

Onions: Organic Production in Virginia

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PHASES OF GROWTH

Onions are cool season plants. They have 3 distinct phases of growth and the switch from one to the next is triggered by environmental factors. It does not work to plant onions at a random date in the year without taking account of these environmental factors. Success depends on understanding what this crop needs. The main text of this information sheet is written by a Piedmont grower, with variations for Appalachian and Tidewater regions included in the tables and sidebars.

Vegetative Phase

To grow large onions it is important to produce large healthy roots and leaves before the vegetative stage gives way to the bulbing stage. Each onion leaf represents one ring of the future onion bulb. The larger the leaf, the larger the ring becomes. If plants are small when bulbing starts, only small bulbs are possible. Cool weather with adequate irrigation encourages heavy leaf growth.

Bulbing Phase

Bulbing is initiated when the daylight length reaches the number of hours critical for that variety. Temperature and light intensity are also factors that determine when vegetative growth stops and bulbing starts. It takes a temperature of 60°F, or even 70°F to trigger bulbing. The rate of bulbing is more rapid with high light intensity and increased temperature. The optimum temperature for rapid bulb development is 75-85°F.

It's important to grow varieties that are suitable for the latitude of your farm. The further north you are, the longer the number of daylight hours you have in summer. Onion varieties are often described as Northern / Long Day and Southern / Short Day. The dividing line between short day (south of 35°) and long day (north of 38°) varieties is around 35-36-37° latitude. Hence neither one is ideal for us at 38°N. Nowadays there are also Intermediate Day (or Day Neutral) types.

Long Day onions are bred to start bulbing at

Contents:

Phases of Growth	p.1
Onions: the Appalachian Region Perspective	p.3
Summary of Variety Observations in Floyd County	p.3
Summary of Variety Observation in the Piedmont	p.4
Working with Onions for Success	p.4
Onion Growing in the Tidewater Region.	p.4
Resources	p.6
Contact Information	p.6
Onion Diseases Chart	p.7

14-16 hours of daylight, depending on the particular variety. Here at 38°N, our longest day (summer solstice) has 14 hours, 46 minutes of daylight. A few varieties of Long Day onions can be grown here, but those requiring 15 or 16 hours of daylight will never form bulbs at this latitude. We have 14 hours of daylight on May 6th. If the onion doesn't start bulbing until close to the summer solstice, the bulb is then exposed to hot summer conditions as it matures. Soils can dry out fast and if water is insufficient, growth will be stunted. The leaves may die, and the bulbs can get sun scald or even start to bake. Drip irrigation (so leaves stay dry and don't get diseased from overhead watering) may help the 14-hour Long Day onions survive here through the conditions we get in June and July. (Long Day onions are the pungent, storing varieties).

Short Day onions start to bulb at 10-12 hours of daylight, provided temperatures are warm enough. Here we reach 10 hours of daylight on January 21; 11 hours on February 20; and 12 hours, naturally enough, at the spring equinox. Bulbing initiation will be delayed beyond the daylight trigger, until temperatures are higher than 60 or 70F, (which is April here). If we grow short day varieties here, they only have a brief time in January-March to grow leaves and roots before bulbing starts. Therefore it's a waste of time to sow Short Day onions here in spring. One way to deal with this is to start the

seedlings in the late fall /early winter, let them make some vegetative growth and keep them alive over the winter, to grow again in the spring. Short Day onions are mild flavored and do not store. (What makes an onion sweet is the same as what makes it not store well – high water content.) Short day varieties can provide early onions for immediate use.

Intermediate Day onions start to bulb at 12-14 hours of daylight. We reach 13 hours on April 10 and 14 hours on May 6. As yet there are not many Intermediate Day varieties. They are relatively sweet (not as pungent as Long Day onions) and mostly do not store well. This is not a concern for growers selling all their crops soon after harvest, but it is if your goal is to provide onions for as much of the year as possible.

Garlic, by the way, will start to bulb at 13 hours of daylight (April 10 here) and soil temperatures above 60F.

