Summary
of
Technical Science Working Group
on
Soybean Rust – Teleconference #1
Held on November 13, 2002

A. Purpose of Working Group
B. History and Current Status
C. Germplasm Screening for Host Resistance
D. Comparative Efficacy Trials in Africa and South America
E. Registrant Efficacy Data
F. Strategic Plan

Note: An excellent web resource on various aspects of soybean rust can be viewed at: http://www.aphis.usda.gov/ppq/ep/pestdetection/soybean_rust/soybeanrust.html.

A. Purpose of Working Group – presented by Kent Smith, USDA/OPMP, Washington, DC

The basic purpose of this working group is to enhance communication between state and federal scientists concerning soybean rust. Specifically, we hope to better prepare state extension specialists to deal with soybean rust given that they will make the recommendations to growers concerning this disease when it arrives in the continental United States.

B. History and Current Status – presented by Mo Bonde, USDA/ARS, Frederick, MD

Soybean rust (*Phakopsora pachyrhizi*) was first reported in the Philippines in 1914. It was reported over the next 50 years throughout Southeast Asia in various countries including China, Japan, Australia, and India. In 1966, it was reported to reduce the soybean yields over the entire island of Taiwan from 20 to 30%, and 70 to 80% in individual fields.

On the creation in 1971 of the ARS Foreign Disease Lab in Frederick, Maryland, soybean rust was viewed as the greatest disease threat to U.S. Agriculture. This determination was made because of the disease's capacity to spread quickly and easily cause yield losses from 10 to 50%. For this reason, studies were undertaken immediately to answer several basic questions about the soybean rust's basic biology and means of management.

In 1976, soybean rust was discovered in Puerto Rico, but determined to be a much less virulent pathogen than the organism in Asia. In 1992, this pathogen was classified as a separate species – *P. meibomiae* – of soybean rust, now recognized as common throughout the Caribbean, Central and South America, but of little concern as a pathogen.

In 1994, the yield-reducing species of soybean rust began to move. First, It was discovered in the Hawaiian Islands. Then, in 1998, it made its first appearance in Africa in Zimbabwe, from there it has spread to other African countries such as South Africa and Nigeria. Rapidly moving, it made its entrance into South America in 2001, where it is now confirmed in Paraguay, Brazil, and Argentina. As of this writing, *P. pachyrhizi* has not been confirmed north of Brazil in the Americas. The expectation is that it will soon arrive in the United States, the only question is when.

C. Germplasm Screening for Host Resistance – presented by Monte Miles, USDA/ARS

ARS began a project to screen soybean germplasm for soybean rust resistance 5 months ago in a Class 3 containment facility in Frederick, Maryland. Germplasm is being evaluated against a mixed *P. pachyrhizi* population of 4 isolates of from Zimbabwe, Thailand, Brazil, and Paraguay. Thus far, approximately 1000 commercial and public cultivars as well as over 4,000 germplasm accessions have been screened. Most of the material has been found to be susceptible. A limited number have shown a resistant reaction type, reduced lesion numbers or other interesting criteria, and will be re-evaluated. Included in the evaluation will be screens of adult plant and partial resistance traits as well as single isolate evaluations. Single gene resistance has not been proven to be useful, as the pathogen is known to have wide virulence diversity, so other resistance phenotypes are being sought.

D. Comparative Efficacy Trials in Africa and South America – presented by Monte Miles, USDA/ARS, Urbana, IL

Two separate comparative efficacy trials have been initiated this winter to look at possible fungicides to use to combat soybean rust when it arrives in the United States. Both tests are being managed and monitored by ARS scientists. The one in Africa by Reid Frederick and the other in South America by Monte Miles.

The African study will take place in Zimbabwe on government experiment station land. Six compounds currently registered or expected to be registered in the U.S. will be used. Thus far likely candidates are azoxystrobin, propiconazole, chlorothalonil, and BAS 500. Treatments will receive their first fungicide application 50 days after planting followed by retreatments at 20-day intervals. Treatments will either be light (2 applications) or heavy (3 applications).

The South American study will occur in Paraguay. This study is registrant supported and currently involves AMS 21619, azoxystrobin (Quadris), BAS 500, BAS 516, chlorothalonil (Bravo, Echo), famoxadone + mancozeb, fenbuconazole (Enable), flutolanil, mancozeb (Dithane DF), myclobutanil (Laredo, Systhane), propiconazole (Propimax, Tilt), tebuconazole (Folicur), tetraconazole (Eminent), and trifloxystrobin + propiconazole (Stratego). Treatment methods will be similar to the African experiment.

E. Registrant Efficacy Data – presented by Teung Chin, USDA/OPMP, Riverdale, MD

The registrants of likely soybean rust fungicides are being asked to supply efficacy and other data on their products to USDA for review by interested state and federal scientists. Plans are to make this information available on the Pest Management Centers web site as soon as it is received. This data should provide useful additional information to the above comparative efficacy trials.

Planned tests concerning soybean rust by registrants that are expected beyond the above ARS comparative efficacy trials are: for Bayer, ongoing tests in Brazil and Argentina on tebuconazole (Folicur) + trifloxystrobin (Flint); possible DuPont tests of famoxadone (Famoxate) and possibly with mancozeb (Manzate); for BASF, tests in Brazil and South Africa on pyraclostrobin (BAS 500) and BAS 510 alone and in combination; for DowAgro, tests in Brazil on myclobutanil (Rally, Nova), mancozeb (Dithane), and fenbuconazole (Enable) alone and in combination; possible Nichino America tests on flutolanil + propiconazole; for Sipcam Agro, tests in Brazil on tetraconazole (Eminent) and chlorothalonil (Echo); and for Syngenta, tests in South America and South Africa on azoxystrobin (Quadris), chlorothalonil (Bravo), and propiconazole (Tilt).

F. Strategic Plan – presented by Joel Floyd, USDA/APHIS, Riverdale, MD

To prepare U.S. agriculture for the eventual arrival of soybean rust, a strategic plan has been developed. Sponsored by USDA/APHIS this plan has received wide input from a variety of agricultural interests and serves as a working document for all of agriculture to understand, to prepare for, and to take steps to lessen the impact of this disease on growers. Three basic sections to the strategic plan involve exclusion of the pathogen, outreach to the growers, and needed technology development.

Appendices to the strategic plan contain several useful details, including a listing of: survey detection procedures, identification techniques, communication plans, suggested management practices, known soybean rust hosts (and there are many!), and selected references. The entire plan can be viewed on the APHIS web site listed above.