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Proper planting depth for grafted plants

There is one thing to consider when planting flowers, shrubs, tomatoes or trees and that is planting depth. This is particularly critical when dealing with grafted plant material.

What is grafting?

Grafting is an ancient technique of vegetative propagation where two plants are joined into one. Grafted plants consist of the bottom part, or rootstock, of one plant and the tender shoot, or scion, of another plant. The main reason for doing this is to combine the best characteristics of the two plants.

Rootstocks affect the overall plant size, anchoring, winter hardiness, precocity, mineral uptake, bloom, fruit size and its quality, such as brix-sugar content. In many cases, rootstocks are highly tolerant or resistant to certain diseases and soil-dwelling insects and can directly affect the overall health of the plants.

Planting depth

To preserve the benefits the rootstock provides, most grafted plants should be planted with the graft union

above ground level. For example, when planting apples on dwarf and semi-dwarf rootstocks, the graft union should be 2 to 4 inches above the soil level (Figure 1). The goal is that after the soil settles, the graft union should be a minimum of 2 inches above the ground.

Positioning the graft union more than 4 inches above the ground will provide an additional dwarfing effect. It also can lead to burr knot development and potential feeding sites for dogwood borer larvae, as well as fire blight infection sites.

If the graft union is buried too deep (Figure 2) it could develop adventitious roots above the graft on the “scion-rooting,” thus losing the benefits of the rootstock. The tree will only become as vigorous as the genetics of the scion allows.

When planting, remember that disturbed soil will settle, pulling the tree or any other plant down about an inch or more, which creates the potential for scion rooting. The exception to this rule is stone fruits (plums, cherries, peaches, etc.) that can be planted an inch or two below the ground.



Figure 1. Graft union properly positioned at 3 to 4 inches about the ground to accommodate for ground settling. (Photo credit: M. Danilovich)



Figure 2. Planted too deep with the graft union 2 to 3 inches below the ground level will lead to scion rooting. (Photo credit: M. Danilovich)

Canada goose management in the eastern U.S.

The Canada goose (*Branta canadensis*) is the most common goose found in the eastern United States. The large-bodied goose weighs 6 to 19 pounds, stands 30 to 43 inches tall with a wingspan of 4 to 5 feet. Its back is brown with a tan to white underbelly. Most characteristic is its black neck and head with a white cheek and chin strap (Figure 3).

These geese can be found in a variety of near-water habitats ranging from wild lands to urban parks, golf courses, airports and residential areas. They are considered herbivores and typically feed on herbaceous plants, but they also feed on berries, seeds and agricultural grains.

Nesting

Canada geese nest in late spring and early summer laying two to eight eggs in a ground nest made of plant material and lined with down and flight feathers. The female will build the nest and incubate the eggs while the male (gander) guards the female and nest. Incubation is around 25 to 28 days, and goslings leave the nest when they are one to two days old.

Migration

Historically, Canada geese would migrate, spending summers in northern North America and overwintering in the southern United States and Mexico. Population numbers experienced a significant decline during the beginning of the 20th century; however, through regulatory protections and reintroductions, the populations have recovered to the point of becoming so numerous that they are considered a nuisance in some locations.

Because Canada geese are adaptable to many habitats, they are taking advantage of milder weather conditions and are changing their migratory habits. While some geese are migrating shorter distances, a large portion of the population has become permanent residents, spending the entire year in parks, golf courses and urban developments across West Virginia and the eastern United States.

Damage

The increase in population and year-round residency have resulted in some wildlife damage issues and human-wildlife conflicts. Canada geese that feed

on turf in lawns and on golf courses can cause significant damage in urban settings. They also can consume and damage agricultural crops and gardens.

If you have walked around an urban park or golf course with Canada geese, you also may have noticed the amount of goose feces left behind. Not only is

this unsightly, but it can create health risks by introducing or spreading human pathogens, such as *E. coli*, salmonella and other diseases and parasites that could impact pet and/or human health.

