

Growing Asparagus

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Many look forward to fresh asparagus each spring. Once established, this perennial vegetable is relatively easy to grow; in fact, it often thrives in roadside ditches or abandoned farmsteads in the higher rainfall areas of the state. An asparagus bed in good soil can easily last 15 years or longer.

There are a number of asparagus species, but only one, *Asparagus officinalis* L., is cultivated for food. Not only is it low in calories, asparagus is an excellent source of vitamin A and contains significant amounts of calcium, phosphorus, riboflavin, and vitamin C as well. In past centuries, it was sometimes prescribed as a gentle diuretic and kidney tonic. Edible asparagus is native to Europe, and has been cultivated for over 2000 years. An ancient Roman author, Cato the Elder, in 200 B.C. wrote detailed directions for growing asparagus that are close to current recommendations.

In South Dakota, the eastern end of the state and the Black Hills are two areas where asparagus can be grown most successfully, but other areas can grow it if extra attention is paid to watering during dry spells, and hardy varieties are used.

Climatic Requirements

During the growing season, warm days and cool nights with low relative humidity are preferred. Asparagus produces best when temperatures during harvest range from 78° to 85°F during the day and 55° to 65° at night. To be productive, the asparagus plant needs a long rest period (dormancy); this can be met by cold winter temperatures or a prolonged period of drought. Cultivars vary in winter hardiness (see below), but there are a number that will do well in our state.

Site Selection

Asparagus needs full sun for good production. Good soil drainage is also essential - the highest yields are obtained on deep sandy loams, since asparagus roots may extend six feet deep. Heavy soils that form a crust after rain or irrigation can damage the emerging spears. A soil pH of 6.5 to 7.0 is best, but asparagus is quite tolerant of higher pH soils and salinity. The bed or field should be fairly level to avoid soil erosion, and avoid low-lying areas subject to late spring frosts that could delay harvest and reduce yield. The soil should be free from stones, which can cause crooked spears. The field should also be free of perennial weeds, which are difficult to control as there are few herbicides available for newly planted asparagus. To avoid root and crown diseases, choose an area that has not been in asparagus for the last eight years.

Varieties

Mary Washington and Viking are perhaps the two varieties that have been most readily available to home growers through mass markets, although newer hybrids such as "Jersey Giant" are becoming more common. It is worthwhile to seek out these newer varieties, such as the male hybrids "Jersey Giant" or the even higher-yielding "Jersey King." These hybrids have been

developed to have greater disease resistance and higher yield, along with good cold hardiness, and have done well in trials in North Dakota and Minnesota. A newer male variety that has greatly out-yielded other varieties in many northern trials (including Saskatchewan), and has also done well in heavier soils, is “Guelph Millennium”. It tends to emerge about a week later in the spring than other varieties, which can help it to avoid spring frosts, and the spears stay tight in high temperatures, so that it maintains good quality over a range of conditions.

Growers may also want to consider the novel variety “Purple Passion”, which has performed well in Iowa trials. It may have special consumer appeal with its purplish-colored, tender, large-diameter spears.

Avoid varieties bred in California, such as UC 157, as they are not hardy enough for us.

Plant options

Asparagus production beds are most often established from 1-yr-old crowns which are purchased or grown from seed. Direct-seeding is not recommended, but transplants grown in a greenhouse or protected area can also be used for planting the permanent bed.

One-year-old crowns (Fig. 1) are more vigorous and have greater productivity as compared to 2- or 3-year-old crowns that suffer more root damage during digging, which may reduce quality. Good-quality crowns weigh about 1.5 pounds per 10 crowns.



Fig. 1 One-year-old crown.

Growing Crowns

Crowns can be produced from seed in a separate bed for later transplanting. If producing your own crowns, choose soil that is well-drained, deep, loose, and light.

