

FODDER CROPS

1. (Oat)

Botanical name – Avena sativa

Family – Gramineae

Oat (*Avena sativa*) can be grown successfully for fodder purpose during the *rabi* season under both irrigated and rainfed conditions. Oat fodder is quite nutritive containing, on an average, 7.6 per cent crude protein at 50% flowering stage and about 14.6 per cent at very early stage of growth. Under adequate irrigated conditions, it may give three cuttings starting from January when green fodder is scarce.

Oats is an important Cereal crop as well as fodder crop. Cultivation of Oat is similar as wheat crop. It is mainly grown in Temperate and Subtropical climates. It can also thrive well in high-altitude tropics. They are very popular due to their health benefits. Oat meal is very famous food. Oats is rich in proteins and fiber. They also help in weight loss, controlling blood pressure and for building strong immune system.

CLIMATE

Temperature
20-30°C

.

Rainfall
80-100 mm

.

Sowing Temperature
20-25°C

.

Harvesting Temperature
25-30°C

SOIL

It can be cultivated on all kinds of soil. Well drained loamy soil rich in organic matter is suitable for cultivation. pH range of 5 - 6.6 is optimum for oats.

POPULAR VARIETIES WITH THEIR YIELD

Weston-11: It has been released in 1978 for cultivation in Punjab. Plants have height of about 150 cm. Grains are long and amber in color.

Kent: It is suitable for growing in all areas of India. Average plant height is 75-80 cm. This variety is resistant to rust, lodging and blight. It gives fodder yield of 210 qtl/acre.

OL-10: Suitable for cultivation in all irrigated areas of Punjab. Seeds are of medium size. Gives average fodder yield of 270 qtl/acre.

OL-9: Suitable for cultivation in all irrigated areas of Punjab. Seeds are of medium size. Gives average seed yield of 7 qtl/acre and fodder yield of 230 qtl/acre.

OL 11: Released in 2017. It gives an average yield of 245qtl/acre. The plants are leafy, long and wide leaf.

Other States Varieties

Brunker-10: It is a quick growing variety having fine, narrow, smooth leaves. It is resistant against drought. It can be cultivated in areas of Punjab, Delhi, Haryana and Uttar Pradesh.

HFO-114: It is suitable for cultivating in all oat growing areas. It was released in 1974 by HAU, Hisar. This variety is tall and it is resistant to lodging. It has bold seeds and has an average yield of 7-8 qtl/acre of seed.

Algerian: This variety is suitable for irrigated areas. Average plant height is 100-120 cm. It has slow early growth and light green color leaves.

OS-6: Suitable for cultivation in all areas of India. Gives average green fodder yield of 210 qtl/acre.

Bundel Jai 851: Suitable for cultivation in all areas of India. It gives average green fodder yield of 188 qtl/acre.

Other varieties:- UPO 94, UPO 50, OS 6, HFO 114, Algeria 19, UPO 212, OL-125, OL-265, OS-6,

LAND PREPARATION

Land should be properly prepared to form a weed free field. Ploughing should be done 6-8 times to gain higher yields. Oat crop can tolerate higher pH levels than barley and wheat. Propagation in Oats is done through seeds.

SOWING

Time of sowing
Second week of October to last week of October is optimum time for sowing seeds.

Spacing
Spacing of 25-30 cm should be kept between rows.

Sowing Depth
Depth should be 3-4 cm.

Method of sowing

Sowing is done through drilling method, zero tillage drill.

SEED

Seed Rate: Seed rate of 25 kg is required for one acre land.

Seed Treatment: Seed should be treated with Captan or Thiram @3 gm/kg of seeds to protect seeds from various fungal and pathogenic diseases.

FERTILIZER

Nutrients Value (kg/hectare)

Nitrogen	Phosphorus	
100-120	60	

FYM should be added at the time of land preparation. Apply half dose of nitrogen and full dose of Phosphorus at the time of sowing. Apply remaining amount of Nitrogen, 30-40 days after sowing.

WEED CONTROL

Weed management is not necessary in case if plants become successful to make a good crop stand.

Weeds are less likely to occur in oats. 1-2 hoeing can be given as intercultural operations.

IRRIGATION

Oats are mainly cultivated as rain-fed crop. But if they are grown as irrigated crop, two irrigations should be given at 25-28 days interval from sowing.

PLANT PROTECTION



Insect-Pest and Their Management:

Aphid: It is the main pest of oats. It causes considerable damage by sucking of cell sap. It results in distortion and mottling of leaves. Dimethoate 30EC @0.03% helps to prevent aphid attack. This fodder should not be fed to animals for at least 10-15 days after spraying.



Disease and Their Management:

Leaf Blotch: Fungus establishes itself inter-cellular, tends to produce conidiophores which emerges through stomata and bears single terminal conidia. These conidia are brown to black in color, tapered at apex, 4-6 septate. Primarily infection occurs through these conidia. Secondary infection occurs through Air-borne spores. Seed treatment should be done properly to manage this disease.



