Evaluation of resistance to stripe and stem rust in some native Iranian landraces of wheat

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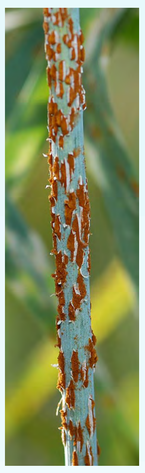
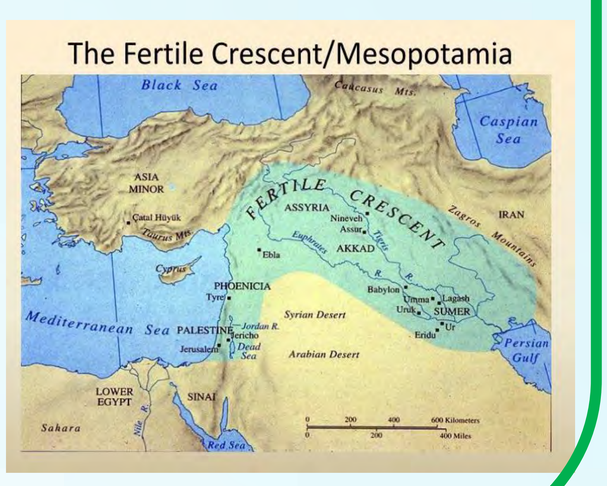
Introduction

Puccina striiformis f. sp. *tritici* (*Pst*), and *Puccinia graminis* f. sp. *tritici* (*Pgt*) are important fungal pathogens that cause destructive wheat lost world wild. Wheat landraces are valuable sources of resistance that developed over long periods and have complex resistance in their geographical regions. Northwestern Iran is located in the Fertile Crescent, presents an important wheat and pathogens co-epicenter.





Method

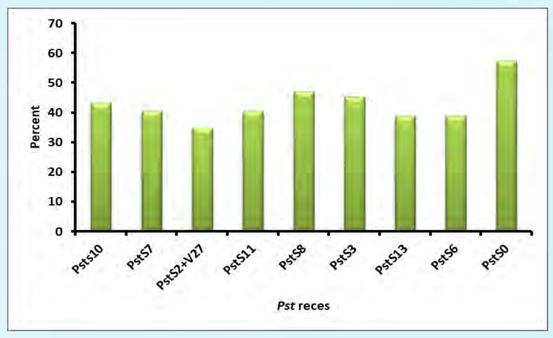
Reactions of one hundred-six Iranian wheat landraces including 39 Iranian reference set (IRS) genotypes and 67 genotypes from Seed and Plant Improvement Institute (SPII) were evaluated against both wheat yellow and stem rusts. These genotypes were selected base on their field response to yellow rust at Zarghan research station during 2 cropping season 2018 and 2019 (unpublished date).

- Nine different *Pst* races including; *Psts10*, *PstS7*, *PstS2+V27*, *PstS11*, *PstS8*, *PstS3*, *PstS13*, *PstS6* and *PstS0* were inoculated based on method described by Hovmoller *et al.*, 2017.
- 15-18 days after yellow rust inoculation plant were scored based on McNeal *et al.*, 1971.
- Six different *Pgt* prevalent races, TTKTT, TTRTF, TTKSK, TKTTF, TKKTF and TTTTF were inoculated based on method described by Jin *et al.* (2008).
- 16-18 days after stem rust inoculation plants were scored based on Stakman *et al.* (1962) and McIntosh *et al.* (1995).

