



Line Sowing of Sunflower through Seed-cum-fertilizer Drill

Use seed-cum-fertilizer drill to maintain proper depth, row-to-row spacing, fertilizer placement and facilitate mechanical weeding along with earthing-up for higher productivity and profitability of sunflower.

In Odisha, the sunflower is grown as an irrigated crop in 0.25 lakh ha and the productivity is 1,193 kg/ha against an all India average of 712 kg/ha. Its oil is considered as premium oil because of high oleic acid which reduces the blood cholesterol level. Besides other inland districts, it has been successfully introduced in the super cyclone affected coastal districts of the state. It is a slightly salinity-tolerant crop.

Field Preparation

Sunflower requires a well pulverized field with adequate moisture availability which can be attained by 2-3 ploughing followed by planking/leveling (with laser land leveller, if available) to make the seedbed free from clods and weeds. Ensure sufficient moisture at the time of sowing for proper germination.

Sowing and Seeding Equipment

It is a photo-insensitive crop. Therefore, it has remarkable adaptability to be grown as a winter crop (mid-October to mid-November sowing) or as an early summer crop (first fortnight of January sowing). Planting time should be adjusted to avoid flowering period coinciding with temperature above 38-40°C, otherwise this would cause desiccation of pollens resulting in poor seed set and yields. For precise seeding, sunflower can preferably be drilled with seed-cum-fertilizer drill fitted with an inclined-plate seed metering system and inverted-T-type furrow openers. Power tiller-operated seeder (PTOS) or seed-cum-fertilizer drill for two-wheel tractors can also be used for sowing, if available.

- **Seeding depth:** 5-7 cm

Row to row spacing:

- **Inbred:** 45 cm x 30 cm
- **Hybrid:** 60 cm x 20 cm
- **Sowing time:** Mid-October to mid-November (winter crop) and first fortnight of January (as early summer crop)

Suitable varieties

- **Inbred** – Modern, TNAUSUF-7 and DRSF-108 (90 days)
- **Hybrid** – (~95-110 days) PAC 36, KBSH 1, MSFH 8, MSFH 17, Jwalamukhi 110

Seed Rate:

- **Inbred:** 4 kg/acre
- **Hybrid:** 2 kg/acre

Seed treatment: Treat the seeds with Vitavax power (Carboxin+ thiram) @ 1.5 g/kg or Metalaxyl @ 5 g/kg of seed just before sowing.

Fertilizer Management

| Situation | Nutrients required (kg/acre) | | |
|-----------|------------------------------|-------------------------------|------------------|
| | N | P ₂ O ₅ | K ₂ O |
| Inbred | 30 | 40 | 30 |
| Hybrid | 60 | 80 | 60 |

Note:

1. Apply 70 kg of DAP, 40 kg MOP and 25 kg Urea per acre for hybrid.
2. Apply 35 kg of DAP, 20 kg MOP, and 12.5 kg Urea per acre for Inbred.
3. DAP should be drilled along with sowing as basal and MOP as broadcast during field preparation. Urea should be applied in two splits (just before first and second irrigation) along plant rows.



- Sunflower responds to Ca, S and B. Calcium helps in seed filling and improves seed weight. Sulphur is required for oil synthesis and it helps in increasing the seed and oil yield. Boron increases the pollen viability, stigmatic receptivity and seed set. To meet requirement of these elements, apply gypsum @ 100 kg/acre and Borax @ 4 kg/acre as basal in seed furrows or Borax may also be applied @ 0.2% solution as directed spray to capitulum at ray floret stage.

Irrigation

Besides a pre-sowing (for vattar sowing) or post-sowing irrigation (when crop is sown in dry soil condition), apply three irrigations at following critical growth stages:

- Bud initiation – 30-35 DAS
- Flowering – 45-50 DAS
- Grain filling – 55-80 DAS

Weed Management and Intercultural Operation

- Thinning may be done at 2 weeks stage, if required.
- Pendimethalin (Stomp 30% EC) @ 1 kg ai/ha i.e. 1.25 lit/acre (product) as PRE or fluchloralin (Basalin 45% EC) @ 1 kg ai/ha i.e. 800 ml/acre (product) as a PPI may be applied in Vattar sown crop. It may be supplemented with manual/mechanical weeding at 3-4 weeks after sowing (WAS).
- Use power weeder for weeding and earthing-up together at 3-4 weeks stage followed by irrigation.



Insect Pest and Disease Management

As per discussion with KVK/RRTS-Bhadrak, following plant protection measure are suggested:

Insect Pest Management

- Leaf Eating Caterpillar: Spray lamdacyhalothrin @ 300 ml/acre.
- Sucking pests complex (aphids, hoppers, thrips and whitefly): Treat seed with Imidacloprid 600 FS 5 ml/kg seed or need based spray of Acetamiprid 60 g/acre or Thiomathoxam 80 g/acre.
- Sunflower head borer –Spray Indoxacarb 14.5 SC @ 200 ml/acre
- Bird damage: Bird damage is a serious problem in sunflower cultivation. Crop is damaged by birds during the period from seed filling to harvesting particularly in the morning and evening hours. Bird scaring like tying of bright reflector ribbons above the crop should be used.

Disease Management

- Soil born disease (down mildew, root, collar rot, stem rot or wilt, vascular wilt): Treat the seeds with Vitavax power (Carboxin + thiram) @ 1.5 g/kg or Metalaxyl @ 5 g/kg of seed just before sowing or spray Redomil MZ (Metalaxyl + Mancozeb) @ 400 g/acre after appearance of disease.

- Alternaria blight and leaf spot: Spray Mancozeb @ 500 g/acre at initiation of the disease and 10 days later.
- Powdery mildew: Spray 0.2% wettable sulphur @ 400 g/acre
- Head rot-spray: 0.4% copper oxychloride @ 800 g/acre.

Harvesting

Crop is ready to harvest when moisture in seed is 20%. Phenotypically the heads are ripe when back of the head turn from green to lemon yellow-brown colour. The heads should be re-dried in the sun on the threshing floor for 4-5 days and threshed by beating with stick or by sunflower thresher. Dry the seeds to reduce the moisture content to 9% for safe storage.

Advantages of Line Sowing over Dibbling

- Opportunity for basal fertilizer application through seed-cum-fertilizer drill
- Ease in inter-cultural operations and timely operation
- Cost and energy saving
- Less labor requirement
- Reduced drudgery
- Efficient water use
- Business opportunity as service provider through custom hiring
- Improved productivity and profitability

| Operation | Cost (Rs/acre) | |
|-----------------------------|----------------|---------------|
| | Mechanical | Manual |
| Land preparation(CT) | 1,200 | 1,200 |
| Cost of seed | 840 | 840 |
| Seed Treatment | 50 | 50 |
| Line sowing with seed drill | 500 | 2,500 |
| Herbicide | 500 | 500 |
| Weeding and earthing up | 500 | 3,000 |
| Pesticide | 700 | 700 |
| Thinning | 1,000 | 500 |
| Fertilizer | 3,000 | 3,000 |
| Irrigation | 2,000 | 2,000 |
| Harvesting | 1,600 | 1,600 |
| Threshing | 2,000 | 2,000 |
| Total cost (CT) | 13,890 | 17,890 |

Note:

- Labor required for manual sowing: Seeding (7 laborers), line marking (3 laborers) @ Rs. 250/day
- Weeding and earthing-up: 12 labor @ Rs. 250/day
- Harvesting: 8 laborers @ Rs. 200/day
- Threshing: 10 laborers @ Rs. 200/day