Management

In areas where Canada geese are becoming a problem, the first step would be to ban feeding, which entices geese to stay in an area. The geese prefer to nest, feed and loaf near water, so consider installing fencing that restricts access to nearby water.

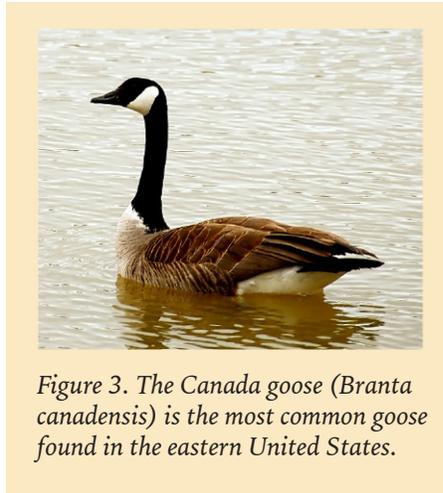
To further minimize access to

water, install netting or wires over water sources.

When geese first arrive at a site or when they are roosting, frightening devices, such as pyrotechnics and flagging, can be used to deter them. Harassing geese with drones, motorized hobby boats or dogs (such as border collies) also can discourage geese from using an area. During the early summer, Canada geese will molt their flight feathers and for about two weeks are incapable of flying. Because geese cannot fly during this period, harassment techniques are less effective.

There also is a regulated hunting season for Canada geese to help reduce populations. Some areas have an early season to focus harvest on resident birds. The Canada goose is managed by the United States Fish and Wildlife Service under the Migratory Bird Treaty Act, which authorizes the use of permits for specific damage management activities, such as nest/egg removal and lethal removal outside of the regulated hunting season. Landowners experiencing problems with Canada geese are encouraged to first contact the United States Department of Agriculture Wildlife Services for technical assistance or operational control (304-636-1785).

For more information, contact WVU Extension Wildlife Specialist Sheldon Owen (304-293-2990; Sheldon.Owen@mail.wvu.edu).



Rain, soils and gardens

Throughout the summer, gardeners will be faced with above normal precipitation, which is not good for plants or the soil. To thrive, plants need their roots in a well-drained layer of soil 1 to 2 feet deep. For shrubs and trees with deeper root systems that layer should be even deeper than 2 feet.



Figure 4. Leaf cupping due to poor drainage. (Photo credit: M. Danilovich)

Generally, West Virginia soil is quite shallow and contains a lot of clay, which creates poor drainage. Because water cannot penetrate the compacted, dense clay subsoil, it starts to back up and saturates all of the air-filled pores, which creates an anaerobic condition that favors certain root-damaging organisms.

The plants will indicate distress by rolling the leaves upward (cupping), followed by leaf yellowing and dropping (Figure 4). In addition, if the roots are under water for a prolonged period, the plant will die due to oxygen starvation, or asphyxiation (Figure 5).



Figure 5. Dead tree due to asphyxiation. (Photo credit: M. Danilovich)

Improving drainage

Proper soil drainage is critical in preventing many root disorders. Certain root-rotting fungi thrive in waterlogged conditions prevalent in spring and early summer. To improve surface drainage, flowerbeds and gardens should be graded at a slight 2 to 3% pitch. If internal drainage (drainage through the soil profile) is a problem, consider installing drainage tiles, installing a dry well or planting on a ridge at the spot noted for its poor drainage.

Drainage tiles

To install a drainage tile, dig a trench about 1 foot wide and about 2 feet deep. Pour gravel or river stone into the trench about 4 to 6 inches deep. Place a perforated 4-inch PVC pipe covered with a fabric sleeve on top of the gravel. Cover the drainage pipe with gravel up to the top of the trench. Water will go through the gravel layer, into the pipe and out of the pipe to the collection channel located at the lower end of the property.

Dry well

To build a dry well, dig a large hole not far from the tree and fill it with stone, bricks and concrete. Water will accumulate in the well and then slowly be absorbed by the surrounding soil.

