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Course name :

**Crop Production Technology-II
(ASAG 2204)**

Course credit :

(2-1-0)

Lecture 3

Topic: Wheat



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3.1 METHODS OF SOWING : 5 methods

- 1. Broadcasting** – cheap and quick method
- 2. Sowing behind the plough with hand-irrigated areas (PORA)**
- 3. Sowing behind the plough with seed drill (KERA)**
- 4. Dibbling-** Dibbling 2 or 3 seeds by hand at 4-6 cm depth at a distance of 22.5 cm between rows and 10 cm between plants in a row. It is a good method for quick multiplication of pure seed material on a small scale. But it is laborious and time consuming for large scale sowing.
- 5. Zero / No-tillage sowing**
- 6. FIRB – Furrow irrigated raised bed system**



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3.2 ADVANTAGES OF ZERO TILLAGE WHEAT

- **Timely sowing**
- **Better placement of seed and fertilizers**
- **Less seed requirement**
- **Less requirement of labourer**
- **Line sown and optimum plant stand**
- **Easy inter-culture & management**
- **Less cost involvement in sowing & ultimately less CoC; more profit**





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3.3 PREPARATORY CULTIVATION

It requires well pulverized but compact seed bed for good and uniform germination.

➤ 3-4 ploughing in summer, repeated harrowing in the rainy season followed by 3 or 4 cultivator workings and planning's immediately before sowing produce a good fine seed bed for the dry crop on alluvial soils. Timely cultivation and conservation of moisture are essential.

3.3.1 SPACING

Rain fed: 30 cm row to row

Irrigated areas: 22.5 cm row to row

Favorable conditions : 30 X 10-15 cm (dibbling)

3.3.2 DEPTH OF SOWING

➤ Dwarf varieties: **5-6 cm**

➤ Tall varieties : **8-9 cm**



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3.4 FERTILIZERS

- Apply 10 tonnes of FYM /ha before 5-6 weeks of sowing.

	N (Kg/ha)	P(Kg/ha) basal	K (Kg/ha) basal
Timely sown irrigated	120-150	40-60	40
Late sown irrigated	80-100	40-60	20
Rainfed wheat	60	20	0

- Entire P & K and $\frac{1}{2}$ of N to be applied 5 cm below the seed at the time of sowing.
- Remaining $\frac{1}{2}$ N should be applied at the time of 1st irrigation i.e. at the CRI stage (i.e. 21 DAS). In case of Zn deficiency, 25-50 kg $ZnSO_4$ /ha is to be applied as a basal dose in the soil.



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3.5 WEED MANAGEMENT

- First 25-40 DAS is critical for weed competition.
- **Grassy weeds: Phalaris minor, Avena fatua, Cynodon dactylon, Poa annua, Polypogon monospliensis**
- **Sedges: Cypreus rotundus, C. esculentus**
- **Broad leaves: Chenopodium album, Rumex retroflux, Convolvulus arvensis, Argemone mexicana, Melilotus indica, M. alba.**

3.4.1 MANAGEMENT

- **Hand weeding** with Khurpi or hand-hoe at 20-25 DAS.
- **Pre-emergence** application of **Pendimethalin @ 1kg a.i./ha in 500-750 l/ha of water with in 3DAS** to provide broad spectrum weeds control.



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- **Post-emergence application of **Cladinifop @ 60 g a.i./ha OR Sulfosulfuron @ 25 g a.i./ha in 200-250 l/ha of water with in 25-30 DAS** to control **Phalaris minor and other grassy weeds.****
- **For broad leaved weeds application of **Metribuzin @ 200 g a.i./ha in 500 l/ha of water during 25-30 DAS** is effective.**



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3.6 Insect, pest and disease management

