

Dry Beans

General Information

Dry beans (*Phaseolus* spp.) are a traditional crop in the northeast, and Jacob's cattle, soldier, black turtle, and yellow-eyed beans are commonly grown here. These edible field beans are considered a grain legume crop that is well-suited for our climate but requires good soil quality and high fertility. Beans are a staple food for much of the world due to their high protein content (generally 22-24%). They can serve as a great addition to a grain rotation and are a highly marketable crop if there is appropriate demand. Dry beans are harvested once the shell and bean have matured and dried, and they require less post-harvest processing and specialized equipment than many other grain crops.

Preparation & Planting

Do not plant dry beans in a field that floods easily, is heavily compacted, or regularly develops a thick crust. Beans should be grown on very well-drained, sandy or loamy soils with low saline and high zinc levels. Recommended pH levels for dry beans are slightly higher than most other grain crops (6.0-7.0). Dry beans are generally planted in early- to mid-June, once soil temperatures are reliably 50°F or higher, and will do not do well if temperatures drop immediately after planting. The seedbed can be prepared in the fall prior to planting and then gently tilled again before spring seeding to clear weeds and debris from the field. Some growers choose to plant a winter or early spring crop immediately preceding their dry beans and make sure that the seedbed is clean of plant residue at the time of sowing. Avoid planting beans in the same field within three years.

There are many different types of dry beans, which are often classified by color. Generally,



within each type, both bush (determinate) or trailing (indeterminate) varieties are available. Growers should carefully choose their dry bean varieties based on maturity, growth habit, and water requirements and buy certified, disease-resistant seed. White beans are often recommended for the northeast because they tolerate poorer-quality soils and have a shorter growing season than colored beans. However, their light-colored flesh can become stained in wet weather, especially in late summer. Seeds should be inoculated with the bacteria *Rhizobia phaseoli* for optimal nitrogen fixation before planting.

Beans can be planted with a corn planter fitted with bean cups appropriate for the seed size. Adjust the planter to seed at about 60 lbs per acre, but calculate the seeding rate based on desired plant population. This should be about 4-8 seeds per foot, depending on the variety. Beans are usually planted about 1½ to 2½ inches deep and in 30-inch rows for disease prevention and in

order for row cultivators to be used for weed management. Planting narrower rows will increase the likelihood of disease in leaves and stems and make weeding and harvesting difficult.

Cultural Practices

Weeds develop quickly in beans because the beans are slow to establish a canopy and do not compete well. Pre-emergence weed control can be done with either a tine-weeder or a rotary hoe, depending on the conditions and amount of plant residue in the field. Cultivation can be undertaken carefully while the plants are between 2 and 3" tall, but bean taproots are easily torn from the ground during imprecise mechanical cultivation. To minimize damage to the plant, beans should not be cultivated when they are wet or just after they have flowered.

Dry bean yields can be jeopardized by various root rots, *Sclerotinia* white mold, and other fungal and bacterial diseases; the beans are especially susceptible to disease during wet periods. Many of these diseases are perpetuated when the canopy closes, and fungus growth can spread among living plant tissue; wide row spacing will help, as well as avoiding disturbing or handling the plant during wet periods. Clean the seedbed well and till before seeding to promote decomposition of residue. Crop rotation also minimizes disease, as the inoculum that affects dry beans can build up in soils over time. Small grains are well-suited to this rotation because they are not susceptible to the same diseases as beans, but crops like sunflower, canola, and soybeans should be spaced properly between dry bean plantings.

Beans are sensitive to day-length; when there are enough hours of sunlight, the plants produce small white or light purple flowers that are self-pollinating. Indeterminate varieties of dry beans will continue to expend energy in vegetative development for a few weeks after they flower. Most dry bean growth will occur when temperatures are between 65°F and 75°F. During extended periods of cold (below 46°F) or hot (above 95°F) weather, bean blossoms and developing pods can drop to the ground. Because beans cannot tolerate water-logged soils and require adequate moisture as they bloom and develop pods, water management is often the most crucial issue with dry beans. Drier conditions during the season (or heavy rainfall near harvest) will decrease yields.

Harvesting & Storing

Generally dry beans take 60-90 days to mature in the northeast, depending on the variety. Bush varieties (including navy, kidney, and dry red beans) will mature more evenly and facilitate consistent harvesting. When the majority of the pods have turned yellow, beans are ready to be pulled and harvested. Harvesting can be difficult if the crop is weedy or not consistently ripe, and some field loss can occur during harvesting. Bean pods can lie close to the ground and most varieties need to be pulled (either with a bean-puller or, if weedy, by hand); utilize the early morning dew to minimize shattering. A mechanized puller-cutter will uproot or cut the entire plant and lay it on the ground in windrows as the machine moves along the field, but a puller followed by a separate tow-behind windrower will accomplish the same goal. Combine these windrows when the beans have dried to 18% moisture and adjust the spike-tooth combine's two cylinders for low speeds (150-200 RPM's) to minimize shattering; monitor continuously for seed damage while harvesting.

Each bean pod typically has 2-4 seeds, and good dry bean yields are about 1500-1800 lb per acre (with a test weight of 60 lb per bushel), but this is heavily dependent on variety. Clean beans to remove broken seed, stones, weed seeds, and other debris but beware that excessive handling will lead to damage to seed coats. Many growers use a conveyor table to grade beans; any that are split, cracked, or otherwise broken and not up to human consumption standards can be roasted and incorporated into livestock rations.



On-farm storage will allow growers to evaluate beans periodically for damage or deterioration, as well as wait to sell their product until prices are high. Beans should be conditioned using a low temperature and dried to a moisture level of 15-16%, then stored in bins that are inaccessible to rodents, insects, contamination, and temperature extremes. Storing dry beans at low temperatures (35-55°F) will discourage mold growth. Field beans can be marketed as dry beans or processed and sold as pre-cooked, canned beans for convenience.

References:

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