Ridge planting

Planting on a ridge system is suitable for gardens and can be used in commercial orchards as well. Mound the soil, creating a ridge that is about 1 foot to 2 feet high and 2 to 3 feet wide. Plant shrubs or trees on the top of that ridge (Figure 6). This will provide a good layer of well-drained soil to keep a majority of the roots above water level, preventing problems associated with a high water table. Keep in mind that the ridged soil dries out faster, so the plants would benefit from irrigation and mulching.

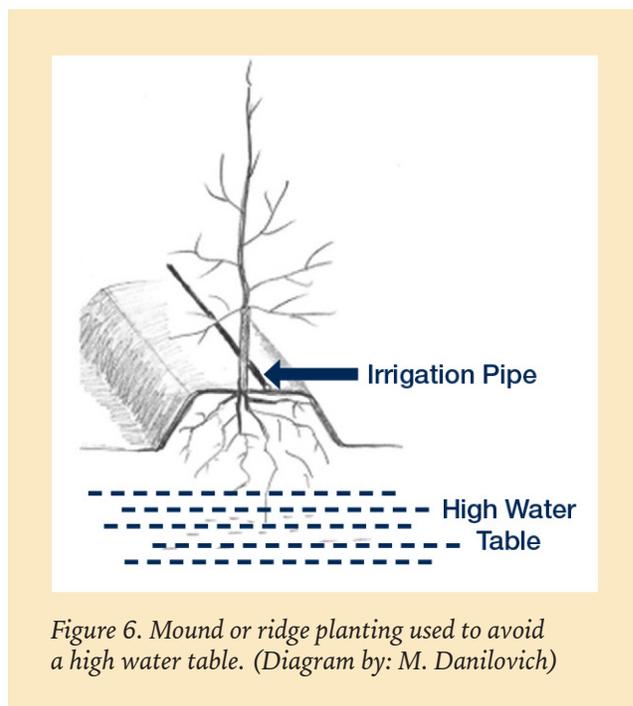


Figure 6. Mound or ridge planting used to avoid a high water table. (Diagram by: M. Danilovich)

Bees and wasps: summer safety

Bees and wasps are vitally important as pollinators of flowering plants and/or natural enemies of many pest insects. Despite their importance, many people often fear bees and wasps because of their potential to sting. A better understanding of these insects and some simple safety precautions can greatly reduce the risk of an adverse encounter.

Stingers

The stinger of a bee or wasp is used for one of two main purposes: defense or predation. Honeybees, bumblebees, yellow jackets, hornets and paper wasps use their stingers strictly for defense.

The hives of these insects contain many female workers that possess an egg-laying organ (ovipositor) modified into a stinger. In queens (and other insects), the ovipositor is used for laying eggs. Ovipositors are unique to female insects; therefore, male bees and wasps do not have a stinger and pose no threat.

Honeybees, unlike other bees and wasps, can sting only once because their barbed stinger becomes detached after insertion. Bumblebees, yellow jackets, hornets and paper wasps have a smooth stinger, which allows for repeated stings. The pain and irritation from a sting is caused by venom injected through the stinger via special glands. Because a honeybee stinger continually releases venom after the stinger is detached, immediate removal is recommended.

Nests

Bees and wasps nest in a wide variety of locations, such as rodent burrows, lodged grass, pipes, behind shutters, crack and crevices within trees and rocks, and hanging branches (Figure 7). Be alert when climbing, digging, playing or working outdoors. Be especially alert for groups of flying bees or wasps entering or leaving an opening.

To prevent bees and wasps from nesting in buildings or other structures, seal holes and other entry points

and screen ventilation openings. If bees or wasps are found nesting inside a building, it is best to call a pest control professional for removal.

Commercial wasp aerosols are available to treat nests on the exterior of buildings. These should be applied to the nest itself, focusing sprays near the opening. Sprays should be applied at night when insects are in the nest and less active.

