

Influence of an introgression from *Triticum timopheevii* into chromosome 5A of bread wheat cultivars Saratovskaya 29 and Diamant 2 on agronomical, physiological and biochemical parameters under contrasting irrigation conditions.



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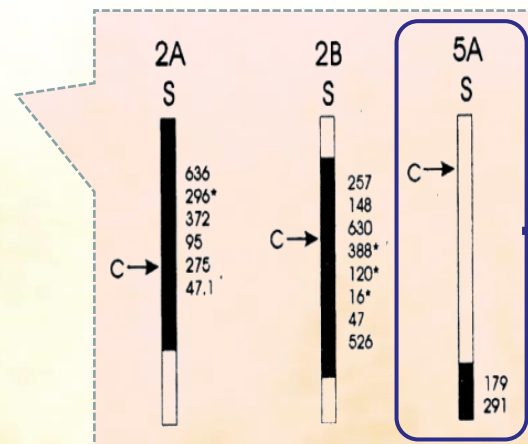
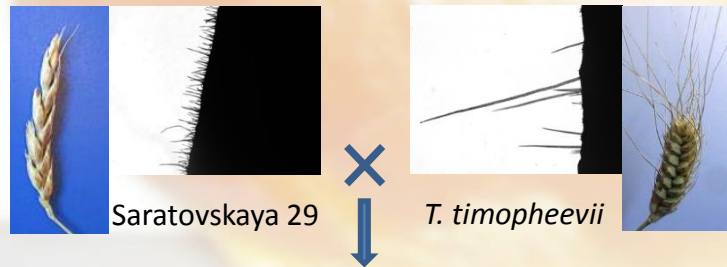
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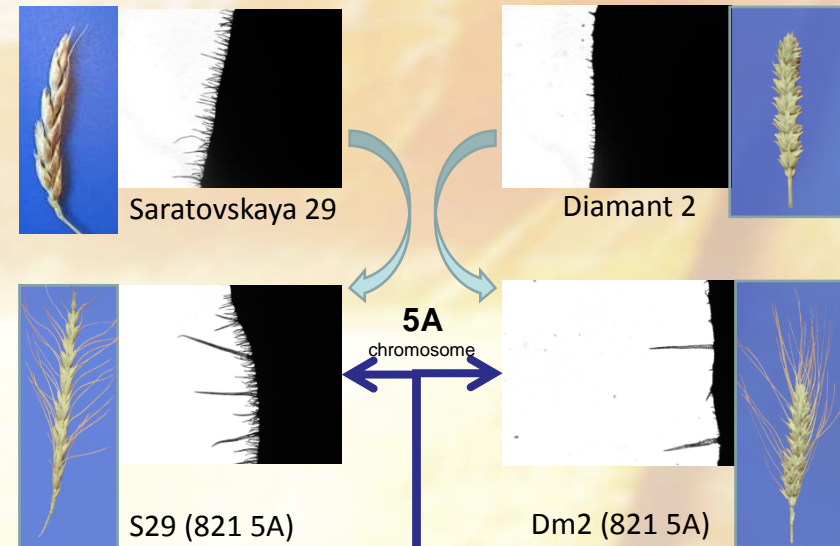
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Leaf pubescence of primary genetic material



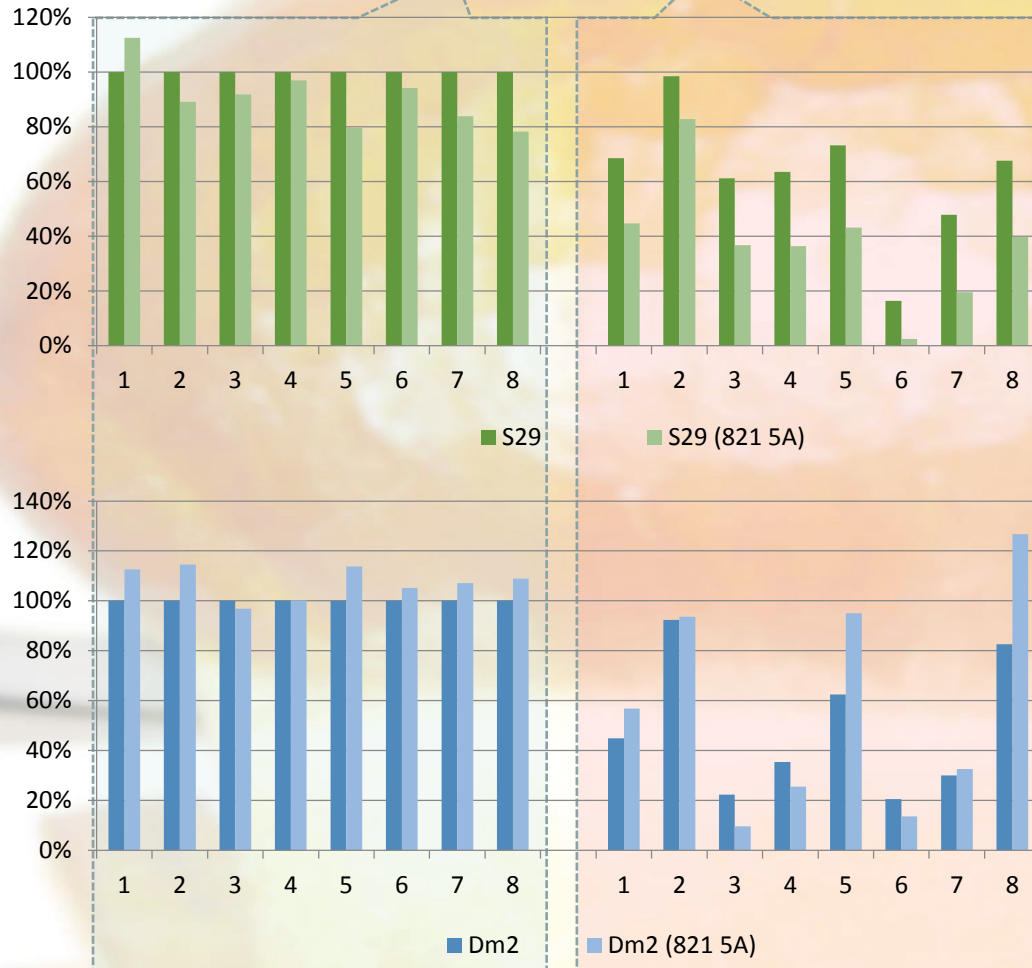
introgressed areas of line 821
Leonova et al., 2001

