



GRASS PEA FOR DIVERSIFICATION AND SUSTAINABLE FOOD PRODUCTION

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ABSTRACT

Grass pea (*Lathyrus sativus* L.) is also called as Lathyrus, a well-known pulse crop. It is grown for fodder and human consumption as Dal. It is also known as Indian pea, blue sweet pea, chickling pea, white vetch, and khesari in Hindi. It is a very hardy crop with tolerance to drought conditions. It is an insurance crop which can be grown in low-rainfall areas where chickpea, lentils, and pea failed to give optimum yields. This crop can withstand to water logging conditions. Lathyrus is considered one of the most important climate-resilient crops. Lathyrus crop can save about 35-50 kg ha⁻¹ nitrogen for the succeeding crop through biological nitrogen fixation and decomposition of plant parts.

INTRODUCTION

Lathyrus seed contains about 32% protein, 54% carbohydrate, 0.9% fat, and 3.2% ash. Neurotoxin ODAP, also known as β -N-oxalyl-amino-L-alanine (BOAA), is the primary health concern associated with grass pea consumption. Lathyrism may affect anyone consuming a diet consisting of more than 25% grass pea for 3–4 months (Asthana 1996 and Rao et al., 1969). In India, the cultivation of Lathyrus is mainly concentrated in the Chhattisgarh region, and Madhya Pradesh state (Ganapathy and Dwivedi, 1961).

CLIMATE AND SOIL

Lathyrus is a winter season crop and grows well under a temperate climate. It adapt well in extreme harsh weather but grows well in temperature range from 15⁰C to 25 ⁰C from sowing to harvesting. Lathyrus is unsuitable for growing on soils having high acidity (pH below 6.0). Generally, it prefers to grow on heavy, loamy, and deep black soils. For good production, deep summer ploughing should be done once in 3 years. It can be grown in a standing paddy crop as utera or relay crop.

VARIETIES

Bio L-212 (Ratan), RLS-4595, B-1, LS 157-14, HD-3, LSD-6, Prateek, MahaTeora, Pusa-24 and Rajendra Khesari 1

SEED AND SOWING

For line sowing, a seed rate of 40-60 kg ha⁻¹ and for broadcasting and utera system a seed rate of 70-80 kg ha⁻¹ is effective for good crop stand. Seed should be sown as broadcast between among the rice rows in utera cultivation. The recommended spacing is 30 cm x 10 cm for normal sowing of lathyrus. In a pure crop stand it is sown after harvest of rice crop on residual soil moisture during the last week of October to the first week of November. However, the last week of September or the first week of October is best for sowing under utera cropping. Before sowing the crop, the seed should be treated with 3g kg⁻¹ of thiram. Inoculation of lathyrus seed with *Rhizobium* and PSB culture @ 5-7 g kg⁻¹ of seed gives good yield.

NUTRIENT MANAGEMENT

Lathyrus is grown on residual soil fertility after harvest of rice under utera/paira cropping. In this case, if the crop is grown on a highly phosphorus fertilized paddy field, there is no need to apply phosphorus. However, in the area where phosphorus deficiency is observed, it responds well to phosphorus up to 40-60 kg ha⁻¹. For normal crop growth, application of fertilizer dose @ 100 kg DAP + 100 kg gypsum ha⁻¹ is recommended. Foliar application of 2% urea or 20 ppm Salicylic acid is recommended at flowering and pod formation stage to obtain higher yield of Lathyrus.

IRRIGATION/WATER MANAGEMENT

Lathyrus is grown on residual moisture after harvest of rice crop. Under high moisture stress conditions an irrigation at 60-70 days after sowing gives good yield.

WEED MANAGEMENT

For effective weed management spray fluchloralin 45 EC @ 0.75-1 kg a.i.ha⁻¹ as pre-plant incorporation. If heavy weed infestation prevails, one hand-weeding at 30-35 days after sowing is recommended.

PLANT PROTECTION MEASURES

INSECTS/PESTS: Aphid is the most problematic insect of Lathyrus, which sucks the juice from the leaves, and leaves turn brown and crumpled, and the plant looks sick. For effective control of Aphid spray systemic insecticide.