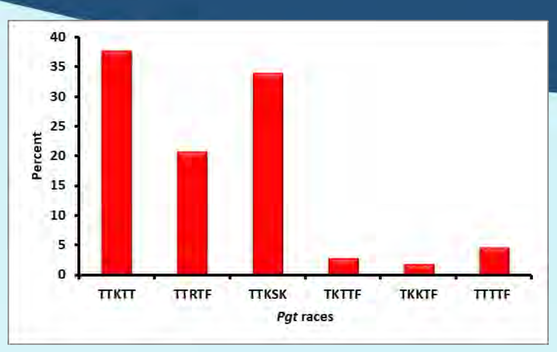
Results

In total, 43.4% (46), 40.6% (43), 34.9% (37), 40.6% (43), 47.2% (50), 45.3% (48), 38.7% (41), 38.7% (41) and 57.5% (61) of the genotypes showed different levels of resistance (infection type) to *PstS10*, *PstS7*, *PstS2+V27*, *PstS11*, *PstS8*, *PstS3*, *PstS13*, *PstS6* and *PstS0*, respectively.
Sixteen genotypes (15%) showed resistance to all studied *Pst* isolates, mostly originated from Northwest of Iran.
Moreover, 37.74% (40), 20.75% (22), 33.96% (36), 2.83% (3), 1.89% (2) and 4.72% (5) of the genotypes showed different levels of resistance against TTKTT, TTRTF, TTKSK, TKTTF, TKKTF and TTTTF, respectively.
Two genotypes (1.8%) originated from Hamedan and Lorestan provinces showed resistance to all *Pgt* races.

Frequency of resistance genotype in materials

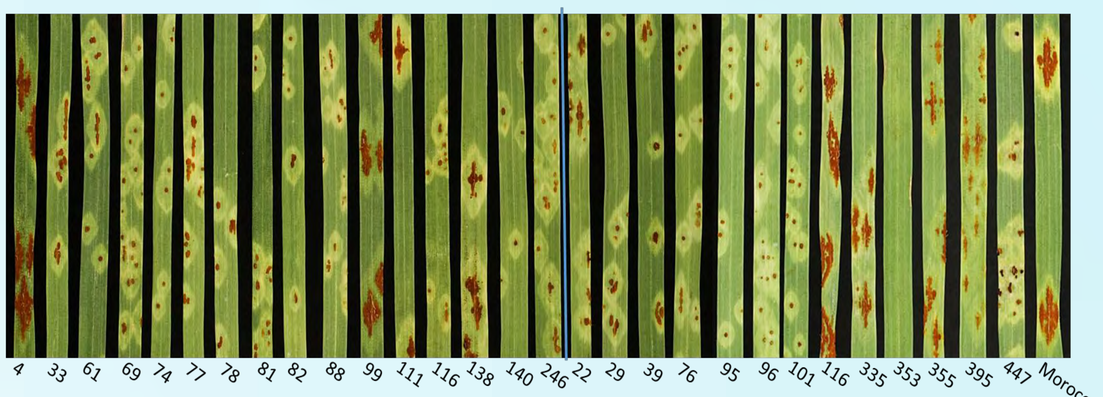


Yellow rust



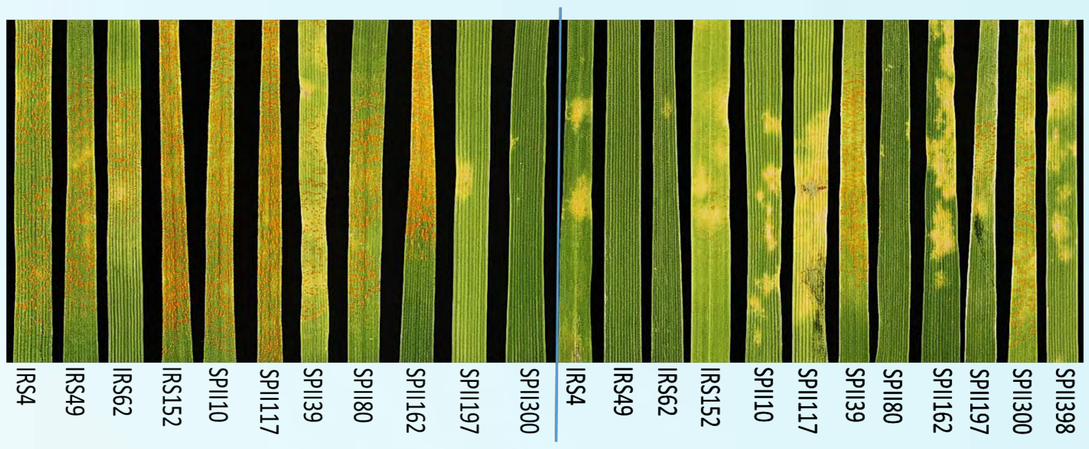
Stem rust

Reaction of some Iranian Landraces to TTRTF



IRS **SPII**

Reaction of some Iranian Landraces to *PstS7* and *PstS3*



PstS7 ***PstS3***

Concluding and future directions

Further breeding and molecular studies will be perform to investigate harboring wheat rust resistance genes in the resistant landraces. Identification of novel sources of resistance against wheat rusts and employing valuable native wheat landraces genetic backgrounds, local and international wheat-breeding programs would be further facilitated.

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