

## Master Gardener Volunteer Program

### Level 1 Training

#### Plant Presentation-Final Exam

1. Common Name:
  - a. Asparagus
2. Scientific name:
  - a. *Asparagus officinalis*, genus of the family Asparagaceae
3. Cold hardiness zone:
  - a. Zone 3 (- 40 degrees in cold Wisconsin winter)
4. Heat hardiness zone:
  - a. Zone 9 (+115 degrees in smothering California summer)
5. Life cycle of plant in this region:
  - a. Asparagus is a cool-season, perennial bulb and stem vegetable that sprouts in the spring. It may take two to three years to produce and can then be productive up to 20 years. Asparagus is dioecious (female and male plants), but only the female plants produce berries. Most of the newer hybrids are all male plants, producing no seeds.
6. Habit of plant:
  - a. Asparagus is an herbaceous plant. Preferred site selection is full sun. Deep well-drained, sandy soils are essential to good asparagus production. The soil should have at least 2% organic matter and high levels of phosphorus and potassium before planting. Soil pH should be 6.5 to 7.5 for best production.
7. Describe the leaf arrangement:
  - a. The leaves are needle-like cladodes (modified stems) in the axils of scale leaves; 6-32 mm long; 1 mm broad; and clustered four to 15 together in a rose-like shape.
8. What are the cultural/environmental requirements of this plant? Also, discuss pruning, etc. needs of this plant.
  - a. Asparagus prefers well-drained soil with a neutral pH between 6.5 and 7.5. The edible part of the asparagus plant is the young stem shoot, which emerges in the spring as the soil temperature rises above 50 degrees Fahrenheit. The spears are not harvested the first year, rather they are cut down in late fall and covered with compost. During the second year, the bed is thickly mulched in the spring and cut down in late fall. Asparagus can take three growing seasons to harvest, though you may be able to lightly harvest during the second year. Harvest period lasts two to three weeks once the spears reach six to eight inches long. After harvest allow the ferns to grow as this replenishes the nutrients for next year's production.
9. List three insect pests of this plant. Describe signs and symptoms of each and how would you manage utilizing an IPM approach?

There are a number of insect pests to watch for asparagus Miner, common and spotted asparagus beetles, asparagus aphid, the Japanese beetle, tarnished plant bug, dark-sided and white cutworms, rose chafer and yellow-striped armyworm. We will be examining the beetles, aphid and cutworms.

  - a. **Common Asparagus beetle** (black and white markings on a red thorax) is the most common insect that attaches to asparagus. Adult beetles over-winter under debris along field edges

