Asian soybean rust and common soybean leaf diseases

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Asian soybean rust and common soybean leaf diseases

Abstract
Asian soybean rust was found in several southern states in November 2004. The fungus is expected to overwinter on weed hosts in southern Florida and the southern tip of Texas. Rust outbreaks in Iowa will depend on the northward seasonal dispersal of rust spores from these overwintering areas.

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Asian soybean rust was found in several southern states in November 2004. The fungus is expected to overwinter on weed hosts in southern Florida and the southern tip of Texas. Rust outbreaks in Iowa will depend on the northward seasonal dispersal of rust spores from these overwintering areas.

What does Asian soybean rust look like?

Early symptoms of rust infection are found on leaves deep in the canopy, and look like tiny black specks scattered within mottled yellowed areas. These yellow areas appear see-through (translucent) if the affected leaves are held up to the sun (Figure 1). As the disease progresses, the specks enlarge, becoming tan or reddish-brown spots. These spots usually are clustered alongside the veins (Figure 2). In older infections, pimple-like structures (pustules), which produce masses of orange to brick-red spores, may be seen on the underside of the leaf (Figure 3). The disease usually starts within the low to mid-canopy and moves up the plant. This disease is favored by cool (< 75 °F) temperatures and frequent rains.

How do I scout my soybeans for Asian soybean rust?

One of the challenges of identifying Asian soybean rust is that the early stage of the disease can look like other leaf diseases of soybean. The “Guide to common soybean leaf diseases” at the end of this article provides images and descriptions of common soybean leaf diseases in Iowa.

To check a field for rust:

- Walk through the entire field in a standard scouting pattern. For example, walk across the field in a W-shaped pattern.
- Periodically stop and examine the soybean plants.
- Look low and deep into the canopy of the plants.
- Closely examine the plants for mottled yellow leaves with “telltale” pustules (pimple-like structures) on the underside. Be aware that there are several other foliar diseases that can be confused with Asian soybean rust (see “Guide to common soybean leaf diseases”).
- Areas in the field with distinct yellowing or browning of the leaves, or areas of dense canopy development, should be targeted in addition to the areas covered by the standard scouting pattern.
What do I do if I suspect my soybeans have Asian soybean rust?

Please use the Iowa Fast Track System (Figure 4) to get confirmation. This system was put in place to (1) alert the ISU Plant Disease Clinic that a suspected sample is on its way for examination, and (2) provide quick, no-cost confirmation to Iowa soybean producers. For the first few occurrences of the disease in Iowa, an official diagnosis of Asian soybean rust will be issued only when the USDA’s National Plant Germplasm and Biotechnology Laboratory in Beltsville, Maryland, confirms the presence of the disease. Therefore, immediately contact an Iowa Asian Soybean Rust First Detector if you suspect Asian soybean rust in your soybeans. First Detectors can be found by visiting www.soybeanrust.info or your local Iowa State University Extension county office. (See related article, “Use the soybean rust Iowa Fast Track System” on page 36.)

How can I manage Asian soybean rust?

No soybean rust-resistant varieties are currently available.

Fungicides have been very effective at controlling Asian soybean rust in Brazil, South Africa, and Zimbabwe.

To control the disease effectively and economically, spray the chemicals at the recommended time. Five fungicides (Bravo® Weatherstick, Chloronil®, Echo 720®, Headline®, and Quadris®) are currently registered for use against Asian soybean rust in the United States.

Seven additional fungicides (Bumper 41.8®, Folicur 3.6®, Laredo 25 EC™, Laredo 25EW™, Propimax 3.6™, Stratego®, and Tilt®) have been given emergency registration (Section 18) for use on Asian soybean rust. Section 18 approval for additional fungicides is pending.

Research is needed to identify the best fungicide application method (nozzle type, pressure, adjuvants, timing) for growers in Iowa. See www.soybeanrust.info for more information.

Guide to common soybean leaf diseases

Brown spot (Septoria glycines)

Causes small, irregular-shaped, dark-brown spots scattered on the upper and lower surface of leaves. Adjacent spots frequently join together to form dead blotches. Late in the season, affected leaves may turn yellow or orange-brown and drop prematurely.

This disease is very common and is usually one of the first to appear on young plants, starting at V2 stage. It begins at the bottom of the plant and moves up the plant if conditions are favorable (warm and wet).

How does this differ from Asian soybean rust? First symptoms closely resemble rust; spots more angular; no pustules (pimples) on the underside of the leaf.

Bacterial blight (Pseudomonas savastanoi pv. glycinea)

Causes small, angular, yellow-to-brown spots surrounded by yellow halos. The angular spots enlarge and join together producing large, irregular dead areas. The centers of old dead areas tear away so infected leaves have a ragged appearance.

This disease is seen on the leaves at the top of the plant. It is very common and usually one of the first to appear on young plants, starting at V2 stage. It is common after heavy rains and if temperatures remain cool.

How does this differ from Asian soybean rust? First symptoms closely resemble rust; spots more angular; no pustules (pimples) on the underside of the leaf.
**Bacterial pustule (Xanthomonas campestris pv. glycinea)**
Causes small, yellow-green spots with angular reddish-brown centers. The spots may join together to form large, irregular dead areas that rupture and tear away during windy, rainy weather. Pimple-like structures (pustules) may be seen on the underside of the leaf surface.

This disease is seen on the leaves at the top of the plant. Favorable conditions are high temperatures and higher than average rainfall. Occasionally occurs in southern Iowa.

**How does this differ from Asian soybean rust?** Pustules not associated with each lesion; pustules do not have spores; pustule openings are cracks instead of round pores.

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**Frogeye leaf spot (Cercospora sojina)**
Causes small angular spots with gray centers and distinct purple to reddish-brown margins. In older spots, dark fungal structures form in the center of the spot, and the spots look like frog eyes.

This disease is found in the mid- and upper canopy during warm and humid weather. It occurs in mid- to late season, and is not very common in Iowa.

**How does this differ from Asian soybean rust?** Spots are larger; spots have dark, defined edges; no pustules on underside of the leaf.

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**Cercospora leaf blight (Cercospora kikuchii)**
Starts as a mottled purple-to-orange discoloration that becomes orange or bronze. The leaves become leathery in texture.

Usually occurs on topmost three to four trifoliate leaves and on the upper surface of the leaf in warm, wet weather. Usually occurs in mid- to late season.

**How does this differ from Asian soybean rust?** Only upper leaf surface discolored; no spots and/or pustules (pimples) on underside of the leaf.

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**Downy mildew (Peronospora manshurica)**
Causes light-green to yellow, irregular-shaped spots on the upper surface of the topmost leaves. On the underside of the leaves, the fungus may be seen growing out of the center of the spots.

This disease is favored by cool, moist conditions; therefore, it is usually found on leaves inside a well-developed plant canopy. Occurs in mid- to late season.

**How does this differ from Asian soybean rust?** Spots are larger; no pustules on underside of the leaf; fuzzy fungal growth may be seen.

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The information in this article is revised from PM 1989, *Common Soybean Leaf Diseases and Asian Soybean Rust*, one of several publications produced by the Iowa Soybean Rust Team to help soybean producers begin to prepare for the appearance of Asian soybean rust in Iowa. Team members include Iowa State University, the Iowa Soybean Association/Iowa Soybean Promotion Board, the Iowa Department of Agriculture and Land Stewardship, and the United States Department of Agriculture—Animal and Plant Health Inspection Service.