characteristic symptoms on affected trifoliate leaves. Pollen production, fertility and subsequent pod formation is severely reduced with effect on seed weight and size of seeds in infected plants leading to decrease in yield.

Management

- Seeds from diseased crops should not be used.
- Treat the seeds with appropriate chemicals before sowing.
- Rogue out the infected plants to avoid contact between healthy and diseased plants.
- Give one foliar spray of insecticide (dimethoate 30 EC @ 1.7ml/ha) on 30 days after sowing.

Cercospora Leaf Spot

Cercospora leaf spot (CLS) is caused by several species dominated by *Cercospora canesens* and may cause severe losses of yield under humid weather conditions. Leaf spots with brown to greyish centre and reddish brown border are its characteristic symptoms. The petioles, stems and pods also get affected by the pathogen. During favourable condition the spots increase in size and at the time of flowering and pod formation lead to defoliation. The fungus survives on the infected seeds and crop debris.

Management

- Field sanitation, crop rotation, destruction of infected crop debris and avoiding the collateral hosts in the vicinity of the crop would greatly help in reducing the incidence of the disease.
- Treat the seeds with thiram or captan @ 2.5g/kg of seed.
- On appearance of the symptoms spray with carbendazim 50 WP @1.0 g/l or mancozeb 45 WP @ 2.0 g/l. Spraying with copper oxychloride @ 3 to 4 g /liter water has also been found effective in management of the disease.

Anthracnose

The disease occurs on several legume crops including mungbean and urdbean. The fungus *Colletotrichum* spp. is the causal organism of anthracnose affecting aerial plant parts, however, the leaves and pods are more vulnerable. The characteristic symptoms are circular brown sunken spots with dark centers and bright red orange margins on leaves and pods. In severe infection, affected part withers off. The pathogen survives from one crop season to the next on infected seeds and crop residue. Intermittent rains at frequent intervals favor the epidemic development of the disease.

Management

- Hot water seed treatment at 58oC for 15 minutes has been found effective in checking the seed-borne infection and increasing proportion of seed germination.
- Seed treatment with thiram 80% WP @ 2 g/l or captan 75 WP @ 2.5 g/l.
- Spray the crop with any available fungicides.

Harvesting and threshing

The crop should be harvested when most of the pods turn black. Over maturity may result in shattering and loss. Harvested crop should be dried and threshed manually. A well-managed crop can yield between 1.5-2.0 t/ha.

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Ministry of Agriculture & Forests
Department of Agriculture

PRODUCTION PACKAGE FOR URDBEAN/MUNGBEAN

Mungbean

Urdbean

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Introduction

Mungbean (*Vigna radiata*) and Urdbean (*Vigna mungo*) are important pulse crops. Both are important short duration grain legume crops with wide adaptability, low input requirement and have the ability to improve soil fertility by fixing atmospheric nitrogen. There is often confusion between mungbean and urdbean, the two being different only at the species (*radiata* and *mungo*) level. What our farmers traditionally grow in the southern foothills is actually Urdbean, but we are used to calling it Mungbean There are many local varieties of Urdbean but none in Mungbean. Again, there are no improved varieties of Urdbean, but there are two improved varieties of Mungbean (Bari Mung 2 and KPS-2) released from RDC Wengkhar.

Mungbean is also known as green gram and serve as a major source of dietary protein. The nutritive value of both urdbean and mungbean lies in its high and easily digestible protein, and contain approximately 25-28% protein,1.0% oil, 3.5-4.5% fiber, 4.5-5.5% ash and 62-65% carbohydrates on dry weight basis. Urdbean is also known as black gram. The seed colour can be either black or yellow. High values of lysine make urdbean and mungbean an excellent complement to rice in terms of balanced human nutrition.

The mung bean resembles the black gram but there are differences: the corolla of *Vigna mungo* is bright yellow while that of *Vigna radiata* is pale yellow; mung bean pods are pendulous (hanging) whereas they are erect in black gram. Mung bean is slightly less hairy than black gram.

Production Techniques

Selection of Land and its Preparation

It is a common practice for our farmers to cultivate urdbean on rice bunds and terrace walls after rice crop is transplanted. It is a form of intercropping or companion cropping. This is possible in the wetland farming system. However, urdbean can be grown as a sole crop in the dryland system. It can be cultivated in different kind of soils, but the best soil for its cultivation is loam soil with good drainage. The crop should not be raised on alkaline, saline or waterlogged soils. A well prepared seedbed is required for proper germination and establishment of the crop. For land preparation, 2-3 ploughings followed by planking or harrowing to make the seedbed free from clods and weeds will be necessary.

Selection of Cultivar/Variety

There are so far no recommended improved varieties of urdbean. The local varieties presently grown by farmers have probably been introduced from neighboring countries and selections made over the years. Generally, varieties with black seed colour and yellow seed coat are popular. For mungbean, two improved varieties from Bangladesh and Taiwan have been introduced and released in 2002 by RDC Wengkhar. These are Bari Mung 2 and KPS-2.

Seed Treatment and Seed Rate

For the prevention of soil and seed borne diseases, seeds should be treated with Rhizobium and Phoshorus Solubilising Bacteria. Seed should be treated with 2.5 g thiram or 2 g carbendazim/kg of seed. After seed treatment, the seed should be mixed with Rhizobium culture. 250g of Rhizobium culture is sufficient for the seed required for one acre. Rhizobium treatment increases the nodule formation. Generally, a seed rate of 20 – 25 kg/ha of mungbean and urdbean is used. If sown in lines, the distance between two lines should be 30 – 35cm. Seed should be sown at a depth of 4-5 cm.

Sowing Time

Urdbean should be sown during the month of June and July. This is a common practice of our farmers who dibble seeds on bunds and terrace walls after the rice crop is transplanted. Sowing on drylands can be done at the same time, or earlier.

Fertilizers and Irrigation

Normally, urdbean is cultivated without any fertilization. However, for optimum yields, a fertilizer rate of 10 kg nitrogen, 45 kg phosphorus and 20 kg of sulphur per ha should be applied at sowing time. Use of gypsum @ 200 kg/ha would ensureavailability of calcium and sulphur.It is advisable to use fertilizers on the basis of soil test and recommendations. Irrigation is normally not required as the crop season coincides with the rainfall. However, one irrigation before flowering and another at pod-filing stage would ensure healthy seeds. Water logging in the field should be avoided at all cost.

Diseases

Both mungbean and urdbean are infested by similar fungal pathogens and viruses. Some of these diseases can cause severe losses in yield in epidemic conditions. Main diseases are described below.

Yellow Mosaic Disease

This disease is caused by yellow mosaic virus (MYMV), which is transmitted by whitefly. This viral disease is found on several alternate and collateral host which act as primary sources of inoculums. The tender leaves show yellow mosaic spots, which increase with time leading to complete yellowing. Yellowing leads to less flowering and pod development. Early infection often leads to death of plants.

Management:

Diseased plants should be rogued out to prevent further spread of the disease. In order to prevent whitefly infestation spray with any available insecticides.

Leaf Crinkle

This disease is caused by leaf crinkle virus (ULCV) which is transmitted by aphids, whitefly and leaf hoppers. Disease symptoms include crinkling, curling, and puckering of leaves often coupled with stunting and malformation of floral organs. Enlargement in size followed by crinkle surface of laminae are the