Creating substitution lines with pubescence from *T. timopheevii*



Hl^{tt} - Hairiness leaf gene from *T. timopheevii* (Simonov et al., 2021)

Relative yield parameters of recipients and substitution lines
under irrigation and drought conditions, in % to the recipients S29 and Dm2 on irrigation



irrigation and drought
after 70 days of vegetation

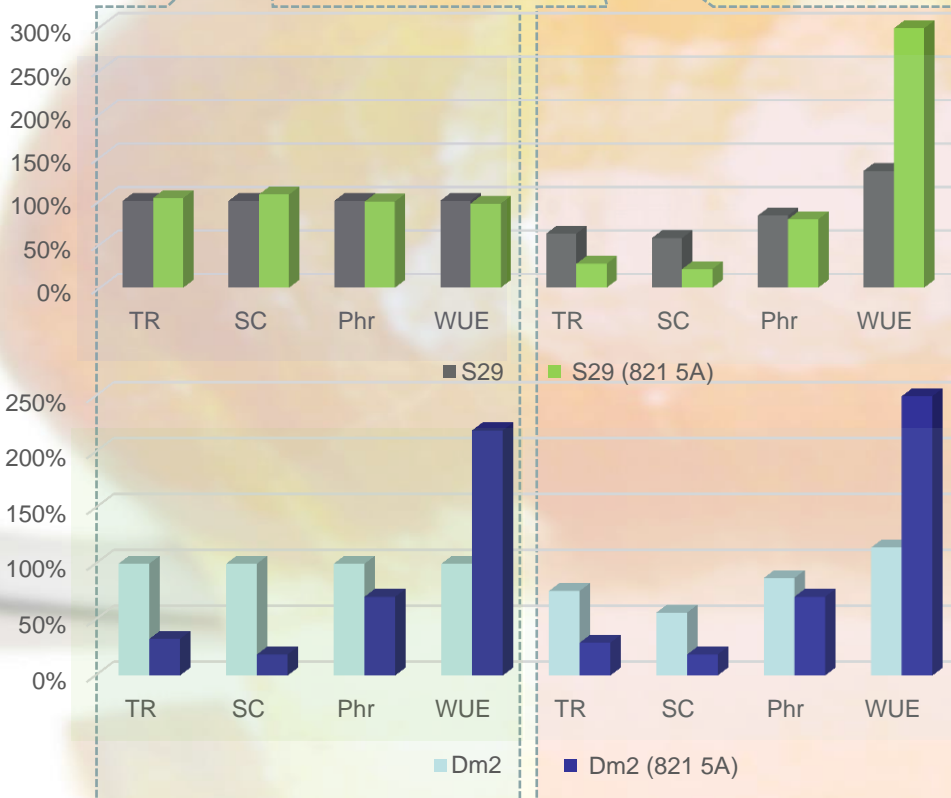
- 1 - number of productive sprout
- 2 - number of grains per main spike
- 3 - number of grains per another spikes
- 4 - number of grains per plant
- 5 - grain weight per main spike, g
- 6 - grain weight per another spikes, g
- 7 - grain weight per plant, g
- 8 - TGW (weight of 1000 grains), g

Introgression to chromosome 5A from *T. timopheevii* significantly modifies the yield parameters under drought conditions.

