

Disease and insect pests of asparagus

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Introduction

The goal of this bulletin is to provide basic information needed to identify, understand and control insect and disease pests of asparagus. Because each pest is different, control strategies are most effective when they are tailored to the species present in your production fields. For this reason, this bulletin includes sections on pest identification that show key characteristics and pictures to help you determine which pests are present in your asparagus. It is also necessary to understand pests and diseases in order to appropriately manage them. This bulletin includes sections on the biology of each major insect and disease pest. Finally, it also provides information on cultural and general pest control strategies. For specifics on the pesticides available for chemical control of each pest, consult MSU Extension bulletin E312, "Insect, Disease, and Nematode Control for Commercial Vegetables" (Order in the MSU Extension Bookstore section of <http://shop.msu.edu/>).

DISEASES

Purple Spot

Stemphylium vesicarium/*Pleospora herbarum*

Identification

- Sunken, purple, oval-shaped lesions that develop on asparagus spears. Epidemics may affect 60-90% of the spears.
- Tan to brown lesions on the fern, including the needle-like leaves (cladophylls). May expand, coalesce and cause defoliation.



Purple spot lesions close up and viewed on spears.



Biology

- Fungus.
- Sexual stage of the fungus (*Pleospora herbarum*) produces overwintering structures (pseudothecia), appearing as small, black dots on asparagus plant debris from previous season.
- Pseudothecia release ascospores via rain splash and wind, causing the primary infection for the new season.
- Primary infection progresses in the asexual stage of the fungus (*Stemphylium vesicarium*), which produces multiple spores (conidia) cycles throughout the growing season.
- Conidia enter plant tissue through wounds and stomata, which are pores of a plant used for respiration.
- Premature defoliation of the fern limits photosynthetic capability of the plant, decreasing carbohydrate reserves in the crown for the following year's crop. This can reduce spear quality and marketable yield and make the plant more susceptible to *Fusarium* and *Phytophthora*. It also reduces longevity of plantings.

Management

- Scout the fields for symptoms of the disease.
- Use the TOM-CAST disease forecaster to predict when to apply fungicides. Refer to MSU Extension bulletin E312 for fungicides recommended for purple spot.



Field with purple spot.

- Controlling purple spot enhances fern vigor and may aid in managing soilborne pathogens.
- Burn crop debris in late fall or winter – not feasible in large acreage due to human and environmental safety concerns.
- Till to bury crop debris – leads to wind erosion, reduced spear quality and marketability, and damage to crowns and roots.

Rust

Puccinia asparagi

Identification

- Foliar disease.
- Four different lesions caused by four spore types.
 - » Spring: Oval, light-green lesions form.
 - » Early summer: These lesions become sunken and turn orange.
 - » Mid-late summer: New lesions on the foliage are brick-red colored and appear “blistered” above the plant surface.
 - » Early fall: Lesions on the foliage become black.
- Severe infections can defoliate plants.

Biology

- Fungus
- Four different spore types.

- » Spring: Basidiospores are produced from overwintering teliospores on asparagus debris. Basidiospores are spread via wind and/or rain splash, and cause new infections resulting in oval, light-green lesions.
- » Early summer: Lesions become sunken and turn orange when they start producing aeciospores. Aeciospores are spread via wind and/or rain splash, and infect through wounds or stomata in the presence of water.
- » Mid-late summer: New infections on the foliage are brick-red colored with production of uredospores, causing the epidemic phase of the disease. New generations of uredospores are produced every 10 to 14 days, spread via wind and/or rain splash, and infect in the presence of water from rain, dew or overhead irrigation.
- » Early fall: Infections on the foliage become black with the production of teliospores, which overwinter on asparagus debris.
- Premature defoliation of the fern, stunting and killing of young plants limits the photosynthetic capability of the plant, decreasing carbohydrate reserves in the crown for the following year’s crop. This can reduce spear quality and marketable yield and make the plant more susceptible to *Fusarium* and *Phytophthora*. Reduces longevity of plantings.



Rust teliospores.



Rust aeciospores.



Rust uredospores.



Rust evident in a field.



Rust on a stem.

