



Asian Soybean Rust

By Mark Raymond, CCA

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With Asian Soybean Rust now being confirmed in the United States, the Ontario soybean crop is at a much higher risk of being infected with this disease. When and to what extent soybean rust will occur is of much speculation. Asian Soybean Rust has spread significantly over the last decade; Hawaii in 1994, Africa in 1996, South America in 2001 and now North America in 2004.

Asian Soybean Rust is caused by two different fungi, *Phakopsora meibomia* and *Phakopsora pachyrhizi* (*P. pachyrhizi*). *P. pachyrhizi*, is the more aggressive strain of the two and is the variety that has been confirmed in nine U.S. states. These states include: Louisiana, Alabama, Arkansas, Florida, Georgia, Mississippi, Missouri, South Carolina and, most recently, Tennessee.

There are many factors that will affect when and to what extent this disease will be introduced into Ontario.

Soybean rust is an airborne disease and is able to travel great distances to infect a huge range of soybean growing areas. It is believed that this past season's increased hurricane activity and increased winds from South America to the U.S. is the cause of the outbreak.

Asian Soybean Rust is known to infect more than 90 species of legumes such as dry beans, snap beans, yellow sweet clover, and garden peas. Although soybean rust has a wide range of hosts, none are suitable for the disease to over winter in the Ontario climate. Soybean Rust requires living green plant material to survive the winter. It is believed that this pathogen will not over winter in our region, and that it will have to be spread to Ontario via wind currents from infected areas of the U.S. However, the

environmental conditions of the growing season allow for seasonal rust epidemics to occur.

Optimal conditions for Soybean Rust infection are temperatures between 15 and 28 degrees Celsius. These are commonly seen during Ontario's growing season. Soybean rust uredospores are able to survive above 28 degree temperatures but their germination and the rate of disease development is greatly slowed. Warm temperatures in combination with prolonged leaf wetness of at least 6 hours provide the most favorable growing conditions. Under these conditions the fungus is able to reproduce spores within 10 – 21 days. Soybean Rust is able to repeatedly produce spores if the environmental conditions are good.

The best method of controlling Soybean Rust is through early detection and fungicide treatment.

While using all of the best management practices for soybeans will produce a good crop, practices such as rotation will not be an effective control measure because it is not a soil borne disease. There are currently no commercial soybean varieties in North America that are resistant to Asian Soybean Rust and their production is still many years away.

It is important to check early planted fields seeded with early maturing varieties. The fungi will usually cause lesions in mid to late summer but its occurrence will be dependant upon south to north winds over the growing season. The yield losses result when the rust lesions cover most of the leaf surface, causing premature defoliation. The disease can cause plant defoliation, poor pod set and fill, and ultimately, reduced yields. Yield losses have been

documented ranging from 10 -90 percent if left untreated. It is speculated that potential yield losses could range from 10 – 40 % in Ontario depending on environmental conditions.

Asian Soybean Rust is often misdiagnosed when scouting fields.

Plants infected with the rust look similar and can often be confused with other diseases that are present in Ontario. Similar soybean diseases are brown spot, bacterial blight, downy mildew and bacterial pustule. When scouting for Soybean Rust, it is important to check the lower leaves first. Soybean rust can produce two types of lesions, tan and red lesions, with tan being the most severe. The appearance of small yellow spots on soybean leaves is the first sign of infection. On the underside of the leaves, a plant infected with Soybean Rust will have raised pustules with rust spores inside. Use a 10X or 20X hand lens to detect small pustules (uredinospores) on the lower leaf surface.

Until resistant soybean cultivars become available, foliar fungicide treatments are our best option to manage soybean rust outbreaks. The Canadian Pest Management Regulatory Agency has approved four fungicides for emergency use registration until November 30, 2005. These fungicides are Headline, Quadris, Tilt and Folicur.

The outbreak of Asian Soybean Rust in Ontario in 2005 as well as subsequent years will be dependant upon many factors. The key factors being the ability of the rust to over winter in the southern U.S. states, the extent of the north to south winds during the growing season, and the environmental conditions during periods of possible outbreak. 2005 is going to be a learning year for all soybean producers across North America.

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