

GROWING DRY BEANS IN HOME GARDENS

Crop at a Glance

Growing Season	Summer
Time of planting	May 15-June 1
Spacing	Plant seeds 2-3 inches apart in the row; space rows 2-3 feet apart
Days to harvest	90-110
Average yield	1.2 pounds per 10-foot row

Introduction

Dry beans are an easy crop to grow in the garden. Their large seeds germinate quickly and easily. Dry beans are a member of the legume family and are able to ‘fix’ nitrogen from the air. Thus it is not necessary to apply large amounts of nitrogen fertilizer to the crop, and at the end of the season you can compost the plant residue or till it into the soil to provide nitrogen to the next crop the following year. Dry beans are a good rotation crop because of their nitrogen fixing ability, and they are able to break some common disease cycles for other popular garden crops. In addition, dry beans are a nutritious food, easy to store for long periods of time, and seed can be saved and planted the following year.

Selecting Bean Types

There are bush bean and pole bean types of dry beans. Both bush beans and pole beans are planted in rows or in raised beds, but pole beans require a trellis. There are many more varieties of bush beans than pole beans. Refer to our website <http://vegetables.wsu.edu/NicheMarket/BeanVarieties.html> for photos of many bush dry bean varieties that grow well in Washington state, days to maturity, plant height and pod and bean characteristics.

Choosing a Planting Site

Plant dry beans in fertile, well-drained soil in full sun with at least six hours of direct sunlight each day. While soil drainage is determined mostly by the site, it can be improved by using raised beds.

Planting Guidelines

Before planting, inoculate seed with *Rhizobium leguminosarum*, a natural soil bacterium that forms nodules on the plant roots and creates a symbiotic relationship with the plant to fix nitrogen from the air. The root nodules are the site of nitrogen fixation. By fixing

nitrogen, the plant is able to meet much of its own nitrogen needs. Do not apply too much nitrogen fertilizer or this will prevent the bacteria from forming root nodules. Plant seed when soil temperature is at least 50 °F. Seed will germinate in 6-14 days.

Bean Type	Planting Depth (in.)	No. Seeds per Row Foot	In-row Spacing (in.)	Between Row Spacing (in.)
Bush	1 ½ - 2	6 - 8	2 - 3	18 - 30
Pole	1 ½ - 2	4 - 6	4 - 6	36 - 48

Irrigation

Water beans once a week from seeding until the end of August. Apply approximately 1.25 gallons of water to 10 feet of row each week. Watering is especially important once plants are flowering to ensure good pod formation. Too much or too little water can cause blossom and pod drop, which leads to a decrease in yield. Apply water to the base of the plant and avoid wetting the foliage (leaves). Use drip irrigation to provide an even amount of water throughout the garden, to avoid water loss from evaporation, and to avoid watering weeds in the alleyways. Drip irrigation also prevents foliar diseases, which tend to become established on wet plants. If you are using overhead watering (sprinkler), water plants early in the morning to allow them to dry before nighttime. Wet plants are more susceptible to foliar diseases when temperatures drop, such as in the evening and nighttime. Stop irrigating bean plants in late August to allow bean pods to dry.

Weed Control

Beans are easy to weed if you start early in the season. Weed thoroughly between rows and in the rows once the plants have become established, usually about 6 weeks after seeding. If you weed too soon, it is easy to pull bean plants out when you pull out the weeds. Weed once more in mid July and a final time in early August. In dry areas, weeds that have not yet flowered can be discarded between rows of beans; weeds will dry out completely and die in 1-2 days and will form a layer of mulch on the soil surface around the beans. In wet areas and once weeds have flowered, discard weeds outside of the garden area as the weed plants can re-root and seeds can sprout. After the first weeding, apply 2-3 inches of mulch around the bean plants to reduce weed growth as well as to retain moisture in the soil. Fallen leaves, untreated lawn clippings and weathered straw are all good mulch materials. Do not apply mulch within 2 inches of the plant as the mulch may provide habitat for pest insects, which may feed on the bean plants.



If you are using lawn clippings or other yard debris where herbicides have been applied, or if you are using purchased compost made from yard debris or agricultural feedstocks (i.e., dairy manure, animal bedding, hay, straw), be aware of potential herbicide residues. Beans are especially sensitive to residues of some common herbicides such as Aminopyralid. Affected bean plants will become distorted and the damage looks much like virus symptoms; plants will be very low yielding and can die.

Fertilizer

Use a complete garden fertilizer that contains approximately equal amounts of nitrogen (N), phosphorus (P) and potassium (K). Refer to the label of the fertilizer you are using

and apply at the lowest recommended rate. Do not over apply nitrogen fertilizer as this will prevent the natural formation of nitrogen fixing nodules on the plant roots.

Common Problems

Problem	Athracnose, <i>Glomerella lindemuthiana</i> (perfect state) or <i>Colletotrichum lindemuthiana</i> (conidial state)	
Symptoms	<p>Leaves: Lesions on leaf petiole and lower leaf surfaces are brick red to purple and turn dark brown to black over time.</p> <p>Pods: Tan to rust colored lesions (1-10 mm in diameter), sunken in and bordered by a slightly raised black ring and reddish brown boarder.</p>	
Image	 <p>Photo source: WSU Vegetable Extension Group – Krishna Mohan</p>	
Preventative/ Corrective Action	Plant disease-free seed. Use a 2-3 year crop rotation with non-host crops such as small grains, corn and other vegetables.	
Problem	Bean common mosaic virus	
Symptoms	<p>Leaves: Leaf roll, green-on-green vein banding, blistering and yellow dots (atypical).</p> <p>Whole plant: Stunted growth, mosaic mottle, and malformation.</p>	
Image	 <p>Photo source: WSU Vegetable Extension Group – Philip Hamm</p>	
Preventative/ Corrective Action	Use virus-free seed. Aphid control may reduce disease transmission.	






