# Unit 3

# Sowing and fertilizing equipment

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## TYPES OF FURROW OPENERS

The furrow openers are provided in a seed drill for opening a furrow. The seeds travel through the seed tube and reach the furrow

**Different type of furrow openers are in use**

(1) Shovel type

(2) Shoe type

(3) hoe type

4) Disc Type (single disc, double disc)

**(1) Shovel Type**

Shovel type furrow openers are widely used in seed drills. There are three types of shovels in use. They are: (a) reversible shovel (b) single point shovel and (c) spear head shovel. Shovel type openers are best suited for stony and root infested fields. The shovels are bolted to the shanks at their bottoms. Boots are fitted at the back of the shovels which carry the delivery ends of the seed tubes. In cultivator type seed drills shovel type furrow openers are used.

(2) Shoe Type

It works well in trashy soils where the seed beds are not smoothly prepared. They are made from two flat pieces of steel welded together to from a cutting edge. It is specially suited for black soils. Bullock drawn three tyne seed drills are provided with shoe type furrow openers.

(3) Disc Type

They are two types: (a) Single disc and (b) Double disc types.

Single disc type

Disc type furrow openers are suitable to fields where plant residues or trashes are used as mulches. It consists of a curved disc made of hardened steel. It is set at an angle which while working shifts the soil to one side making a small furrow.

Seeds are
placed in the furrows. The disc is kept clean by two scrapers, one toe shaped at the convex side and one 'T' shaped at the concave side. It works well in sticky soils also, but the discs are costly and maintenance is bit difficult.

Double disc type

In double disc furrow opener there are two flat discs, set at an angle to each other. The discs open a clean furrow and leave a small ridge in the center. The seeds are dropped between the two discs, providing more accurate placement. It is suitable for trashy lands. Seed drills operated at high speeds, usually use this type of furrow openers.

**Furrow closers**

These devices fill the furrow by moving the loose soil from the edges of the furrow to cover the seed. The covering and compacting devices should place the moist soil over the seed, press the soil gently around the seed, cover them to a proper depth and yet leave the soil above the seed loose enough to minimize crusting and promote easy emergence. There are different type of covering and compacting devices, but these are not integral part of Indian drills. Separate operations are performed to cover and compact the soil. The brief description of types of covering and compacting devices are given:

**Types of furrow closers**

**1) Drag or fixed type of covering unit**

The drag type covering devices include covering chains, drag bar, scraper blade, drag roller and wooden planks. These devices are attached behind the drill with rear of furrow opener/frame of drill and cover the seed. Drag type devices are used for shallow-seeded crops. The compactness of the soil around the seed will differ with the weight of the device. The performance is greatly affected by the amount of loose soil present in immediate vicinity of the device. Some of them are as follows:

**i) Covering paddles**: one or two opposing elongated blade like soil deflectors or scrapers are positioned along the edge of the seeded furrow with curved trailing ends for moving the soil into the furrow. The paddles may be equipped with downward forcing springs. The paddles may be 3-6 mm thick, 25-76mm wide with varying length.

**ii) Covering knife**: one or two sharp elongated blades placed opposite to each other on either side of the seeded furrow. The knives may be straight or curved inward or rearward. The depth can be adjusted as per the requirement. The width

and
thickness of knives may be 50-100mm and 6-12mm, respectively with variable length and curvature.

**iii) Covering chains**: Chains of various length and design can be used as seed covering device. It drags the available loose soil along the edges of seeded furrow to cover the seed. The covering chain may be a loop type, both ends of chain connected behind the furrow openers or trailing type which has multiple chain links dragging over seeded furrow.

**Rolling type disc**

**Rolling type disc are as follows**:

**i) Covering disc**: These are rolling type furrow covering and firming devices. It is of two types namely, single disc type and double disc type. Single covering disc consists of a single sharp, flat or concave disc positioned upright at an angle from the direction of movement at the side of seeded furrow. Soil cutting and moving over furrow is adjusted by changing the angle and depth. The thickness and diameter of the disc blade varies 3-10mm and 15-300mm respectively. Double covering disc has two opposed disc blades positioned evenly or in staggered manner on each side of the seeded furrow to cover the seed in the furrow. Pressure applied at seed level in range of 34.47 to 68.95 kPa (5-10 psi) on the soil help Improved emergence when adequate moisture is available below the seed.

**ii) Press wheel**: These are also known as seed furrow closure and firming devices and are positioned to follow the furrow openers. The soil firming wheels have positive effect on soil compaction and seed germination. These are wheels of different width, diameter and are arranged with or without scrapers. It moves the soil laterally to cover the seed and apply surface pressure on one or both sides of the furrow either in vertical plane or at an angle to the vertical to firm the soil over or around the seed. These wheels may be fixed type or floating type with ballast or spring loaded. The press wheel diameter may vary from 305-660 mm. press wheels of various types such as flat face, open in the the centre, concave in the centre, zero pressure pneumatic press wheels are commonly used as compacting devices. No soil built up takes place when rubber wheel is used reducing seed displacement in furrow.

**The types of press wheels are:**

**a) Wide press wheel**: It is a single semi-pneumatic or steel wheel having width more than 100mm and positioned over the centre of the row

**b) Ribbed press wheel**: It is a single semi-pneumatic or steel wheel with one or two circumference ribs in the centre. Single ribbed wheel concentrate soil firming

directly
over the seeded furrow whereas double ribbed press wheel firm the soil on each side of the seeded furrow.

**c) Narrow press wheel** : It is a single semi-pneumatic or steel wheel narrower than 100mm and centered over the seeded row and may have v-shaped or rounded surface. Wheels with v-shaped circumference firm the soil directly over the seed whereas rounded circumference wheel firms the soil over the width of wheels.

**d) Dual angled press wheels**: In this case two wheels are positioned at an angle less than 30 degree from vertical towards the opposing wheels at the bottom. The wheels may be directly opposed or staggered to reduce blockage

**e) Split narrow pre wheels**: Two narrow vertical steel wheels positioned closely on a common axle to firm the soil on each side of the seeded furrow. The surface of the wheel may be flat, inward angles or outward angled.

**f) Dual wide press wheels**: These have two wide vertical steel wheels fixed on a common axle and are spaced wide enough. It is used to avoid furrow compaction and wheel sinkage.