However, its agronomic value depends on the recipient's genotype:

it is favorable for Dm2 and not favorable for S29

Relative photosynthesis parameters of recipients and substitution lines under irrigation and drought conditions, in % to the recipients S29 and Dm2 on irrigation



measurement of photosynthetic parameters

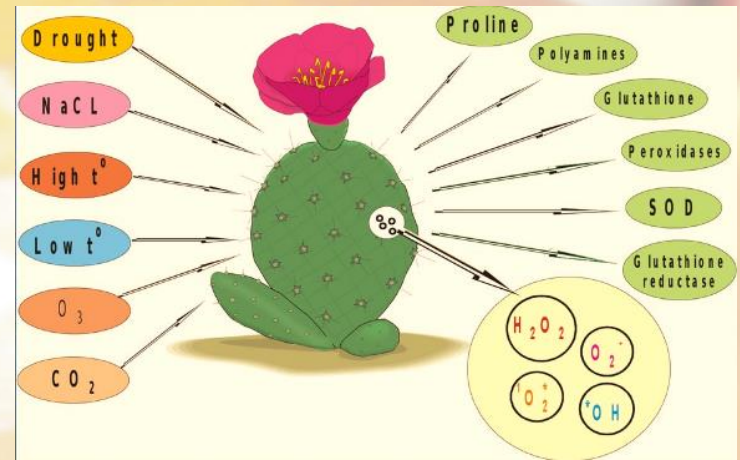
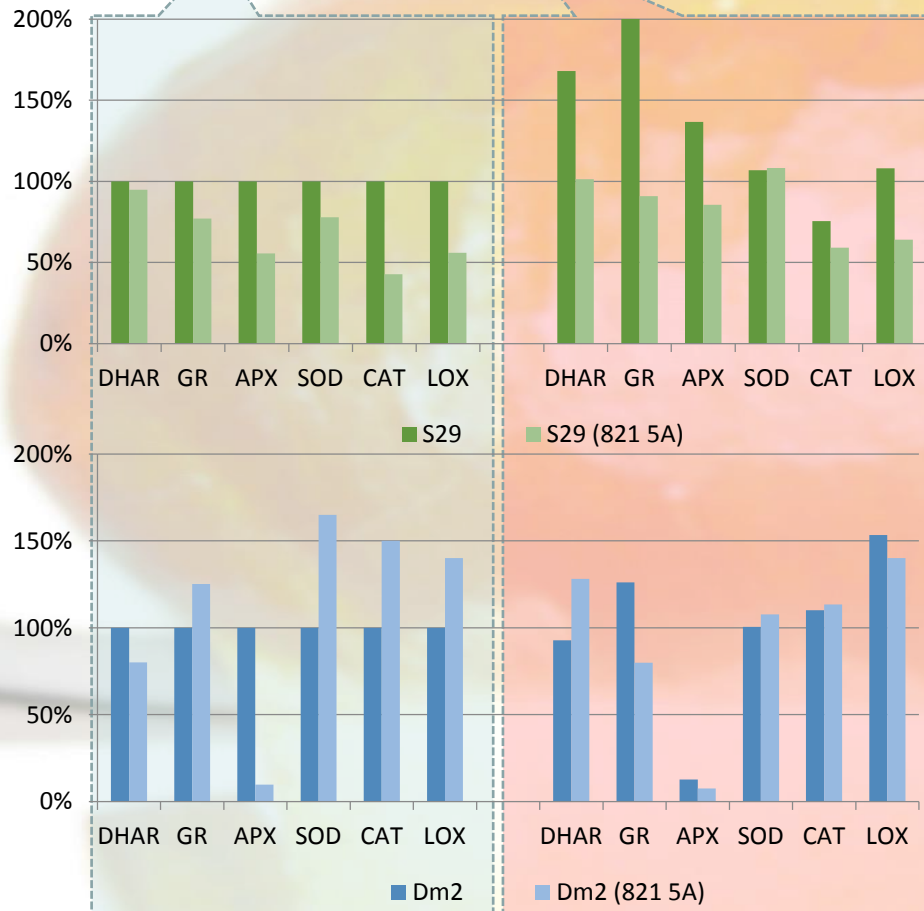


dosed soil moistening

TR – transpiration rate
 SC – stomatal conductance
 Phr – photosynthesis rate
 WUE – water use efficiency

The photosynthesis parameters of S29 (821 5A) changed only during drought, and in Dm2 (821 5A), they both changed under irrigation and under drought. The transpiration photosynthetic rates decreased and water efficiency was doubled.

Relative activity of the main antioxidant enzymes of recipients and substitution lines under irrigation and drought conditions, in % to the recipients S29 and Dm2 on irrigation



antioxidant enzymes protect the intracellular environment from reactive oxygen species that are formed during drought

- DHAR – dehydroascorbate reductase
- GR – glutathione reductase
- APX – ascorbate peroxidase
- SOD – superoxide dismutase
- CAT – catalase
- LOX – lipoxygenase

Introgression of *T. timopheevii* fragment in S29 reduces the antioxidant potential under drought and irrigation.

In general, substitution of chromosome 5A in Dm2 from the line 821 increases the antioxidant potential on irrigation. Under drought the total activity of the enzymes is maintained at the level of Dm2.

Substitution suppress activity of ascorbate peroxidase, especially strongly against the genetic background of Dm2.