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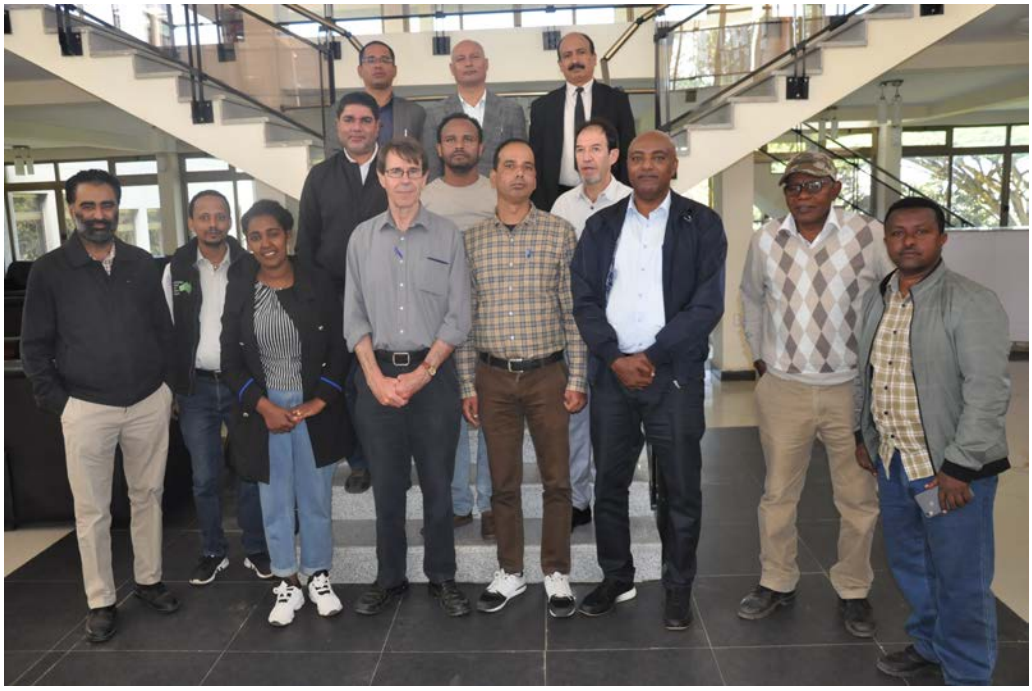
Australian Government
Australian Centre for International Agricultural Research

Mitigating the effects of stripe rust on wheat production in south Asia and eastern Africa



WHEN WE KNOW BETTER, WE DO BETTER

ACIAR Project: CIM/2014/081 Newsletter No. 4, 2020

A mid-term review of project "CIM/2014/081" and the project's annual meeting were held from 17 - 19 October 2019 at the Kulumsa Agricultural Research Centre, Ethiopian Institute of Agricultural Research (EIAR), Ethiopia. We are most grateful to our colleagues at EIAR for hosting us for these meetings.

Dr. Tolesa Alemu, Director, Kulumsa Agricultural Research Centre, Dr. Bekele Hundie, Dr. Habte Zegeye, Ms. Yewubdar Shewaye, Mr. Dawit Asnake, Mr. Tamrat Negash and Mr. Tamene Gurmesa (EIAR), Dr. Subhash Bhardwaj and Dr. Hanif Khan (Indian Institute of Wheat & Barley Research, Karnal), Dr. Suraj Baidya and Dr. Dhruba Bahadur Thapa (Nepal Agricultural Research Council, Khumaltar), Dr. Eric Huttner (ACIAR), and Prof. Robert F. Park, Dr. Davinder Singh and Dr. Karanjeet S. Sandhu (USYD) attended the meetings. Unfortunately, no scientist from Pakistan was able to attend due to problems with securing a visa on time. All attendees provided reviews of the work done so far on phenotyping and genotyping the Core Set and segregating populations, as well as efforts in germplasm enhancement and in training. It was agreed that the information generated to date will make valuable contributions in combating stripe epidemics in all partner countries.