Root Rot: It is caused due to root parasite. It can be cured by proper seed treatment during seed sowing.

HARVESTING

Oats are fully mature and ready to harvest after 4-5 months of sowing. To avoid grain shedding, Crop should be harvested in early April month.

YIELD:- The yield of green fodder is 400-600 quintals per hectare. 25-30 quintals of grain and 40-50 quintals of straw per hectare is obtained from the grain crop.

2. (BERSEEM)

Botanical name- Trifolium alexandrinum L.

Family - Leguminaceae

Berseem is a fast growing, high quality forage that is mainly cut and fed as green chopped forage. Flowers are yellowish-white in color. Berseem can be sown alone or in combination with other species. It is mixed with grass (ryegrass) or with a winter cereal crop such as oats to make high quality silage.

CLIMATE

.

Temperature
15°C - 27°C

.

Sowing Temperature
25-27°C

.

Harvesting Temperature
15-20°C

.

Rainfall
550-750 mm

SOIL

This crop gives best result when grown in Medium to heavy soil. It can be grown on sandy loam soil but it requires frequent irrigations. It improves physical, chemical and biological properties of soil and thus improves its fertility status.

POPULAR VARIETIES WITH THEIR YIELD

BL 1: It is quick growing variety and medium duration variety. It produces more tillers. Gives green fodder upto last week of May. It gives about 380 quintals of green fodder per acre.

BL 10: It is a long duration variety. Supply green fodder upto Mid June. Tolerant to stem rot disease. It gives 410 qtl of green fodder per acre.

BL 42: It is quick growing variety. Produces more tillers. It is tolerant to stem rot disease. It produces green fodder upto first week of June. It gives 440 qtl/acre of green fodder.

BL 43: Early maturing variety. The average yield of green fodder is 390qtl/acre.

Other state varieties:

Mescavi: Developed by CCS, Hisar. Suitable for cultivation in entire growing areas.

Wardan: Developed by IGFRI, Jhansi. Suitable for cultivation in entire growing areas.

BL 22: Developed by PAU, Ludhiana. Suitable for hill areas of north India and sub-temperate region.

HFB 600: Developed by CCS, Hisar. Suitable for cultivation in entire growing areas.

BL 180: Developed by PAU, Ludhiana. Suitable for growing areas of north India.

OTHER VARIETIES:- BL 1, JB 2, JB 3, BL 22, BL 2, Pusa giant.

LAND PREPARATION

For sowing, use leveled land so that water logging conditions will not appear during growth period. Carry out planking operation after each ploughing

SOWING

Time of sowing
Last week of September to first week of October is best time of sowing.

Spacing
Sowing broadcasting method is used.

Sowing Depth
Depending upon weather conditions, Broadcast seeds in standing water (water depth 4-5 cm). Complete sowing in evening hours.

Method of sowing
Berseem is sown by broadcasting method.

SEED

Seed Rate
Use seed free from weeds. Before sowing put seeds in water and remove seeds which floats on water. Use seed rate of 8 to 10 kg seeds. For getting good yield, mix 750 gm of mustard seed along with berseem seeds.

Seed Treatment
Before sowing, treat seeds with Rhizobium culture. Mix one packet of Rhizobium culture in 10% gur solution and then rub this mixture on seeds. Dry them in shade.

FERTILIZER

Nutrient Requirement (kg/hectare)

NITROGEN	PHOSPHORUS	POTASH
20-30	50-60	#

WEED CONTROL

Bween is serious weeds of Berseem crop. To control this weed before sowing, spray Fluchloralin @ 400 ml/200 Litres of water per acre on seed bed.

IRRIGATION

Apply first irrigation, within 3 to 5 days in light soil and 6-8 days in heavy soils. Remaining irrigation should be applied at 8-10 days interval in summer and 10-15 days during winter.

PLANT PROTECTION



- **Pest and their control:**

Grass hopper: It damage crop by eating leaves. It occurred mostly in May-June month. If infestation is observed, spray crop with Malathion 50 EC @ 500 ml in 80-100 Ltr of water per acre. After spraying do not feed cattle for seven days.



Gram Caterpillar: Avoid raising of crop nearby tomato, gram, late sown wheat. If infestation is observed spray with Chlorantraniliprole 18.5 SL @ 50 ml or Spinosad 48 SC @ 60 ml per acre in 80-100 Ltr water with help of knapsack sprayer.



- **Disease and their control:**

Stem Rot: It is seed borne disease. It causes rotting of stem near soil surface. White fungus growth is observed on nearby soil.

Remove and destroyed affected plants. Take spray of Carbendazim @ 400 gm in 200 Ltrs of water per acre.

HARVESTING

Crop is ready to harvest 50 days after sowing. After then take cutting with 40 days interval in winter and 30 days interval in spring. Berseem can be mixed with 20% ground maize to provide high quality silage

Yield:- On cultivation of berseem with advanced methods, 1000-1200 green fodder is available from the crop grown in one hectare. 15 to 18% dry matter is found in this feed.