Management

- Scout for aeciospores on young asparagus or early volunteer plants in early summer.
- Plant crop rows with ample spacing and in the direction of the prevailing winds to increase air movement and minimize periods of prolonged foliar wetness.
- Plant asparagus cultivars that are moderately disease resistant or tolerant (slow rusting).
- Eliminate asparagus seedlings and volunteers. Destroy abandoned fields.
- Controlling rust enhances fern vigor and may aid in managing soilborne pathogens.
- Apply fungicides. Refer to E312 bulletin for fungicides recommended for rust.
- Burn crop debris in late fall or winter – not feasible in large acreage due to human and environmental safety concerns.
- Till to bury crop debris – leads to wind erosion, reduced spear quality and marketability, and damage to crowns and roots.

Fusarium Crown, Root and Lower Stem Rot

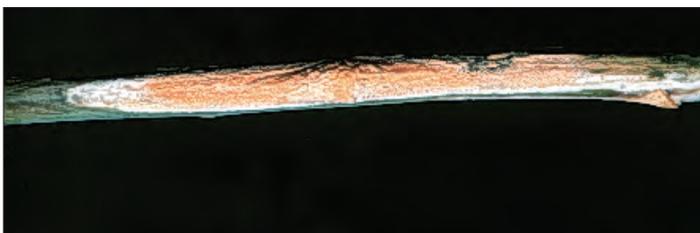
Fusarium oxysporum f. sp. *asparagi*
Fusarium proliferatum

Identification

- Infection more likely when plants are stressed by drought.
- Russet-colored lesions on roots, lower stems and/or crowns.
- Yellowing of fern of infected plants.
- Damping-off of seedlings in crown nurseries.
- Crown death in nursery and commercial fields.
- Can shorten the lifespan of production fields by 50% despite good cultural practices. One of the causes of declining fields.

Biology

- Extremely long-lived, ubiquitous soilborne fungi.
- *F. oxysporum* f. sp. *asparagi* causes a vascular wilt.
 - » Chlamydospores are long-lived spores that can lie dormant for up to 30 years.



Fusarium spores on a stem.

- » Macroconidia are commonly found on the surface of infected plants.
- » Microconidia are produced under all conditions.
- *F. proliferatum* primarily causes root rot.
 - » Abundant microconidia are produced.

Management

- Irrigate fields during times of drought.
- Fumigate fields the fall before planting. Refer to MSU Extension bulletin E312 for fumigants recommended for *Fusarium*.
- Avoid rotations to corn and planting on previous asparagus fields for a minimum of four years.
- Avoid tillage that may damage crown and roots.
- Select vigorous cultivars, avoid overharvesting and control pests (weeds, diseases, insects).



Fusarium growing from an asparagus miner mine.



Crown with Fusarium.



Fusarium after one year.



Seedlings with Fusarium.

Phytophthora Crown, Root and Spear Rot

Phytophthora asparagi

Identification

- Infection more likely when soils are wet.
- Spear rot begins as soft, water-soaked lesions and/or shriveling occurring slightly above or below the soil line. Continued growth of infected spears result in shepherd's crook of spears and fern.
- Infected crowns and roots show water-soaked lesions and/or shriveling, but the tissue remains firm at the lesion site.
- Yellowing of fern of infected plants.
- Crown death in nursery and commercial fields.
- Can shorten the lifespan of production fields by 50% despite good cultural practices. One of the causes of declining fields.



Roots shriveling.



Shepherd's crook with shriveling (above) and watersoaking (below).



Biology

- Fungal-like organism called an oomycete or water mold.
- Extremely long-lived spores (oospores) overwinter and persist in the soil; in the presence of a host, they germinate, grow and infect asparagus roots and crowns.
- Another type of spore (sporangia) form on infected tissues.
- In the presence of water, sporangia release swimming spores (zoospores). Rain splashes zoospores onto the spears, where they encyst and infect the spear.

Management

- Apply fungicides. Refer to MSU Extension Bulletin E312 for fungicides recommended for *Phytophthora*.
- Avoid planting into low-lying or poorly drained fields.



Phytophthora plant death in flooded area.

INSECT PESTS

Note

Explanation of image labels: Images of major insect pests feature eggs "E," nymphs "N," larvae "L," pupae "P," adults "A" and damage "D."

