Journal of Pharmacognosy and Phytochemistry

Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; 7(5): 1141-1143
Received: 25-07-2018
Accepted: 27-08-2018

Debasis Mahata
Research Associate, Department of Agronomy, Banga Krishi Viswavidyalaya, Pundibari, Cooch Behar, West Bengal, India

Binoy Chhetri
Field Assistant, Regional Research Station Hill Zone, UBKV, Kalimpong, West Bengal, India

Amit Ghosh
Ph.D, Research Scholar, Department of Agronomy, Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia, West Bengal, India

Saikat Chongdar
Field Assistant, Regional Research Station Teari Zone, Banga Krishi Viswavidyalaya, Pundibari, Cooch Behar, West Bengal, India

Correspondence
Debasis Mahata
Research Associate, Department of Agronomy, Banga Krishi Viswavidyalaya, Pundibari, Cooch Behar, West Bengal, India

Improved technology of Grasspea (*Lathyrus sativus*) cultivation

Debasis Mahata, Binoy Chhetri, Amit Ghosh and Saikat Chongdar

Abstract
The field experiment were carried out are the districts of Cooch Behar and Jalpaiguri under the project "Enhencing Grasspea Production for Safe Human Food, Animal Feed and Sustainable Rice Based Cropping System in India" under DAC-ICARDA-ICAR-Pilot Project on Grasspea funded by National Food Security Mission (NFSM-Pulses) West Bengal, during the year of 2012-13 and 2013-14 respectively. To find out the Varietal performance, comparison between local and hybrid variety and practice of zero tillage and paira cropping in rice fellow sanitation of Cooch Behar and Jalpaiguri district of West Bengal.

Keywords: Grasspea, Ratan, Nirmal, Zerotillage and Paira cropping

Introduction
Grass pea, locally known as khesari/ lakh/lakhadi or Teora is an important pulse crop since time immemorial. The major grass pea growing states are Chhattisgarh, Madhya Pradesh, Uttar Pradesh, Bihar, Orissa, West Bengal and Maharashtra. When other crops fail due to adverse condition, grass pea can be the only available food source for the poorest section, and sometimes is a survival food in times of drought- induced famine. It has an area of about 0.9 million hectare with an annual production of 0.47 million tone in the country. Primarily it is eaten as dal, as an adulterant with chick pea besan and with pigeonpea. Grass pea has good yield potential of 1.3-1.8 t/ha and green fodder ranging from 15 to 18 t kg /ha. Grass pea has good amount of starch (48.0-52.3%) and protein (25.6-31.6%) in its seeds, and thus ensuring nutritional security utilization is restricted due to presence of a neurotoxin, β-N- oxalyl-L-a, β-diaminopropionic acid (ODAP).
Its fodder being rich in nutritive value, serves as good supplement to nutritionally poor paddy straw used as animal feed, since growing of other quality fodder is not feasible under rainfed situation. Grass pea being a leguminous crop fixes atmospheric nitrogen, improves soil carbon and organic matter, thus collectively improves soil health and provides sustainable production system.

Growing Situations
There are three prevailing situations for grass pea production:
Sole crop: in rainfed areas where irrigation water is not available for winter crops and soils are vertisols, grass pea is cultivated during winter with proper tillage operation. However, very low area is under this condition.

Relay or Utera System: this is the most prevalent grass pea cultivation system in rice growing regions of India. *Utera* cultivation of grass pea has advantage as it is cost-effective and easy to cultivate without much efforts. Farmers broadcast the seeds of grass pea in standing paddy crop about 15-20 days before its harvest. Grass pea seeding stays in the field and grows to maturity.

Mixed cropping: Traditionally grass pea is also grown as mixed and intercrop with other *Rabi* crops. This minimizes risk of total crop failure and farmers can produce more crops from same field for household consumption. Wheat, chickpea, barly, linseed, mustard and sugarcane are generally used as companion crop with grass pea.

Major constraint
1. Unavailability of suitable varieties: only a few high yielding and low toxin varieties have been released in India. Even their seeds are not available to farmers.

2. Inadequate plant population: In farmer's field low plant population is a major constraint to achieve maximum yield. Many a times, the crop faces excessive moisture at sowing and water stress at growth stages, resulting in poor plant stand at maturity.
3. Unavailability of quality seed: Not adequate seed productions programmed of low-toxin improved varieties have been taken into consideration. Farmer's are virtually unaware of the improved varieties.
4. Plant protection measures: Black aphids (*Aphis crassivora*) and Thrips (*Caliothrips indicus*) are the major pest and powdery mildew (*Erysiphe pisi*) and doeney mildew (*Perenosopra* sp.) are the major disease, causing substantial yield loss. No plant protection measures are taken into consideration to grow this crop.
5. Unavailability of efficient strain of *Rhizobhium* for commercial use in grass pea growing regions.
6. Lack of awareness amongst farmers about benefit of improved variety and profitable production technology.

Prospects

Grass pea has a number of unique features that make it attractive to farmers and the consumers. These are:

- Adapted under harsh environmental conditions such as excess moisture and drought.
- A high level of protein which normally ranges from 26 to 32%.
- Good taste which is used in snacks, various food products as well as a component of the regular diet as dal.
- A high biological nitrogen fixation ability which allows the crop to be an important component in sustainable cropping systems.
- Used as forage or fodder for animals, both as a primary crop and as the residue after threshing.
- The grains are used as human food or as animal feed.
- Requires very low inputs for its cultivation. Virtually seed is the only investment.

Health Benefits

The genus *Lathyrus* is a potential source of natural antioxidants in addition to high quantity of proteins for humans and animal nutrition. The antioxidant activity of polyphenolic extracts from grass pea reduces the risk of cardiovascular disease and cancer compared to the antioxidant activity extracts from chickpea, lupin and soybean seeds.

