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ITEMS FROM UNITED KINGDOM

JOHN INNES CENTRE
Department of Disease and Stress Biology, Colney Lane, Norwich NR4 7UH, United Kingdom.

Genetic biodiversity for stripe and stem rust resistance in African wheat genotypes.

Zakkie Pretorius, Davinder Singh, Ruth Wanyera, Susanna Dreisigacker, Cornel Bender, Denise Liebenberg, Ruth MacCormack, Lesley A. Boyd, and Renée Prins.

Over 500 African wheat genotypes have now been screened for resistance to the new virulent stem rust, *Puccinia graminis* Ug99-derived strains, and to stripe rust, *P. striiformis*, at Njoro, Kenya. Some 300 genotypes have been selected for genetic diversity and association analyses using SSR and DArT markers. This program is a collaboration between Dr. Lesley A. Boyd at the JIC, Norwich, UK; Prof. Zakkie Pretorius and Dr. Renée Prins of the University of the Free State, Bloemfontein, RSA; Dr. Ruth Wanyera and Davinder Singh, KARI, Njoro, Kenya; and Dr. Susanna Dreisigacker, CIMMYT, Mexico. This work is supported by UK, BBSRC/DfID funding under the Sustainable Agriculture Research for International Development (SARID) initiative.

Fine mapping of durable resistance to stripe rust in the South African wheat cultivar Kariega.

Gloudi Agenbag, Ruth MacCormack, Zakkie Pretorius, Debbie Snyman, Lizaan Rademeyer, Lesley A. Boyd, and Renée Prins.

Adult-plant resistance to stripe rust has previously been identified in the South African cultivar Kariega, with major QTL being identified on chromosomes 7D and 2B, and minor QTL on chromosome 4A. EST have been mapped to both 2BS intervals and to 4AL in the target QTL interval. These EST provide anchors for further EST-derived marker development within the QTL intervals. This program is a collaboration between Dr. Lesley A. Boyd at the JIC, Norwich, UK and Prof. Zakkie Pretorius and Dr. Renée Prins of the University of the Free State, Bloemfontein, RSA. The student working on this project is Miss Gloudi Agenbag. This work is supported by UK, BBSRC/DfID funding under the Sustainable Agriculture Research for International Development (SARID) initiative.

Genetic mapping of adult-plant, stripe rust resistance within the European wheat cultivar Cappelle Desprez.

Gloudi Agenbag, Zakkie Pretorius, Cornel Bender, Debbie Snyman, Lizaan Rademeyer, Lesley A. Boyd, and Renée Prins.

Cultivar Cappelle Desprez was grown in Western Europe throughout the 1960s and 1970s, being a known source of durable adult-plant resistance (APR) to stripe rust. The stripe rust resistance in Cappelle Desprez has remained effective under South African conditions since 2001, and programs are underway to select for this APR in a cross to the South African cultivar Palmiet. A genetic map has been constructed for a RIL population derived from the cross 'Cappelle Desprez/Palmiet', which currently is being used to genetically map the QTL for stripe rust resistance derived from Cappelle Desprez. This program is a collaboration between Dr. Lesley A. Boyd at the JIC, Norwich, UK and Prof. Zakkie Pretorius and Dr. Renée Prins of the University of the Free State, Bloemfontein, RSA. The student working on this project is Miss Gloudi Agenbag. This work is supported by UK, BBSRC/DfID funding under the Sustainable Agriculture Research for International Development (SARID) initiative and the Winter Cereal Trust (SA).

Biological and transcriptional defence responses of wheat to non-adapted and adapted species of the blast fungus, Magnaporthe.

Hale A. Tufan, Graham R.D. McGrann, Patrick Schweizer, Ulrich Schaffrath, Rients Niks, and Lesley A. Boyd.

The *Magnaporthe* species complex infects over 50 graminaeceous plant species, *M. oryzae* pathotypes colonising cultivated cereals, whereas *M. grisea* attacks wild grass species. In Brazil, *M. oryzae* has become a field pathogen of wheat, causing wheat blast. We have investigated resistance in the wheat cultivar Renan against species of *Magnaporthe* that are either adapted or not adapted to wheat. Early defence responses against both adapted and unadapted species involved the production of a diffuse autofluorescent HALO structure around the site of attempted fungal penetration. In the case of the unadapted *M. grisea* pathotype, very few infection attempts were able to progress beyond the HALO stage. In contrast, the adapted *M. oryzae* pathotypes were able to develop past the HALO stage, and colonize the leaf. In these cases, whole-cell autofluorescence was often observed, indicative of a hypersensitive response.

Transcriptome analysis of both the adapted and non-adapted *Magnaporthe*–wheat interactions has identified a number of candidate genes integral to the resistance reaction. Functional genomic analysis of these candidate defence genes is currently underway. This program is now funded by a ERA-PG grant, TriNonHost, and forms a new collaboration with Patrick Schweizer, IPK, Gatersleben, Germany; Ulrich Schaffrath, RWTH, Aachen, Germany; and Reints Niks, WU, Wageningen, The Netherlands.

Publications.

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ITEMS FROM THE UNITED STATES OF AMERICA

INDIANA

PURDUE UNIVERSITY
Departments of Agronomy, Botany and Plant Pathology, Entomology, and the USDA-ARS Crop Production and Pest Control Research Unit at Purdue University, West Lafayette, IN 47907, USA.

J.M. Anderson, S.E. Cambron, C. Crane, S.B. Goodwin, S. Scofield, B. Schemerhorn, R.H. Shukle and C.E. Williams (USDA–ARS); H.W. Ohm (Department of Agronomy); K. Wise (Department of Botany and Plant Pathology); and J. Stuart (Department of Entomology).

Wheat production.

According to the USDA National Agricultural Statistics Service, harvested wheat acreage in Indiana in 2009 totaled 450,000 acres. Wheat production was down from 560,000 acres in 2008. Total production was estimated at 30.1 million bushels, with an average yield of 67 bu/ac. Winter survival of wheat during the winter of 2008–09 was excellent. However, average temperatures from February to mid-June were below normal and soil moisture was higher than normal due to frequent rainfall, resulting in delayed growth and development of wheat and limited uptake of nitrogen, resulting in poor wheat growth in low and wet areas of fields. By mid-June, temperatures were higher and near normal, and there was mild soil moisture due to dry soil conditions, resulting in slightly reduced grain test weight.

Wheat disease summary.

Wheat diseases were generally at low levels throughout central and northern Indiana in 2009. Stagonospora leaf blotch and Septoria leaf blight were problematic in southern Indiana early, and a prolonged period of rainy and humid weather in early May contributed to significant Fusarium head blight (FHB) throughout southern Indiana. The resulting disease caused significant yield loss and reduction in grain quality due to the mycotoxin DON, especially on susceptible cultivars. Due to cool weather conditions, FHB developed late in the season in mid to northern Indiana, and was less severe than in the southern third of the state, although there was some grain yield loss. Leaf rust moved into Indiana late in the growing season, and stem rust was observed in southern Indiana, however, both diseases arrived too late in the growing