Generally, one acre of seedlings will produce enough crowns for ten acres of asparagus. There are 900-1200 seeds per ounce. One ounce of seed can produce 550 high-quality crowns. You can figure out how many crowns you need and plant the seed accordingly. For example:

Area per plant: 4 ft. row spacing x 1.5 ft. between plants = 6 square feet

Plants per acre: 43,560 (square feet per acre) / 6 ft per plant = 7,260 plants per acre

To hasten germination, soak the seed for 48 to 96 hours in warm water before planting; change the water several times a day to avoid fungal growth. It is also advisable to use a seed fungicide before planting. Plant seed ½ inch deep, 2-3 inches apart in rows that are 24-30 inches apart. Optimal temperatures for germination are 60-85 degrees F.

Cultivate during the growing season to control weeds. When seedlings are one year old, they may be transplanted to their permanent location. Dig the crowns in the spring before the buds begin to grow. Old plant tops can be mowed if they interfere with the digging. A modified potato digger or moldboard plow can be used to lift crowns from larger plantings.

Transplant production

An alternative to planting one-year-old crowns is to use transplants, which can be grown in a greenhouse. To do this, seed can be treated as above, but then seeded into peat pots filled with a good potting media (not field soil). Plant two seeds per pot, and thin to one after emergence. Transplants can be started either in the early spring for setting out after danger of frost has passed, or in late summer for transplanting in mid-September. Transplant when seedlings are 10 to 12 weeks old into the permanent bed prepared as for crowns: Pots should be covered with at least one inch of soil at the time of planting in the furrows, and the furrows filled in gradually over the season as with crowns. If peat pots are used, when planting be sure none of the pot is exposed above the soil as it can act as a wick, drying out the plant. A transplant starter fertilizer solution should be applied at the time of planting.

Planting crowns

Discard any small or badly injured crowns. Sort crowns according to size. Plant crowns of the same size in a row to avoid competition for food. If needed, crowns can be stored at 38°-40°F and 85-90% humidity until planting. Do not allow them to freeze. To avoid decay, the crowns should not have any damp or moist areas on them during storage. Before planting, dip the crown in a recommended fungicide solution.

Before planting the crowns, prepare the land so the soil is free of stumps, rocks and other coarse debris that might cause crooked spears. Any existing weeds should be controlled; spraying any perennial weeds with a glyphosate herbicide (for example, RoundUp or KleenUp) two to three weeks before planting is recommended.

Open the planting furrow to a depth of 8-10 inches (8 inches in heavier soils). Position the crowns, upright with the roots spreading (Fig 2), in the furrow about 8 inches below ground level and then cover with about two inches of soil. Close spacing may be practiced in the home garden, but when planting half an acre or more, space rows 3 to 4 ½ ft with plants 12-18 inches apart in the row.



Fig. 2 Planting crowns in furrow

As the crowns grow, gradually work the soil toward the plants during cultivation until the furrow is entirely filled. Be careful not to bury the ferns. Each cultivation should add about 2 inches of soil over the crowns. Approximately three cultivations should cover the crowns and completely fill the furrow (Fig 3). Shallow-planted crowns often are injured by spring frosts or by disking and produce smaller spears. Deeply planted crowns produce larger spears that emerge later in the spring.



Fig. 3 Young shoots

Fertilizer

Because asparagus may occupy the land for 15-20 years, good soil preparation before planting is important. If possible, apply 5-10 tons of good farmyard manure per acre or plow down a green manure crop in the fall. Otherwise apply 600-1,000 pounds of 8-32-16 per acre (20 lbs per 1,000 square feet or ½ lb per 10 ft of row) before planting. A soil test (0-12") is the best way to determine fertilizer needs, as some soils may require only additional nitrogen.

Once the crop comes into production, commercial growers should test the soil at least every other year for phosphorus and potassium. Broadcast any needed fertilizer and then either water in or work into the soil by shallow cultivation.

The crop will also require about 50 lbs of nitrogen (about 140 lbs of 35-0-0) per acre each year after

planting. Regardless of the general fertilizer practice, it is desirable to split the nitrogen application, applying half of the recommended amount in the early spring before growth starts and half at the end of the harvest season. For smaller plantings, apply ½ cup of ammonium nitrate [35-0-0] per 10 ft row in early spring and again after harvest. The second application enhances vegetative growth and carbohydrate accumulation which results in a higher yield the following year as well as improved plant vigor to survive the winter.

