Agricultural Biotechnology Program

Agronomy 3
(Crop Production)
AG 0103

(3 CREDIT HOURS)

LECTURE 4

(Rice)

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Rules

4

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Quiz

- What is the most essential nutrient for grain crops?

a) nitrogen
b) phosphorus
c) calcium
d) potassium

- Broadcasting leads to

a) equal distribution of pesticides

b) equal distribution and proper use of seeds

c) unequal distribution and wastage of seeds

d) proper spreading of fertilizers

Student Learning Objectives

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

Rice

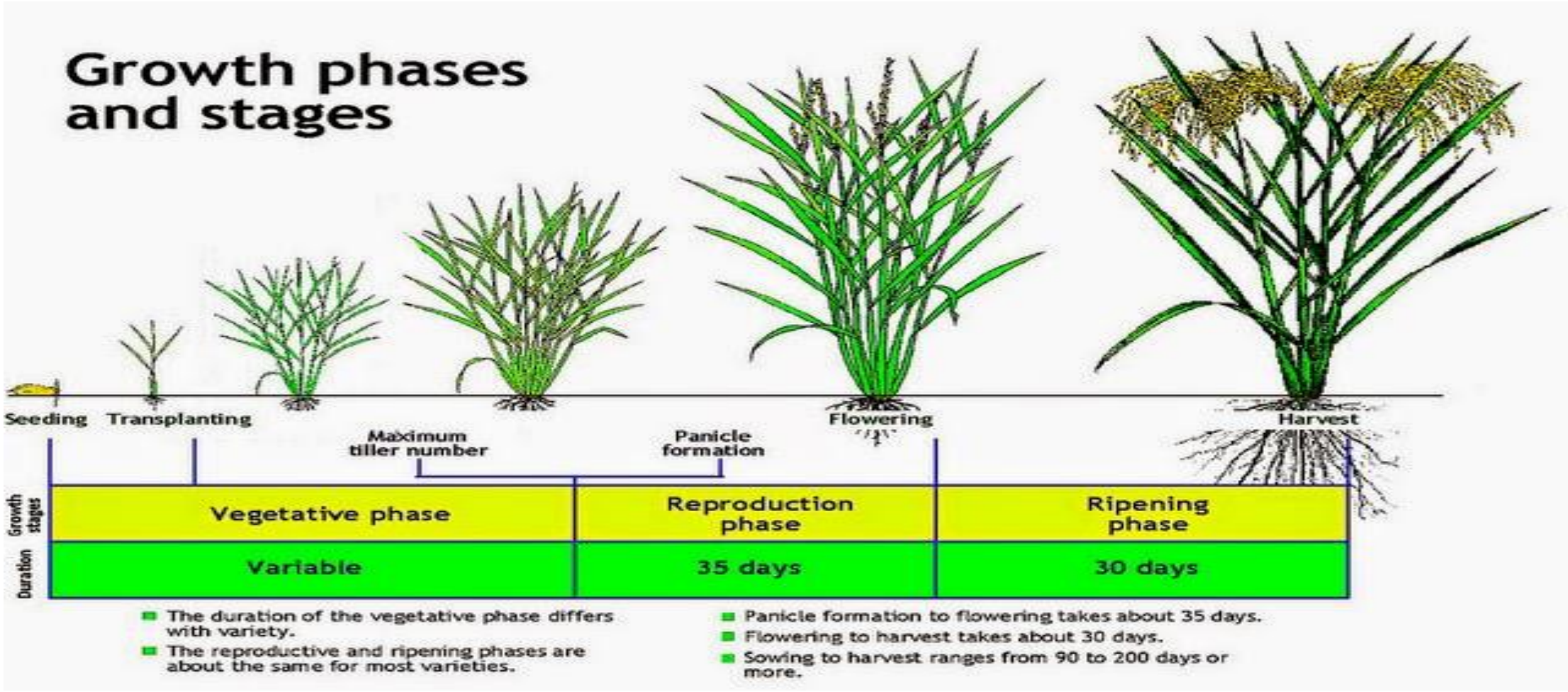
Rice is one of the most important cereal crop of the world. It is considered to be the main food for about half population of the world, especially in the eastern parts of Asia as in China, Japan, India.

Egypt is the second country in rice production after Spain. Egypt produced large amount than consumption, so , Egypt export large amounts of rice to other countries.

