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ASPARAGUS IN CONNECTICUT AND COMMON DISEASES

INTRODUCTION

In Connecticut, May marks asparagus season. Asparagus (Greek for "shoot") is a coveted, highly nutritious vegetable that has medicinal properties (Figure 1). It is reported to act as a strong diuretic, benefits people with heart problems, and some claim it is an aphrodisiac. Alexander the Great has been credited with discovering asparagus during his exploits and introducing it to Greece. Romans rapidly adopted the crop. Asparagus was introduced to the US with early settlers. Although acreage in the US is now concentrated in California, Washington, and Michigan, Connecticut had a sizeable asparagus industry until the 1950's, when a sharp decline in acreage occurred. The loss was attributed to diseases, mostly Fusarium crown and root rot. However, increased demand and new cultivars revived interest in the crop in New England during the 1990's and today, we currently have between 45 and 50 acres of asparagus being grown. One grower in Oneco, CT (Falls Creek Farm) is our largest producer with more than 25 acres.

Although demand is still high in the US, acreage has shown an alarming decline due to imports from Peru. The ability of exporting countries to cheaply produce the crop year-round has made serious inroads into US production.

Figure 1. Asparagus shoots.

Although labor costs still remain the major obstacle to Connecticut's growers, fresh asparagus production can benefit local farm stands by allowing markets to open earlier in the spring. Today, growers interested in asparagus have many options for managing diseases that were not available in the 1950's. Below is an overview of some of

the factors associated with growing asparagus in Connecticut, the major yield-limiting diseases, and their management.

Asparagus is usually established with 1-year-old plants, commonly referred to as crowns, which include buds and fleshy storage roots. All-male hybrids (Jersey hybrids) have repeatedly been shown by the author to be superior to open-pollinated cultivars (Mary Washington). Sandy, well-drained soils are best suited for asparagus production. Growers should check soil pH and ensure that pH is between 6.5 and 7.0. Crowns are buried approximately 10 inches deep in trenches in the spring (Figure 2). The first marketable spears are harvested after 2 years, cut to 18-22 cm in length every 24-48 hr. Harvest periods can last up to 2 months in Connecticut, depending on the age and vigor of the field.

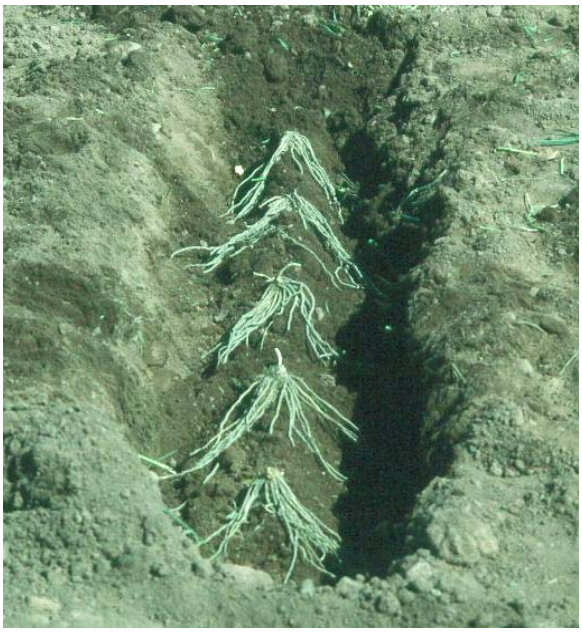

Figure 2. Asparagus crowns being planted in trenches 10 inches deep.

COMMON DISEASES

The major root problems in asparagus include Fusarium crown and root rot and Phytophthora rot. Fusarium crown and root rot was first noted in Massachusetts in 1908 and affects seedlings and mature plants. Symptoms include yellowing of the ferns, occasional wilt, and crown rot (Figures 3 and 4). The Fusarium fungi associated with the disease are *Fusarium oxysporum* and *F. proliferatum*. These pathogens are seedborne and are introduced on transplants and may exist at low levels in soil never planted to asparagus. The disease became economically limiting in the 1950's and caused many Connecticut growers to abandon asparagus as a crop.

Figure 3. Yellowing and wilt of ferns with Fusarium crown and root rot.

Figure 4. Symptoms of discoloration in asparagus crown infected with *Fusarium*.

Management of Fusarium crown and root rot has been difficult since the pathogens are ubiquitous. Any stress factor will increase

the incidence and severity of Fusarium crown and root rot. As a result, management programs that control insects and weeds will reduce damage from this disease.

