**Rabi Fodders**

1. **Berseem** *(Trifolium alexandrinum* L*.)*

**Botany and importance**

It belongs to rabi fodder and mostly it is cultivated separate and sometimes cultivated with oat, mustard and rai grass. Berseem is the king of rabi fodders and cultivated at 81% area of total rabi fodders. It is very important and fast growing rabi fodder, it contains a lot of nutrients. Berseem is a legumes crop and improve soil fertility by nitrogen fixation. It gives 40 to 50 tons per acre in 4 to 6 cuts from November to May. It is a leguminous crop and nitrogen fixing bacteria present in its roots which fix nitrogen and increase soil fertility.

**Climate**

It requires moderate climate for its good production, in December and January its growth is reduced due to low temperature. It can be cultivated in all irrigated areas of Punjab.

**Varieties**

Superleet, Faisalabad berseem, Anmol ageti berseem, Pacheti berseem

**Soil and seedbed preparation**

It gives good production in heavy loam soil, it can be cultivated in medium saline if irrigation is available. Seed bed is prepared by three to four cultivations with planar. Laser leveling must be done for good production.

**Sowing time**

1st to mid of October is best sowing time.

**Seed rate and sowing method**

8kg per acre healthy and weed free seed is recommended for berseem. In case of mix cropping with oat 6kg of berseem seed is recommended with 10 to 12 kg seed of oat per acre, in case of mix cropping with mustard 8kh berseem and ½ kg mustard seed per acre and in case of rye grass and berseem mix cropping 7kh berseem and 1kg rye grass seed is used. After soil preparation seed is sown in standing water by broad cost method

**Fertilizer application**

13% Nitrogen and 36% Phosphorus is recommended. All fertilizer must be applying at sowing time during seed bed preparation. More nitrogen can be used after each cut according to need.

**Irrigation**

Berseem is cultivated in standing water, first irrigation is applied after one week of sowing, after this water is applied according to demand. In heavy cold season we can protect crop from frost by Appling a light irrigation with 7 or 10 days’ interval.

**Weeds**

For Itsit and other weeds control use Pendimethaline 1.5L per acre 3 weeks before sowing.

**Diseases**

Stem Crown Rot White Mould, Berseem Root Rot, Collar Rot and Anthracnose. These diseases can be control by seed treatment and by using resistant varieties.

**Insects**

Army worm, whitefly, shoot fly, weevil, gram caterpillar and aphids. Use recommended insecticide to control insects.

**Time of harvesting and production**

In case of seed crop it must be harvested when it fully matured, after cutting arrange in the form of bundles and after drying harvested with thresher. if crop is cultivated on more area then combine harvester must be used. Seed store in dry and aerated store.

1. **Lucerne** *(Medicago sativa* L.*)*

**Botany and importance**

It belongs to family Leguminosae. It is perennial crop which provide green fodder whole of the year, it can grow many years by sowing one time. It is harder as compare to other rabi fodders and can bear hard season in winter and summer.

**Climate**

This crop can adopt every type of climate and every type of soil. Partially dry climate is more suitable for this crop.

**Varieties**

Sweet Sadabahar (certified variety of FRI Sargodha).

**Soil and seedbed preparation**

Well-drained loamy soils are more suitable for its cultivation. his is an annual crop so must focus on good soil preparation, 4 to 5 times cultivate the soil with planar. Soil must be leveled before sowing.

**Sowing time**

Best sowing tie is 15 October to 15 November but according to climate change sowing time can be changed.

**Seed rate**

In drill sowing or kera method 4 to 6kg/acre healthy seed is needed and incase of broad casting 6 to 8kg/acre seed is needed.

**Sowing method**

For good fodder production and control of weds it must be growing lines with single row cotton drill or small seed drill. Row to row space must be 1 to 1.5cm in case of fodder and 1.5 to 2cm in case of seed production. Seed depth must be lower.

**Fertilizer application**

Fertilizer should be used after testing the soil, recommended fertilizers for alfalfa is 23% Nitrogen and 35% Phosphorus. All fertilizes should be applied at basal. Nitrogen fertilizer can be used after each cutting according to need.

