

Onion

Cultivars

Contact Manitoba Agriculture and Food's Vegetable Specialist for variety information.

Climate and Soil Requirements

Manitoba's spring and summer temperatures and photoperiod are favourable for the production of quality onions.

Commercial onions are primarily produced on silty-sand and clay loam soils in Manitoba. Well drained peat soils are also well suited to the production of onions.

Seed Treatment

Seed treatment will control soil borne pathogens and reduce the incidence of damping off and onion smut.

Seeding

Dry (cooking) onions, onion sets and pickling onions are seeded as early as the seedbeds can be prepared.

Spanish Onions can be direct seeded or transplanted as early as possible in the spring. Well hardened transplants can withstand a frost and light freeze without plant injury.

Rates

Dry onions: 3.5 – 4 lb/ac

Bunching onions: up to 6 lb/ac

Pickling onions: 31 – 40 lb/ac

Onion sets: 62 – 71 lb/ac

Seeding Depth: Sow seeds at a depth of $\frac{1}{2}$ – $\frac{3}{4}$ inch (1.3 to 1.9 cm)

Spacing

Dry onions: Rows 14 – 18 in (35 – 45 cm) apart with 9 – 12 plants/ft (30 – 40 plants/metre) of row

Spanish Onion Transplants: Space plants 4 – 5 inch (10 – 12.5 cm) apart in the row, with between row spacing at 14 – 18 inch (35 – 45 cm).

Fertility

Refer to Tables 1 through 9 for this crop. For general recommendations in the absence of a soil test, refer to Table 10 in the fertility section.

Micronutrient deficiencies have not been a problem in onion production on mineral soils in Manitoba.

Irrigation

Onions have shallow, limited root systems. The critical water use period lasts up to and including the bulb formation stage. Do not permit the soil moisture to fall below 50%. The plants should receive 1 inch (2.5 cm) of water a week, either as rainfall or irrigation. Irrigation after bulb maturity may not be beneficial and may reduce yield and/or quality.

Sprout Inhibition

The use of a growth inhibitor such as maleic hydrazide sprays will improve the storage life and quality of onions by inhibiting sprouting in storage. Short-storage-life cultivars do not benefit from maleic hydrazide sprays. Contact MAF's Vegetable Specialist for more information.

Apply at a rate of 3.3 lb product in a minimum of 27 gallons water per acre (3.75 kg product in 300 L of water/ha) for ground equipment or a minimum of 9 gallons (100 L) of water for aerial equipment. To obtain maximum benefit, spray when about 50% of the onion tops have fallen and each plant has four to eight green leaves. This will occur about 10-14 days before harvest. Earlier application may result in spongy, hollow-necked bulbs.

Pest Management

Diseases

Damping-Off and Root Rot

Treated seed and use of good sanitation practices during transplant production are the best methods of controlling root rots and damping-off.

Downy Mildew, Botrytis Leaf Blight and Purple Blotch

These diseases develop in humid weather or when rains and heavy dews occur frequently. Such conditions normally occur in July and August in Manitoba. Then spray every 7 to 10 days with one of the fungicides recommended in the Fungicide/Bactericide section of the *Guide to Vegetable Crop Protection 2003*.

Disease forecasting models and crop monitoring can greatly improve disease management. Consult the Manitoba Agriculture and Food's Pathology Specialist for more information.

Smut

To reduce smut infections, steam-pasteurize soil for growing onion transplants or use a sterile soil-less mix. Refer to the tables in the Fungicide/Bactericide section of the *Guide to Vegetable Crop Protection 2003* for recommended seed treatments.

Botrytis Neck Rot and Smudge

Be certain onions are mature before harvesting. Avoid late growth by restricting nitrogen and irrigation after early August. Do not lift bulbs until two-thirds of the tops are down. Once the tops have been removed, dry rapidly with forced air at 35°C for the first week. Ensure exhaust air temperature is 35°C for a one week period. The air temperature may then be reduced to 26°C until onions are well cured. Store under cool, dry conditions. White and Spanish-type onions are more susceptible to these diseases.

Basal Rot

This soil-borne *Fusarium* disease prefers warm soil temperatures and is common in Manitoba. Early symptoms include yellowing and tip die-back. As the disease progresses, the plant will collapse, the roots will decay and the basal plate will have a pinkish colour. Secondary rots often follow. Crop rotation and the use of disease-free transplants are recommended.

White Rot

The prevalence of White Rot in Manitoba has

been low. Onion white rot disease is a serious threat to onion production. Fortunately, the incidence of White Rot in Manitoba has been extremely low.

