

Spinach

Botanical Name: *Spinacea oleracea* L.

Family: Umbelliferae

Chromosome number 2n=12

Origin: Central Asia

Spinach beet or vilayati palak is an important leafy vegetable commercially grown in Himachal Pradesh. Among vegetable crops, it ranks second only to broccoli in total nutrient concentration. Though, it is rich in Ca, but the element is said to be unavailable owing to the fact that it unites with oxalic acid to form calcium oxalate.

Importance and uses: Normally consumed as cooked vegetable and sometimes as a salad in company with lettuce and other vegetables. It is not commercially grown in India except hilly areas. It ranks next to broccoli in total nutrient concentration among vegetable crops. Rich source of vitamin A, Fe, Ca and also contain appreciable quantity of ascorbic acid, riboflavin and small quantity of thiamine. Ca is unavailable since it unites with oxalic acid to form calcium oxalate.

Plant growth and development: Spinach is an annual. Plants are usually dioecious. Some monoecious plants may develop rarely in certain cultivars. Dioecious types produces two different kinds of male plants:

1. **Extreme males:** small with very little vegetative development and tend to bolt quickly.
2. **Vegetative males and females:** slower to flower and produces considerably more foliage, making them the preferred plants type for commercial cultivation.

Eliminate the extreme males from commercial strains by selection.

Cultivars: These are classified in two groups;

On the basis of seed: Further in 2 groups :a) Prickly seeded b) Round seeded

On the basis of leaf: a) Smooth leaved eg Early Smooth Leaf b) Savoy leaved: Virginia Savoy

Soil: This crop is susceptible to injury by high acidity

Climate: It is a hardy, cool season crop that does best at temperature of 60-65°F. Withstands hard frost and temperature as low as 20°F, but the growth is depressed below 35°F. The plant is very intolerant of warm temperature above 77°F which in combination with long days causes plants to bolt. Seed germination at 10-15.5°C (50-60°F) and decreases at higher temperature

Sowing time: North Indian Plains September-October

Himachal Pradesh

Low Hills	Mid Hills	High Hills
October-November	September-October	March- July

Seed Rate: 30-35 kg/ha (37-45 kg/ha)

Spacing: 30cm X 5-10cm (thinning is done to maintain the spacing within the rows)

Harvesting: The crop will be ready for harvest about 4 weeks after sowing. It gives about 3-4 cuttings in the season. Harvesting by hand gave higher yield than mowing. A plant with seed stalk is considered unmarketable.

Yield: 100 q/ha

Diseases: Damping off, Leaf spot (spray 0.2% Blitox at 15 days interval), White rust, Downy mildew: (0.2% Dithane-M-45)

Insects: Aphids and Catterpillar

Beet leaf

Botanical name: *Beta vulgaris var. bengalensis*

Family: *Chenopdiaceae*

2n-18

Origin: *Indo-China*

Varieties: Pusa Bharti, All Green, Jobner green

Sowing time: In plains of India can be grown 3 times in a year i.e. Early spring, In the beginning of rainy season and as main crop during Sept.- Nov. Throughout the year in places with mild climate.

- The seed rate for raising crop in one hectare area is 25-30 kg/ha.
- The crop is planted at a spacing of 30cm × 5-10cm (thinning is done to maintain the spacing within the rows).
- Farmyard manure @ 100q/ha can be added at the time of field preparation.
- The recommended dose of fertilizer is 40-70:30-50:30-50 kg NPK/ha, respectively depending upon the nutrient status of the soil.
- Full dose of phosphorus, potassium and half of N should be applied at the time of sowing. Remaining part of N should be top dressed in two equal installments at an interval of one month.
- To keep the fields weed free and to loosen the soil for proper aeration, 2-3 hoeings-cum-weedings are required.
- A pre-sowing irrigation is done to help the seeds to absorb moisture and germinate properly.

- The spring summer crop need frequent irrigation at 6-7 days interval whereas autumn winter crop requires irrigation at about 10-15 days interval.
- The crop is ready for harvesting in about 3-4 weeks after sowing. Subsequent cuttings are done at 15-20 days interval.
- Only well grown green succulent and tender leaves should be trimmed.
- Winter crop gives more cuttings than spring-summer crop.
- The average yield is 150-200q/ha

Difference between beet leaf and spinach

Beet leaf	Spinach
<i>Beta vulgaris</i> var. <i>bengalensis</i> .	<i>Spinacea oleracea</i> .
Chr. No. 2n=18.	Chr. No. 2n=18.
Leaves with entire margins.	Leaves with lobed leaf margin.
Produces bisexual flowers.	Produces staminate/ pistillate and/or hermaphrodite flowers.
Tolerates high temperature and grows well in hot weather.	Purely a cool season crop and cannot tolerate high temperature. In warm season and long days, it quickly tends to flower.

Amaranthus

It is a common leafy vegetable grown during summer and rainy season. The important characteristics are rapid growth, quick rejuvenation after each harvest, high yielding capacity and high nutritive value. There are 8 cultivated species of amaranthus, of which only two are most common belong to family Amaranthaceae

Amaranthus blitum: *chhoti chaulai*

Amaranthus tricolor: *Badi chaulai*

Varieties: The varieties recommended for cultivation are Pusa Chhoti Chaulai, Pusa Badi Chaulai, Pusa Kirti (most suitable for summer), Pusa Kiran (for rainy season), Pusa Lal Chaulai (red pigmented variety), Arka Suguna, Arka Arunima

Climate: Warm humid climate is congenial. It responds well to full sunlight. Sandy loam soils with slight acidic pH are preferred. It is susceptible to water logging.

Sowing: Direct sowing is followed in north India for which 2.0-2.5 kg seed/ha is sufficient. Transplanting is done in Kerala and Tamil Nadu for which 1.0-1.5 kg seed is required to raise seedlings for one hectare area. It can be sown throughout the year except May-June in Northern plains. It should be planted at a spacing of 20cm × 15 cm

Irrigation: It requires plenty of water for its fast growth and high yield. Frequent irrigation may therefore be applied at 5-7 days interval depending on the soil, weather and season. Proper drainage must be provided during rainy season.

Weeding: Two to three weedings or hoeings are sufficient to keep the weeds under control and to ensure good aeration.

Harvesting: First cutting can be taken about 25-30 days after sowing and subsequent harvestings can be done at 8-10 days. Normally 6-8 cuttings are can be taken till the crop starts flowering or becomes unfit for consumption.

Yield : 60-80 q/ha.