Cultivation

Keep the field free of weeds. The spears are less brittle in the afternoon and cultivation is best done at that time. Once the plants are established, weeding problems can be reduced by using herbicides in the rows. Use a windbreak to shield spears from wind which can damage spears by blasting the spear with soil particles, or by retarding growth on the windward side of the spear, causing them to become crooked or misshapened.

Leave the ferns standing in the field in winter months to help trap snow, which can help insulate the roots and crowns from low temperatures. In the early spring before the shoots develop, cut, and burn the old ferns (to reduce insects and disease) or disk them into the soil.

Harvest

Do not harvest the first two years after planting, and then limit harvest in the third year to 2-4 weeks, depending on the vigor of the fern the previous season. Established fields may provide a yield of 2,000 to 4,000 pounds per acre (¾ to 1 pound per foot of row in a home garden), depending on climate and cultural practices.

Snap spears by hand or cut 2 inches below ground level, at about a 45° angle, when they are 6-10 inches tall. Morning harvest is preferred because the spears then contain the maximum amount of water and stay fresh longer.

Lignin fibers make asparagus tough and undesirable. The tip of the spear has less lignin and the amount increases toward the bottom. The following practices can reduce lignin in the spears: Snap asparagus, rather

than cutting at ground level, thus leaving most of the fiber portion (white portion) of the spear in the field. During cold weather, harvest shorter spears; the longer it takes a spear to grow, the more fiber it develops. Do not harvest very small diameter (thin) spears; they have more fiber on a weight basis.

Cool spears as quickly as possible after harvest in ice cold water. Store asparagus at less than 36°F, but do not allow it to freeze. Avoid water stress by wrapping asparagus in a wet material or in perforated plastic wrap, or store upright in a bowl with the stems in water. Do not store asparagus for more than 7-10 days.

Crooked Spears

Crooked spears generally are the result of dirt clods in the field, hot dry wind in early spring, or injury due to insects, frost, disking, or heavy soils. Avoid all these problems to produce straight, marketable spears.

Irrigation

To help plants become established, apply water at least for the first two years, if possible. Irrigation is not essential for established asparagus except in drier years or areas, but it will increase productivity (spear size and numbers) and longevity of the planting. Avoiding drought stress will also increase vigor and decrease risk of infection by *Fusarium*, a fungal crown rot.

Male vs. Female Plants

Asparagus is dioecious (male flowers on one plant and female flowers on another plant). Non-hybrid varieties will have about 50% male and 50% female plants, but many all-male hybrids are available. Female plants are less productive and have a shorter life because some of the plant's energy is allocated to seed production in the fall. Male plants produce a larger number of spears, starting earlier in spring, but they often are thinner. Female plants produce fewer spears, but they are larger and are produced later in the season.

Diseases and Problems

Since fusarium root rot and crown rot eventually invade every planting, cultural methods that maintain the vigor of the plants will help prolong productivity.

Fusarium root rot: The fungus lives in the soil and enters the plant through the roots. Plant asparagus in a

field that did not have asparagus for the last eight years, and dip the crowns in recommended fungicide before planting. Keep the planting healthy by practicing good cultural methods.

Rust: Cut and burn the tops in the spring, and use resistant varieties, such as the Jersey hybrids (Guelph Millennium is more prone to rust). Fungicides may be used in commercial plantings.

Feathering: Bracts of the spears are partly spread as a result of high temperatures.

Planning small-scale commercial production:

Prospective growers should always assess their potential market before planting, as well as the presence of other growers nearby. Fresh locally-grown asparagus sells out quickly at farmers markets across the state, and would be a great way to start a CSA season. Local restaurants may be interested in featuring this unique vegetable in spring menus. A grower within a 15-minute drive of a population base may also be able to successfully market as a “pick-your-own,” with about one acre per 5,000 urban dwellers. Asparagus also may be harvested and graded according to the specifications of the local supermarket and sold wholesale to them.