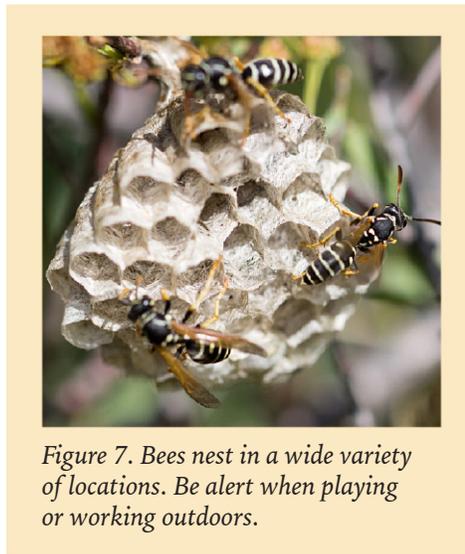


Figure 7. Bees nest in a wide variety of locations. Be alert when playing or working outdoors.

Preventing stings

Follow these simple steps to prevent stings:

- Never strike or swing at a bee or wasp. Swatting and waving your arms can aggravate bees and wasps more.
- Never trap a bee or wasp against your body. This can cause the insect to sting.
- Avoid wearing sandals or walking barefoot in the grass when bees are actively foraging.
- Do not disturb a nest. If you disturb a nest and are being attacked, run away as quickly as possible in a straight line (do not zig-zag) and get to

shelter. If there is no shelter nearby, keep running until you leave the swarm behind.

- When picnicking outside, examine food and drinks for bees or wasps before consuming – particularly, sweet drinks and foods.
- Use garbage cans with tight-fitting lids and keep them closed.
- Be observant when using any loud equipment near a hive, especially a lawnmower.
- If a bee or wasp gets in the vehicle while you are driving, stay calm, pull over, come to a stop and open the doors to let the insect out.

Sting treatment

If you get stung by a bee or wasp, follow these steps:

- If stung by a honeybee, remove the stinger immediately. Muscles attached to the stinger allow it to continue pumping venom, even though it is no longer attached to the bee.

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Black rot: an endemic disease of grapes

Black rot, caused by the fungal pathogen *Guignardia bidwellii*, is a serious disease of both table- and wine-producing grape varieties in West Virginia and the mid-Atlantic states. The disease causes the most damage during warm, wet seasons by infecting all green parts of the plant including fruit, leaves, shoots, tendrils, petioles (leaf stems) and pedicels (fruit stems). The most detrimental effect, however, becomes evident on the fruit as they rot, shrivel and mummify. Warm, humid weather in the spring and summer, coupled with unsprayed fruit of susceptible varieties, can cause complete yield loss by harvest time.

Symptoms

Reddish brown, circular to angular spots develop on the leaves' upper surface starting in late spring. As the spots enlarge and merge together, they form irregular, reddish brown blotches (Figure 8). The number of spots or lesions per leaf can vary from two to more than 100 depending on the severity of the disease.

As the spots become older, the centers turn light brown surrounded by irregular dark borders. Black, speck-sized pycnidia



Figure 8. Black rot symptoms on a grapevine leaf. (Photo credit: MM Rahman)

(asexual fruiting bodies) are formed inside the lesions that sometimes can be arranged in a definitive ring just inside the border of the lesion. These pycnidia can be viewed using a hand lens or low-power stereo microscope.

Most infections occur on young, quick-growing leaves under rainy, humid conditions. Severely infected leaves can defoliate early and lay on the ground from one season to another (overwintering).

Shortly after the flower petals fall from the plant, fruit infection can occur as fungal conidia from leaf lesions are rain-splashed onto the developing grapes. Although fruit can be infected at any stage of development, most infections take place when fruit are half to nearly full size.

Initially, a small spot appears at the infection site and develops into a whitish tan circle, often encompassed by a brown border. This happens when the fruit is still green (Figure 9).

The spots rapidly grow and can cover half of the fruit within 48 hours. Within a few days, the fruit becomes hard, mummified and black.