Towards Safe Consumption

Uninterrupted consumption of high-toxin local grass pea varieties as a main dietary component can cause neurolathyrism. In the past, attempts have been made to ban the cultivation of grass pea but without success for obvious reasons. Moreover, changing environmental conditions, may be farmers will compel to more grass pea, if the global warming continuous**.**

Hence, making grass pea consumption safe as food and feed is need of the day. This may be achieved through detoxification of grass pea in two possible ways.

Genetic Detoxification

This method involves breeding and selection for low-toxin lines. Several low-ODAP and duel purpose grass pea through classical hybrid-dization and soma clonal variation. Twenty such low-ODAP lines with ODAP content ≤ 0.1% have been made available to India.

Physic-chemical Detoxification

This involves educating the consumers, especially housewives in simple and effective methods of detoxification.

i. Boiling the seeds in water and draining away the first wash.
ii. Soaking the seeds overnight and draining away of excess water
iii. Steeping the dehusked seed/ dal in water
iv. Parboiling the seeds, similar to rice parboiling
v. Roasting at about 150^0c for 20 minutes

If leaves of grass pea are being consumed as "Sag", consumption together with cereals, onions, garlic and ginger is advocated as protective factor. Among commercial legumes, grass pea contains the lowest level of the sulphur amino acids, Methionine and Cystine. Supply of external sulphur in food with sulphur reduces the effect of ODAP which is the potential cause of neurolathyrism.

Grass pea Enhancement Initiative

An initiative has been undertaken for grass pea area expansion in rice-based cropping system in India to increased availability of fodder and safe food for low income consumers, production of good quality seed for continuity of seed chain, increased seed replacement rate (SRR) with low-ODAP and high yielding cultivars. The major aim is to replace high- toxin and low yielding varieties with low-toxin and high yielding varieties with more biomass for ensuring safe food and availability of fodder.

Production technology

Cultivation of low-ODAP and high yielding varieties

Cultivation of low-ODAP varieties is recommended. Several improved low-ODAP varieties are available for cultivation (P24, Ratan, Prateek, Mahateora and Nirmal).

Seeding

Seeding should be done using zero till seed drill at the rate of 40-50 kg/ha instead of utera/paira cultivation after harvesting of paddy crops as itgives better yields as compared to utera method of its cultivation. Seed treatment with fungicide and Rhizobhium before sowing ensure to enhanced germination and higher yield. Seed treatment with Carbendazim (1 ga.i/kg seed)+ Thiram (2 g/kg seed)should be done for managementof soil bornedisease viz., Fusarium wilt, downey mildew and seed/ seedling rots followed by seed priming with Rhizobhium inoculums (15-20 gm/kg seed).

Table 1: Improved grass pea varieties

Variety	β – ODAP (%)	Average Yield (Kg/ha.)
Pusa 24 (P24)	0.20(duel)	1655
Bio R 202 (Ratan)	0.05	2530
Prateek (LS82046XA60)	0.08	1560
Mahateora (RatanxJRL2)	0.07	1550
Bio L 208 (Moti)	0.03	2900
Nirmal	0.15 (duel)	1500
Local cultivars	0.50-2.50	455-640

Nutrition

N:P:K:S should be applied at the rate of 20:50:30:20 Kg ha^{-1}. In case of SSP as source of P_2O_5, there is no need of applying S separately. If not, elemental S or gypsum should be applied. Organic components like 5t/ha quality phosphocompost/FYM/green manure should be used as INM component.

Weed management

Pendimetheline P.E. @ 1.5 kg ai/ha should be applied immediately after sowing followed by application of post-emergency herbicide Quinzalofop-ethyl (Targusuper) @ 40-50 gm/ha at 15-20 DAS or one hand weeding at 40-50 DAS.

Insect and disease management

Spray with 5% crude neem extract or 2% neem oil 3000ppm or Dimethoate 30 EC (1.7 ml/l) and Imidaclopide 17.8 SL @ 0.2ml/l should be done for aphid management. Use of coccinellid beetles, their grubs and Chrysoperla may be done for bio control of aphid.

Foliar spray of wettable Sulphur Sulfex/Thiovit @ 3kg/ha, or carbendazin 50WP @ 1gm/l (0.05%), benlate (0.05%) and topsin-M (0.15%) for management of powdery mildew. Spray with NSKE @ 50 g/l or eucalyptus leaf extract 10% at initiation of the disease may also be done. The unique qualities of Grasspea as resistance to biotic and abiotic stresses, high nitrogen fixation and adaptability to variable conditions and in poor soil (considered for phyto-remedition) should be better exploited to arm against climate changes and pollution, the Grasspea should no longer be treated as an orphan crop.

Reference

1. Department of Agronomy, Uttar Banga Krishi Viswa Vidyalaya, Pundibari, Cooch Behar, West Bengal, India
2. Department of Agricultural Extension, Uttar Banga Krishi Viswa Vidyalaya, Pundibari, Cooch Behar, West Bengal, India.
3. Agro Advisory Bulletin, AMFU-Pundibari, Uttar Banga Krishi Viswa Vidyalaya.
4. Hand Book of Agriculture ICAR, New Delhi, 2006.
5. Hand Book of Plant Protection L.R. Saha, Kalyani Publishers, New Delhi, 1994.
6. Bulletin Pulses and Oil seed Research Station, Beharampore, Department of Agriculture, Govt. of West Bengal, 1996.
7. Adhunik Prajuktite sab Fosoler Chas Archak Gupta, Mehanti Prakashani, Hooghly, W.B, 2009.
8. Sahaj Kothai Bigyan Vittik Chasbas G-Nayban, Ananda Agency, Kolkata, 2014.