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# REGIONAL COLLABORATION IS CRUCIAL TO COMBAT WHEAT RUST DISEASES IN CENTRAL AND WEST ASIA

Wheat is the key crop for world food security. It covers the largest area of sowing, and alone supplies almost 20 percent of the calories consumed by the world population. Wheat productivity is crucial to meet the increasing demand for food.

Rust diseases are among the main constraints affecting wheat production globally, especially when suitable climatic conditions prevail. The frequency, extent and impact of rust diseases have increased in recent decades, and the emergence and expansion of more aggressive new strains that can infect previously

resistant varieties generate concern worldwide.

Wheat rusts are caused by fungal pathogens belonging to the *Puccinia* species. The three major rusts and their respective causal fungi are yellow rust (*P. graminis f.sp. striiformis*), stem rust (*P. graminis f.sp. tritici*) and leaf rust (*P. triticina*). These fungi are airborne and their spores can spread rapidly over large distances.

These fungi infect the leaves, stems or ears of plants, resulting in shrivelled grains and yield losses of up to 80 percent or more, depending on local conditions.

Rusts affect almost all wheat-producing regions, from the Americas to Australia. Wheat production in East and North Africa, in the Near East and West, Central and South Asia – which accounts for over 37 percent of total global wheat production area – is severely affected by wheat rust epidemics resulting from new races.

To provide support, FAO continuously reinforces collaboration with its partners to boost countries' ability to detect and manage these emerging wheat rust races.

## NEW RUST RACES EMERGE AND SPREAD QUICKLY ACROSS BORDERS

Wheat rust fungi frequently produce new races that can spread quickly over borders into new environments, affecting large areas. In the last two decades, stem rust drew international attention

due to the impact of the Ug99 race in East Africa especially. To date, the race has spread to 13 countries, as far away as the Islamic Republic of Iran and Egypt.

Similarly, the aggressive races of yellow rust with virulence on Yr9 and Yr27 genes caused epidemics affecting thousands of

# KEY FACTS

## WHEAT RUST DISEASES

WHEAT IS A SOURCE OF FOOD AND LIVELIHOOD FOR OVER 1 BILLION PEOPLE IN DEVELOPING COUNTRIES

RUST DISEASES THREATEN WHEAT PRODUCTION AROUND THE WORLD AND CAN CAUSE YIELD LOSSES OF UP TO 80 PERCENT OR MORE

YELLOW AND STEM RUSTS HAVE RECENTLY PRODUCED NEW RACES, CAUSING SIGNIFICANT LOSSES

WHEAT PRODUCTION IN EAST AFRICA, THE NEAR EAST AND ASIA IS PARTICULARLY VULNERABLE TO RUST DISEASES

A NEW REGIONAL PROJECT BOOSTS MONITORING, COLLABORATION AND NATIONAL CAPACITIES FOR MANAGEMENT OF RUST DISEASES IN CENTRAL ASIA AND CAUCASUS

**FAO-EMPRES  
PLANT PROTECTION**

**E-MAIL**

[Food-Chain-Crisis@fao.org](mailto:Food-Chain-Crisis@fao.org)

**WEBSITE**

[www.fao.org/food-chain-crisis](http://www.fao.org/food-chain-crisis)

Food and Agriculture Organization  
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hectares in many countries along the North Africa-Central Asia wheat belt. More recently, the Warrior race and its derivatives affected wheats across Europe. In the last few years, new races of both yellow and stem rusts have been emerging and spreading in various regions. For example, a study conducted by the Global Rust Reference Center (GRRC) at Aarhus University, Denmark, indicates that the Sicily race of stem rust, first identified in Sicily, has spread to Spain, Tunisia and the Islamic Republic of Iran, while the yellow rust Pst11 race, which was first detected in Afghanistan, has reached East Africa, where it caused significant losses, and Turkey.

### ENHANCING REGIONAL COLLABORATIONS, BOOSTING NATIONAL CAPACITIES

The emergence of new races year after year indicates that the effective management of rust diseases requires continuous monitoring of population shifts and implementation of relevant strategies – in particular, the development and use of resistant varieties – is essential.

The long-term management of rusts should focus on the use of resistant varieties and integrated approaches, as part of national strategies and contingency plans.

These efforts require close collaboration and information-sharing among countries within the main wheat-growing regions, as well as between the regions themselves.

In 2008, FAO established a global wheat rust programme to facilitate regional collaboration and offer technical support to boost countries' capacities in Africa, the Middle East and South and West Asia.

FAO, the International Center for Agricultural Research in the Dry Areas (ICARDA), the International Maize and Wheat Improvement Center (CIMMYT),

the International Fund for Agricultural Development (IFAD), Cornell University and Aarhus University worked together in the context of the Borlaug Global Rust Initiative (BGRI).

Almost 40 countries in the Middle East, South and West Asia and in East Africa have benefited from the support of this programme, in various domains.

In the last decade, assistance was also extended to Central Asian countries, following the establishment of the Regional Cereal Rust Research Center (RCRRC) in Izmir, Turkey. FAO and ICARDA supported trainings at this centre, helping to improve the skills of over 50 scientists from 10 countries of the Central Asia and Middle East in the surveillance and management of wheat rust diseases, coupled with survey activities.

A new project has been implemented to facilitate regional collaborations, surveys race analysis and information-sharing among the countries. Rust samples will be collected and analysed at the RCRRC to map the race composition of the rust populations and to identify emerging races. This will enable early detection of threats and rapid response, and contribute to the global rust monitoring system coordinated by CIMMYT in context of the BGRI.

The project CAC-Rust, supported by the FAO-Turkey Partnership Programme (FTPP II), is implemented in collaboration with national institutions, ICARDA and CIMMYT and the International Winter Wheat Improvement Programme (IWWIP), operated from Turkey. The initiative also seeks to build up national capacities in surveillance, race analysis and disease management by providing trainings at RCRRC. Farmer trainings and support to the development of national strategies and contingency plans for short- and long-term management of the disease will also be offered.



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