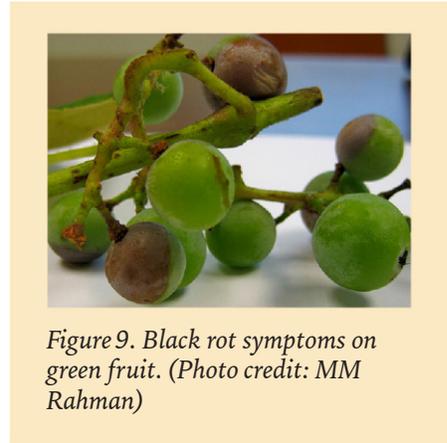


Figure 9. Black rot symptoms on green fruit. (Photo credit: MM Rahman)

The surface of the withered fruit can soon be covered with small, black, pimple-like pycnidia that are arranged in circular shapes.

Life cycle

Black rot fungus overwinters in leaves, canes and tendrils on the grapevine and ground. Mummified fruit on the vine and ground become a major source of infection the following spring. During times of rain, ascospores (sexual spores) shoot out of perithecia (black sexual fruiting bodies) and are carried through the air to young, growing leaves. In the presence of moisture, these spores germinate within 36 to 48 hours and eventually infect leaves that show symptoms after one to four weeks.

When the weather is constantly wet, spores can be released throughout spring and summer spreading and causing secondary infections. New black rot infections continue into late spring and summer during long periods of warm weather coupled with two to three days of rain, drizzle or fog.

In August, the pycnidia (fruiting bodies) transform into pycnosclerotia (the overwintering stage) that gives rise to perithecia from which the springtime ascospores are produced, completing the disease cycle.

Management

Black rot management requires a combination of cultural practices and protective fungicide sprays.

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Yellow nutsedge – a weed in lawns, gardens and crops

Yellow nutsedge (*Cyperus esculentus*) is a perennial weed that can easily invade a lawn, ornamental and vegetable gardens, landscapes and row crops. It can bring about considerable yield reductions in crops and can reduce the aesthetic appeal of lawns and gardens. For these reasons, it is consistently ranked as one of the worst 25 weeds globally.

Identification

Yellow nutsedge belongs to the family Cyperaceae, also referred to as the Sedge family. Although members of this family are monocots (under which grasses fall),

they are different from grasses because they possess stems with a triangular cross-section, as opposed to the circular cross-section of grasses (Figure 10). It is easy to distinguish yellow

nutsedge from grasses by remembering the phrase, “sedges have edges.” The leaves have grooves and ridges, and a shiny surface with a slight yellow hue, and the leaves taper to a sharp point.

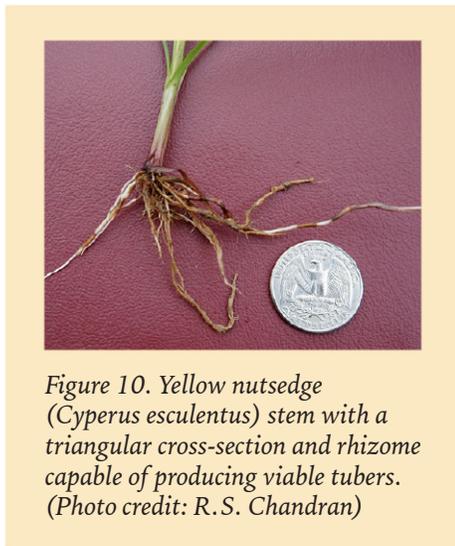


Figure 10. Yellow nutsedge (*Cyperus esculentus*) stem with a triangular cross-section and rhizome capable of producing viable tubers. (Photo credit: R.S. Chandran)

Life Cycle

The weed typically emerges in early May. It actively grows during the hot summer months and starts to produce tubers in July. The blooms are characterized by inconspicuous dull yellow clustered spikelets. The rhizomes of yellow nutsedge produce tubers at their distal ends; more than 1,000 tubers can be produced by a single plant during a growing season. The tubers can overwinter and remain viable in the soil for more than 10 years, often found in the top 6 inches of soil.

