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Ashwagandha a Magical Crop

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Plant Introduction

Scientific name:

Withania somnifera (L.) Dunal

Common Name:

Ashwagandha, Varahakarni (Sanakrit) Askandhatilli, Asgandh, Punir (Hindi) Hiremaddinagida, Panneru, Ashwagandha Kiremallinagida (Kannada) Amukkira, Amukkiran Kizhangu (Tamil)

Family:

Solanaceae

Plant Description:

Ashwagandha (Withaniasomnifera) is one of the most powerful medicinal plants has been used for more than 3,000 years by one of the oldest medicinal systems in the Ayurvedic medicine world. Its history means that the effects of the plant are very well known. The plant promotes sleep, balances the nervous system and restores the strength of the horse (Ashwagandha means "the smell of the horse"). It is considered as a major plant in ayurvedic medicine and is sometimes known as Indian Ginseng, in reference to its similarities to Panax Ginseng, which also has the capacity to restore energy and vitality and has an effect on the libido. Several types of alkaloids are found in this plant, out of which `Withanine' and `Somniferine' are important.

Leaves contain five unidentified alkaloids (0.09%), withanolides, glycosides, glucose and many free amino acids

Crop Status:

It grows in dry parts in sub- tropical regions. Rajasthan, Punjab, Haryana, Uttar Pradesh, Gujarat, Maharashtra and Madhya Pradesh are the major Ashwagandha producing states of the country. It is traditionally cultivated in Madhya Pradesh near Mandsaur and

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Neemach. In Madhya Pradesh alone it is cultivated more than 5000 hectares. The estimated production of Ashwagandha roots in India is more than 1500 tonnes and annual requirement is about 7000 tonnes. However, its cultivation has been extended to most of the states now because of availability of new high yielding and high-quality varieties.

Medicinal properties and uses:

Ashwagandha root's drug are useful in the treatment of rheumatic pain, inflammation of joints, nervous disorders and epilepsy. Dried roots are used as tonic for hiccup, cold, cough, female disorders, as a sedative, in care of senile debility, ulcers, etc. Leaves are applied for carbuncles, inflammation and swellings. Leaf juice is useful in conjunctivitis. Bark decoction is taken for asthma and applied locally to bed sores. Ashwagandha extract is used in preparation of herbal tea, powders, tablets and syrups.

Cultivation Method:

Soil:

Ashwagandha can be grown well in sandy loam or light red soil having pH 5.5 to 7.5 with good drainage facility. Black soils or such heavy soils are suitable for cultivation.

Climate:

It is grown as late rainy season (*Kharif*) crop. The semi-tropical areas receiving 500 to 750 mm rainfall are suitable for its cultivation as rainfed crop. If one or two winter rains are received, the root development improves. The crop requires relatively dry season during its growing period. It can tolerate a temperature range of 200C to 380C and even low temperature as low as 100C. Now a Days Ashwagandha can also grow in rabi season because of availability of new hi yielding varieties.

Varieties:

- **Jawahar Asgand-20 and Jawahar Asgand-134:** High alkaloid variety. It is developed by Jawaharlal Nehru Krishi Vishwavidyalaya, Madhya Pradesh. Plant height is short and is known for its higher density planting. The crop yields in 180 days with a total withanolide content of about 0.30 per cent in dry roots.
- **Raj Vijay Ashwagandha-100:** It is also developed by CJawaharlal Nehru Krishi Vishwavidyalaya, Madhya Pradesh.
- **Rakshita and Poshita:** Developed by CSIR-CIMAP, Lucknow and are high yielding varieties. WSR: Developed by CSIR-Regional Research Laboratory, Jammu.

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- **Nagori**: It is a local variety with feature of having starchy roots

Nursery Raising:

It is propagated by seeds. Fresh seeds are sown in well prepared nursery beds. Although it can be sown by broadcast method in the main field, transplanting method is preferred for better quality and export purpose. For export, a well-maintained nursery is a prerequisite. The nursery bed usually raised from ground level is prepared by thorough mixing with compost and sand. About 5 kg of seeds are required for planting in 1 hectare of the main field. Nursery is raised in the month of June-July. Seeds are treated in carbendazim to control wilt and seed borne diseases. Seeds are sown just before the onset of monsoon and covered thinly using sand. The seeds germinate in 5 to 7 days. About 35 days old seedlings are transplanted in the main field. Field preparation: 2 to 3 ploughing and discing and /or harrowing should be done before rains. The land is well ploughed and pulverized and brought to a fine tilth. 10 to 20 tonnes farm yard manure is applied. Field is then levelled**.**

Transplanting:

After the manures are incorporated in the soil, ridges are prepared at 60 cm spacing. Healthy seedlings are planted at 30 cm spacing. In some places, 60 cm x 60 cm or 45 cm x 30 cm spacing is also followed. However, a spacing of 60 cm x 30 cm with a plant population of about 55000 seedlings per hectare is considered optimum.

Seed rate and sowing method:

A seed rate of 10 to 12 kg per ha is sufficient for broadcasting method. They can be sown in lines also. Line to line method is preferred as it increases root production and helps in performing intercultural operations smoothly. The seeds are usually sown about 1 to 3 cm deep. Seeds should be covered with light soil in both the methods. Line to line distance of 20 to 25 cm and plant to plant distance of 8 to 10 cm should be maintained. According to soil fertility, in fertile soil, distance can be extended.

