

Award Category: International IPM Program

Nominee Name: Soybean Rust- Pest Information Platform for Extension and Education (PIPE)

Nominee Title: Extension Plant Pathologist, Extension Educators and Extension Agents, Faculty and Support Staff, Consultants

Nominee Affiliation: Land Grant Universities and State Departments of Agriculture in Soybean Production States, Canada (Ontario Ministry of Agriculture, Food and Rural Affairs, Agriculture and Agri-Food Canada), Mexico (Mexican PIPE (called SCOPE))

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Nominator Name: Giesler, Loren

Nominator Company: University of Nebraska-Lincoln

Nominator Title: Professor/Extension Plant Pathologist

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Supporting Document: SUBMITTED

Improving economic benefits related to IPM adoption: Checked

Reducing potential human health risks: Checked

Minimizing adverse environmental effects: Checked

Brief Summary of Nominee's or Program's Accomplishments (500 words or less):

Soybean rust (SBR) was first identified in the fall of 2004 in Louisiana. Immediately, upon this identification plant pathology faculty in land grant universities worked closely with soybean grower organizations and the USDA to mobilize an active scouting program to monitor spread and development of this disease. Starting in the spring of 2005, an international sentinel plot network was established to monitor for spread of soybean rust in North America including (Mexico, United States and Canada). Information collected in the field was entered into the SBR-Pest Information Platform for Extension and Education (PIPE) and the web site served to deliver timely information including time-sensitive SBR risk assessments and information on SBR management options. Since 2005, hundreds of individuals across 33 states, Canada and Mexico have participated in the SBR-PIPE to one extent or another. In most states, the Extension plant pathology specialist in the state's land grant university provided the leadership. In each state and Ontario, the local coordinator determined the extent of SBR monitoring based on available funding, local needs, and stakeholder interest. This coordinated network involved private industry with the establishment of a web site for data collection and communication and the continued connection of state plant pathology specialists at land grant universities to alert soybean producers and commercial agricultural clientele of the development and risk for SBR. Near real-time information on the distribution and severity of SBR in North America was provided through the SBR-PIPE web site. Interactions with RMA resulted in assessment tool development for grower documentation in the case of a significant loss due to SBR. As SBR is a disease that spreads each year from overwintering sites in the south to soybean production regions in the north, continued monitoring over the past seven years have continued to keep the soybean industry aware of where SBR has occurred and the level or risk for disease development. Monitoring spread of the disease each season, therefore, is essential for developing SBR risk assessments used by stakeholders to make management decisions. The data management and IT capabilities of the SBR-PIPE are perfectly suited for disseminating SBR monitoring data to stakeholders via a public website. The only effective means of managing SBR at present is through the proper application of fungicides and in order to be fully effective, fungicides must be applied when SBR is at low levels (e.g., $\leq 5\%$ incidence). In the first few years of development the SBR-PIPE was used to make a decision to use a fungicide on an estimated 73 and 65% of the U.S. soybean crop in 2006 and 2007, respectively. Since 2005, the SBR-PIPE has successfully met the needs of the North American soybean industry and is estimated to have saved farmers as much as \$299 million, annually, based on a USDA Economic Impact Assessment. Economic savings have primarily resulted from fungicides not being deployed when they were not needed to combat SBR. In a few southern states, savings resulted from higher crop yields where fungicides were applied to protect it from SBR.

Describe the goals of the program being nominated; why was the program conducted? What condition does this activity address? (250 words or less):

The goal of the soybean rust sentinel monitoring program was to establish sentinel plots from south to north in the Soybean Belt to monitor northward movement of soybean rust for early detection and early warning for soybean producers and crop managers. The SBR causal fungus, *Phakopsora pachyrhizi*, and host plants in which the fungus develops, cannot survive in areas prone to extended periods of freezing temperatures. Thus, in the U.S., the fungus can only survive between seasons along the Gulf Coast. Soybean is produced on over 74 million acres in the U.S. and 4 million in Canada and is one of the most valuable field crops in North American agriculture. Field observations were reported to a web site that was easily accessible through the SBR-PIPE. The SBR-PIPE has been used to provide soybean farmers and agricultural professionals with: 1) near real-time information on the distribution and severity of SBR in North America; 2) time-sensitive SBR risk assessments; 3) information on SBR management options; and 4) links to other important tools and information on SBR. The information delivered was very time sensitive and the monitoring of SBR spread in North America continues to be important to alert growers of the presence of rust spores in their production region. This information was/is essential for soybean producers and agricultural professionals to make timely and cost effective decisions regarding fungicide use to manage SBR.