<p>Rust Brown, rust yellow rust black rust</p>	<ul style="list-style-type: none"> • Mixed cropping with suitable crops. • Avoid excess dose of nitrogenous fertilizers. • Spray Zineb at 2.5 kg/ha or Propioconazole @ 0.1 %. • Grow resistant varieties like PBW 343, PBW 550, PBW 17
<p>Powdery mildew</p>	<p>Spray <u>Wettable sulphur 0.2%</u> or Carbendazim @ 500 g/ha</p>
<p>Loose smut and Kurnal burnt</p>	<p>Vitavax 2.5 g/kg seed</p>
<p>Army worms</p>	<p>Carbaryl 50 WP in 1000 litre of water (15 day interval)</p>
<p>Rat</p>	<p>Aluminium phosphide</p>

3.7 IRRIGATION



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A life saving irrigation is necessary for uniform germination and good plant stand. Total water requirement is **300-400 mm**.

- i) CRI (21 -25 DAS)
- ii) Jointing (45 DAS)
- iii) Heading (65 DAS)
- iv) Dough stage (85 - 90 DAS)

**Available
irrigations**

Critical stages

1

Crown root initiation (CRI)

2

CRI +Late jointing (LJ)

3

CRI+ boot (B)+ milking (M)

4

CRI+ late tillering (LT)+ LJ+ flowering (F)+ M

5

CRI+LT+LJ+F+M

6

CRI+LT+LJ+F+M+D



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- Irrigation may be given when ASM reaches 40-50 %.
- Irrigation at CRI is very necessary as this stage is the most critical for irrigation.
- Since the rooting depth at early stages is very shallow (15-25cm), initial irrigations should be given with less amount of water (4-5cm / irrigation), later irrigations should be given with sufficient water (6-7 cm / irrigation).

3.8 HARVESTING

It varies from time to time and zone to zone; growing conditions.

Rainfed crop reaches maturity earlier than irrigated.



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3.9 MATURITY SYMPTOMS

1. The crop is harvested when the grains harden and the straw becomes dry.
2. Don't allow the crop till it is dead ripe. Harvest the crop while base of the stalks lightly green to avoid shedding.
3. Non shedding varieties they are harvested when the grain is matured fully.
4. The most suitable stage is when the grains become hard & contain 20-25% moisture.

3.10 YIELD

- Irrigated conditions : 45-55 q/ha
- Rainfed conditons : 20-25 q/ha



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- Grain : straw ratio = 1:2
- By adopting improved technology, the crop may yield 5-6 t grain and 7-8 t straw/ha from dwarf wheat varieties under irrigated conditions.
- Under rainfed conditions 2-2.5 t grain and 3-3.5 t straw/ha may be obtained. Deshi tall wheat varieties usually give 2-3 t grain and 6-7 t straw/ha may be obtained.

3.11 YIELD ATTRIBUTES

1. No. of productive tillers / unit area
2. Total no. of grains / head
3. % of fertile grains/earhead
4. Test weight (1000 seed weight)



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The yield attributes (range) of wheat is given below:

Attributes Value Tillers/m² 230-340

Grains/spike 42-58

1,000 seed weight (g) 36-50

Protein (%)

10-12 Fat (%)

1.5 Fiber (%) 1.2

3.12 STORAGE

- The grain should be thoroughly dried before storage. The storage life of grain is closely related to its moisture content. Grains with less than 10% moisture are ideal.
- In Eastern India, the storage of wheat grains without losing viability for the next crop is a big problem due to high humidity prevailing in that area.



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3.13 BY PRODUCT UTILISATION :

1. Wheat is ground to prepare flour which is mainly consumed after preparing leavened bread i.e. **chapathi** (cellular spongy like structure due to the presence of GLUTIN).
2. Its flour is also used to prepare chapathis called **PURIS or PARTHAS etc.,**
3. One of the most important use of wheat is to manufacture flour to prepare bread, pastry and biscuits etc.,
4. Varieties of Durum wheat having large white kernels are often used for puffing.
5. Wheat straw makes an important fodder.
6. By-products of wheat flour mills particularly bran are used as cattle feed.