Seed treatment:

Seed should be treated with thirum or dithane M-45 (Inofil M45) at the rate of 3 g/kg seed before sowing to protect the seedlings from the seed borne diseases. Thinning and weeding: Grown up seedlings raised by sowing by broadcasting method or in line in furrows should be thinned out by hand 25 to 30 days after sowing the seeds to maintain a plant population of about 30 to 60 plants per sq.m. The plant density to be maintained finally may

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depend on the nature and fertility of the soil. On marginal soil, the population is maintained high. If some fertilizer is applied, the population should preferably be kept at lower level. Generally, two Weeding are required to keep the field free from weeds, the first within 20-25 days after sowing and the other after 20-25 days of the first weeding.

Manures and fertilizers:

The crop does not require heavy doses of manure and fertilizers. It responds well to organic manures and addition of 10 tonnes FYM / 1 tonne vermin compost per hectare is recommended. Application of 15 kg of Nitrogen and 15 kg of Phosphorous per hectare is beneficial for higher production.

Irrigation:

Ashwagandha is usually grown as rain fed crop where irrigation facilities are not available. However, for irrigated crop there should be access to a clean and reliable source of good quality irrigation water. Excessive rainfall or water is harmful for this crop and not require irrigation if monsoon is well distributed throughout the growing season. However, one or two lifesaving irrigations can be given if required. Under irrigated conditions, the crop can be irrigated once in 15 days depending on soil type. Organic mulches such as wheat straw or ashwagandha straw of previous crop should be spread in between the rows to conserve the soil moisture, facilitate better water infiltration during excess rains and control weed.

Intercultural operations and weeding

The seeds sown by broadcasting or in the line in furrows should be thinned out by hands at 25-30 days after sowing to maintain a plant population of about 3 to 6 lakh plants per hectare. Weeds should be managed before they start competing with the crop for nutrients and light. One hand weeding at an early stage is sufficient to enable the ashwagandha plants to take over the growth of weeds. At later growth stages the weeds are get suppressed by its smothering effect. Care should be taken during hand weeding that the roots should not be damaged by hoe. Use of chemical herbicides is restricted for weed control in medicinal crops hence, alternative methods of weed control such as use of organic mulches to control weeds should be preferred as they inhibit the weed growth as well as conserve the soil moisture.

Pests and diseases:

No serious pest is reported in this crop. Whenever the crop is damaged by insect, 2 to 3 sprays of rogor or nuvan should be applied @ 0.6%. A combination of 0.5% malathion and

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0.1% - 0.3% kelthane as foliar spray at 10-15 days interval was found highly useful for aphids, mites and insect attack.

Diseases like seedling rock and blight are observed. Seedling mortality becomes severe under high temperature and humid conditions. Disease can be minimized by use of disease-free seeds and by giving seed proper treatment before showing as stated earlier. Carbofuran should be applied @ 2-2.5 kg/ha at the time of sowing. Neem cake also can be applied. It will save root damage done by nematodes and insects. Further, adoption of crop rotation, timely sowing and keeping field well drained also protect the crop.

Harvesting:

Maturity of the crop is judged by drying out of leaves and yellow-red berries. Flowering and bearing of fruits start from December onwards. The crop is harvested for roots by digging in January to March i.e. 150 to 180 days after sowing. There should be moisture in soil at the time of digging. Roots are dug out or ploughed using power tiller or a country plough. The tap root should be carefully pulled out not damaging even the small lateral roots.

Post-harvest handling:

The roots are separated from the aerial portion by cutting the stem 1 to 2 cm above the ground. After digging, the roots are washed, cut into 7 to 10 cm small pieces and dried in sun or shed. Roots should be dried to 10 - 12 % moisture content. Root pieces can be graded in following 3-4 grades as per its length and thickness.

- **A grade root:** Root pieces unto7cm and diameter 1.0 - 1.5 cm, solid, bright and pure white.
- **B grade root:** Root piece unto5 cm and diameter 1 cm, bright and white.
- **C grade root:** Root pieces unto 3-4 cm in length, diameter less than 1 cm, solid, side branches.

Lower Grade:

Small root pieces, semi-solid, very thick, yellowish, chopped. The superior grade has stout and long root which fetches premium price. To avoid moisture and fungal attack on the dried roots, it should be stored in tin containers. Berries are hand plucked separately. They are dried and crushed to take out the seeds.

Yield:

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On an average, good managed crop from 1 hectare of commercial cultivation is approximately 3 to 5 q $ha^{-1}$of dry roots and 50 to 75 kg ha^{-1} of seeds. A maximum yield can be procured up to 6.5 to 7.0 q ha^{-1}. There are instances where farmers have achieved root yields as high as 1 tonne. Commercially, 6 to 15 mm diameter and 7 to 10 cm length root species are better. Alkaloid percentage in roots ranges from 0.13 to 0.31%.

Marketing:

The Neemuch and Mandasaur markets of Madhya Pradesh are popular world over for Ashwagandha. Importers, buyers within the country, processors, traditional practitioners, Ayurvedic and Siddha Drug manufacturers throng these markets for procurement of Ashwagandha roots every year. The domestic demand for Ashwagandha roots as stated earlier is about 7000 tonnes annually. As the production is much less (around 1500 tonnes) in India, the internal market itself is highly potential.