

Commercial Pumpkin Production for New Mexico

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All species of pumpkin are native to the Western Hemisphere, with most originating in tropical America. Plants have large leaves and sprawling vines with coiled, modified leaves called tendrils, although they may be absent on some bush varieties. The pumpkin's taproot can grow as deep as 5 feet. Lateral roots, however, are near the surface, are generally longer and are more extensive.

Pumpkins are called monocious because male and female flowers occur on the same plant. Bees are usually required for effective pollen transfer. Similar to other cucurbits, the appearance of male and female flowers is affected by daylength. First flowers of the season are usually males, followed later by females that produce the fruit. Pumpkins will cross with other plants of the same species, but will not cross with cucumbers, watermelons or cantaloupes.

Pumpkins and winter squash have similar characteristics, but pumpkin rinds are generally softer than those of winter squash. When mature, most pumpkins have a characteristically orange color, although the rinds of some winter squash can also be orange. Pumpkin flesh is generally coarser with a stronger flavor. Most pumpkins are a good source of vitamin A.

Pumpkins were originally grown for their seed, not their flesh. Roasted seed can be salted for a nutritious snack. Some varieties have been developed for their naked seed, a mutation that lacks the normal tough seed coat.

Male blossoms can be dipped in egg batter and fried and they can also be sauteed in butter. There are more male blossoms than female blossoms, and limited harvest of male blossoms probably will not affect yields.

TEMPERATURE AND SOIL CONSIDERATIONS

Pumpkins are a warm season crop that needs a relatively long, warm growing season. The soil temperature at a 2-inch depth should be at least 60° F for good seed germination. Plants grow best if daily tempera-

tures are between 60 and 80° F. Pumpkin roots are inefficient in cold soils, which can cause plants to permanently wilt.

Pumpkins are adapted to a wide variety of well-drained soils, but light-textured soils are preferred in colder areas of the state because they warm up more quickly in the spring. Pumpkins do not tolerate wet or poorly aerated soils. Large amounts of soil organic matter and a soil pH of 6.5 to 7.5 favor maximum production.

SEEDBED PREPARATION AND FERTILIZATION

Most soils can be improved by incorporating some organic matter. Composted manure can be applied in the fall at a rate of 10 to 20 tons per acre. Green manure crops (winter rye, wheat or barley) planted in fall and turned under a month or two before planting are good sources of organic matter. A broadcast application of nitrogen fertilizer at a rate of 30 to 50 pounds per acre of nitrogen will help micro-organisms break down the organic matter.

In addition to plowing and disking, chiseling or subsoiling fields before planting promotes deeper root penetration, particularly in compacted soils. Preplant fertilizer treatments can be incorporated in the final disking operation for sprinkler irrigation or by listing for furrow irrigation. Depending on row spacing, listed beds can be flattened on top (vegetable beds) with a bed shaper or rototiller to keep pumpkins out of irrigation furrows to reduce fruit rots. Fields should be laser leveled if a flat vegetable bed is required.

To avoid salt burn on young seedlings, all potassium (100 to 150 pounds per acre of K_2O) and half the nitrogen (35 to 60 pounds per acre of N) fertilizer requirements for a pumpkin crop should be broadcast as a preplant application. Phosphorous (60 to 100 pounds per acre of P_2O_5) can be broadcast or applied in a band 2 inches below and 2 inches to the side of the seed row. Phosphorous rates can be cut in half if banded.

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The second application of nitrogen should be applied at a rate of 35 or 60 pounds per acre of nitrogen when plants begin to form vines as a sidedressing 8 to 10 inches to the side of plants and 1 inch deep. Nitrogen fertilizer applied too deeply or too close to the vine can cause root damage and reduce yields. All fertilizer application rates, including secondary and minor nutrient requirements, should be based on soil analysis recommendations.

PLANTING

Vining habit and fruit size of each variety should determine distance between rows and plants. Row spacing varies from 5 to 12 feet for large-fruited vining varieties, with 2 to 6 feet between plants. Bush varieties are planted in rows 3 to 6 feet apart, with plants 1 to 3 feet apart within the row.

Seed should be planted 1 to 2 inches deep, preferably in moist soil (pre-irrigated beds dry to touch on top). Seed planted in dry soil and left unirrigated for any length of time are subject to attack by rodents. Growers occasionally plant in hills (2 to 3 seed/hill) and thin to a stand. Plants are thinned when they have 2 or 3 true leaves. To avoid disturbing roots of plants that remain in the hills, cut excess plants off at the soil surface. Do not pull them.