Blooming Phase

Onions are a biennial plant, which means that they normally grow up and produce a bulb in the first year, then in the second year send up more leaves, followed by a thick central flower stem. The trigger for the transition from bulbing to flowering is cold temperature after the plants have 6 leaves or more. If such a plant experiences an extended period of cooling temperatures, it can go dormant. When temperatures rise and it starts growing again, it bolts. Bolting is to be avoided because the flower stems are tough and inedible, and the bulb starts to disappear to feed the growing flower stem.

Seedlings with a diameter less than 3/8" (pencil thickness) exposed to cold temperatures will not usually bolt. It is possible to sow onions in the fall and plant the seedlings out in the early spring, for bigger vegetative growth and therefore the chance of bigger bulbs. The temperature-and-size trigger limits how early in fall the seed can be sown – if the seedlings have made lower stems larger than a pencil in diameter before conditions are right for transplanting, the plants are likely to bloom in the spring before they can bulb up. A few onion plants will likely always bloom, especially if the spring is long with alternating warm and cool spells.

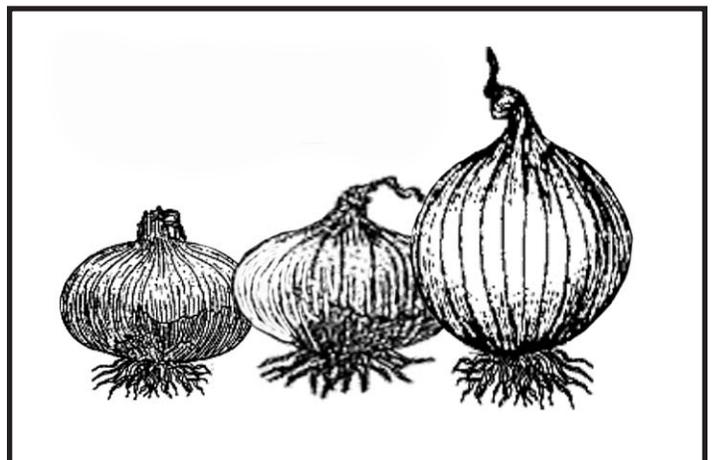
Starting seedlings in a hoop house in early November seems to work well for us. Previously we sowed outdoors in late September and protected

the plants with row cover and cold frames. The hoop house works much better because the plants get much better air flow, are protected better from very cold temperatures, and can be easily seen and cared for. Outdoor sowings tend to suffer some winter killing and varying degrees of mold. The colder the temperatures the plants experience, the more likely it is for the larger ones to bolt before growing large bulbs. Hence a more moderate microclimate, such as a hoop house, reduces the rate of bolting.

Onions are out-breeding plants, that is, they cross pollinate each other. Open-pollinated varieties can suffer from "inbreeding depression" so that saving seed from an isolated open pollinated variety for even two generations can cause problems with vigor and yield, unless steps are taken to avoid this - growing a very large population of plants and removing the feeble ones. Inbreeding depression is caused by the reduction of diversity in the genetic material. Therefore hybrid varieties are very worthwhile if yield and vigor are important to you.

Sets

Onion sets are small bulbs which are planted in spring in hopes of growing bulbs. Often the variety of sets available for purchase is not stated. Onions grown from sets are intrinsically more likely to go to seed before forming a bulb than transplanted seedlings are, because they are in their second year and are big enough to have flowering triggered by low temperatures. Also, storage of sets before planting needs to be 32-35°F or above 65°F. Store bought sets may well not have had suitable storage before you buy.



Onions: the Appalachian Region Perspective Mark Schonbeck, Floyd County.

Onions are somewhat challenging to grow in the Appalachian region of Virginia, but because of our relatively cool, moist summers, we can produce high yields of large onions (both sweet and pungent varieties) when all goes well. We have had success with yellow, red and white varieties when started from seed. Yellow onion sets usually give good results, whereas red and white onion sets often bolt or otherwise perform poorly.

