

## ***Responding to the transboundary threat of wheat black stem rust (Ug99)***

### ***The challenge...***

Wheat farmers have battled plant-killing fungi since the grain was domesticated over 10,000 years ago. Wheat black stem rust, or *Puccinia graminis*, is a deadly threat to wheat harvests, capable of spreading across continents and decimating the wheat crops in its path.

Thirty years ago, this lethal fungus was stopped in its tracks, when Norman Borlaug, Nobel Peace Prize laureate, developed wheat varieties that could resist the fungal attack. However, a new race of the virulent cereal black stem rust disease, or Ug99, has started to spread rapidly across Africa and South Asia and is posing a major threat to global wheat and barley yields. It has overcome existing defences in cultivated wheat varieties and is leading to devastating crop losses. To ensure the safety of the world's wheat production, it is necessary to accelerate research into new varieties of wheat to identify those resistant to the aggressive fungus.

### ***The project...***

Under a technical cooperation project, the IAEA has supported the breeding of resistant wheat lines using induced mutation techniques to produce varieties that are able to fight off Ug99 while preserving good agronomic traits.

The project facilitated and coordinated a network of laboratories as a defence line against Ug99 in high risk countries. It has supported multi-location trials of mutant germplasm in epidemic hotspots and various quality management activities. The project built human resource capacity by providing training on mutation induction and breeding, and developed a methodology to apply induced mutation techniques adapted to low budget and low infrastructure laboratories. The project also improved laboratory infrastructure through the procurement of equipment and other materials.

### ***The impact...***

The project has contributed significantly to the global effort to fight the epidemic spread of stem rust by accelerating research on new wheat varieties that are resistant to the aggressive fungus. As a result of this project, thirteen advanced lines and variety candidates of stem rust resilient wheat have been identified from six countries, including Algeria, Iraq, Kenya, Syria, Uganda and Yemen. Two of the mutant lines have been successfully validated by the independent national authority in Kenya, and have received formal recognition as wheat varieties. All advanced lines produced under the project will be delivered to other participating countries for submission to respective National Performance Trials. The seed of selected varieties will be multiplied and later disseminated to farmers. This will ensure sustainable crop production and will further enhance global food security.



*Screening results are shared among the participating countries, Kenya.*