IRRIGATION

Pumpkins can be irrigated less often because they have deeper root systems than summer squash. There are, however, three critical growth stages when moisture stress can be a major problem: seedling emergence, early bloom and 10 days before harvest.

Inadequate moisture at planting can result in poor and uneven emergence, particularly in areas where soil crusting is a problem. Crusts should be carefully broken mechanically or kept moist by irrigation until plants emerge.

Shortages of water at bloom can result in poor fruit set and misshapen fruit. When leaves begin to wilt, blossoms will drop rather than set fruit. Moisture stress 10 days before harvest can result in a rapid decline of vines with a reduction in fruit size.

Furrow irrigation is the best way to apply water because moisture on the leaves from sprinklers can increase the incidence of foliar diseases. Seed should be planted 2 to 4 inches from the edge (closest to irrigation furrow) of a flat vegetable bed. Water should never be allowed to flow over the top of the bed as it will form a crust. It should be allowed to soak slowly through the beds until beds are soaked in the middle.

This concentrates salts in the middle of the beds, away from developing seedlings.

If overhead sprinklers are used, apply water in the morning to give leaves a chance to dry before nightfall. Do not sprinkle in midmorning during bloom when bees are active. Sprinkling will reduce bee activity, resulting in poor fruit set and small and misshapen fruit.

POLLINATION AND FRUIT SET

Pollen of the pumpkin flower (male) is not carried by the wind; bees are normally needed for pollen transfer from male to female flowers. At least one strong honey bee colony per acre is needed for good pollination, although pollen transfer can be accomplished by wild bees. Bee activity may decline during cold, wet, windy weather. To avoid killing bees, spray insecticides only in late evening or early morning. Hives should be covered with tarps before spraying and removed immediately afterwards.

Although the female flowers are receptive to pollen throughout the day, they generally close in the early afternoon. Whether they set fruit or not depends on whether they were properly pollinated and the condition of the plants. Fruit set also depends on the number of fruit already set on the plant. If there are several fruit already set on the plant, further fruit set may be delayed.

HARVESTING AND STORAGE

Pumpkins grown for Halloween sales must be ready for market by early October. Pumpkins will withstand light frosts that can kill vines, but pumpkins should be removed from the field before heavy frosts occur.

Pumpkins should be harvested when fully grown and well colored. The rind should be hard enough to resist denting by thumbnail. Fruit can be cut from the vines with pruning loopers, leaving approximately 1½ to 2 inches of stem attached to the fruit. Longer stems tend to get broken off in transport, which makes an entry wound for bacterial that cause rot.

New Mexico pumpkins are generally cured in the field for a week before transport. Fruit are put in windrows for easier handling when loading on trucks. Curing pumpkins in a windrow lets small cuts and bruises heal (callous) before transport, which reduces rot in transport and storage. When loading, cull all diseased, insect-damaged and bruised fruit. Care should be used not to bruise any fruit taken to market. Pumpkins are normally loaded in bulk (loose) in

trucks or in large bulk boxes that can be handled with a forklift.

If pumpkins are to be stored for any length of time (pie pumpkins), they should be cured for at least 10 days at 80 to 85° F and 80% relative humidity. Then store in a dry, well-ventilated area between 50 to 60° F.

PEST CONTROL

The squash bug is a major pest on pumpkins, particularly in warmer areas of the state. The flat-backed, brownish-black adults can grow to $\frac{3}{8}$ -inch long or more. Brownish eggs are deposited in neat rows on the bottom of leaves. Nymphs that emerge, along with existing adults, puncture leaf tissue to feed on plant sap. Heavy infestation will cause vines to wilt and die.

Because adult squash bugs overwinter in plant trash, field sanitation is important to control this pest. Registered insecticides should be sprayed on the underside of leaves to control young nymphs when they first appear.

Both the striped and spotted cucumber beetles can be a problem on pumpkins when pumpkins first emerge. These beetles transmit bacterial wilt, which can cause severe losses later in the season. The small ($\frac{1}{8}$ inch) yellowish-green beetles with longitudinal black stripes or black spots will riddle young plants by chewing on them. Registered insecticides should be applied as soon as plants emerge.

Wilted vines can also be a sign of the squash vine borer. The brown-headed, 1 to $1\frac{1}{4}$ inch long white caterpillars can be found tunneling inside the stems causing the plants to suddenly wilt and die. Sawdust-like excrement can often be seen coming from holes in the stem near the soil line.

Pupae of this borer overwinter in soil and emerge about the time vines begin to run. Small, black, wasp-like moths emerge when the pupae split, and lay eggs on the base of the stems. Larvae hatch in about one week or two, then bore into the stems. Registered insecticides should be applied before and during the egg hatch.

