



## ASPARAGUS RUST

Asparagus rust, caused by the fungus *Puccinia asparagi*, is found worldwide wherever garden asparagus (*Asparagus officinalis*) is grown. Rust is one of the most common and damaging diseases of this crop in Illinois. All aboveground parts of the plant may become infected. If the bushy green tops of fronds are attacked for several successive years, the crown and root system is weakened, reducing both the size and the number of edible shoots (spears) the following spring. Severely diseased plants may be prematurely desiccated and killed during the summer. Damage is most severe during prolonged dry periods. Asparagus plants weakened by rust are also very susceptible to the Fusarium wilt, root rot, and decline disease.



Figure 1. *Asparagus rust-pycnia and aecia on spears.*

The causal fungus also attacks a number of nonedible species of *Asparagus* (*A. brouseopetii*, *A. caspius*, *A. maritimus*, *A. medeoloides*, asparagus fern [*A. plumosus*], and *A. verticillatus*) as well as the common onion, Welsh or Spanish onion, chives, and shallot.

The rust fungus thrives where heavy dews or fogs are prevalent, as droplets of water are required for infection to occur. Rust spores (pycniospores, aeciospores and urediospores) germinate and infection takes place at temperatures between 50° and 86°F or 10° and 30°C (optimum about 68° to 72°F; 20° to 22°C). At 59°F (15°C) a three-hour, spore-wetting period is needed for initial infection. Maximum infection at this temperature occurs after the spores are wet for nine hours.

### SYMPTOMS AND DISEASE CYCLE

Asparagus rust appears in four stages. The first symptom, occurring in April or May, is the appearance of inconspicuous, light green, oval spots (brownish pycnia and then aecia) on the first shoots or spears (Figure 1). If these spears are harvested, the rust cycle will be broken and the disease does not develop further. In young plantings where the spears are not harvested, these spots develop into yellow, cup-shaped, spore-bearing aecia in concentric ring patterns. Air currents and splashing rains carry



Figure 2. *Close-up of uredial pustules and one telial pustule on an asparagus stem.*

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the microscopic, globose to oval, golden aeciospores to the smaller branches and “needles,” where the spores germinate and infect when free moisture as dew, fog, or rain is present. The common, cinnamon-brown, blisterlike pustules (uredia) develop about two weeks later (Figure 2).

Large numbers of brick-red, almost spherical urediospores are produced in the small, dusty, cinnamon-brown pustules. These spores are carried by air currents to produce numerous infections on other asparagus plants, often in fields several hundred feet or more away. Successive generations of urediospores may be produced, germinate at once in the presence of moisture, and cause infections every 12 to 14 days until late summer, causing severely affected fields to appear reddish brown.



Figure 3. Telial pustules on asparagus stem and branches.

During late summer or autumn, the production of urediospores is gradually replaced by the formation of large, two-celled, thick-walled, black teliospores either in existing uredia or in newly formed pustules. These blackish brown lesions, called telia (Figure 3), give a blackened appearance to the tops of the plants. The teliospores remain attached in the pustules on asparagus plant parts or plant debris for the remainder of the season and throughout the winter.

In the spring, about the time the young shoots are emerging, the overwintering teliospores germinate on the old stems or stubble to produce sporidia (often called basidiospores). The delicate sporidia infect the nearby new emerging shoots or spears. This infection results in the development of yet another fruiting structure called pycnia which produces pycniospores. Shortly thereafter the aecia and aeciospores develop completing the disease cycle. If the young spears are cut and harvested, the rust fungus cannot develop further.

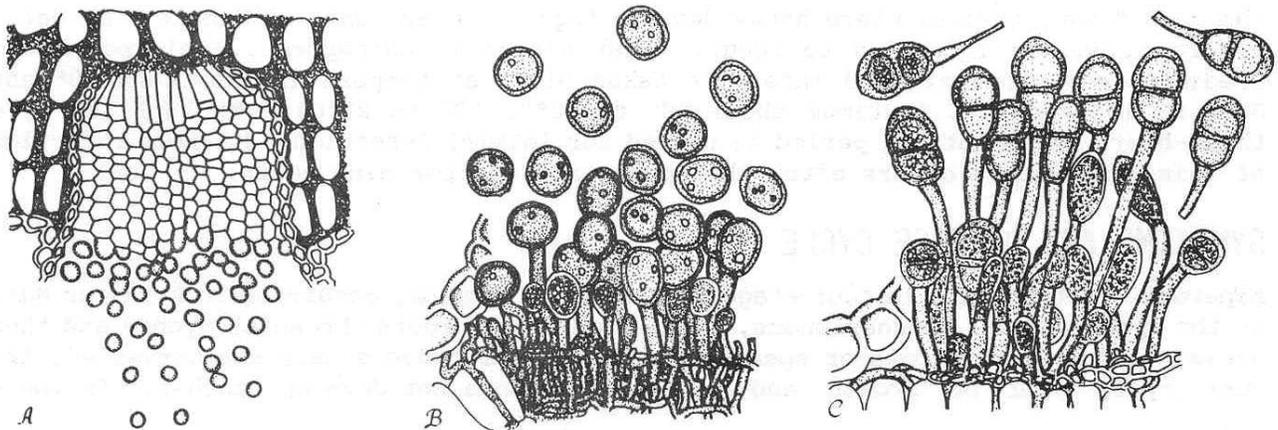


Figure 4 *Puccinia asparagi*, the cause of asparagus rust, as it would appear under high power of a light microscope: A, aecial stage, B, uredial stage, C, telial stage (drawing by Lenore Gray).

Figure 4 illustrates three stages (aecial, uredial and telial) of the asparagus-rust fungus as it would appear under a high-power light microscope.

## CONTROL

1. Grow only “rust-resistant” asparagus varieties. For the latest information on recommended varieties for growing in Illinois refer to C1373 Midwest Vegetable Production Guide for Commercial Growers. Also consult current seed catalogs and trade publications.
2. Keep **all** beds and fields that are three years old, or older, cut until July 1, when the danger of infection from aeciospores is past.
3. In commercial asparagus-growing areas, growers should coordinate their planting and harvesting operations. All new fields in a locality should be planted the same year, and all older fields should be harvested until July 1. Planting wide rows in the direction of prevailing winds and avoiding windbreaks, increases air circulation and helps to dry plants off rapidly, thus preventing rust infections.
4. Clean up and destroy **all** unused beds as well as volunteer or wild asparagus plants along roadsides or fence rows or other areas within 1000 feet of bearing beds and fields.
5. When harvesting, cut the spears **below** the soil line with a knife. This cutting eliminates the aecial stage of the rust fungus that may develop on the stubs of spears snapped off at or above the ground.
6. After the cutting season, thoroughly spray the tops with a suggested fungicide at 7- to 10-day intervals. For current recommendations, refer to publication listed above. Thorough coverage of the foliage and stems with each application is essential. Sprays in general are much more effective than dusts. Dusts may be used effectively, however, if applied frequently (every 5 to 7 days) and diligently. Apply dusts and sprays in the early morning or evening when the wind is usually at a minimum (less than 5 miles per hour for dusting and 10 mph for spraying), leaf surfaces are damp with dew, and the temperature is below about 85°F (29°C). Dusts should contain at least 5 to 10 percent fungicide. Be sure to follow all directions and precautions for mixing and applying as printed on the container label.

For information on how and where to obtain publications mentioned above, contact your nearest Extension office or University of Illinois, ITCS P345, 1917 S. Wright St., Champaign, IL 61821.