

# Horsegram

## A Traditional Food Legume for Ensuring Nutritional security in Uttarakhand hills

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**H**ORSEGRAM is an important food legume popularly known as “Gahat” in Uttarakhand hills. Traditionally, it is grown as mixed crop with finger millet and also as a component crop of mixed cropping system “Barah Anaaja” prevalent in Uttarakhand hills. By virtue of its better resilience to adapt harsh environmental conditions particularly, drought and poor soil fertility it has become an important pulse crop in rainfed hill agriculture. Horsegram is endowed with unique nutraceutical properties and serves as cheapest source of protein for rural and tribal populace of hilly terrains. Concerted efforts must be made to increase its production to ensure nutritional and livelihood security in Uttarakhand hills.

Horsegram [*Macrotyloma uniflorum* (Lam.) Verdc.] is an indigenous food legume grown since prehistoric times in arid regions of India. It is generally regarded as poor man’s pulse and grown in harsh production environments particularly in areas having risk of drought. Horsegram is a major *kharif* pulse crop in Uttarakhand hills and by

virtue of its excellent nutritional composition and unique medicinal significance it is an integral part of traditional cuisine in Uttarakhand hills. It has a special significance in organic agriculture of hills as it naturally improves soil fertility by fixing atmospheric nitrogen and its foliage adds organic matter to soil after decomposition of foliage and other plant parts. Besides, dry straw of horsegram is very nutritive feed for milch animals. These attributes makes it one of the potent dual purpose pulse crop of hills.

Horsegram is generally grown under sub-humid to semi-arid climate up to an altitude 1800 masl. In Uttarakhand, its cultivation is mainly distributed in mid hills up to 1200 m asl altitude. It is well adapted to wide range of well drained soils ranging from sandy and gravelly to heavy clay with neutral pH in areas receiving low rainfall while alkaline soils are not suitable for this crop. Optimum temperature range for its growth is 25° to 32°C and can tolerate temperature up to 40°C but it is completely intolerant to water logging and frost. This crop

abounding the ability to tolerate drought and perform better in poor input conditions on marginal lands than any other crop therefore, resource poor farmers has reliance on this crop as an indemnity against natural calamities often experienced in hill regions.

Horsegram is cultivated as a food, forage and green manure crop in India, Eastern and Southern Africa, Myanmar, Malaysia, West Indies and Australia. It is grown in India from Himalayan region in the North to Tamil Nadu in the South and Gujarat in West to Bengal in the East. The total area under horsegram cultivation in India is about 5.07 lakh ha and production of 2.62 lakh tonnes with productivity of 516 kg/ha. It is mainly produced in Karnataka, Andhra Pradesh, Tamil Nadu, Odisha, Maharashtra and Chhattisgarh as both *rabi* and *kharif* crop by poor farming communities on poorly fertile soils not suitable for cultivating any other crop. Although, the area and production of horsegram is more in *kharif* but productivity is more in *rabi* season. In India, horsegram cultivation is facing

*Horsegram possesses excellent therapeutic properties and is traditionally used to cure kidney stones, asthma, bronchitis, leucoderma, urinary discharges, heart diseases and piles etc. by rural unprivileged masses. It is an integral part of the local cuisine of Uttarakhand hills and "locally grown Gahat" fetches higher market prices as well as has huge market potential. Presently, production level of such a valuable crop is much below the sustainability line because it is mainly cultivated by resource poor marginal farmers using traditional cultivars with least care and inputs. Its replacement by other remunerative crops is also a matter of great concern. So there is an urgent need to draw attention of growers, consumers and researchers towards this legume as its nutritional and remedial potential are under exploited.*

almost stagnant yield levels with drastically reducing trend in area and production. In Uttarakhand, horsegram is entirely grown as *kharif* crop under rainfed organic condition contributing about 10.45 thousand tonnes of production from 12.78 thousand hectare area. The average productivity of horsegram in Uttarakhand (8.17q/ha) is significantly higher than yield level in major growing states suggesting better suitability of horsegram to the agro-ecosystem of this region and a vast potential exists for enhancing the area and production of horsegram in Uttarakhand hills.

### Nutritional and medicinal properties of horsegram

Horsegram seed is a blend of excellent nutritional quality and unique medicinal value and serves as the cheapest source of protein for rural and tribal masses in Uttarakhand hills. Horsegram seed contains 57.2 % carbohydrate, 22% protein, 5.3% dietary fibre, 0.50 % fat, 287mg calcium, 311mg phosphorous and 6.77mg iron per 100 g of edible portion. It is comparable to other commonly consumed pulses in protein content while fibre, calcium, iron and molybdenum content is higher than any other legume consumed in India. It is largely consumed as whole rather than spilt pulse and its higher lysine content makes it a good complement to a cereal based diet. In Uttarakhand, prolonged cooking on mild flame is practiced which destroys trypsin inhibitor and makes the preparation digestible. Horsegram is normally soaked prior to cooking in most of the local recipes of Uttarakhand and soaking has beneficial effects on nutritional and cooking quality of horsegram.

