RESISTANCE IN DURUM AND COMMON WHEATS TO STEM RUST DETECTED IN CENTRAL ITALY

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Stem rust, caused by *Puccinia graminis* f.sp. *tritici*, is an age-old disease of wheat and it has been reported as one of the most destructive diseases worldwide. Its epidemics can be devastating when the most currently grown cultivars are susceptible. During the last fifteen years the presence of stem rust in Italy and in many other countries was detected at non-significant levels. This was probably due to the diffusion of more resistance genotypes, to the eradication of its alternate host (*Berberis vulgaris*) and to the cultivation of early heading wheat genotypes, able to escape disease infections. At the end of nineties a new virulent pathotype of *P. graminis*, known as Ug99 or TTKS, appeared in Uganda and, successively, it was detected in Kenya, Ethiopia, Sudan, Yemen and more recently in Iran. For the next years it is expected its dispersion also in South and Central Asia and in the future it could represent a potential threat to wheat production worldwide. During the last years very devastating stem rust epidemics have been detected in North Africa and around 85% of the wheat genotypes proved to be susceptible to this new stem rust strain, virulent against the traditional wheat resistance genes *Sr31* (located in the translocation 1BL.1RS from *Secale cereale*) and *Sr38* (derived from *Triticum ventricosum*). Moreover, during its migration, new variants of this pathotype, able to defeat the most effective resistance genes in wheat, have been identified. Wheat scientists from different countries were mobilitated for this rust emergency and different global initiatives were supported relating to stem rust surveillance and resistance screening and breeding.

A regular disease monitoring is currently carried out in the most important Italian wheat growing areas. Data on disease severity recorded in Italy during 2007-08 confirmed the absence of stem rust infections in all the locations tested except one, located in Central Italy (Montelibretti-RM), where two common wheat varieties Arsenal and Compair showed symptoms of this disease. Two pathotypes were identified within the pathogen population by testing in greenhouse a set of differential lines/varieties carrying known genes for resistance to *P. graminis*. Different resistance genes like *Sr24*, *Sr25* (both derived from *Thinopyrum ponticum*) and *Sr31*, showed their efficacy to the Italian pathotypes identified, while the lines carrying *Sr38* were susceptible.

Phytopathological analysis were carried out to test the seedling behaviour to stem rust of durum and common wheat cultivars grown in Italy. Many durum wheat cultivars resulted resistant to the pathotypes used for artificial inoculations, while several common wheat cultivars resulted susceptible. The different response of the two species could be due to the source (common wheat) of stem rust inoculum. Molecular PCR markers, closely linked to some *Sr* genes (*Sr24*, *Sr25*, *Sr31*, *Sr38*), were used to detect the presence/absence of the corresponding genes into the genetic background of the above mentioned materials. The presence of *Sr31* gene was evidenced in only two common wheat cultivars (Colledoro and Sollario), while several other genotypes resulted carrying *Sr38* gene. None of the durum wheat genotypes was positive to PCR analysis for the presence of *Sr31* and *Sr38*. A molecular marker assisted selection program was carried out to
pyramid into elite common wheat cultivars different genes for resistance to rust diseases. Novel genotypes with the combined presence of resistance genes to *P. graminis*, *P. triticina* and *P. striiformis* were obtained.