**Pulses (Grain Legume Crops)**

1. **Mung bean (*Vigna radiate* L.)**

**Botany and importance**

Mung bean having diploid chromosomes number belongs to family Leguminosae. It is also called green gram and an important pulse crop in many Asian countries including Pakistan. It is grown mainly for its edible seeds, which are cooked, fermented, roasted, sprouted, or milled. It is high in protein and digestible. Seed protein content averages 20-24%. Leaves, stalks and husks are used as fodder, and the whole plant can be ploughed under as green manure for soil improvement. In symbiotic association with specific soil rhizobia, root nodules develop on the root in which atmospheric nitrogen is converted into available nitrogen forms.

**Climate**

Mung bean is a crop of tropics and subtropics. Though it can survive in a wide range of temperatures. Optimum mean temperatures for its cultivation are in the range of 28-300C.

**Varieties**

Niab mung-2006, Azri mung-2006, Niab mung-2011, Niab mung-2016, Bahawalpur mung-2017, Azri mung-2018, PRI mung-2018, Chakwal mung-6

**Soil and seedbed preparation**

Well-drained sandy loam to heavy loam soils are best for mung cultivation. However, more salt-affected and water-logging soils are not suitable for cultivation.

**Sowing time**

* Planting time for the spring crop ranges from 1st week of March to end of March. However, 1st fifteen days of March are more suitable for cultivation.
* Planting time for the kharif crop is 1st May to 15 June.

**Seed rate**

Use 10-12 kg/acre healthy and certified seed with more than 80% germination percentage. Plant population should be 160000-1800000/acre.

**Sowing method**

* Cultivation of mung bean is done with drill in rows 30 cm apart. Pora and kera methods are also used.

**Fertilizer application**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Crop** | **N** | **P** | **K** | **Fertilizer before sowing** |
| Mung bean | 09 | 23 | 12 | 11/4 bag DAP+1/2 bag SOP |

**Irrigation**

Normally, 3 irrigations are applied.

* Ist irrigation should be applied after three weeks of sowing.
* 2nd irrigation should be applied at flower initiation.
* 3rd irrigation should be applied at grain-filling stage.

**Thinning**

* Uproot weak and damaged plants at four leaf stage before 1st irrigation and after 8-10 days after germination in irrigated and rainfed areas, respectively. and maintain PxP distance 08-10 cm apart.
* PxP distance should be 8-10 cm.

**Weeds**

Itsit, Tandla, Deela and other broadleaf weeds.

* Use Pendimethaline @ 1000ml/L to control by chemical method.
* Use recommended chemical to control weeds.

**Diseases**

Mung bean Yellow Mosaic virus, Urdbean Leaf Crinkle virus, Anthracnose, Cercospora leaf spot, Wilt, Stem and Root rot and Collar rot are disease which can be controlled by seed treatment with fungicide.

* Concern to extension workers and use recommended chemicals.

**Insects**

Whitefly, Thrip, Aphid, Jassid, Mille bug, Termite, Grass hopper, Cut worm, Pod borer and Army worm.

* Use recommended insecticides to control these insects.

**Time of harvesting**

Harvesting of mung bean should be done in morning time when 80-90% of the pods mature. Harvested crop should then be left in the fields in small heaps. Threshing should be done when plants are fully dried.

1. **Mash bean (*Vigna mungo* L.)**

**Botany and importance**

Mash bean having diploid chromosomes number belongs to family Leguminosae. It is also called black gram and an important pulse crop in many Asian countries including Pakistan. It is grown mainly for its edible seeds, which are cooked, fermented, roasted, sprouted, or milled. It is high in protein and digestible. Seed protein content averages 20-24%. Leaves, stalks and husks are used as fodder, and the whole plant can be ploughed under as green manure for soil improvement. In symbiotic association with specific soil rhizobia, root nodules develop on the root in which atmospheric nitrogen is converted into available nitrogen forms.

**Climate**

Mash bean is a crop of tropics and subtropics and requires a relatively high temperature.

**Varieties**

Mash-97, Urooj-2011, NAPC Mash-3, Chakwal mash.

**Soil and seedbed preparation**

Well-drained sandy loam to clayey soils are best for mash cultivation. However, more salt-affected and water-logging soils are not suitable for its cultivation.

**Sowing time**

* In irrigated areas, whole month of July is suitable for cultivation.
* In rainfed areas, cultivation should be done in last week of June to end week of July.

**Seed rate**

Use 08-10 kg/acre healthy and certified seed with more than 80% germination percentage. Plant population should be 160000-1800000/acre.

**Sowing method**

* Cultivation of mash bean is done with drill in rows 30 cm apart. Pora and kera methods are also used.

**Fertilizer application**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Crop** | **N** | **P** | **K** | **Fertilizer before sowing** |
| Mash bean | 09 | 23 | 12 | 11/4 bag DAP+1/2 bag SOP |

**Irrigation**

Normally, 3-4 irrigations are applied.

* Ist irrigation should be applied after three to four weeks of sowing.
* 2nd irrigation should be applied at flowering initiation.
* 3rd irrigation should be applied at pod initiation stage.
* 4th irrigation should be applied as per need.

**Thinning**

* Uproot weak and damaged plants at four leaf stage before 1st irrigation and after 8-10 days after germination in irrigated and rainfed areas, respectively. and maintain PxP distance 08-10 cm apart.
* PxP distance should be 8-10 cm.

**Weeds**

Itsit, Tandla, Deela and other broadleaf weeds.

* Use Pendimethaline @ 1000ml/L to control by chemical method.
* Use recommended chemical to control weeds.

**Diseases**

Mash bean Yellow Mosaic virus, Urdbean Leaf Crinkle virus, Anthracnose, Cercospora leaf spot, Wilt, Stem and Root rot and Collar rot are disease which can be controlled by seed treatment with fungicide.

* Concern to extension workers and use recommended chemicals.

**Insects**

Whitefly, Thrip, Aphid, Jassid, Mille bug, Termite, Grass hopper, Cut worm, Pod borer and Army worm.

* Use recommended insecticides to control these insects.

**Time of harvesting**

Harvesting of mash bean should be done in morning time when 80-90% of the pods mature. Harvested crop should then be left in the fields in small heaps. Threshing should be done when plants are fully dried.