Limited success has been achieved by broadcasting NaCl onto older, declining fields. The practice of salting asparagus beds was probably used from before 1860 to around the 1940's to control weeds and boost yields, but was discontinued after herbicides were developed in the 1940's. About this time, the number of reports of Fusarium crown and root rot in asparagus began to increase. Research has found that rates between 500-1000 lb/A (approximately 2 lb/100 ft^2) will boost vigor, slow the rate of decline, and may allow growers to recoup some profits for a negligible cost (Figure 5).

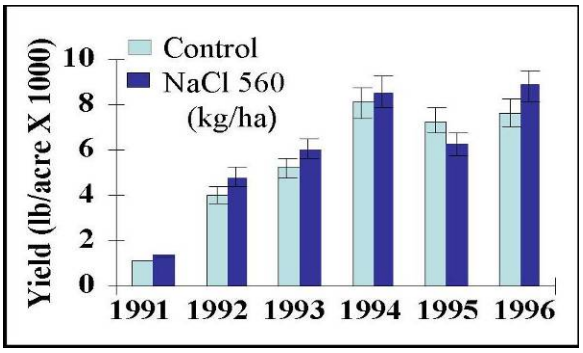

Figure 5. Effect of NaCl on asparagus yield.

We also found that boosting earthworm densities in asparagus soil will favor plant health (Figure 6). This research is ongoing at The Connecticut Agricultural Experiment Station.

Phytophthora spear rot was first described in California in 1938, but has appeared in New England in the last decade. The fungus-like organism associated with the disease is *Phytophthora asparagi*.

Figure 6. Effect of earthworms on growth of asparagus. The plant on the left was grown without earthworms and the plant on the right had earthworms added to the soil.

Symptoms include soft, water-soaked lesions on shoots at, slightly above, or below the soil level causing the spear to flatten and bend (Figures 7 and 8). The internal tissues of infected crowns may be a yellow-brown color.

The damage caused by Phytophthora rot depends on rainfall and soil drainage. In wet years, new plantings may benefit from fungicide applications. Trials to identify resistance to Phytophthora rot have commenced in California, but cultivars are not yet available.

The most damaging foliar disease of asparagus is asparagus rust, caused by a fungus called *Puccinia asparagi*. It was originally described in France in 1805, appeared in New Jersey in 1896, and was quickly observed in Connecticut within a few years.

Figure 7. Curling asparagus spear infected with Phytophthora rot.

Figure 8. Healthy spear (left) and spear with symptoms of Phytophthora rot (right).

Many rust diseases have multiple hosts, but asparagus rust is autoecious, meaning it has only one host and does not require another host to complete its life cycle. Early spring infections of young spears occur with basidiospores that, in turn, produce lesions that give rise to orange spots that produce aeciospores. These give rise to the brownish-red lesions that release urediniospores, which then give rise to teliospores, which overwinter (Figure 9).

Figure 9. Symptoms of asparagus rust. Lesions of the orange fruiting bodies characteristic of the aecial stage (left) and fruiting bodies of the darker telial stage (right).

Management of rust in the US includes an integrated approach of resistant cultivars, sanitation, and fungicides. Breeders have since made great improvements in

incorporating resistance into commercial lines. However, the current resistance is insufficient to control severe outbreaks.

Purple spot is caused by the fungus *Stemphylium vesicarium*, and was first reported in the US in 1981. The disease has since been reported in all major asparagus-growing regions in the US, including Connecticut. It causes two types of symptoms: on spears and on ferns. On spears, symptoms appear as small (0.02-0.10 in), elliptical, slightly sunken, purplish spots, which blemish the spears and lower marketability (Figure 10).

Figure 10. Diagnostic symptoms of purple spot on spears. Spots blemish and reduce the quality of the spears.

On ferns, damage results in defoliation of the fern needles (Figure 11). Spear infections are favored by wet, cool weather and by wounding from wind-driven sand. During a harvest period in Connecticut, spears were free of purple spot until two days of wet and cold weather occurred, and then incidence increased to 100%. When weather conditions improved, new spears remained disease-free. Current management of purple spot has focused on sanitation and fungicides. Removing the previous year's fern growth can reduce severity of purple spot on spears during harvest. Chlorothalonil was effective when applied to the ferns during cool, wet periods.

Figure 11. Symptoms of purple spot on ferns.

Asparagus is susceptible to viruses. The most important one (Asparagus virus II) causes stunting and increases susceptibility to Fusarium and other seed-borne diseases. By purchasing virus-indexed cultivars, the damage from asparagus viruses is minimal.

Demand for asparagus will surely increase as more and more growers provide it. The success of the all-male hybrids has been a tremendous asset to the rebirth of asparagus production in Connecticut, but attention on pests and diseases is still needed.

Mention of a trade name does not constitute an endorsement. Always read and follow the pesticide label directions.
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