- and begin to move to asparagus as the plants first emerge in the spring. They feed on the spears and lay rows of black eggs on the tips. Eggs hatch in approximately one week and the larvae then move to the foliage on which they feed. The larval stage lasts two to three weeks, after which the larvae drop to the ground, burrow into the soil and pupate (cocoon stage). Two or three generations are produced during the growing season. The **twelve-spotted asparagus beetle** (orange with black spots) may also be present. Its life cycle is similar to that of the common asparagus beetle, differing primarily in that the larvae feed on the developing berries.
- i. The spotted asparagus beetles cause relatively minor damage to the spears or fern. When the common asparagus beetles are present at harvest, they cause extensive damage. Early season feeding by adult beetles causes a distorted 'shepherd's crook' growth of the spear. The presence of eggs also renders the spears unacceptable for eating. On nursery seedlings, defoliation of the plants by asparagus beetle larvae should be monitored carefully.
  - ii. **Cultural controls** for both species of beetles include following good cultural practices that promote healthy plants and thorough harvesting of spears to reduce the number of beetles that hatch in the spring. Look for the presence of adults and larvae in the afternoon as this is the time of greatest activity. **Chemical control** of adult beetles may have to be repeated, since the beetles emerge from overwintering sites over an extended period. Insects should be sprayed if a field has five to 10 adults/100 crowns or 2% of the spears have eggs. After harvest, limited feeding by larvae on established plantings may be tolerated; treatment threshold for adults increases to 5-10 adults/10 crowns.
- b. The **asparagus aphid** (*Brachycorynella asparagi*) is one of the most devastating insect pests to attack asparagus. The aphid lays its eggs in late summer or early fall. The eggs overwinter on the fern and fall to the ground by spring. Unharvested asparagus which ferns out in the early spring are highly susceptible to early aphid infestations. It is a minute, blue-green sucking insect that feeds on the fern, not the spears. In the process of feeding, it injects a toxin into the asparagus plant that is then translocated down the stem into the dormant buds.
- i. The toxin causes the buds to elongate into new shoots prematurely producing a 'witches broom' or 'dwarfed' plant with silver, blue-green color. Under severe insect pressure, all the buds on the crown may 'break' causing the plant to have none left over the following seasons, essentially terminating the plants life. The younger plants are most susceptible to damage of root growth.
  - ii. **Cultural controls** include removing the asparagus fern in late fall after it has died down greatly reducing the potential aphid infestations the next year. Introducing adults and larvae of several lady beetle's species, a parasitic wasp (specific to aphids) and fungi (triggered by warm, humid conditions) may all help to reduce aphid infestations. If not effective, **chemical controls** include applying an insecticide such as Malathion (Cythion 5E) when 5% of ferns show asparagus aphid damage. Sevin is not recommended for aphid control.
- c. **Dark-sided and White Cutworms** can cut off asparagus spears below ground and even cause damage by feeding on the tips of spears above ground. White cutworm larvae appear early

as they overwinter as caterpillars. Dark-sided cutworms overwinter as eggs. The dark-sided cutworm reaches 1.5 inches and has a characteristic pale-brown and dark brown striped pattern whereas white cutworms have a translucent, milky white appearance.

- i. White cutworms damage plants from the start of the growing season through early-June. They climb the spears to damage the tips. The dark-sided cutworms need to hatch before causing damage from May through end of harvest. They feed on the base of the plant causing distorted spear growth.
  - ii. **Cultural management** includes scouting for cutworms by targeting areas where there are bare spots. Shoots damaged by cutworm feeding will also develop into crooked spears and must be picked and culled. Dig the top two inches of soil from around the base of the damaged plants and look for caterpillars. **Chemical control** is warranted if one or more worms/10 crowns are found. Pyrethroid insecticides, particularly under cool, spring conditions will usually provide good cutworm control.
10. List three disease pests of this plant. Describe signs and symptoms of each and how would you manage utilizing an IPM approach?
  - a. A common, **soil-borne fungus**, *Fusarium proliferatum* is the cause of asparagus crown, root and lower stem rot. The fungus is found in soil where asparagus is grown. Infection is more likely when plants are stressed by drought. The fungus enters the roots and spreads throughout the plant.
    - i. Symptoms of asparagus crown rot include wilting of mature plants during hot summer weather, stunting, yellowing of the fern, seedling blight and death. Infected areas of the crown turn brownish in color as cells that transport water and nutrients become clogged due to the infection. Cutting open affected plants reveals a dark, reddish-brown colored decay of lower stems, crowns and roots. Positive diagnosis is based on laboratory detection of the fungus.
    - ii. Primary **cultural management** includes selecting healthy, fusarium-tolerant varieties of plants obtained from a reputable source, as well as controlling pests. Avoid rotations to corn and planting on previous asparagus fields for a minimum of four years. Irrigate fields during times of drought. **Chemical control** includes fumigating the fields the fall before planting with an appropriate fumigant.
  - b. **Purple spot**, caused by *stemphylium vesicarium* appears as elliptical, sunken and purplish lesions. Environmental conditions are favorable for purple spot development during extended dew and rainy periods coupled with high humidity and warm temperatures. The disease produces brown to tan lesions with dark purple margins on the ferns.
    - i. In spring, spores are produced from last year's infected plants and spread by wind and water to newly developing plants. Infection occurs through natural openings and wounds on current season asparagus tissue with favorable temperatures and moisture from rainfall or irrigation. Volunteer asparagus seedlings can become infected during the harvest season and may serve as a reservoir to carry the disease from the harvest period when the spears are removed to when the ferns are allowed to grow.
    - ii. **Cultural management** includes good sanitation, as it is a key to good disease management. Incorporating asparagus debris from the previous season into the soil in the fall results in less disease severity than when debris is left on the soil surface. If

needed, **chemical management** includes applying fungicides specifically recommended for purple spot.

