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Impact of cultural practices on Asian soybean rust (*Phakopsora pachyrhizi*)

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Impact of cultural practices on Asian soybean rust (*Phakopsora pachyrhizi*)

Abstract

Despite technology available to manage Asian soybean rust (ASR), the uncertainty that the disease will arrive in Iowa this year has some farmers thinking about reducing their soybean acreage. However, the alternating corn and soybean rotation typically results in higher net return and lower variability than continuous corn or soybeans. The possible financial effects on the whole farm are the net return of the break crop itself, the effect on the variable costs of the continuously grown crop, and the beneficial effect on the yields of the following crop after the break crop. These financial effects combined result in the likely difference in net return of the different rotations.

Disciplines

Agriculture | Agronomy and Crop Sciences



Plant Diseases

Impact of cultural practices on Asian soybean rust (*Phakopsora pachyrhizi*)

by Palle Pedersen, Department of Agronomy

Despite technology available to manage Asian soybean rust (ASR), the uncertainty that the disease will arrive in Iowa this year has some farmers thinking about reducing their soybean acreage. However, the alternating corn and soybean rotation typically results in higher net return and lower variability than continuous corn or soybeans. The possible financial effects on the whole farm are the net return of the break crop¹ itself, the effect on the variable costs of the continuously grown crop, and the beneficial effect on the yields of the following crop after the break crop. These financial effects combined result in the likely difference in net return of the different rotations.

Currently, I am finishing a long-term corn and soybean rotation study with Joseph Lauer from the University of Wisconsin. The results show that when averaged across 15 years, corn rotated annually with soybean yielded 17 percent more than continuous corn. Sure, there will be years where excellent environmental conditions help second-year corn yield to perform as well as annually rotated corn. However, who can predict when that will be the case? Do you want to put all your eggs into one basket? Disease and insect pressure will rise if we increase our corn acreage. It is just a matter of time. We need diversity to minimize our risk and to increase our long-term economic sustainability.

What about row spacing, plant population, and planting dates? It is still too early to say if ASR will be an epidemic in Iowa in 2005. Therefore, I do not recommend dramatically changing your management practices until we get more experience with this disease in the United States.

Observations from South America show that soybean row spacing or plant population doesn't influence ASR infection and severity. The most common

row spacing in Brazil is 18-inch spacing, and ASR can be managed with this spacing. Wider rows seem to allow for a higher dispersal factor within the field, while narrower rows tend to support more concentrated areas of ASR in the field. The picture for plant population is the same. We know that by overseeding, you will build a microenvironment that a lot of pathogens prefer. It is all about penetration, coverage, and timeliness. We have the technology to manage ASR despite different plant distribution patterns.

Planting soybeans earlier also has been a topic of discussion. Research from South America has shown the impact of ASR is greatest from flowering (R1) to end of seed filling (R6). My recommendation is still to have growers plant soybean at the optimum time in Iowa, which is the last week of April and the first week of May. Planting date has a greater influence on the vegetative growth stages than on the reproductive stages. If you want your field to reach harvest maturity earlier, you need to plant a soybean variety from a shorter maturity group. This is not always recommended since we often see a correlation between maturity groups and yield if an early frost isn't a factor.

Overall, continue to do what you currently are doing to maximize yield. Plant in the optimum window (last week of April and first week of May), use row spacing narrower than 30-inch spacing but don't overseed to generate a rust-favorable microenvironment in the canopy, and then scout your fields frequently to monitor for yield-limiting factors such as ASR.

Palle Pedersen is an assistant professor of agronomy with research and extension responsibilities in soybean production.

¹A break crop is different than the crop planted the previous year.