As far as its therapeutic value is concerned, horsegram is a neglected and underexploited legume for its medicinal value in spite of its long history of use as traditional medicine to cure many diseases. It has unique property of dissolving kidney stones which is common in hills due to high mineral content in drinking water. It is given to prevent urinary stones and also has healing effect on acute

gastric ulceration, curing acidity, lowering cholesterol, asthma, bronchitis and constipation. The rich fibre content and the body heat generating property in it also helps in reducing the body fat in a faster mode.

### Horsegram based traditional cultivation practices in Uttarakhand hills

Horsegram cultivation is well-suited to hill ecosystem where this crop is entirely grown under organic rainfed condition on soils which are not fit for cultivation for other crops. It is very well accommodated in hill cropping system and grown as *kharif* crop. It is sown in last week of June which flowers in mid August to mid September and harvested in mid or late October. It is also grown as late catch crop if the season is too dry for the other pulses. In Uttarakhand, it is mainly grown as a mixed crop with finger millet [*Eleusine coracana* (L.) Gaertn]. When finger millet matures the farmer harvests its panicle and leaves its stem for the support of growing horsegram. This practice is followed to avoid rotting of stem, leaves and pods of horsegram due to rains. Horsegram + finger millet (1:1), horsegram + maize (2:1) and horsegram + arhar (1:1) are economically viable intercropping systems. In Uttarakhand hills, horsegram is a component crop in popular “*Barah Anaaja*” system of traditional mixed cropping in which seeds of twelve food grains are mixed and grown. Culture of “*Barah Anaaja*” is a unique example of cultivating agro-biodiversity for raising food and nutritional security of rural and tribal inhabitants in the hills.

### Improved varieties of horsegram for Uttarakhand hills

Horsegram is entirely cultivated on hilly terrains by resource poor farmers mainly for household consumption and a little surplus is sold in the market. Poor production and productivity of this crop is mainly due to the use of local cultivars by farmers which are generally poor yielding and susceptible to many diseases and insect-pests. Besides, replacement of

horsegram with other remunerative crops also renders poor production of horsegram in hills. Keeping these aspects in view high yielding varieties of horsegram have been developed which are well suited for cultivation under rainfed organic conditions in hills. Adoption of improved varieties with improved production technologies can improve production and rekindle the interest of farmers for horsegram cultivation in hills.

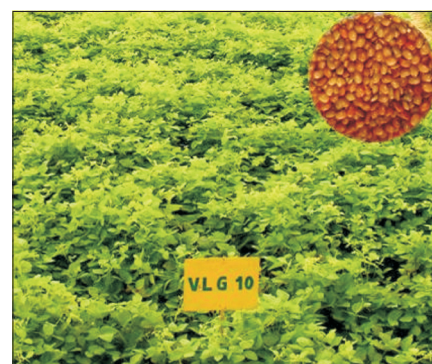
#### VL Gahat 8

This variety is suitable for cultivation under rainfed timely sown conditions of Uttarakhand hills. It has been developed from the cross VL Gahat 1 x P-1648 and released by State Variety Release Committee in 2006. It has an average yield potential of 9-12 q/ha with the maturity period of 125-130 days. It has resistant against stem rot and anthracnose diseases.



#### VL Gahat 10

It has been developed from the cross VL Gahat 1 x NIC 2659. It is released by State Variety Release Committee in 2006 for timely sown rainfed conditions of Uttarakhand hills. Its yield potential ranges from 9-12 q/ha and it matures in about 110-115 days. It has resistance against anthracnose disease.



### VL Gahat 15

This high yielding variety has been developed from the cross VL Gahat 1 x NIC 7321 and released by Central Variety Release Committee in 2009 for cultivation in rainfed timely sown conditions of Northern and Central India. Grain colour of this variety is yellowish brown and has better digestibility (86.2%). Its yield potential ranges from 6-10 q/ha and it matures in about 92-106 days. It has moderate resistance against anthracnose and leaf spot diseases.



### VL Gahat 19

This variety has been developed through selection from local germplasm VH 61 and released by



Central Variety Release Committee in 2010 for cultivation in timely sown rainfed condition of Northern India. Its average yield is 5-6 q/ha with maturity period of 88-94 days. Its seed is brown in colour which is preferred by local masses of hills and also has low tannin content with better digestibility (83.47%). It is resistant to root rot as well as exhibit moderate resistance against anthracnose, collar rot, powdery mildew and leaf spot diseases. Superior performance and profitability of improved cultivars as compared to local cultivars can revive the interest of hill farmers for the profitable cultivation of horsegram. Simultaneously, this legume can be

popularized among consumers for its nutritional and health benefits and farmers can be sensitized for value addition to realise its real potential for income generation.

### SUMMARY

Horsegram is a major *Kharif* pulse which can play a significant role to improve the livelihood and nutritional security of resource poor rural and tribal population of Uttarakhand hills but its potential is underexploited and ignored. Poor production and unprofitability of horsegram cultivation in hills resulted in its gradual replacement by other remunerative crops. So it is imperative to create awareness among hill farmers for adoption of these improved horsegram varieties which are higher yielding as well as have better tolerance for diseases and insect pests.