Asparagus Miner

Ophiomyia simplex Loew

Family - Agromyzidae

Identification

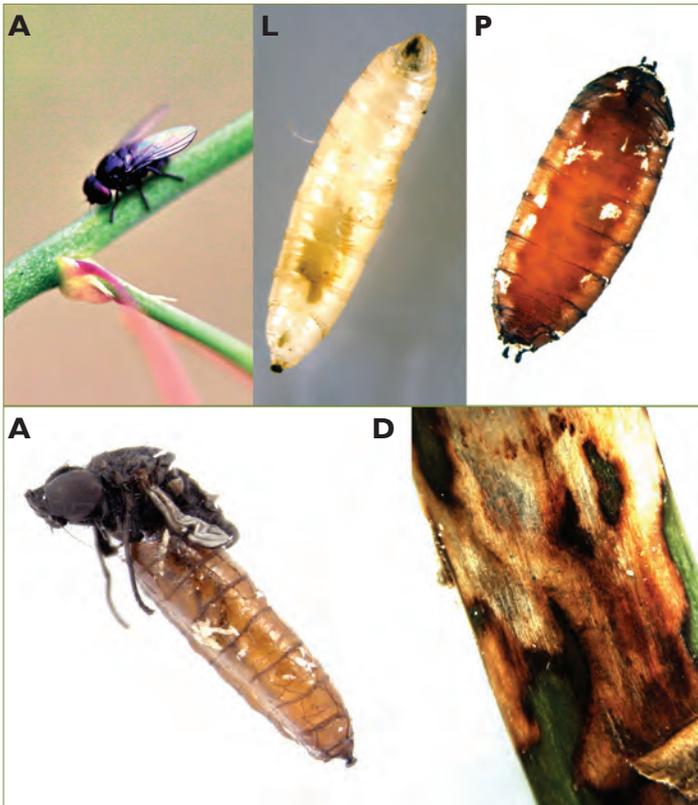
- Small black fly less than 0.2 inches long.
- Characteristic mining damage along stem base: discolored reddish brown tunnel in a serpentine pattern.
- Pupae are brownish red, about 0.2 inches long.
- Maggots are white, eel-like (early instars) or plump (later stages).

Biology

Two generations per year.

- Overwinters as pupae in stems and field debris.
- Larvae are protected within the asparagus stem.
- Putative vector for pathogenic *Fusarium* spp. responsible for Fusarium crown and root rot and early decline of fields.
- Attacks recently planted fields.
- Feeds on nectar from flowers and plant fluids from asparagus beetle damage as an adult.

Asparagus miner



Management

- Use degree-day model on MSU's Enviro-weather website to properly time foliar insecticide sprays for peak adult abundance in the field.
- Remove field debris over the winter to prevent buildup of pest, and destroy debris or transport it far from asparagus production fields.
- Remove volunteer asparagus plants around fields.

Common Asparagus Beetle

Crioceris asparagi (L.)