Evaluation of Rust screening nurseries and training of junior scientists at Kulumsa Agricultural Research Centre, Ethiopia

L to R: Mr. Asnake, Prof. Park, Dr. Singh, Dr. Sandhu, Dr. Thapa, Mr. Negash, Dr. Baidya, Dr. Khan, Dr. Hundie, Dr. Bhardwaj and Dr. Huttner inspecting wheat stripe rust field trials at the Kulumsa, Ethiopia

PLANT BREEDING INSTITUTE, COBBITTY, NSW, AUSTRALIA

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Impact of training in rust genetics and pathology

This year has been particularly challenging for the project due to the COVID-19 situation. Project personnel from Australia were unable to visit Nepal and rust scoring was conducted independently by Dr. Thapa and Plant Breeding Institute (PBI) trained scientist Mr. Prem Magar. Dr. Thapa and Mr. Magar took the opportunity to impart training of local students as well. Dr. Thapa said that "Mr. Prem actively participated in each scorings of this season. He is perfect professional in this regard. Thank you very much for your schooling such guys for science and technology". We are delighted to receive such acknowledgement of the capacity building in Rust Genetics and Pathology we have undertaken as part of the project, and it is great to learn that the training imparted at PBI is having an impact.

L to R: Mr. Mahesh Subedi, Mr. Anup Dhakal, Mr. Bhajuman Maharjan, Mr. Prem Magar, Ms. Ritu Acharya, Dr. Dhruba Thapa, Ms. Sapana Ghimire and Ms. Eliza Sarma

Wheat stripe rust epidemics in Nepal and Pakistan

Stripe rust hits wheat crop in Nepal

Dr. Thapa and other wheat scientists conducted a detailed rust survey in the Terai and hills regions of Nepal. His team reported stripe rust epidemics in the mid- and far- western hills, where most of the popular wheat varieties like WK1204 (80S), Dhaulagiri (90S), and Danphe (spike infection) as well as farmers' local varieties were heavily infected with stripe rust. Dr. Thapa and CIMMYT scientist Dr. Dave Hodson suspect that there are one or more new races of stripe rust in Nepal. According to Dr. Thapa, the current outbreak of stripe rust in the hills districts of Nepal is comparable to what farmers have experienced during the stripe rust epidemics that occurred from 2005 to 2007. However, recently released varieties such as BL 4341, Bandganga, Sworgadwari and some new pipeline genotypes such as NL1327, NL1369, BL4818, BL4868, WK1712, WK2286 and WK2422 were observed to be free of stripe rust infection. Wheat scientists have warned seed entrepreneurs and farmers to limit the use of seeds of susceptible varieties of wheat in the next season.

Wheat under yellow rust attack in Pakistan

According to the DAWN Newspaper March 25, 2019 report; Wheat, the largest crop sown in Pakistan was under attack by the Yellow Rust disease in Punjab. Commenting on the use of old varieties, Dr. Javed Ahmad, Director Wheat Research Institute at Ayub Agriculture Research Institute, stressed that wheat growers should sow new rust resistant varieties, as most of the old varieties like FD-2000, Sehar, Punjab-2011and Galaxy are susceptible to stripe rust.

Photo: Wheat stripe rust screening trials at the Crop Diseases Research Institute, PARC, Islamabad

Greenhouse screening for stripe rust resistance, IIWBR Shimla, India

Wheat germplasm was evaluated for stripe rust resistance by colleagues at the ICAR-IIWBR Flowerdale Regional Station Shimla using 9 of the most virulent and predominant stripe rust pathotypes in the Indian subcontinent (viz. 238S119, 110S247, 110S119, 46S119, 110S84, 78S84, 111S68, 47S103, 46S103). The wheat lines Digalu, HAR1136, and NR340, and the stripe rust resistance genes *Yr5*, *Yr10*, *Yr15*, *Yr27* and *Yrsp* were effective to all the pathotypes used. All stage resistance genes *Yr9* (18%), *Yr2* (16%) and *YrA* (11%), both ineffective against at least one pathotype, were postulated in the germplasm. Under controlled conditions, a substantial number of lines (61%) showed different levels of adult plant resistance against a mixture of the 9 pathotypes used for seedling screening.

Photos: Rust screening under controlled conditions at ICAR-IIWBR Research Station Flowerdale, Shimla

Dr. Fayyaz and his team innovate against the odds of weather

Out of season rains could have delayed or stopped the sowing of trials, but Dr. Muhammad Fayyaz, Senior Scientific Officer at the Crop Diseases Research Institute, PARC, Islamabad took the initiative to sow all the wheat lines using disposable cups in the greenhouse. As soon as the rain stopped, seedlings were transplanted in the field and crop season was saved. This was a remarkable achievement and we offer our congratulations and sincerest thanks to Dr. Fayyaz and his team.

