Early Detection and Rapid Response: Pest/pathogen modeling and early warning through the IPM-PIPE

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New pests offer new challenges to recognizing movement pathways and recognizing the initial occurrence of a pest. *Phakopsora pachyrhizus* was tracked in the US by the Integrated Pest Management - Pest Information Platform for Extension and Education (IPM-PIPE) that was developed specifically for that purpose following the introduction of the soybean rust pathogen into the US in 2004. The IPM-PIPE was initially conceptualized during the outbreaks of soybean aphid that occurred in the north central US about five years ago. Currently the IPM-PIPE consists of a monitoring and reporting effort for soybean rust in 35 states and two Canadian provinces. In 2007, the soybean rust PIPE will also be in use in five Mexican states. In 2006, efforts were extended revive soybean aphid tracking and other legume diseases will be added in 2007. The IPM-PIPE has proven to be a robust and nimble framework for reporting to the public on one side and for researchers and extension specialists to communicate on the password protected side. For the present, records of pest and disease presence and progress are reported from sentinel observation sites, but aerobiological and climatological forecasting are also reported to researchers and Extension specialists on the password protected site to aid them in the public commentary that they post for producers. The USDA Risk Management Agency has been a major supporter of the program, funding the system since the 2005, the initial year that was funded by USDA-APHIS and USDA-CSREES. Commodity check-off support has also been critical to the success of the soybean program. Recent incursions of wheat stripe rust in the central plains and southeastern US have increased concern and crop loss from *Puccinia striiformis*. Stripe rust, leaf rust (caused by *Puccinia triticina*) and stem rust all offer good pathosystems for adoption of the IPM-PIPE monitoring and communications model. In large part the monitoring network is already in place for wheat rusts in the US. While there are opportunities for the PIPE in the US, there are also opportunities abroad. Particularly with the emergence of the wheat stem rust TTKS race of *Puccinia graminis* f. sp. *tritici* (Ug99) in eastern Africa, the IPM-PIPE system could be used to track the pathogen across the globe using following aerobiological models coordinated by a multinational team of scientists from US Land Grant institutions, USDA-ARS, and the Global Rust Initiative teamed with scientists from Africa and India. While wheat stripe rust moved from east Africa to India, soybean rust moved from a very similar site in Africa to the south. The IPM-PIPE offers great potential for use on a worldwide scale.