

## **05. OATS, RYE AND TRITICALE - ORIGIN, GEOGRAPHIC DISTRIBUTION, ECONOMIC IMPORTANCE, SOIL AND CLIMATIC REQUIREMENT, VARIETIES, CULTURAL PRACTICES AND YIELD**

### **OATS (*Avena sativa*)**

**ORIGIN:** Oats is Asiatic origin. Asia minor is believed to be an origin for oats.

#### **GEOGRAPHIC DISTRIBUTION**

- Oats area and production in the World are about 27m ha and 40m tones, respectively.
- Countries cultivating oats widely are Russian federation, USA, Canada, Poland, China, France and Australia.
- In India, Punjab, Haryana, UP and limited areas in MP, Orissa, Bihar, West Bengal are the Oats growing states.

#### **ECONOMIC IMPORTANCE**

- Oats is a good cattle feed, human food in the form of good quality grain, oat meal and cookies.
- Three cultivated types are 7 haploid (14 chromosomes), 14 haploid (28 chromosomes) and 21 haploid (42 chromosomes).
- Common oats (*Avena sativa*) spread in 80% total oat area.
- *Avena brevis* is short oat grown in South Europe for green fodder.
- *Avena abyssinica* is Abyssinian oat grown in North Africa.
- Red oats is grown around Mediterranean region.

#### **SOIL AND CLIMATIC REQUIREMENT**

##### **Soil**

- Wide range of soil with good water holding capacity is more suited for oats cultivation.
- High N content in soil is not a desirable condition may lead to lodging.

##### **Climate**

- Grows best in cool and moist climate.
- Also, best adapted to cotton belt.
- Cool weather is important during grain filling for high yield.

**VARIETIES:** Kent, Algerian, Bunker 10, Coachmen, HFO 114, UPO 50.

#### **CULTURAL PRACTICES**

**Land preparation:** As that of wheat.

##### **Seeds and sowing**

- Fanning the light weight seeds is mandatory. Otherwise, even if those germinate, results weak stem and poor yield.
- About 25-30% seeds are normally rejected.
- Seed rate recommended is 100 kg/ha.
- Best time of sowing for oats is mid October to mid November.
- 15<sup>th</sup> October is optimum time for fodder production.
- Method of sowing: Drill sowing is better than broadcasting.

**Spacing:** 20-23cm row spacing for fodder and 23-25cm for grain production is optimum.

**Manures and fertilizer**

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- 12.5 t/ha of FYM is to be applied before last ploughing and to be incorporated before sowing.
- 80:40:0 kg NPK/ha is the recommended dose of fertilizers.
- 100% P is to be applied as basal.
- 60kg N is to be applied as basal, 10kg at first irrigation and 10kg at second irrigation is good for higher yield.
- 10 kg of N is to be applied after first cutting if sown for fodder cum grain.

#### **Water management**

- Oats requires higher water than wheat.
- 4-5 irrigations provide good yields. Generally, irrigation immediately after each cutting is mandatory.
- Critical stage for irrigation of oats is tillering stage.

#### **Weed management**

- One hand weeding is sufficient.

#### **Harvesting**

- 120-150 days required to mature.
- Common practice is 2 or 3 cuttings for fodder and then allowing for grain.

#### **Cropping system**

- Sorghum-oat-maize
- Maize-oat-maize
- Cowpea-oat + mustard-maize + cowpea
- Sorghum + cowpea-oat + lucerne

#### **Yield**

- 50-60t fodder and 200-400 kg grain/ha.
- Maximum grain yield of 3 -3.5t /ha is possible.

### **RYE (*Secale cereale*)**

**ORIGIN:** Western Asia to Southern Russia.

#### **GEOGRAPHIC DISTRIBUTION**

- World area: About 16m ha, production: 40 m tones.
- Leading countries produce Rye are Russia, Germany, Austria, Hungary, USA, Canada, Poland and Turkey.
- In India, Punjab, Haryana and UP cultivate Rye crop.

#### **IMPORTANCE**

- Minor *Rabi* cereal crop, used for green fodder.
- Rye also cultivated as pasture crop, green manure crop and cover crop.
- Used to mix with wheat flour for bread making.

#### **SOIL AND CLIMATIC REQUIREMENT**

**Climate:** It is a winter hardy cereal, can tolerate cold, but not, heat.

**Soil:** It is the only *Rabi* cereal more suited for sandy soil. But, it can be cultivated in all soils.

#### **CULTURAL PRACTICES**

**Seasons:** Winter and spring seasons crop.

**Varieties**

- Not numerous varieties as wheat, barley or oats.
- Winter season: Forage type - Athens, Common, Abruzzes; Grain type - Rosan, Dakold, Balba
- Spring season - Prolific, Merced.

**Time of sowing**

- For forage purpose - October is best.
- Grain crop – November is the optimum for sowing.
- Pasture / green manure / cover crops - Rye must be sown in August month.

**Seed rate:** Forage crop: 80 kg /ha and Grain purpose: 60 kg/ha.

**Land preparation:** As done to other winter cereals

**Method of sowing:** Drill seeding is better than broadcasting.

**Nutrient management**

- About 12.5t /ha of FYM to be incorporated before sowing.
- Nitrogen: 50 kg/ha applied in two splits as basal and during first irrigation.
- Phosphorus: 40 kg/ha is applied as basal.
- Potassium: 65 kg/ha applied as basal.

**Irrigation management**

- CRI and flowering stages are critical for irrigation.
- Six irrigations, during sowing, CRI (20-25 DAS), tillering (40-45 DAS), late jointing (70-75 DAS), flowering and dough stages give higher yield.
- If limited irrigation only available, one irrigation means at CRI; two irrigation means CRI and flowering; three irrigation means CRI, late jointing and flowering must be given.

**Harvest**

- For forage purpose: two cuttings at 50-55 days interval.
- Forage cum grain: Two cuts as above, but the second after maturity.

**Yield**

- 50-55 t/ha – Fodder purpose.
- Dual crop: 25 t/ha fodder, 2.5t/ha grain + 2.5t/ha straw.

**TRITICALE**

- Triticale is a Man made cereal.
- First wheat x rye occurred in Scotland during 1875.
- Initial crosses were sterile. First fertile cross was made in Germany in 1888.
- The name Triticale first appeared in Germany in 1935.
- There are Octaploid, tetraploid, hexaploid cultivars in triticale. Of which, hexaploid is most commonly used. Hexaploids of wheat and rye are called primary hexaploid.
- Triticale is either spring or winter cultivated. They tend to tiller less but have larger inflorescence. Majority of triticale cultivars are awned.
- Initial cultivars are, low yielder, tall and weak straw, shrunken/shriveled kernels, high susceptibility to ergot. But high protein, high level of amino acids and good for animal nutrition.

- But today's cultivable triticale is better yielding ability than wheat, more tiller producing habit, resistance to lodging, resistance to ergot, plump kernels, protein is similar bread wheat, suitable for spring and winter seasons.

### **Specialty of Triticale**

- They can utilize water and nutrients more efficiently than winter wheat.
- Seeding, seed rate, season, etc. are as similar to wheat.
- Nutrient and water requirement are similar to wheat and they are responding well when grown for grain.
- For forage, the seed rate may be enhanced to 80-100 kg in rainfed and drylands. For irrigated crop about 110kg of seed rate is adopted.
- Since the complete package of practices for triticale are not developed, cultural practices of wheat are utilized for cultivating triticale.

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