Yellow nutsedge’s ability to reproduce through rhizomes, tubers and viable seeds enables it to spread rapidly and outcompete desirable plants growing in

its vicinity. In lawns, the differences in its leaf color and texture make it conspicuous, especially when growing in scattered clumps (Figure 11). The shoots of yellow nutsedge often grow faster than most turfgrasses after being mowed, which causes them to become even more conspicuous.

Control

Yellow nutsedge can thrive in a variety of soil conditions ranging from damp or wet soils to those that are well-drained. In a lawn, rectifying drainage problems can provide better growing conditions for the turf to outcompete yellow nutsedge and other moisture-loving weeds.

Control methods are more effective during the early stages of infestation compared to when the weed is well-established. In lawns, an herbicide containing the active ingredient halosulfuron (sold as Sedgehammer) is considered to be effective. It must be applied during the weed’s active growing period, and a sequential application may be needed two months after the initial application to control well-established stands. The herbicide sulfentrazone is also considered to be somewhat effective to control yellow nutsedge in lawns. It is sold as Dismiss and Q4, which contains three other active ingredients to control a broader spectrum of weeds. Halosulfuron is found in Sandea, which is labelled for use on certain vegetables, and in Permit, which is for use on certain row crops.

Other herbicides, such as metolachlor (Dual Magnum) and mesotrione (Callisto and Tenacity), are considered

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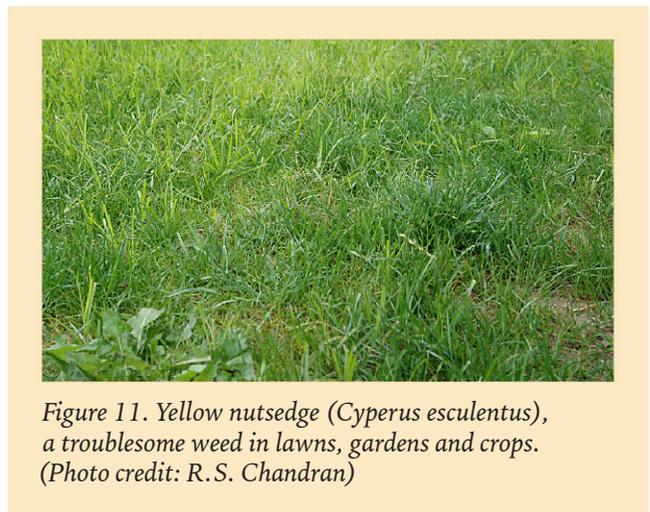


Figure 11. Yellow nutsedge (*Cyperus esculentus*), a troublesome weed in lawns, gardens and crops. (Photo credit: R.S. Chandran)

Save the pollinators – a call to action!

For more than 30 years, there's been a variety of environmental causes, but the newest call to action is to save the pollinators.

Why save the pollinators?

Pollinators are essential to the environment. If it weren't for pollinators, nearly 70% of the flowering plants, including two-thirds of the crops for food, would not be able to reproduce. In the United States, the economic value of more than 100 crops that benefit from pollinators is estimated at \$3 billion per year. They also affect medicines, and dyes and fibers used in fabrics. Unfortunately, now the essential service pollinators provide is at risk due to habitat loss, pesticide use and newly introduced diseases.



Figure 12. A bumblebee, which is one of the most important pollinators, on a cosmos flower.



Figure 13. Bumblebee on a sunflower.

Who are the pollinators?

Bees are the most important group of pollinators; however, there are many other types of bees beyond the most commonly known honeybee and bumblebee (Figures 12 and 13). Other bees include sweat bees, mason bees and leaf-cutter bees – just to name a few. In addition to bees, butterflies, moths, flies, beetles and wasps are also important pollinators. There are more than 700 species of butterflies and 1,300 species of moth involved in pollination.