Start the seed in the greenhouse in February and transplant to the field in early April, or purchase sets and plant these anytime from mid March to early April when winter cold is past and the soil can be worked. Onions planted after the middle of April will produce very small bulbs because of daylength responses.

Mulch onion sets immediately after planting – their robust shoots emerge easily through a couple inches of hay or straw. For seedlings, plan on hoeing a couple of times, then mulching when the crop is established. Be prepared to irrigate if dry weather sets in. Nothing hurts

onion yields as badly as a drought at midgrowth – even here in the cooler mountains!

Our two biggest problems are maggot pests (seedcorn maggot and/or onion maggot), and difficulty curing the larger onions. The soil-dwelling maggots occasionally damage newly-planted onions, and more often infest the maturing bulbs so that they will not keep after harvest. It is possible that the adult onion fly is attracted to large, damp onions after they are hung up to cure, leading to post-harvest infestation. (Need experiments to verify.)

Large onions (over 8 oz) often do not store well because their thicker necks do not dry properly during curing, and decay organisms enter. Onions grown from sets often “double” when they get large, which further interferes with curing. Fairly small (3-6 oz) onions of medium to high pungency keep best, often lasting until the following April in a cool dry place. Once onion bulbs have nearly attained their full size in the field (sometime between early July and early August depending on variety), *don't irrigate*, as dry conditions at this point will aid curing and reduce maggot activity.

Summary of Variety Observations in Floyd County:

Planting method Variety	Color & Pungency	Typical size range (oz)	Maturity	Storage ^a	Overall success ^b
<u>Sets</u>					
Stuttgarter	Yellow, strong	4-10	Early-mid	fair-good	Fair
Yellow Danvers	Yellow, med. strong	4-10	Early	fair-good	V. Good
Variety not stated	Yellow, med. strong	4-10	Early	good	V. Good
	White	-	Early		Failure
	Red	-	Early		Failure
<u>Seedlings, grown on farm</u>					
Copra F1	Yellow, medium	4-8	Mid	excellent	V. Good
Clear Dawn OP	Yellow, medium	4-8	Mid	excellent	V. Good
New York Early OP	Yellow, medium	6-16	Mid	excellent	Good
Bennie's Red OP	Red, medium	6-16	Mid	fair	Good
Red Mars F1	Red, medium	6-16	Mid	fair	Fair
Blanco Duro	White, mild-med.	8-20	Late	fair	Good
Walla Walla OP	Yellow-white, mild	8-24	Mid-late	poor	Fair
Ailsa Craig OP	Yellow-white, mild	4-24	Early	poor-fair	Fair
<u>Seedlings, mail-ordered</u>					
Vidalia	Yellow, mild	8-16	Early-mid	poor	Good

^a excellent = through following April; good = well into winter; fair = two or three months; poor = 1 month or less – these varieties not intended for storage.

^b reliability, based on experience in Floyd County. (No onions were as rock-solid reliable as red hardneck garlic in this region, my gold standard for “excellent” success)

^c This is an improved-storage variety, developed by growers in New York directly from Early Yellow Globe, which is no longer available.

Summary of Variety Observations in the Piedmont :

Planting method Variety	Color & Pungency	Typical size range (oz)	Maturity	Storage	Overall success
<u>Seedlings, grown on farm</u>					
Amethyst Cipollini	Red, mild	1	63 days	very good	Very Good
Candy ID	Yellow, medium	4-6	102 days	fair-good	Good
Copra F1	Yellow, medium	4-8	104 days	good	Good
Frontier LD	Yellow, medium	4-8	95 days	good	Good
Red Long of Tropea	Red, mild	12-20	90 days	poor	Fair
Super Star	White, mild	6-8	105 days	poor	Poor
Walla Walla SD	Yellow-white, mild	8-24	Mid-late	poor	Fair

WORKING WITH ONIONS FOR SUCCESS**Vegetative phase****Seeds**

Use fresh seed of a variety suitable for the latitude and the time of year (fall or spring sowing). [Store seed in a cool place, in an air-tight container. Seeds from the previous year is as old as you should go.] Yellow onions are easier to grow than whites or reds, and have tougher skins. Whites are more susceptible to sunburn, and to green streaks if rained on near harvest. Reds are slower growing and therefore tend to make smaller onions. Plan for an approximate yield of 100-150 lbs/100'.