Photos: Transplanting in progress at CCRI, Islamabad and CDRI, Nowshera in Pakistan

Congratulations to Ms. Shewaye

USYD & ACIAR nominee wins the 2020 Jeanie Borlaug Laube Women in Triticum Award

Ms. Yewubdar Shewaye Ishetu (MSc. Plant Breeding), is an Associate Researcher at the Ethiopia Institute of Agricultural Research, Debre Zeit Agricultural Research Centre (DZARC), Ethiopia. Yewubdar helps in the rust screening of wheat germplasm at DZARC and was nominated for the Jeanie Borlaug Laube Women in Triticum (WIT) Early Career Award 2020. Ms. Laube has served as the chair of the Borlaug Global Rust Initiative (BGRI) since 2009.

Upon receiving the award, Yewubdar said "I feel very grateful and happy when I heard that I am one of the 2020 WIT award winners. Having seen the WIT awardees receive their reward from Jeanie Borlaug Laube in Sydney Australia in 2015 and in Marrakech Morocco in 2018, I really wanted to be one of the next awardees and thanks to God my dream came true. Receiving this award has encouraged me even more to continue doing what I love while standing strong as a woman in science. It is a great honor to receive the award named after Jeanie Borlaug".

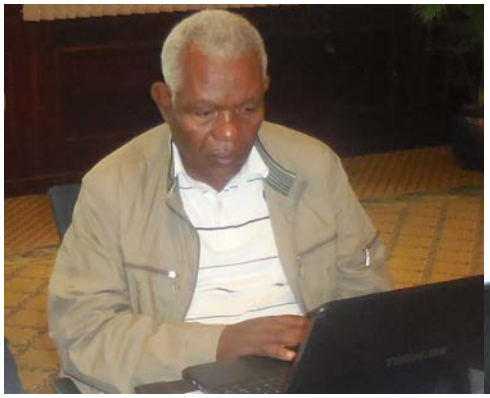
Congratulations to Ms. Belayineh

Winner of the 2019 Jeanie Borlaug Laube Women in Triticum Award

Ms. Fikrte Yirga Belayineh, (MSc. Plant Pathology), is an Associate Researcher at the Ethiopia Institute of Agricultural Research, Kulumsa Agricultural Research Center (KARC), Ethiopia. Her MSc. work on the characterization of *Puccinia striiformis* f. sp *tritici* and evaluation of wheat genotypes for their resistance to stripe rust, at the School of Plant Science at Haramaya University, was supported by the EIAR and DGGW. For her continued research and support in the rust screening of wheat germplasm at KARC, she was nominated for the Jeanie Borlaug Laube Women in Triticum (WIT) Early Career Award 2019.

Congratulations to our recently retired colleagues:

On behalf of our entire team, we congratulate Dr. Bekele Hundie (EIAR Ethiopia), Dr. Ravish Chatrath (IIWBR, India) and Dr. Anjum Munir (PARC, Pakistan) on their retirement. We thank them all for the valuable contributions to the project and their warm friendship, and wish them a very happy and healthy and well earned retirement.



Photos: L to R: Dr. Bekele Hundie, Dr. Ravish Chatrath and Dr. Anjum Munir

News and events

Centenary of Cereal Rust Research - Wednesday 28th October 2020

We are feeling proud to announce that year 2020 marks 100 years of rust research at the University of Sydney – the very first rust sample received for race analysis by Professor Walter Waterhouse at the University was collected from Hawkesbury NSW in May 1921.

A one day celebration of this remarkable milestone in the history of rust research at the University of Sydney will be held at the PBI on the October 28th, starting with a morning tea and tours of our greenhouses, labs and fields. The afternoon will be a more formal event, held at the Liz Kernohan lecture Theatre, after which there will be a dinner at Camden Valley Inn.

Should our ability to hold this meeting as a gathering be prevented by COVID-19 restrictions, we will proceed with a virtual web-based event.

Australian Cereal Rust Control Program (ACRCP) webpage;

https://www.sydney.edu.au/science/our-research/research-areas/life-and-environmental-sciences/cereal-rust-research.html

Follow us at: https://twitter.com/PbiCobbitty

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