3. (LUCERNE)

Botanical name- Medicago sativa

Family- Leguminaceae

Lucerne also known as "alfalfa" or "rijka" in northern India is a protein rich fodder and considered as "queen of fodder crop". It is a perennial plant and can supply fodder for 3-4 year in same growing. Along with protein, it is also major source of mineral and calcium. It is a palatable green fodder contain 16-25% of crude protein and 20-30% of fibre. Lucerne is native of South-West Asia. It is a hardy leguminous crop and can survive in drought conditions. It can be easily converted into silage and hay. It is winter season crop and mainly cultivated in Gujarat, Madhya Pradesh, Maharashtra and Rajasthan. In one season 7 to 8 cutting can be taken with average fodder yield of 280 to 320 qtl/acre.

CLIMATE

.

Temperature

15-32°C

.

Rainfall

350-400mm

400-500mm

.

Sowing Temperature
28-32°C

Harvesting Temperature
15-20°C

SOIL

It can be cultivated on variety of soils but it gives best result when grown on deep and well drained loamy soils. Avoid waterlogged, alkaline and heavy soils for its cultivation.

POPULAR VARIETIES WITH THEIR YIELD

LL composite 5: It is a fast growing, tall annual variety having broad dark green leaves with purple flowers. Seeds of this variety are bold. It gives to resistant to downy mildew. It gives average yield of 280 qtl/acre.

Sirsa 8: It is developed at fodder research station Sirsa (Haryana). Suitable for cultivation in Punjab, Haryana, Delhi and UP. It gives average yield of 140-160 qtl/acre of green fodder.

Lucerne No 9L: It is developed by Punjab Agriculture University, Ludhiana. It is a quick growing variety with green foliage. Once planted it can give fodder upto 5-7 years. Gives average yield of 300 qtl/acre of green fodder per year.

Chetak S 244: It is suitable for cultivation in Punjab,

Haryana, Uttar Pradesh and Gujarat. It gives average yield of 560 qtl/acre.

Other States Varieties:

Rambler: Suitable for cultivation in Hilly areas. Gives average yield of 240-360 qtl/acre per year

LL composite 3: Suitable for growing in entire country. It give resistance to downy mildew and lodging. Gives average yield of 156 qtl/acre.

IGFRI S 54, IGFRI S 244, Moopa, IGFRI S 112.

Other varieties:- NDRI Selection 1, Anand 2, Anand 3, S- 54, S-244, African, T.8, T.9, T.15.

LAND PREPARATION

Prepared field thoroughly and prepared levelled seed bed. Plough land once with help of disk plough and three times with cultivator. After every ploughing do planking to make seed bed levelled.

SOWING

Time of sowing
Best time for lucerne sowing in Punjab, is middle of October.

Spacing

At time of sowing keep row to row distance of 30 cm

Sowing sow seeds at depth of 2-4 cm in soil. **Depth**

Method of **sowing**
For Sowing broadcasting method is used. Before lucerne sowing, broadcast oats @ 15kg/acre and mix well in soil with help of cultivator.

SEED

Seed Rate.

Splash method- 12-15 kg/ hectare.

Howard law- 10-12 kg/ hectare.

FERTILIZER

Nutrient Requirement (kg/hectare)

NITROGEN	PHOSPHORUS	POTA
20-30	50-60	-

WEED CONTROL

To keep field weed free, carry out first hoeing one month after sowing. In rainy season weed infestation is high at that time take hoeing operation according to weed intensity.

IRRIGATION

Apply first irrigation, one month after sowing and depending upon soil type and climate, apply remaining irrigations at interval of 15-30 days. No irrigation is needed during rainy season.

PLANT PROTECTION



- **Pest and their control:**

Alfalfa Aphid: Serious pest of lucerne crop. If infestation is observed, to control take spray of Malathion 50EC@350ml in 150 litre of water per acre.



Lucerne caterpillar, jassid and weevil: If infestation is observed, take spray of Hexavin 50WP@450gm or Malathion 50EC@ 400ml in 150 Ltr of water per acre.



- **Disease and Their control:**

Rust: If not controlled timely can reduce yield severely. Small brown spots are observed on leaves with black or brown color at centre. If infestation is observed, take spray of Mancozeb (Dithane M-45)@25gm/10 Ltr of water.



Leaf spot: It is mostly found in north and central India. Affected plant turn yellow and leaves gets drop off. If infestation is observed, take spray of Mancozeb (Dithane M-45) or Chlorothalonil@300gm/150 Ltr of water.

HARVESTING

After sowing, crop is ready to harvest for cutting in 75 days. Remaining cuttings are taken at interval of 30-40 days.

YIELD

Under normal condition, 500-600 quintals of green fodder per hectare are obtained every year.

But in the stages of improved agricultural activity, 700-800 quintals of green fodder per hectare are obtained every year.

When the seeds have to be taken in the crop, the number of harvesters is reduced, so a lower yield per hectare is obtained. At this stage, 300 quintals of green fodder and 2-4 quintals of seeds is obtained.