Timing

Sow suitable Long Day varieties indoors from November to mid January; or outdoors in a mild spell in January or February, 12-16 weeks before the frost-free date -use row cover. Sow Intermediate Day varieties in mid October-late November (or January if necessary). If temperatures don't go below 0°F the Intermediate Day varieties will survive outdoors (e.g., Walla Walla, which has good cold tolerance – as does Juno). So if you are in zone 7 or warmer, onions can be planted out in the fall, but it doesn't work in zone 6 - too many onions die in the winter. Also, weeds grow all winter, even when the onions don't, and onions can't tolerate weeds. Sow Short Day varieties in the fall but keep seedlings from getting too cold (e.g., sow in greenhouse – transplant in February). Choose the most cold tolerant Short Day varieties. Don't even try seeding Short Day varieties at this latitude in spring – we just don't have enough time to grow decent sized bulbs. (If you *want* to grow small pearl/pickling/

boiling onions, you could use this method.)

Onion Growing in the Tidewater Region. Charlie Maloney, Dayspring Farm

We grow Candy and Walla Walla. I start the Walla Walla in the hoophouse in October, then transplant out into the field in early-mid March. I start the Candy in plugs (128) in early February, and transplant in mid-March.

Sowing

Sow seeds 1/4 – 1/2" deep, 3 or 4 per inch if you plan to transplant later, or every 2" if direct sowing. Keep the soil damp, as the first roots will be very near the surface. Use a temperature of 57-86°F to germinate (75°F is ideal). They take between 3.6 days (77°F) and 7.1 days (59°F) to emerge. (Onions will still germinate at 95°F, but take 12.5 days and only produce 73% normal seedlings). Use row cover if there's a very cold snap. If you sow too late you will get small bulbs; if too early your onions will bolt. 225 seeds per gram equals 75' of transplants.

Soil

Onions prefer fairly rich, moist but well drained soil with plenty of organic matter and loose, crumbly tilth. Soil pH should be 6.0-6.5; acid soil (pH below 6) should be limed to bring pH into this range. Onions require about 145 lb nitrogen per acre over the growing season, and may need some supplemental organic N, especially on soils with lower organic matter and biological activity. Ensure adequate potassium for storage quality. Note that

high soil sulfur levels make onions more pungent, and are thus not good for growing mild varieties for their sweetness.

Rotate onions at least three years from other alliums. Waterlogged soil promotes disease; use raised beds if the soil is not well drained.

Onion seedlings do not tolerate weed pressure, so take measures to reduce weed growth at every opportunity. If practical, prepare beds ahead of time and hoe or cultivate off the first round of emerging weeds just before planting.

[NOTE - this is called “stale seedbed” - but it may NOT be practical for early spring onion planting, as one would have to do the bed prep in mid-late winter when the ground may still be frozen, soggy or covered in snow and sleet. More feasible for fall plantings]

Planting out

The final bulb size is affected by the size of the transplant as well as the maturity date of that variety. The ideal transplant is slightly slimmer than a pencil, but bigger than a pencil lead. Over-large transplants are more likely to bolt. If seedlings are becoming too large (thicker than a pencil) before you can set them out, undercut 2” below the surface to reduce the growth rate. Onion seedlings are tough – the roots are not fibrous, so not easily damaged. Transplant at 8-10 weeks from January sowing (around mid / late March), or with at least 3 leaves (4 or 5 is better). They are slow growing. Don’t trim the tops at transplanting time, it reduces yield (even though some books recommend it). Transplant 4” apart for single seedlings or 12” for clumps of 3 or 4 (not more than 4). Set plants with the base (stem plate) 1/2 - 1” below surface. Give plenty of water to the young transplants. Keep the top 3-4” of the soil damp for the first few weeks, to prevent the stem plate from drying out. Bare root transplants can be bought by mail order from Dixondale Farms, Johnny’s Seeds and other suppliers.

