

**PROCEEDINGS FROM THE RUST WORKSHOP HELD AT THE 2005 BIC MEETING
UPDATE ON OFFICIAL NAME CHANGE FOR RUST OF
COMMON BEAN AND SOYBEAN**

Challenges to and Priorities for Management of Rusts of Common Bean

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The 18th Biennial Meeting of the Bean Improvement Cooperative was hosted by Dr. W. E. Kee at the University of Delaware – Newark Campus on October 31 to November 2, 2005. A special workshop (4th International Rust Workshop) was convened by Greg Varner (USDDB representative) on November 2 to provide an overview on common bean (dry, snap, lima) vulnerability to and advances in management of Common Rust (caused by *Uromyces appendiculatus*) and Asian Soybean Rust (caused by *Phakopsora pachyrhizi*). Invited speakers from the USDA/ARS (Drs. Morris Bonde, Catherine Aime, Phil Miklas, Marcial Pastor Corrales), University of Nebraska (Dr. James R. Steadman), and ARC-Grain Crops Institute of South Africa (Dr. Merion Liebenberg) reviewed research progress and provided worldwide perspectives on Asian Soybean Rust, molecular variability within *U. appendiculatus* and compared to other plant rust pathogens, diversity of Common Rust in cultivated and wild beans in the Americas and Africa, and Common Rust resistance gene deployment strategies. Additional information is available in the proceedings of these individual papers elsewhere in this annual report, as well as at the BIC web site: <http://www.css.msu.edu/bic/>

During the course of these common bean rust presentations and discussions, a number of critical issues, needs and challenges emerged that have been compiled in this paper for use in strategic planning for and prioritization by the research community and the bean industry. Please feel free to cite and expand upon the following points that were generated by the collective participants at this biennial BIC meeting and workshop.

General Issues for Rusts of Common Bean:

- Develop universal protocols for the collection, preservation, inoculation and description of pathogenic responses (disease incidence and severity) and expression of genetic variability (race typing, virulence patterns);
- Expand the knowledge of pathogen biology, epidemiology, and especially the role of the sexual stage;
- Incorporate disease forecasting and the critical timing of effective fungicides in an integrated pest management context;
- Expand the use of molecular markers for pathogen resistance in germplasm improvement and varietal release efforts;
- Determine linkage of rust resistance markers to other disease resistance or plant trait markers;
- Continue to support the African Bean Rust Network.

Specific Issues for Asian Soybean Rust of Common Bean:

- Identify and characterize genetic resistance from cultivated and wild plant sources, with emphasis upon varied mechanisms including major gene, slow rusting, induced resistance;
- Expand the scope of germplasm rust resistance evaluation of *Phaseolus vulgaris*, other *Phaseolus* and legume species, and interspecific hybrids;
- Study the effects of mixed legume cropping systems upon endemic survival and epidemic development of the pathogen in tropical and temperate ecosystems;
- Investigate potential host range and vulnerability of cultivated and wild plant species under laboratory and field conditions;
- Preserve and expand a working collection of pathogen isolates at a USDA/ARS facility such as Beltsville or St. Paul;
- Identify and expand funding resources to emphasize research at the national and international level with this pathogen and its hosts;
- Search for resistance genes in *P. vulgaris* for transfer to *Glycine max*;
- Use *P. vulgaris* differential resistance reactions to phenotype *P. pachyrhizi* races.

Specific Issues for Common Rust of Common Bean:

- Develop molecular markers to facilitate elucidation of coevolution of the common rust pathogen and its bean host and expand knowledge base on the common bean – common rust model; identify specific races or pathotypes in support of diagnostic and epidemiological objectives; measure contributions from sexual and asexual stages in Andean and Middle American populations and ecosystems;
- Develop and implement breeding strategies for deployment of resistance genes (stacking, pyramiding, rotation, use of defeated genes) in varied cropping systems and regions;
- Preserve and expand the historical and working collection of pathogen isolates at the USDA/ARS Beltsville facility, and duplicate other collections as projects terminate and active rust personnel retire (e.g., Univ. of Nebraska);
- Improve the utility of race or pathotype differentials by replacing the widely susceptible Andean material Montcalm with red mottled JeMa (Ecuador) in 2006 and the Middle American material GN 1140 with a candidate like PI 310762 in the future;
- Identify and expand funding resources to emphasize research at the national and international levels with this pathogen and its hosts.

Official Name Change has been approved for Rust of Common Bean and Soybean:

- Since the workshop an official name change has been approved for rust of common bean and soybean. Details are shown below.

Diseases of Bean (*Phaseolus vulgaris* L.) – 09/17/07 Submission by H. F. Schwartz

Change Rust to:

Common Bean Rust *Uromyces appendiculatus* (Pers.: Pers.) Unger

Change Soybean Rust (Asian, American) to:

Soybean Rust *Phakopsora pachyrhizi* Sydow

Wild Legume Rust *Phakopsora meibomia*e (Arthur) Arthur

Combine these diseases under a sub-title of:

Rust diseases

*Phakopsora meibomia*e (Arthur) Arthur {Wild Legume Rust}

Phakopsora pachyrhizi Sydow {Soybean Rust}

Uromyces appendiculatus (Pers.: Pers.) Unger {Common Bean Rust}