**Irrigation**

First irrigation is applied after 3 weeks of sowing and remaining irrigation is applied according to need. This is deep rooted crop so it can bear water stress normally one irrigation is need after each cutting, in rainy season there is no need of water for this crop

**Diseases**

Collar Rot, stem & Crown Rot, Anthracnose

**Insects**

Army worm, whitefly, shoot fly, weevil, gram caterpillar and aphids. Use recommended insecticide to control insects.

**Time of harvesting and production**

For seed purposes cutting must be stop in mid or end of March. Crop should be harvested when it became completely matured and harvesting must be done in morning.

1. **Oat** *(Avena sativa* L.*).*

 **Botany and importance**

It belongs to family Gramineae, locally known as javi, jai or jodar. Oat is an important rabi fodder. The leaves and grains are high in carotene and carbohydrates. When mixed with berseem, oats provide balanced feed to animals.

**Climate**

Oat grows best in cold humid climate and it cannot tolerate dry climate

**Varieties**

Oat-2011, S-2000 and PD2LV-65 are approved varieties from Sargodha Fodder Research Center. NARC Oat is also a best variety.

**Soil and seedbed preparation**

Heavy loam soil is best for this crop. Water logged and sandy soils are not suitable. Land should be prepared by cultivating three times with planker, after cultivation land should be leveled.

**Sowing time**

For fodder purpose crop should be sown first to last week of October and for seed purpose it should be sown 15 to 30 November

**Seed rate**

32kg/acre seed needed for fodder purpose and 16 to 20kg/acre for seed purpose. Seed should be clean and healthy. Seed treatment must be done with fungicide.

**Sowing method**

It can be cultivated by broad casting but sowing in lines give good results.

**Fertilizer application**

60% Nitrogen, 36% Phosphorus and 25% Potassium is recommended. In arid areas all fertilizer should be apply at basal.

**Irrigation**

It needs three to four irrigations including rowni irrigation. First irrigation should be applied after three weeks of sowing, remaining irrigations should be applied according to crop requirement.

**Insects**

Army worm, whitefly, shoot fly, weevil, gram caterpillar and aphids. Use recommended insecticide to control insects.

**Time of harvesting and production**

 For fodder it must be harvested when 50% flowering is done and for seed purpose it must be harvested when completely mature. Fodder crop produce almost 700 monds fodder/acre easily and seed crop produce 20 to 25kg seed/acre.

1. **Rye Grass** *(Secale cereae* L*.)*

**Botany and importance**

It belongs to family Poaceae. It is a multi-cuts winter fodder which can grow easily in cold frost condition.

**Climate**

Cold areas more suitable for this crop, it cannot grow in hot climate. Those areas are more suitable where irrigation water is available or good rainfall occurs

**Varieties**

* RG- 1

**Soil and seedbed preparation**

Heavy loam soil is best for this crop cultivation. Seedbed can be prepared with three or four ploughings with a cultivar along with planking.

**Sowing time**

In case of single cropping best sowing time is October and November. In case of mix cropping with berseem best sowing time is October to first week of November.

**Seed rate**

* 6 to 8kg heathy seed is recommended per acre which is sowing through broadcast.

**Sowing method**

The broadcast method is common for fodder crop but sowing in lines 1 feet apart with drill gives better results. For seed crop lines distance should be 2-21/2 feet apart.

**Fertilizer application**

2.5 bags SSP and half bag urea and one bag DAP per acre is applied at sowing, one bag urea at first irrigation and one bag urea after each cutting.

**Irrigation**

Three to four times irrigation is needed, first irrigation is applied after three weeks of sowing

**Weeds**

Itsit and tandla are the serious weeds. Use recommended herbicide to control the weeds.

**Diseases**

Stalk rot and leaf blight are serious diseases of maize. Seed treatment with proper fungicide is helpful to control such diseases.

**Insects**

Army worm, whitefly, shoot fly, weevil, gram caterpillar and aphids. Use recommended insecticide to control insects.

**Time of harvesting and production**

For fodder purpose first cutting is done after 60 days and other cutting should be done 45 to 50 days’ interval. Seed crop should be harvested before few days of maturity. 600 to 700 monds fodder per acre and 2.5 monds seed per acre is produced.