Family - Chrysomelidae

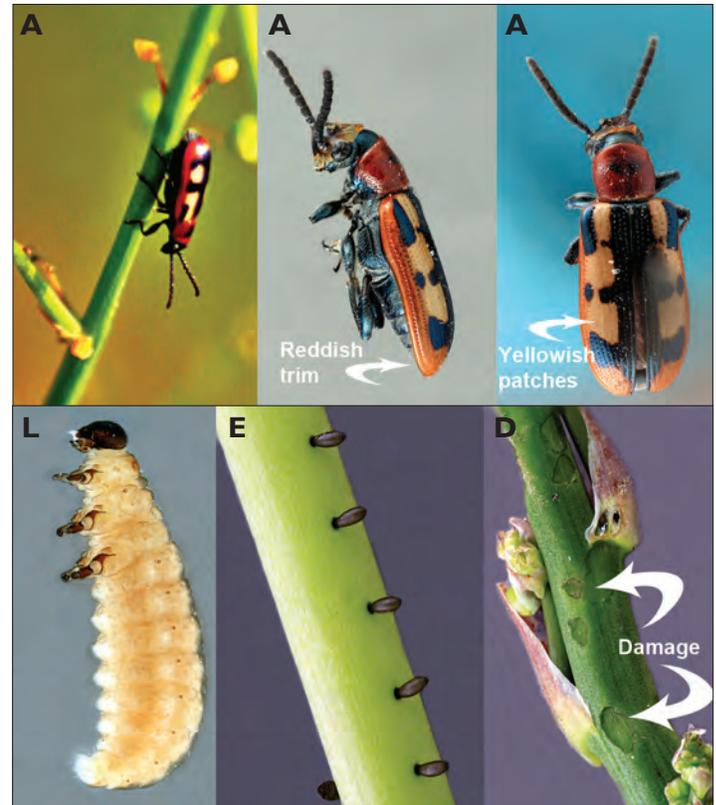
Identification

- Adults are 0.25 inches long with straight antennae.
- Adults have few black spots on a red thorax (middle segment), the abdomen (main body) has a patchy creamy-yellow coloration interspersed with black and a maroon border around the rim.
- Larvae are muck-grayish to off-white with small, black heads and small, stout legs. Eggs are small, oval and grayish black: stuck to fern forming straight rows in groups of three or more and pointing away from the plant.

Biology

- Larvae and eggs are located throughout the fern.
- Larvae and adults feed on the fern by chewing.

Common asparagus beetle



- Damage is composed of broken cladophylls and removal of photosynthetic tissue.

Management

- Use scouting for presence of adults and larvae in the afternoon since this is the time of greatest activity. Sampling at other times of day will result in an underestimation of the actual abundance of the beetle.
- During the harvest season, apply insecticides when 1-2% of the spears have eggs or damage. During the fern stage, apply sprays when 50-75% of the plants are infested with larvae or when 5-10% of the plants are infested with adults.
- The thresholds for fields with repeated outbreaks of asparagus beetles in previous years may be lower since asparagus beetle damage can be cumulative.

Spotted Asparagus Beetle

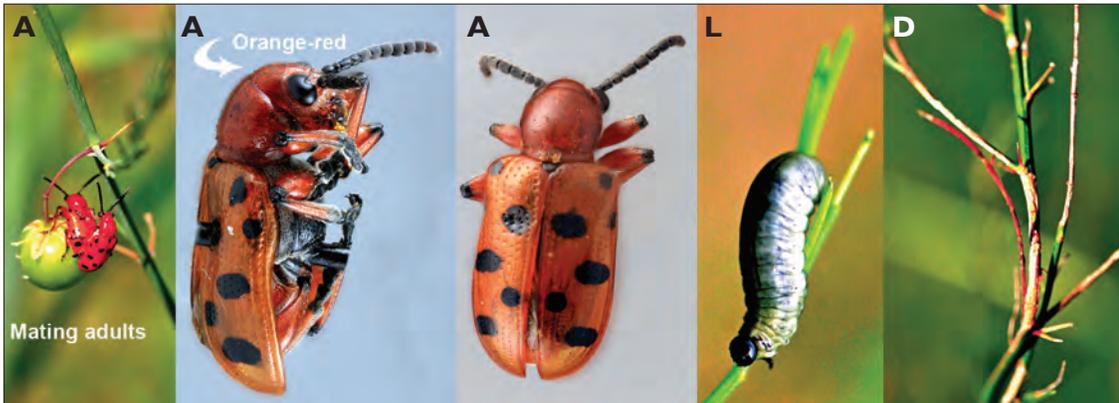
Crioceris duodecimpunctata (L.)

Family - Chrysomelidae

Identification

- Adults are bright orange with six small black spots located on each wing cover.
- Adults are slightly larger than common asparagus beetles.
- Larvae are grayish white.

Spotted asparagus beetle



- Reproduces asexually during the summer.
- Overwinters as eggs laid on fern in September.
- Common in the western United States.

Management

- Remove volunteer asparagus plants.
- Monitor fields one to two times per week

Biology

- Larvae feed within developing asparagus berries, eating their way out.
- Adults feed on young spears and consume buds, causing damage early in the season.

Management

- Same as for common asparagus beetles.
- Spotted asparagus beetles are not damaging as a larva, and are much less of a problem as an adult than common asparagus beetles.