Cultural Procedures

Keep weeds under control – onions do not compete well with weeds as their leaves do not offer a big surface area and they easily get shaded out by weeds. Yield is reduced by 4% per day by weeds, or 50% in 2 weeks. Cultivate shallowly as roots are near the surface. The ideal is to grow 13 leaves before bulbing starts. Competition for water is an issue, so irrigate as needed to provide 1” of water per week.

If your soil has less fertility, side dress, or foliar feed during the growing season. In cooler parts of Virginia, growers mulch around the plants with old hay from late April onwards, to reduce weed problems and conserve moisture. In more humid areas, mulching encourages fungal problems, so is best avoided once the warm weather arrives. Flame-weeding is possible for an unmulched crop, but exacting – consult ATTRA if you are interested in this.

Bulbing Phase

Keep well watered with 1” of water a week until leaves start to die back. Onions need a lot of water during the vegetative and bulbing phases. When leaves begin to brown, consider drawing some soil away from the bulbs to help them dry out. Do this gradually (i.e., 2 or 3 times, once a week). If sun is intense, provide light shade in afternoons. If the weather is very hot, drawing soil away from the bulbs might not be a good idea - it could lead to sunscald. Restrict watering as far as you have control over it, once the plants start to die back.

Do not break the tops over as some books suggest – this can harm the storage quality and encourage fungal diseases. If harvested too soon, the neck area will not have softened enough to allow shrinkage, and bacteria will get in and rot the onion.

Diseases

See the disease chart. Summers in central Virginia are humid and we contend with a lot of fungal diseases. Seaweed spray can build disease resistance.

Pests

The most significant pests are root maggots, aphids, thrips. To control thrips, attract ladybugs, lacewings, and spiders, by planting suitable flowers. See the Farmscaping website for details. Also, mowing around the edges of the field will reduce the habitat for thrips. Onion maggots (larvae of the fly *Delia antiqua*), are attracted by smell of rotting alliums, therefore do good crop clean up. The small grey-brown onion fly lays eggs at the base of the plant. Larvae hatch and feed on the roots, doing extensive damage. There can be 3 generations per year. See the sidebar on p.3 for information on maggots in onions after harvest. Consider an allium-free period, in early spring if you don’t grow garlic, or in July/August if

you don't grow leeks. Rowcover will exclude pests if it is used from the beginning of the season.

Harvest

When 30-40% of the onion foliage has turned yellow to brown, lift the onions gently and put in partial shade to cure for 2-3 weeks. Bruising can seriously damage the bulbs, as can stressing the necks. Do not pull the onions. If they don't lift easily from the ground, use a spading fork (digging fork, not hay fork) to raise them. Our climate causes onions to be prone to many fungal diseases and bacterial rots. One key to organic production is to handle the bulbs gently to minimize physical damage. Think eggs, not tennis balls!

You can start eating the onions fresh right away, and cure the rest.

Compost all onion crop residues. Don't leave any residue in the onion bed.

Curing

Some books recommend curing in the outdoor sun. These books are written in the north. This doesn't work here. Onions can bake in the sun. A greenhouse is **not** suitable for curing onions! We need partial shade, moderate temperatures, and good air flow (and no rain). Handle gently – many rots are the result of poor handling post-harvest. Spread in a single layer in a warm dry place, and check every few days. The ideal conditions are 85-90°F with constant air movement, no direct sunlight. We use racks in a barn, with fans to keep the air moving.

Storing

Roll the neck between finger and thumb to detect any remaining slidey slipperiness, which would indicate that the onion is not yet fully cured. When the necks are dry, clip the tops to 1-2" and gently brush off dirt and loose scales. Minimize the removal of skin, though, as the skin serves to protect the onion in storage. Remove for immediate use or processing, any onions that are not curing properly.

Bag the cured, trimmed onions in nets and label with variety name in order to ensure less storable ones are used first and also to get useful information on how well the different varieties actually do store compared to each other.