These are the following three major diseases of Lathyrus:

DOWNY MILDEW: The fungus *Peronospora spp.* is responsible to cause downy mildew in Lathyrus. The brownish cottony growth of fungus may be seen on the lower surface of the infected leaves. To control this disease, spraying with Mancozeb 75 WP @ 2 g L⁻¹ of water is effective.



POWDERY MILDEW: The fungus *Erysiphe polygoni* causes powdery mildew in the plants. Symptoms of disease first appear on the aerial parts and powdery spores cover the whole plant later. To control powdery mildew spray with carbendazim @ 1 gL⁻¹ of water.

RUST: The casual fungus of this disease is *Uromyces fabae*. The pustules coloured pink or brown found on leaves and stems. To control this disease, seed treatment with carbendazim @ 2 g kg⁻¹ seed is effective.

HARVESTING AND THRESHING

Harvest the crop when pod colour turns to brown and grains become hard, having approximately 15% moisture. After harvesting, the product may be sun-dried for 4-5 days. Threshing is done by the thresher. On an average, lathyrus yield 8-10 q ha⁻¹ yields under normal sowing whereas under utera cultivation crop yield 3-4 q ha⁻¹.

PROSPECTS OF LATHYRUS CULTIVATION

Lathyrus has many unique features and characteristics. Some most important features of Lathyrus are:

1. Lathyrus crop adapted to growing under harsh climatic conditions such as drought and waterlogged conditions. It requires minimal inputs and therefore is adaptable to ecological sustainability.

2. Lathyrus crops may be grown in areas where flooding from monsoon rains can severely damage other crops.
3. Its seed contains a high protein level, which usually ranges from 25.5-28.5% but can be as high as 32%.
4. It has an agreeable taste that can be utilized in snack foods and is a significant component of the regular diet.
5. Lathyrus contributes in biological nitrogen fixation thereby increases the succeeding crop yield
6. The grains are used as food for humans or as animal feed.
7. It can be used as forage or fodder for animals having good palatability.
8. The leaves of the Lathyrus may be used as leafy vegetables, and the selling of Lathyrus leaves as leafy vegetables create livelihood opportunities for poor farmers.



MAJOR CONSTRAINTS AND PROBLEMS IN LATHYRUS CULTIVATION

1. **UNAVAILABILITY OF SUITABLE AND HIGH YIELDING VARIETIES:** In India, suitable and high-yielding varieties of Lathyrus are not available. Farmers are using only local varieties for cultivation.
2. **UNAVAILABILITY OF QUALITY SEEDS:** Generally, farmers are unaware of the improved varieties. Unavailability of good quality Lathyrus seeds having low BOAA content and its traditional varieties have low yield potential.
3. **INADEQUATE PLANT POPULATION:** The crop is sown on high moisture at sowing and lack of irrigation at lateral phase of growth results in low plant stand thereby resulting into low yields.

4. **PLANT PROTECTION MEASURES:** Lack of proper measures for protecting the crop against diseases and insect pest is an important reason for low yields.
5. **LACK OF TECHNICAL AWARENESS:** Farmers of India have not yet been provided with the standardized package of Lathyrus cultivation practices and less support from the public extension system in Lathyrus cultivation.
6. **LACK OF BIO FERTILIZERS AVAILABILITY:** Lack of efficient strain of *Rhizobium* for growing the lathyrus crop.
7. **HIGH CROP WEED-COMPETITION:** High crop-weed competition at initial crop growth stages in relay cropping on residual soil moisture due to heavy weed infestation, reducing production quality and quantity.

CONCLUSION

In India, there is a greater scope of Lathyrus cultivation. Due to its hardy nature, it can be grown where other pulse crops fail to survive and not give a good yield. In the different parts of India, due to low prices, poor people include Lathyrus in their food habits. The Lathyrus cultivation creates livelihood opportunities for the farmers. Farmers fear the consumption of Lathyrus due to the presence of a neurotoxin, and its popularity goes down. There is a need to provide less BOAA content Lathyrus seed to the farmers and develop improved packages and practices to make them aware of the benefits of Lathyrus cultivation.

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