irrigations.



Yield

- The yield varies owing different factors:

1. Variety
2. Soil fertility
3. Time of planting

Yield 20-25 ardab/fed (the weight of one ardab of maize carnels equal 140 kgs)



How can you produce high and improved yield of maize??

1. Variety: its one of the most important factor to choose the suitable variety.
2. Care in using fertilizers: nitrogen fertilizer must be applied at the rate and at time and by the means that contribute to high yield with good qualities.
3. Care in operation practices and using machines in this aspects. Using mechanical power results in high and improved yield.
4. Insects and weed control chemically.

References

- **El-Gizawy, N. Kh. B. (2000)**. Response of maize (*Zea mays*,L.) to nitrogen and manganese fertilization. Ph.D Thesis, Fac. Agric. Moshtohor, Zagazig Univ. Egypt.

The End!