Store in a dry place, either 60-90°F or 32-40°F – *never* 45-55°F. This may mean a barn, shed or

basement at first, until the temperature there gets too close to 55°F, and then move them to a refrigerated cooler. 40-55°F promotes sprouting. If at all possible, do not store onions with fruits, including squash, as these exude ethylene which promotes sprouting.

Resources:

ATTRA: call 800 346 9149 to request a free copy
<http://attra.ncat.org/attra-pub/allium.html>

Dixondale Onion Farms:

<http://www.dixondalefarms.com/index.html>

North Carolina Extension:

<http://www.ces.ncsu.edu/depts/hort/hil/hil-18-a.html>

Georgia *Onion Production Guide*

<http://pubs.caes.uga.edu/caespubs/pubcd/B1198.htm>

Growing For Market, October 2005

<http://growingformarket.com/>

Southern Exposure Seed Exchange:

<http://www.southernexposure.com/>

Territorial Seeds:

<http://www.territorial-seed.com/stores/1/index.cfm>

Johnnys Selected Seeds

<http://www.johnnyseeds.com>

Farmscaping:

<http://www.drncbug.com>

Beneficial Insects and other organism

<http://www.biconet.com>

Pam Pierce: Golden Gate Farming,

Marian Coonse: Onions, Leeks and Garlic - a

Handbook for Gardeners. 1995 available from the public library system.

Contact Information:

Virginia Association for Biological Farming
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Onion Diseases Chart

Disease	Type	Symptoms	Climatic Conditions	Longer Term Effects	Control
Downy Mildew	Fungus	Yellowish spots on upper half of leaves, soon developing to a furry, bluish gray mildew. By 2 days, tops weaken and yellow.	Midseason, poor drainage, poor air circulation. Damp weather.	Winters in scales of onions. Breeds in soil. Wind-borne. Bulb becomes spongy and of poor keeping quality.	Sanitation, fall cleanup. 4-5 year rotation.
White Rot	Fungus	Yellowing and dying back of leaves, from tips down. Roots rot away. Semi-watery decay of scales. Base of bulb has fluffy white mycelia, later black spores.		Breeds in soil, not seed-borne.	Destroy infected plants. Long rotation.
Purple Blotch	Fungus	Grayish, deep lesions with dark centers, on leaves. Dark centers spread into purplish blotches which can spread and kill the plants. Enters neck area usually, not always. Semi-watery rot of scales, which darken and dry up.	Unsure. Warm humid weather? But also in storage. Starts when onions are close to maturity. Bruising during harvesting.		Waxy foliaged varieties (Danvers, Red Creole, Abundance) are more resistant than “glossy” ones (Sweet Spanish, Grano, Bermuda)
Pink Root	Fungus	Roots turn pink, shrivel and die.	South and west of U.S. Throughout growing season, all stages of growth. Attacks other crops too.	Plants’ food supply is cut off, so bulbs are very small.	Resistant varieties (Creole, Grano, Granex, etc.) <u>Never</u> replant in infected areas. Long rotation. Sweet Spanish has <u>some</u> resistance.
Neck Rot	Fungus	Starts as softening of scales at neck and works down. Can start at wound or bruise. Mushy “cooked” areas later become sunken and covered with grayish felt-e mat or powdery mass. Sometimes black spores on and between scales.	Infestation occurs during growth, but manifests after harvest. Moist, cool conditions. Air-borne. Most susceptible time is just before harvest.	Very serious. Spores live on dead onion foliage.	Remove onions at first sign of trouble. Burn infected plants – can survive freezing. Rules: 1) Don’t bend onion tops over. 2) Avoid bruising. 3) Protect bulbs from moisture while curing.