Other insects that occasionally result in losses include cutworms, aphids, fleabeetles, leafhoppers and spidermites.

Crop rotation is one of the best ways to prevent or reduce disease infestations on pumpkins. Maximum protection is afforded if pumpkins are not planted on any land where cucurbits of any type have been produced during the past 4 years. It is also important to destroy any plant residues after harvest.

Powdery mildew is a fungus disease that first appears on the upper leaf surfaces of the plant. Under favorable conditions, the white, powdery spots will

spread over the entire leaf. Infected spots will eventually turn brown and dry. It is most prevalent in late summer and early fall when warm weather, afternoon showers and dense foliage create an ideal environment for the disease to develop. Chemical control involves application of registered fungicides at the first sign of infection. Fields under sprinkler irrigation should be watered in the early morning to give foliage a chance to dry before evening.

Bacterial wilt is spread by both the striped and spotted cucumber beetles that feed on young seedling pumpkins. The first symptoms are dull green patches that appear on leaves that show feeding wound damage. Individual leaves eventually wilt, followed by vines, then the entire plant. Symptoms can also include extensive blossoming and branching on dwarfed plants. Stems cut with a knife secrete a thick white liquid when squeezed. Treat cucumber beetles with an appropriate insecticide.

Black rot (gummy stem blight) is a fungus disease that effects both pumpkin foliage and fruit. Irregular yellow spots on foliage eventually turn brown and spots on pumpkins will eventually turn black as the fungus penetrates the fruit, causing a dry rot. Elongated streaks on infected stems may produce an amber, gummy liquid. Because the fungus survives in infected seed, control involves planting clean seed. Crop rotation and the use of registered fungicides are also recommended.

Weed control can be done either with registered herbicides or cultivation. In wide-row spacing operations, expensive herbicides can be applied in a band over the planted row. Less expensive herbicides can be used as lay-by applications before vines begin to cross. Shallow cultivation and hoeing can be used before plants begin to vine.

VARIETIES

A good pumpkin variety is one that performs well under a wide range of environmental conditions. Choice of variety also depends on market requirements, including its intended use and size.

‘Big Moon’ - 115 days; up to 200 pounds; very large fruit; medium-orange skin; light orange flesh; open pollinated; large vines; for use in fair competition.

‘Big Max’ - 120 days; up to 200 pounds; very large fruit; bright, pinkish orange skin; round to flattened-round shape; slightly rough skin but easily carved; thick, yellow-orange flesh; open pollinated; vining type; for use in fair competition.

‘Connecticut Field’ - 115 days; 15-25 pounds; up to 14 inches in diameter; dark orange skin; fruit flattened at both ends, smooth and slightly ribbed; pale, orange thick flesh; open pollinated; vining type; carving type.

‘Howden’ - 115 days; 10-15 pounds; rich-orange hard rind; improved Connecticut Field type, larger, more uniform and symmetrical; good keeper; thick flesh; large spreading vines; one of most popular varieties for carving.

‘Ghostrider’ - 110 days; 10-20 pounds; 12-16 inches in diameter; deep orange skin with strong handles; classic deep round shapes, hard and ridged; yellow-orange flesh; becoming very popular for carving and cooking.

‘Autumn Gold’ - 90 days; All-America Winner; 7-10 pounds; 12 inches in diameter; golden orange skin; precocious yellow gene causes fruit to color up early in fall; thick, yellow-orange flesh; hybrid; vigorous vines; good for carving and cooking.

‘Spirit’ - 96 days; All-America Winner; 12-14 pounds; 12 inches in diameter; bright orange

skin; bright yellow, thick flesh; hybrid; semi-bush type; carving.

‘Funny Face’ - 100 days; 12-14 pounds; 12 inches in diameter; bright orange skin; bright yellow, thick flesh; hybrid; semi-bush type; for pies or carving.

‘Jack-O-Lantern’ - 110 days; 10-18 pounds; 8-10 inches in diameter; bright orange skin; orange-yellow flesh; round to elongated shape; carving or cooking.

‘Triple Treat’ - 110 days; 6-8 pounds; 7-9 inches in diameter; bright orange skin; thick, deep orange flesh; carving or cooking; hull-less seed make delicious high-protein snack raw or roasted.

‘New England Pie’ - 105 days; 5-7 pounds; dark, orange skin; well-colored, orange flesh relatively stringless; for pies.

‘Jack Be Little’ - 95 days; 3-4 ounces; 2-3 inches in diameter; dark orange skin; dark-orange firm flesh; flattened with strong ribs; long vines producing 6-7 fruit; used for fall table decorations.