Growth phases

- Rice plants take around 3–6 months to grow from seeds to mature plants, depending on the variety and environmental conditions. They undergo three general growth phases: vegetative, reproductive, and ripening.
- Rice varieties can be categorized into two groups: the short-duration varieties which mature in 105–120 days and the long-duration varieties which mature in 150 days. A 120-day variety, when planted in a tropical environment, spends about 60 days in the vegetative phase, 30 days in the reproductive phase, and 30 days in the ripening phase.

Rice growth phases:



Germination

- Germination in rice occurs when the first shoots and roots start to emerge from the seed and the rice plant begins to grow.
- To germinate, rice seeds need to absorb a certain amount of water and be exposed to a temperature range of 10–40 °C. This breaks the dormancy stage of the seed.
- When planted into flooded soil, the shoot is the first to emerge from the seed, with the roots developing when the first shoot has reached the air.
- If the seed is planted in non-flooded soil, the root is the first to emerge from the seed and then the shoot.

Vegetative phase

- The vegetative phase is characterized by the development of tillers and more leaves, and a gradual increase in plant height. The number of days the vegetative stage takes varies depending on the variety of rice, but is typically between 55 and 85 days.
- The early vegetative phase begins as soon as the seed germinates into a seedling and ends at tillering.
- The seedling stage starts right after the first root and shoot emerge, and lasts until just before the first tiller appears. During this stage, seminal roots and up to five leaves develop.
- As the seedling continues to grow, two more leaves develop. Leaves continue to develop at the rate of one every 3–4 days during the early stage.
- The late vegetative phase starts when tillering begins, which extends from the appearance of the first tiller until the maximum number of tillers is reached. This typically happens 40 days after sowing.
- The stem begins to lengthen late in the tillering stage and stops growing in height just before panicle initiation about 52 days after sowing, which also signals the end of the vegetative phase.