Pollinator habitat needs

The diversity and abundance of native bees on a farm, and subsequently their ability to serve as crop pollinators, are strongly influenced by two factors: suitable habitat in the surrounding area and pesticide use on the farm. The basic habitat needs of native pollinators in any location are the same: nesting or egg-laying sites, flowers on which to forage, secure overwintering sites and a refuge from pesticides. The Xerces Society for Invertebrate Conservation, which is an international nonprofit organization that conserves invertebrates and their habitats, promotes the “Bring Back the Pollinators” campaign based on four simple principles:

1. *Plant flowers:* Provide nectar and pollen for pollinators. It is important to grow the correct flowers, shrubs and trees to support the pollinators with overlapping bloom times from spring through fall.
2. *Provide homes:* Not only do pollinators need food, but they also need a place to lay eggs and a place for larvae to grow. There are a number of pollinator

habitat options, such as installing bee-nesting blocks or leaving a base patch of ground or brush piles for native bees to occupy. Plant suitable host plants for caterpillars by growing host plants for butterflies.

3. *Reduce pesticides:* Pesticides are harmful to pollinators. This is especially true for insecticides (even some approved for organic use), but herbicides also reduce food sources for pollinators by removing flowers from the landscape.
4. *Communicate with others:* Post a pollinator habitat sign to let your neighbors know about the importance of pollinators and their habitat. Sign the pollinator protection pledge at <https://xerces.org/pollinatorprotectionpledge/>.

With these core values, pollinator conservation can be adapted to any location.

Yellow nutsedge

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to be partially effective to control this weed. Spot treatment with a non-selective herbicide, such as glyphosate (Roundup) or paraquat (Gramoxone - restricted use pesticide), are other chemical options to consider.

Physical methods, such as mulching and cultivation, are not considered to be effective to control yellow nutsedge. The newly emerging, sharp shoot tips can poke through mulches, and cultivation tends to aggravate the weed problem by spreading the vegetative propagules.

Bees and wasps: summer safety

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Try not to pull the stinger out with your fingers or tweezers because this will squeeze out more venom. Instead, scrape the stinger out with your fingernail or other straight-edged object.

- Wash the sting site with soap and water, and apply a hydrocortisone cream to relieve redness, itching and swelling. For mild allergic reactions, take an antihistamine to further

reduce itching and swelling. For moderate to severe allergic reactions, seek medical attention.

- Apply an ice pack to the site for mild pain relief. Take acetaminophen or ibuprofen if additional pain relief is needed.
- If stung in the mouth or throat, or if stung multiple times (more than 10 to 20), seek medical attention.

Black rot: an endemic disease of grapes

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The fruit becomes resistant to infections over time, however, that time frame differs depending on the variety; therefore, protective spray early in the fruit development plays an important role in disease management. Concord is one of the first to become resistant at about four to five weeks after bloom, while *V. vinifera* varieties take about five to six weeks to obtain resistance.

Follow the recommendations below for successful disease management:

- There are no grape varieties that are highly resistant against black rot, although varieties differ significantly in their resistance reactions.
Select a moderately resistant variety, such as Cayuga White, Chancellor, Chelois, Vidal 256 or Vignoles. Commonly used varieties, such as Concord, Cabernet Sauvignon, Pinot Noir and Sauvignon Blanc, are highly susceptible to the disease and will need additional management measures, including fungicide spray.
- During planting, leave sufficient space between vines. Choose a planting area where vines will be exposed to sun and adequate air circulation. Ensure that the vines are kept off the ground and are properly tied. This will limit the amount of time the vines remain wet.

- Ensure that the planting area is free of weeds and tall grass. This will help lower relative humidity and promote faster drying of the vines.
- Fallen leaves, vines and mummified berries are major sources of inoculum for the next season. Prune vines in the early winter when the plant is dormant to remove mummified berries and infected spur/vine. Keep only a few of the healthiest, strongest vines from the previous growing season to produce the next season's crop.

Remove pruned matter from the growing area and destroy it. If it is not possible to remove all the mummified berries, cultivate the growing area before the buds break to bury them. Diseased fruit under the soil are unable to produce spores that will reach growing vines.

- Apply fungicides in a timely manner (usually from bloom through two weeks after bloom). Despite the best sanitation efforts, some inoculum can still be left in the area.
Ziram, Abound, Mancozeb, Rally, Pristine and Sovran are a few effective fungicides used to control black rot.

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