Asparagus Aphid

Brachycorynella asparagi

Family - Aphididae

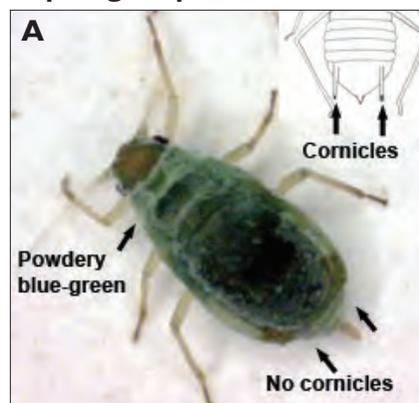
Identification

- Adults and nymphs are bluish gray, milky opaque with a powdery texture. They are some of the smallest aphids at about 0.04-0.0625 inches, lacking visible cornicles, or paired tubes extending from the rear part of the abdomen on the sides.
- Both winged and wingless forms may be present on the plants.

Biology

- Feeding causes distorted growth and branching (broomed appearance). Shoots with aphids also produce flowers after the rest of the field is done flowering. Reduces root growth and can kill seedlings or small plants under heavy infestations.

Asparagus aphid



after harvest by beating the plants over a white surface, then inspect for aphids. Do this on multiple plants and locations across the field.

- An insecticide application may be warranted when 5% of ferns show asparagus aphid damage.

Japanese Beetle

Popillia japonica Newman

Family - Scarabaeidae

Identification

- Adults are usually 1/3 of an inch long with metallic, emerald green head and thorax and bronze wing coloration.
- Grubs are creamy-white, C-shaped and consume roots of grasses.

Biology

- Adults feed on and remove cladophylls, which leads to a skeletonized plant.

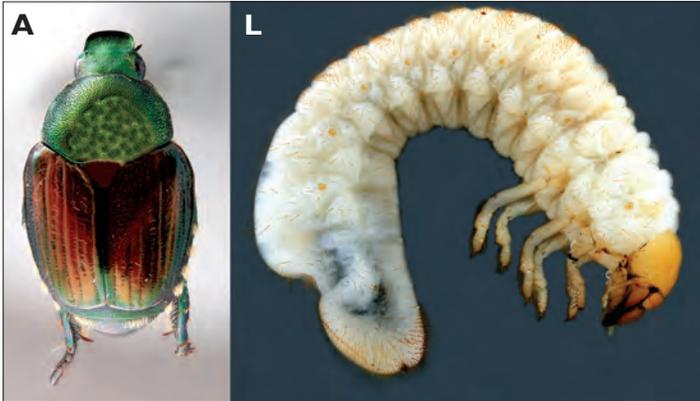
Management

- Pheromone traps are commercially available and help in detecting the beginning of flight.
- Scout by scanning the top of the asparagus fern to

Other aphids



Japanese beetle



check for aggregations of beetles.

- Target adults with a registered insecticide when populations build up.



Dark-sided cutworm



White cutworm



Tarnished Plant Bug

Lygus lineolaris
Family - Miridae

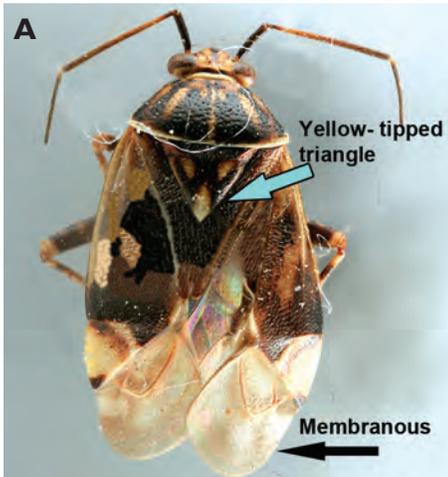
Identification

- Adults are about 1/4 inch long, greenish brown with distinct reddish brown markings on the back and membranous hind-wings.
- Adults have small, yellow-tipped triangle behind the head.
- Nymphs resemble adults but without full wings.

Biology

- Suck plant juices through a beak, causing necrosis

Tarnished plant bug



around feeding sites and tip die-back on developing shoots.

- Feeds on many different crops, including asparagus.

Management

- Prevent weeds from establishing in asparagus fields.
- Low densities tolerable in the fern stage.

Dark-Sided Cutworm (*Euxoa messoria*)

White Cutworm (*Euxoa scandens*)

Family - Noctuidae

Identification

- Mature larvae of the dark-sided cutworm reach 1.5 inches and have a characteristic pale-brown and dark-brown striped pattern along their bodies.
- White cutworms have a somewhat translucent, milky white appearance.

