





DISEASE NOTE

A New Variant of *Puccinia striiformis* f. sp. *tritici*, the Cause of Stripe Rust on Wheat and Barley in Egypt

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Received: 23 August 2022 / Accepted: 13 September 2022 / Published online: 14 September 2022.

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Puccinia striiformis Westend is an obligate parasite, has the capabilities to infect wheat (*Triticum aestivum*) and barley (*Hordeum vulgare*) causing yellow (stripe) rust, which is extremely a very dangerous disease. Several formae specialis of the rust fungus *P. striiformis*, including *P. striiformis* f.sp. *tritici* (Pst) and *P. striiformis* f.sp. *hordei* (Psh), are classified based on host specialization. In 1920, *P. striiformis* f.sp. *tritici* (Pst), which causes wheat stripe rust, was discovered for the first time in Egypt (Briton-Jones, 1920 and Briton-Jones, 1925). In 2022, wheat varieties, Gemmeiza-11, Sids-12, Misr-1 and Misr-2 are susceptible to yellow rust, meantime symptoms of yellow rust caused by *P. striiformis* f.sp. *tritici* were observed on barley line, Sawsan/Badia//Arar/3/Gloria'S'/Copal'S'/6/Rhn-03/Eldorado/5/Rhn-03//Lignee527/NK1272/4/Lignee527/Chn-01/3/Alanda for the first time in the Smart Agricultural Clinic Project plots area at Sakha Agricultural Research Station (hot spot) (Fig. 1). Yellow pustules aligned linearly between the lateral veins bundles of leaves are among the disease symptoms as well as the glumes are filled by the fungus uredospores (Fig. 1.A, B, D, E, C and F). Yellow rust symptoms typically appeared early in the 2022 season and caused severe epidemics because of the availability of suitable climatic conditions (low-temperature and high humidity %). The isolates collected from infected barely leaves were virulent on the wheat differential variety; Chinese 166 at seedling stage under greenhouse condition. Also, the obtained results showed virulence's to *Yr1*, *Yr17*, *Yr27* and *Yr32* under field conditions (Fig. 2). Also, collected samples from barley and wheat were sent to Global Rust Reference Center (GRRC) in Denmark to identify this race. The uredospores and teliospores of yellow rust fungus were found to be comparable in shape and size upon light microscopic examination (Fig. 3A, B, C and D).

Keywords: Wheat, *Triticum aestivum*, Barely, *Hordeum vulgare*, Stripe rust, *Puccinia striiformis*

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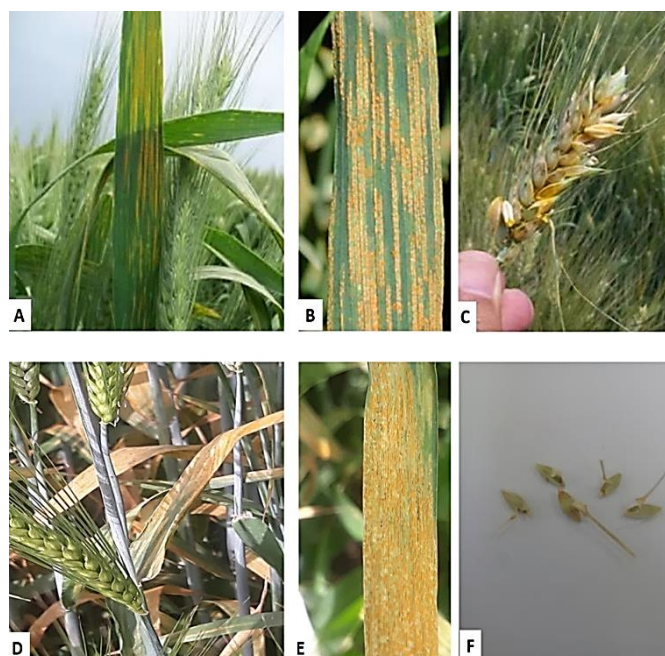


Fig. (1): Symptoms of stripe rust of wheat and barley (A, B, C, D, E and F).



Fig. (2). Symptoms of stripe rust on Chinese 166 (*Yr1*), *Yr17/6*Avocet S*, *Yr32/6*Avocet S*, and *Yr27/6*Avocet S*.

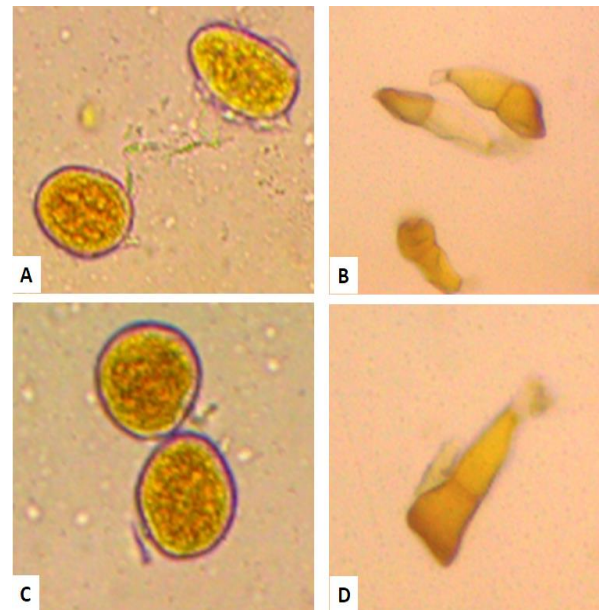


Fig. (3): Uredospores and teliospores of wheat (A and B) and barely (C and D), 400x.

REFERENCES

- Abu Aly, A.A.M.; Omara, R.I.; Abd El-Malik, N.I. 2017. Evaluation of new sources of resistance to wheat stripe rust (*Puccinia striiformis* f.sp. *tritici*), under Egyptian field conditions. *J. Plant Protection Pathol. Mansoura Univ.*, 8, 181-188.
- Briton-Jones, H.R. 1920. The rusts and smuts of wheat, barley and oat. *Tech. Bull. Min. Agric.*, 15, 16 pp.
- Briton-Jones, H.R. 1925. Mycological work in Egypt during the period 1920-1922. *Tech. Bull. Min. Agric.*, 49, 126 pp.

- Omara, R.I.; El-Naggar, D.R.; Abd El-Malik, N.I.; Ketta, H.A. 2016. Losses assessment in some Egyptian wheat cultivars caused by stripe rust pathogen (*Puccinia striiformis*). *Egypt J. Phytopathol.*, 44(1): 191-203.
- Shahin A.; Ashmawy M.; El-Orabey W. and Samar, E. 2020. Yield losses in wheat caused by stripe rust (*Puccinia striiformis*) in Egypt. *American J. Life Sci.*, 8: 127-134.
- Shahin, A.A. 2020. Occurrence of new races and virulence changes of the wheat stripe rust pathogen (*Puccinia striiformis* f. sp. *tritici*) in Egypt. *Archives of Phytopathology and Plant Protection*, 53: 552-569.



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