Problem	Beet curly top virus, <i>Curtovirus</i>
Symptoms	Leaves: Young plants exhibit epinastic leaf curl (downward bending of leaves caused by excessive growth of the upper side) and yellowing. Plants infected at later stages of growth show less severe symptoms, with epinastic leaf curl and yellowing on new growth. Darkening and thickening of leaves and shortening of internode. Pods: Only pods that formed before infection will mature.
Image	 Photo source: WSU Vegetable Extension Group – Lindsey du Toit
Preventative/ Corrective Action	Grow resistant or tolerant cultivars. Delay planting of susceptible cultivars until after leafhopper (a vector) migration is complete.
Problem	Common blight, <i>Xanthomonas axonopis</i> pv. <i>Phaseoli</i>
Symptoms	Leaves: Water-soaked spots that gradually coalesce into irregular shapes. Lesions become dry, brown and surrounded by a yellow margin. Generally occur on margin of leaf. Pods: Dark red-brown, circular and slightly sunken lesions. Seeds: May be shriveled and exhibit poor germination.
Image	 Photo Source: WSU Vegetable Extension Group – Howard Shwartz
Preventative/ Corrective Action	2-3 year crop rotation. Use disease-free seeds.
Problem	Fusarium root rot, <i>Fusarium solani</i>
Symptoms	Red discoloration on main root later turning brown and decaying. Poor root development. In severe cases plants are stunted and leaves turn yellowish and may drop early.

Image	 <p>Photo source: WSU Vegetable Extension Group – G.Q. Pelter</p>
Preventative/ Corrective Action	Plant in well-drained soil or raised bed. Use 5-6 year crop rotation with non-host crop such as grains and vegetables.
Problem	Halo blight, <i>Pseudomonas syringae</i> pv. <i>Phaseolicola</i>
Symptoms	<p>Leaves: Small water-soaked spots on underside of leaf, followed by brown spots with a yellow halo.</p> <p>Pods: Dark, greasy, water-soaked spots.</p> <p>Seeds: May be shriveled or discolored.</p>
Image	 <p>Photo source: Carol Miles</p>
Preventative/ Corrective Action	Use a 2-3 year crop rotation. Plant disease-free seed. Delay planting until there is little or no rainfall. Remove weeds and volunteer beans to avoid disease reservoirs. Plant tolerant or disease resistant cultivars.
Problem	Sclerotinia white mold, <i>Sclerotinia sclerotiorum</i>
Symptoms	<p>Flowers: white moldy, cotton appearance as mycelium grows on flowers.</p> <p>Whole plant: Lesions start as small, circular, dark-green and appear water-soaked but rapidly become larger, slimy and may envelope the entire plant. Under moist conditions, the lesions may grow external mycelium, which have a white mold appearance.</p>

<p>Image</p>	 <p>Photo sources: WSU Vegetable Extension Group – Lindsey du Toit and Krishna Mohan</p>
<p>Preventative/ Corrective Action</p>	<p>Rotate with non-host crops, such as cereal, corn or vegetables. Avoid excessive nitrogen fertilization. Wide spacing between plants reduces disease. Cultivars that grow upright and open can avoid this disease.</p>

Health and Nutritional Benefits

Dry beans are an important and healthful food used by people worldwide. Dry beans are rich in fiber, minerals such as zinc and iron, B vitamins such as folic acid, and contain omega-3 and omega-6 fatty acids. Dry beans do not contain all of the essential amino acids and are deficient in methionine and tryptophan. Supplement dry beans with other foods such as grains or animal protein to obtain all of the essential amino acids.

Traditional societies that use beans as their main source of protein take great care in dry bean preparation to ensure maximum digestibility and nutritional benefits. This includes soaking dry beans for 6-8 hours or overnight before they are cooked. Soaking softens skins and begins the sprouting process, which neutralizes phytic acid and eliminates difficult to digest complex sugars.

Fiber may help prevent coronary heart disease, which is caused by a build up cholesterol in the coronary arteries. Fiber reduces the low-density lipoproteins in the bloodstream, which reduces plaque build up. Type 2 diabetes, which is characterized by a sustained high blood sugar level, can be controlled in part through increased fiber in the diet. The fiber slows down the movement of food through the intestines, thereby moderating the release of sugar from the intestines into the bloodstream. Increasing the amount of fiber in the diet can reduce constipation, a common discomfort for many Americans. When you are increasing the amount of dietary fiber in your diet, do it gradually, as it takes time for the bacteria needed to break down fiber to build up in your intestines. If too much fiber is consumed too quickly, gas and bloating may occur. Also, when increasing your fiber intake, increase your liquid intake to prevent constipation and dehydration.

Resource Information

WSU web page: **Niche Market Dry Beans**

<http://vegetables.wsu.edu/index.html> - WSU's Vegetable Research and Extension homepage. This is where you will find the link to *Dry Bean Variety Descriptions* for photos of many bush dry bean varieties that grow well in Washington state, days to maturity, plant height and pod and bean characteristics.

References

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