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TRANSFER OF A MAJOR QTL FOR RESISTANCE TO FUSARIUM HEAD BLIGHT FROM *THINOPYRUM ELONGATUM* ONTO DURUM WHEAT 7AL CHROMOSOME ARM AND ITS PYRAMIDING WITH OTHER USEFUL GENES FROM *TH. PONTICUM*

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Fusarium Head Blight (FHB), also called scab, a major wheat disease worldwide, has in recent years become a threat also in uncommon cultivation areas of bread and durum wheat. The lack of efficient and durable sources of resistance within adapted durum wheat germplasm is particularly alarming. In fact, durum wheat is used almost exclusively for human consumption, and Fusarium attacks, besides causing severe yield losses, pose a high risk of kernel contamination with health-dangerous mycotoxins, notably deoxynivalenol (DON). To cope with this scenario, looking outside of the primary genepool and exploring exotic variability harboured within related Triticeae species, appears as a worth strategy. We recently mapped an exceptionally effective QTL for FHB resistance (provisional designation *Fhb-7EL*) onto the telomeric portion of the 7EL chromosome arm of diploid *Thinopyrum elongatum*, and pyramided it with other useful genes from the $7el_1L$ arm of decaploid *Th. ponticum* (*Lr19*, *Yp*, yield related traits) onto the 7DL arm of bread wheat-*Thinopyrum* recombinant lines (Ceoloni et al. TAG, in press). Two such FHB resistant recombinants, having distal 70% of their 7DL replaced by chromatin of the two *Thinopyrum* species in slightly different relative proportions, were crossed with two previously developed durum wheat-*Th. ponticum* recombinants, having 23% and 28% of their 7AL arm replaced by $7el_1L$ chromatin, respectively. In the shared $7el_1L$ region between the bread wheat (6x) and durum wheat (4x) parental recombinant types, including in all cases the *Lr19* gene, homologous pairing evidently occurred with high frequency (over 70%), as proved by GISH-based analysis of meiotic pairing of 5x F_1's. As a result, new 7EL-$7el_1L$ recombinant types could be isolated in the BC_1 generation to durum wheat. Selection for desired recombinants, i.e. those involving chromosome 7A and with a total *Thinopyrum* spp. (7EL+$7el_1L$) chromatin not exceeding the 28% of the arm, was carried out by a panel of user-friendly PCR-based markers. To accelerate reduction of chromosome number to the euploid 2n=28, *in vitro* culture of BC_2 embryos was carried out. Selected heterozygous recombinant plants, most of them having reached a stable chromosomal condition, were selfed and in the BC_2F_2 progeny homozygous genotypes were isolated. The latter were challenged by *Fusarium graminearum* spike inoculation, to verify the efficacy of the *Fhb-7EL* QTL once inserted into a durum wheat background. Compared to highly susceptible control plants, inoculation outcomes confirmed what previously observed at the bread wheat level, with remarkable reduction of disease severity, averaging over 90%, invariably associated with presence of the *Fhb-7EL* QTL. Thus, what is considered to be by far the most effective resistance to FHB available, is now readily exploitable in breeding to provide protection against this threatening disease, hence substantially enhancing food security and safety of the bread and durum wheat crop, in Italy and worldwide.