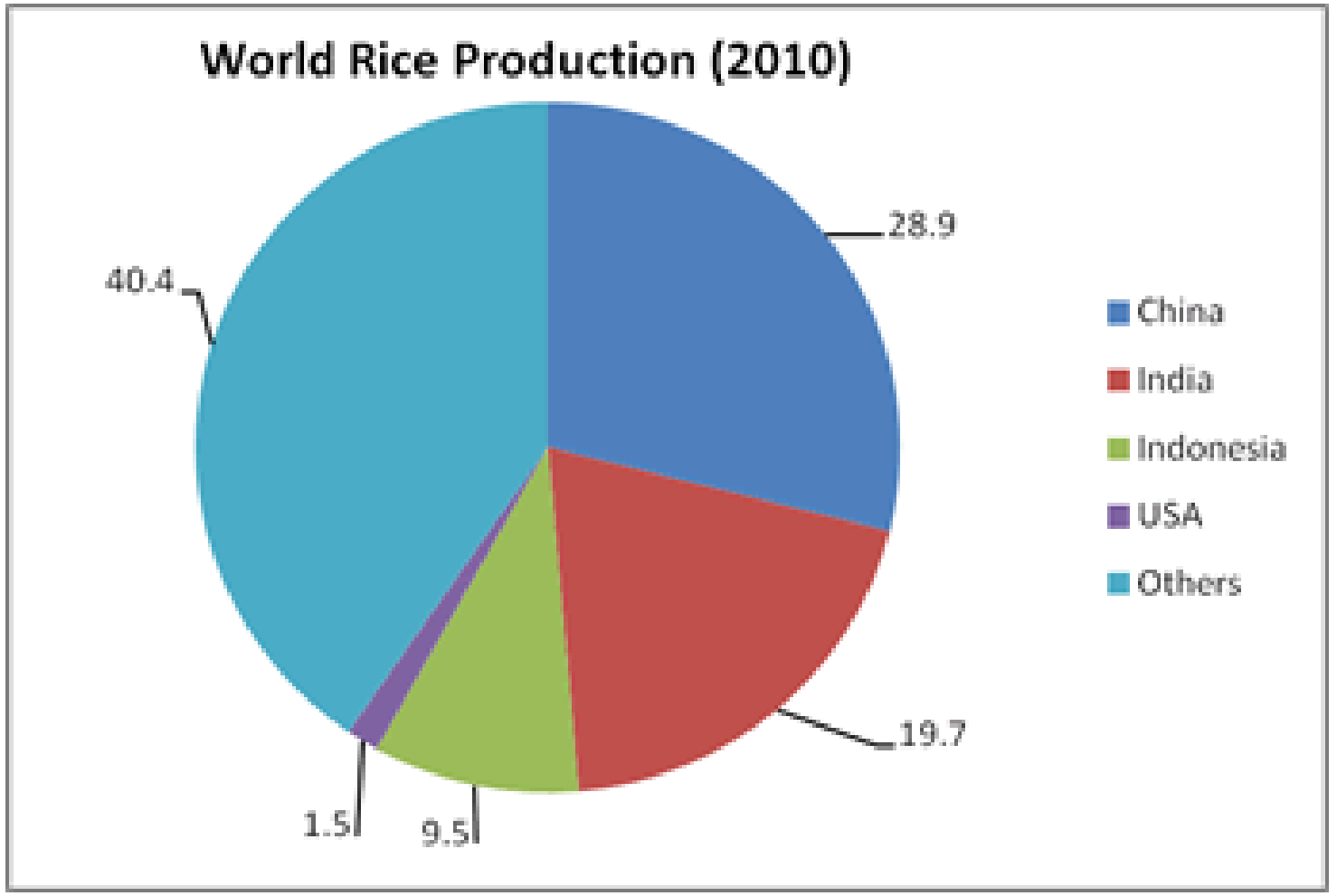
Reproductive phase

- The first sign that the rice plant is getting ready to enter its reproductive phase is a bulging of the leaf stem that conceals the developing panicle, called the ‘booting’ stage. Then the tip of the developing panicle emerges from the stem and continues to grow. Rice is said to be at the ‘heading’ stage when the panicle is fully visible. Flowering begins a day after heading has completed. As the flowers open they shed their pollen on each other so that pollination can occur. Flowering can continue for about 7 days.

Ripening phase

- The ripening phase starts at flowering and ends when the rain is mature and ready to be harvested. This stage usually takes 30 days. Rainy days or low temperatures may lengthen the ripening phase, while sunny and warm days may shorten it. The last three stages of growth make up the ripening phase.
- Ripening follows fertilization and can be subdivided into milky, dough, yellow, ripe, and maturity stages. These terms are primarily based on the texture and color of the growing grains. The length of ripening varies among varieties from about 15 to 40 days. Ripening is also affected by temperature, with a range from about 30 days in the tropics to 65 days in cool temperate regions.

World Rice production



Cultivation of Rice in Egypt:

Producing Zones and Cropping Seasons

- Almost all rice in Egypt is produced in the valley of Lower Nile River. The main rice producing zones are shown in the following table.

Production zone	Harvested area (% total harvested area)
Damieta	30.64
El Dakahlia	23.15
Kafr el Sheikh	15.58
El Sharkia	12.26
El Behaira	10.69
El Gharbia	7.69

Varieties:

Variety Name	Growth duration (days)
GIZA 171	150-160
GIZA 172	140-150
GIZA 175	140-150
GIZA 176	140-150
GIZA 177	110
GIZA 178	140-150
IR 28	140
SAKHA 101	130-140
SAKHA 102	120-130
GIZA 181	140-150

Rice cultivated grown once a year.

Cropping season	Planting	Harvesting
Main season	4-5	9-11

Seed rate:

- At broadcasting method the seed rate is about 70-80 kg/fed and 40-50 kg/fed at transplanting method.

The advantage of broadcasting method:

- Early seeding date
- Quickly preparation of salty soil

The disadvantage:

- Great difficulties in weed control
- Higher seeding rate
- Lower yield than transplanting.

Transplanting method:

The advantage of transplanting method:

- Less seeding rate
- Better weed control
- Suitable density
- High yield

Fertilizers:

- For transplanting method 20 – 30 m/fed of FYM before the second ploughing, 150 kg/fed of super phosphate and 250 kgs/fed of ammonium sulphate applied after 15 days after transplanting.
- For the broadcasting method 20-30m/fed FYM after ploughing and 75 kg/fed of super phosphate before it. 250 kgs/fed of ammonium sulphate + 75 kgs/fed super phosphate applied after 35 days from broadcasting.

Application of water:

- After seeding the field are submerged to depth of 1-2 inches and the depth of water is slowly increased until maximum depth of 5 inches is obtained when the plants should be at least 2 feet in height. Throughout the growing season the maximum depth of water is maintained by supplying fresh water to restore that lost by seepage, evaporation and transpiration. When the crop begin to ripen the water is drawn off to allow the ground to dry out sufficiently for harvesting

Harvesting:

Rice should be cut somewhat before maturity, the proper stage is indicated by the position of the heads, which are well turned down. At this time the kernels in the lower part of the heads have not entirely hardened.

The crop can be harvested by hand or by the binder or by the combine.

Yield

- 4-5 tons /fed

The End!