Disease	Type	Symptoms	Climatic Conditions	Longer Term Effects	Control
Basal Rot	Fungus	Semi-watery decay starts at base of bulb and works up, totally destroying bulbs. Damage already underway when symptoms seen – yellow leaf tips -- all foliage dead in 2 weeks.	Widespread infection enters damaged tissues. Temperature influences growth. Warmer – more damage. Appears as soil warms in spring.	Lives in soil	Rotation. Harvest before soil gets too hot. Handle carefully. Burn infected plants.
Smut	Fungus	Dark swollen area on first leaf, spreading to later leaves as they appear. Bulbs, if any, have black blisters between outer scales.	Latitude 36 degrees and north. Cool weather. Direct seeded crops only. Lives in soil. Appears soon after germination.	Plants die before producing bulbs, within 3-5 weeks of infection.	Use transplants (plants beyond seedling stage have complete immunity).
Black Mold	Fungus		Dry Conditions. Grows in live or dead plants. Soil-borne.	Infection grows on in storage as black mold on outer scales or between them. Scales dry and shrivel. Black spores appear.	White varieties are resistant. Rotation.
Smudge	Fungus	Infection confined to unpigmented tissues of neck area. Begins with small green and black dots, often with concentric rings on outer scales. Later penetrates fleshy scales and develops into deep sunken areas on bulb.	Central and NE states.	Considerable damage in stored onions – bulb shrinkage and premature sprouting.	White varieties susceptible. Others resistant. Rotation. Sanitation.
Soft Rot	Bacteria	Not always evident before harvest – develops rapidly if storage temperature too warm. Begins at neck, works down, mostly in center. Affected area has water-soaked glossy appearance, becomes mushy with a foul odor. Often only 1 or 2 scales affected – rest may be salvaged.	Warm humid temperatures. Biting pests or other injuries introduce bacteria. Common in most soils.	Very destructive and common. Destroys onions in storage. Long lived in soil. Although develops rapidly, does not spread rapidly.	Cull out damaged bulbs. Cure and store in dry, well-ventilated place.

Disease	Type	Symptoms	Climatic Conditions	Longer Term Effects	Control
Sour Skin	Bacteria	First symptom is glazed or water-soaked appearance on outer scales. These then disintegrate into slimy yellow mass with sour smell. Skin slips off, leaving center of bulb firm and salvageable.			Remove affected bulbs from storage to prevent spread of disease.
Yellow Dwarf	Virus	Appears as first leaf emerges. Short yellow streaks at base. All later leaves affected. Later whole plant is yellow, wrinkled, twisted, droopy.	Spread by aphids, but not other pests. Also spread by tools and hands.	Most severe in potato onions.	Resistant varieties (Sweet Spanish, etc.) Pull up and burn infected plants. Kill aphids (plant refugia).
Aster Yellow	Virus	Stunting, yellowing foliage, elongated pedicels, distorted flower heads.	Spread by 6-spotted leafhopper.	Also affects other vegetables – lettuce, carrots/umbelliferae, tomatoes, spinach. Infected bulbs shrink and sprout in storage.	As for Yellow Dwarf.
Blast/Leaf Scorch/Sun Scorch		Succulent foliage undergoes rapid dehydration and dies.	Follows abrupt change from warm, moist period to a hot, dry one.		
Leaf and Tip Blight		Tips of older leaves become bronzed as if heat seared. Affected leaves then brown and die.	Prolonged rainy periods and cool, cloudy weather. Thickly planted onions.		

Disease	Type	Symptoms	Climatic Conditions	Longer Term Effects	Control
Damping Off	Fungus	Sudden development of dark rotted area on root and lower stem along soil line. Seedling topples and dies. Sometimes seed rots before germination.	Spreads more rapidly in cool cloudy weather. Thickly planted onions. Still air.	Can wipe out seedbed overnight.	Don't over-water. Water in morning. Keep good air circulation.
Sunscald		Affected tissues appear bleached and slippery. Dries to become leathery.	Hot sunny south. Immature bulbs most susceptible. Also, most common after harvest, while curing outdoors.	Later susceptible to soft rot, neck rot, and other storage diseases.	Don't harvest during high temperatures and bright sunlight. Keep bulbs of growing plants covered with loose soil until harvest. Shingle the plants while curing.