- c. **Asparagus Rust**, caused by *Puccinia asparagi* occurs in varying amounts wherever the plant is grown and attacks asparagus ferns during and after the cutting season.
    - i. Symptoms are first noticeable on the growing shoots in early summer as light green, oval lesions, followed by tan blister spots and black, protruding blisters later in the season. The lesions can show symptoms during early spring, mid-summer and later summer to fall, as there are four different spore types. Severe rust infections stunt or kill young asparagus shoots, causing foliage to fall prematurely and reducing the ability of the plant to store food reserves in the crown. Orange spores are the key sign for this disease. Spores overwinter on host plant residue, germinate in early spring and produce new infections on growing asparagus spears. The light green, oval lesions are surrounded by a concentric ring pattern. Wind and splashing rain can spread spores to branches and fern needles where they germinate in the presence of water drops. Plants affected by rust are more susceptible to Fusarium crown and root rot.
    - ii. **Cultural management** involves removing volunteer asparagus within 300 meters of established plants and locating new plants away from established fields. Plant well-spaced rows oriented in the direction of prevailing winds to maximize air movement and facilitate drying after rain. Several growers are using the culture practice of increasing the row width from four to five feet to allow more air movement around the plants therefore allowing the plant to dry out earlier from rains or heavy dews. If **chemical control** is required, timely fungicide applications will provide reasonably good control of rust. During periods of high humidity and extended rainfall, applications should be made every seven to ten days.
11. List one abiotic (non-living) problem of this plant? Describe the signs and symptoms and how would you manage utilizing an IPM approach?
- Frost. Spears appear slightly darker green, water-soaked and break off easily. New spears may take several more days to emerge. Spears appear slightly darker green, water-soaked and break off easily. New spears may take several more days to emerge. If frost is imminent, all spears should be harvested beforehand
12. Describe the best method for propagating this plant:
- a. Direct-seeded and transplants are popular practices for establishing new fields of asparagus. However, given the slow germination and emergence rates weed control presents many issues. As a result, most new asparagus fields are established by planting one-year-old nursery grown asparagus crowns into deep furrows. Since the first new shoots may take many weeks to emerge and grow to a size that can be cultivated, weeds in the furrow may become large and not controlled by cultivation. Therefore, an easily applied pre-emergence herbicide of long, dependable activity is helpful to reducing the number of mechanical cultivations needed to keep fields weed-free.
13. Can this plant be used as a phenological indicator? If so, for what?
- a. I was unable to identify any ways in which asparagus can be used as a phenological indicator.
14. List up to five noteworthy cultivars, varieties or hybrids. Note any special attributes or characteristics, if applicable (i.e. Disease resistance, insect resistance, color, dwarfing, etc.).

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- a. There are both open pollinated hybrids and predominately-male hybrids. Male plants provide a greater yield than females. Many of the following cultivars will have resistance to leaf spot, crown rot Fusarium wilt and rust.
  - i. Jersey Knight is probably the best for the home gardener and has the best spear quality.
  - ii. Jersey Giant is a popular home garden variety. It is more tolerant of the cold Wisconsin climate than Jersey Knight.
  - iii. Jersey Supreme is a relatively new variety that is also well suited to colder climates and will produce spears earlier in the season.
  - iv. Purple Passion is a perfect choice if looking for a unique plant. A 2004 variety, it produces a purple spear and has high sugar content.
  - v. Viking KB-3 is a newer, open pollinated variety.