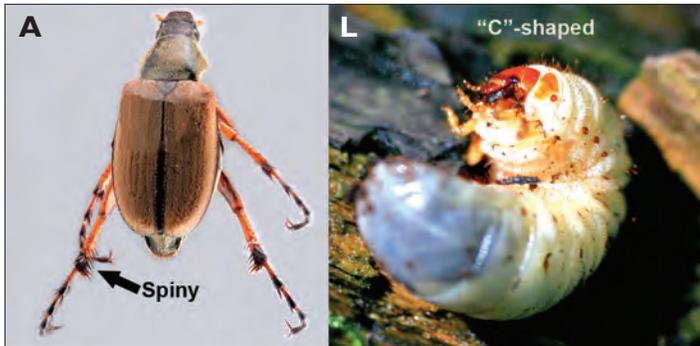
Biology

- White cutworm larvae appear early as they overwinter as caterpillars. They damage plants from the start of the growing season through early-June, climbing spears to damage the tips.
- Dark-sided cutworms overwinter as eggs and need to hatch and develop before causing damage from May through the end of harvest. They feed at the base of plants, causing distorted spear growth as damaged parts grow slower than undamaged areas. Wind-blown sand and *Phytophthora asparagi* can also cause this.

Management

- Scout for cutworms by targeting areas of the field where there are bare spots. Other signs of cutworms may be holes and notches in stems or scattered, arched spears with a "Shepherd's crook."
- Dig the top 2 inches of soil from around the base of

Rose chafer



damaged plants and look for caterpillars. Larvae often curl up when disturbed.

- When there has been nominally 20-35% stand reduction, apply appropriate pesticides. In some cases it might be appropriate to spot-treat if the outbreak is not large.

Rose Chafer

Macrodactylus subspinosus (Fabricius)

Family - Scarabaeidae

Identification

- Adults are tan and 1/3-1/2 inch long with characteristic spiny, reddish legs
- Wings do not fully cover the abdomen on adults.
- Grubs are cream colored, C-shaped and found in the soil.

Biology

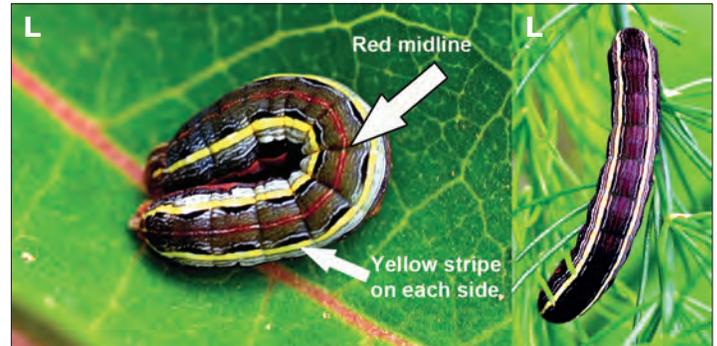
- Damage is localized to asparagus flowers and fern.

Management

- Pheromone traps are commercially available to monitor adults.
- Observations suggest it does not cause serious damage to the fern, but rather only feeds on flowers.
- Usually no need to treat with insecticides.

Photo credits: Diseases - Mary Hausbeck, Fusarium growing from a mine - Julianna Wilson, asparagus aphid - Zsofia Szendrei, other insects - W.R. Morrison, III.

Yellow-striped armyworm



Yellow-Striped Armyworm

Spodoptera ornithogalli (Guenée)

Family - Scarabaeidae

Identification

- Mature larvae are about 1.5 inches long, have a faint red or white stripe on the midline of their backs which is bordered by a noticeable black stripe, yellow stripe and reddish-orange stripe along either side.

Biology

- Damage is from feeding on the asparagus fern, only an occasional pest.

Management

- Use parasitic nematodes for biological control, including *Steinemema carpocapsae* and *S. feltiae*.
- Foliar insecticides may be effective against armyworms if the economic threshold of 0.7 larvae per four plants is reached.
- Armyworms are not usually at damaging levels in asparagus, but may be spotted occasionally.
- Commercially available lures can be purchased to monitor for yellow-striped armyworm.

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