Describe the level of integration across pests, systems and/or disciplines that was involved. (250 words or less):

This innovative international program is a collaboration of many public institutions including governments (local, provincial/state/federal), research (federal/university), extension, and others in conjunction with soybean grower organizations as well as private groups representing the seed and chemical industry. In addition to the monitoring strategy, the forecast modeling technology and delivery platforms developed are transferable to other disciplines and to other disease/pest problems not only in soybean but other crops thus increasing the sectors competitive and innovative ability to react to future pest problems. Many states used sentinel plots to monitor soybean aphid in cooperation with entomologists. Plots were also used for training purposes (disease/pest ID) as well as to run and verify rust predictive models and provide sites where spore monitoring work was conducted in conjunction with epidemiologists. Since the development of the SBR-PIPE, the web site has developed into a broader focus for integrated pest management as the ipm-PIPE has developed into other cropping systems and disease and insect pests.

Describe the team building process; how did the program being nominated get partners involved? Education and awareness are essential in an IPM program. (250 words or less):

The essential leadership of APHIS, commodity leaders and key specialists/researchers were integrated to develop an outstanding program. USDA ARS provided a venue in December 2004 where this program initiated. APHIS and key leaders working closely with land grant university specialists further developed the initial ideas. One of the primary purposes of this innovative international collaboration was not only to coordinate SBR monitoring efforts in the U.S., Canada and Mexico but to create an "early warning system" for early disease detection for the soybean production areas of North America. This program included the establishment of sentinel plots and a spore trapping network that required a large number of field scouts for monitoring areas. In most states this was coordinated by the land grant university pathology specialists. In a small number of states, the state Department of Agriculture has provided leadership and coordination services. In Canada, coordination was led by the Ontario Ministry of Agriculture, Food and Rural Affairs in conjunction with Agriculture and Agri-Food Canada and the Grain Farmers of Ontario. In Mexico, the SBR-PIPE in the U.S. was viewed as such a good idea, that a parallel system (SCOPE) was modeled to track SBR in Mexico. In addition, regular interaction amongst members were promoted and led to considerable exchange of information on current research developments with SBR and monitoring efforts through regular conference calls, annual meetings, SBR Symposia, annual educational training for public and private soybean industry stakeholders at the University of Florida Research and Extension Station in Quincy, Florida.

What outcome describes the greatest success of the program?:

This program is an exemplary example of an integrated international surveillance program to alert soybean producers of the level of risk for SBR. The success is demonstrated by the utility of the information with an average of over a million visits to the web site in the first years following detection of SBR in North America. This cooperation has removed potential duplication and this unified approach to SBR has allowed us to maximize resources. Information from this IPM monitoring effort was vitally important in the education of growers, consultants, and the entire agriculture industry on the identification, management, movement, and risk of SBR during the growing season. Multiple media formats and outlets were used to convey these important messages. The decision to “spray or not to spray” for SBR is critical and answering the question correctly based on information from the sentinel plot program saved Mexican, U.S. and Ontario soybean producers tens if not hundreds of millions of dollars. In addition, the reduced amount of fungicide released into the environment has surely had additional impacts resulting in less overall pesticide placement in the environment and reduced applicator exposure. This environmental impact has not been assessed by any agency to date and all assessments have focused on dollars of fungicide inputs and resulting yields for soybean producers.

Provide evidence of change in knowledge, behavior or condition as a result of the program/individual. (250 words or less):

As a result of this monitoring and surveillance program growers made confident decisions regarding the level of risk for SBR in their area. This resulted in an estimated 73 and 65% of the soybean acres in the U.S. having a decision made apply a fungicide or not based on the information provided on the SBR-PIPE in 2006 and 2007, respectively. This resulted in a reduction of pesticides being introduced to the environment on over 64 million acres in 2007 and 2008. Bradley et al. (2010) conducted a survey of certified crop advisers (CCAs) in selected states, and they established that the SBR-PIPE was highly valuable and heavily used by this key stakeholder group. Information, thus, has a multiplier effect in this climate and it is clear that every hit on the public website makes its way into newsletters, crop advisories, field days, etc. Information from this monitoring effort was vitally important in the education of growers, consultants, and the entire agriculture industry on the identification, management, movement, and risk of SBR. In 2006 this program was awarded the Secretary of Agriculture Honor Award for the teamwork and response to this issue.

Who or what should receive the most credit for the success of this program? (250 words or less):

Soybean grower organizations (including United Soybean Board, North Central Soybean Research Program, individual state checkoff and promotion boards, the Grain Farmers of Ontario), Land Grant Universities (Including research and extension organizations), extension faculty (emeritus faculty, specialists, extension educators/agents, extension assistants, and administrators), USDA (including APHIS, CSREES, ARS, RMA), Ontario Ministry of Agriculture, Food and Rural Affairs, Agriculture and Agri-Food Canada, Mexico (SCOPE), Zedex, Inc., IPM-PIPE Board and Steering Committee, Regional IPM Centers, Media organizations.

If selected, suggested Citation for Award Certificate (40 words or less):

The soybean rust (SBR)-PIPE monitoring program was initiated in 2005 in response to a need to monitor SBR development within North America. This continuing international program is an exemplary collaboration of government agencies, land grant universities, and the soybean industry.