The fungus survives as sclerotia in the soil for long periods. Long-term rotation with carrots, lettuce, potatoes or other crops not related to the onion family is recommended. Rotations of 10 to 20 years may not reduce the population of white rot in heavily infested soil.

Cultural control recommendations such as flooding of fields or field solarizations with clear plastic are not practical for large scale onion production in Manitoba.

Sanitation is extremely important in preventing the spread of this disease. Wash down machinery after it has been used in an infested field. Avoid cultivation practices that can spread contaminated soil from one area to the rest of the field. Dispose of cull onions in a sanitary landfill or bury away from areas of onion production. Pallet boxes that have been used to hold contaminated soil or diseased onions may also be a source of disease and should be cleaned or destroyed.

Pink Rot

This soil-borne disease rarely causes severe damage but may reduce bulb size or stunt growth especially in drier areas of the field. The roots turn pink or maroon when infected. Long rotations, good nutrition and irrigation may be helpful.

Bacterial Diseases

There are at least three different diseases of onions caused by bacteria; these are soft rot, slippery skin and sour skin. The bacteria that cause slippery skin and sour skin can enter the onion through wounds on the leaves and when heavy irrigation or rainfall results in water standing in the leaf axils and neck. Any of these bacteria can enter the bulb when the leaves wither after windrowing or through injuries that occur at harvest.

Soft rot often occurs when bulbs are damaged by the onion maggot or by other bulb diseases. To reduce bacterial diseases, control the onion maggot, do not over-irrigate and avoid damaging the on-

ions at harvest. Let the onions mature properly before harvest, then cure and dry them rapidly.

Insects

Onion Maggot

Compared to other major vegetable producing areas in North America, the population density of the onion maggot fly is relatively low and usually below control thresholds levels in Manitoba. Several years of studying and field monitoring of the onion maggot indicates population peaks occur generally in late-June to mid-July and then again in mid-to-late-August.

However, population densities in south-central Manitoba (Morden, Winkler, Plum Coulee areas) have exceeded control thresholds more often over the years as compared to the Portage la Prairie area.

Onion maggot economic thresholds are based on trapping adult flies with yellow sticky traps. Traps are placed in fields and the number of adult flies stuck on the trap is counted. This number is then divided by the number of days the trap was in the field. The result is a number that gives the number of flies (F) per trap (T) per day (D) or FTD. The economic threshold for adult onion maggot flies in Manitoba is 4.0 FTD.

Proper placement of granular insecticides at the correct rate is the key to onion maggot control. If difficulties are encountered with the granular application, sprays to kill the flies may reduce their numbers. However, evidence suggests that sprays for flies do little to reduce overall damage from maggots in cooking onions and Spanish onions.

Onions left in the field after harvest are a major source of overwintering onion maggot. This is especially true following early harvest of Dutch (onion) sets and pickling onions. Prevent all regrowth and rogue out all volunteer onions early in the season. Incorporate residue immediately after harvest.

Thrips

Monitoring greatly improves the management of thrips on onions. First, estimate the average leaf stage of the crop, then check at least 50 to 100

plants randomly in the field and record the average number of thrips per plant. Divide by the leaf stage to give the number of thrips per leaf.

Thresholds for green onions and Spanish onions (1 thrips/leaf) are lower than those for cooking onions (3 thrips/leaf).

Note: Some producers and researchers believe the threshold of 3 thrips/leaf for onions and leeks is too high, resulting in unacceptable levels of damage.

Evidence suggests that thrips may develop high levels of resistance in onion fields where repeated use of insecticides occur. Rotate with different chemical groups where possible. Hot, dry weather favours thrips infestations. Water volume, coverage and timing are critical.

Cutworms

Cutworms are an occasional pest of onions in Manitoba. If monitoring indicates a problem, refer to Insecticide section for a list of recommended control products.

Weeds

Competition from weeds can reduce yield and also make harvesting more difficult. For recommended herbicides refer to the *Guide to Vegetable Crop Protection 2003*.

Harvest and Storage

If onions are dried in the field they should be well cured before placing in storage. Provide air circulation to keep onions dry during storage. (Excessive air flow will cause dehydration.) If onions are cured artificially, hold the forced air temperature at 35°C for seven days to kill neck rot organisms. Then reduce temperature to 26°C for the remainder of the curing process until outer skin and necks are dry. When well cured, gradually reduce the storage temperature on onions as close to 0°C as possible with a relative humidity of 70%.