

# The studying of hybrid line with spherical grains and reduced height obtained by crossing triticale and synthetic hexaploid wheat

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# Purpose

The aim of the research is identification of genes (loci) determining spherical grain and short stem in the studying hybrid line

## Plant material

**The hybrid wheat line 1102** that is featured by spherical grain and short stem obtained from crossing a wheat-rye amphiploid (triticale) BBAARR ( $2n = 6x = 42$ ) and synthetic wheat ( $2n=6x=42$ , BBAADD).

## Methods

FISH (probes: pSc119.2, pAs1, Spelt1, Spelt52) and GISH (rye DNA) to karyotyping

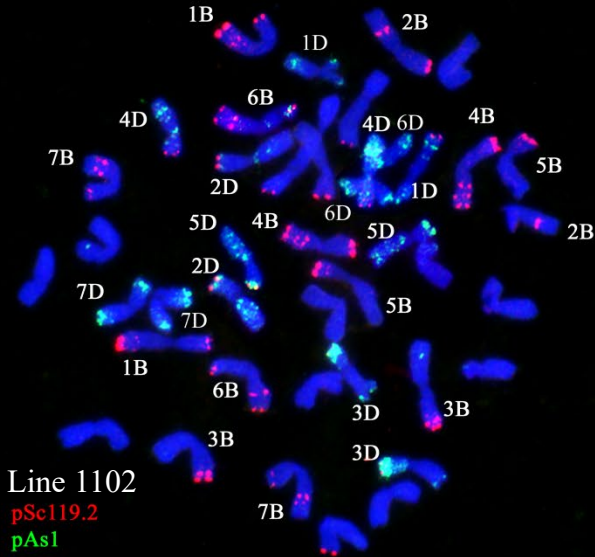
Molecular-genetic analysis with specific markers to Rht-B1a,Rht-B1b, Rht-D1a, Rht-D1b and microsattelite markers to Rht4, Rht5, Rht8 and Rht9

Phenotyping

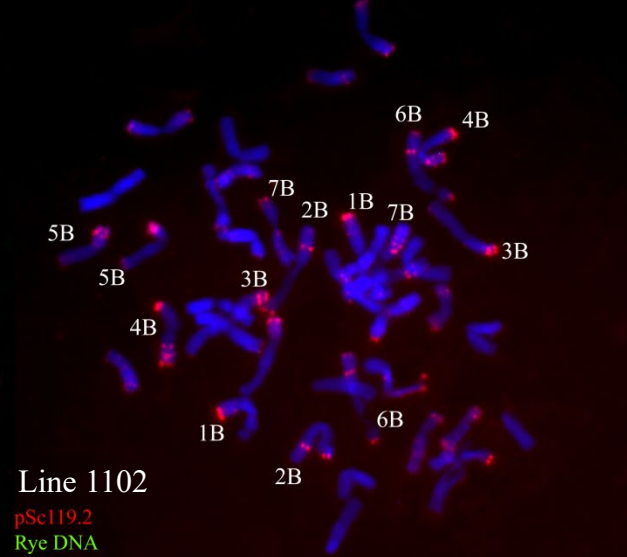
# Karyotype of the studying line 1102 doesn't differ from bread wheat karyotype:

$$2n = 42 = 14B+14A+14D$$

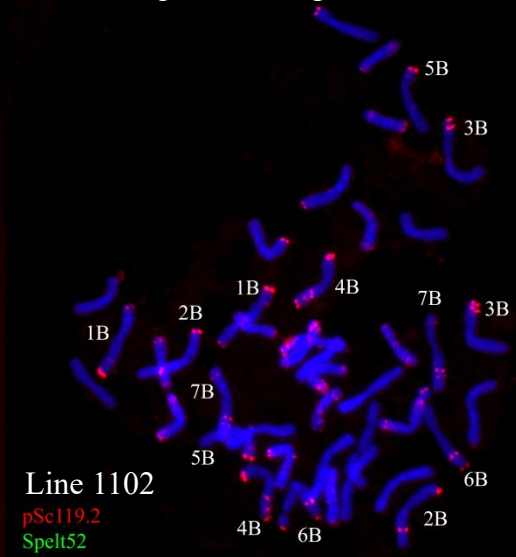
1. Determining the 1102 karyotype



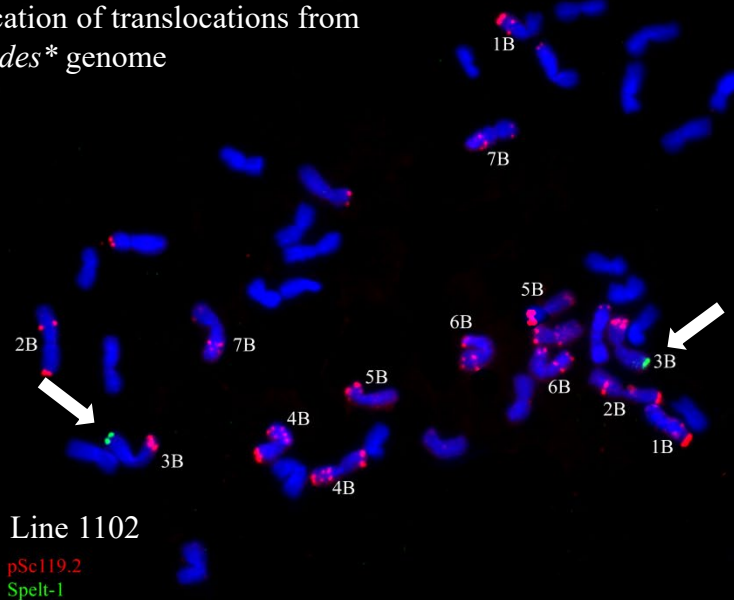
2. Identification of translocations from rye\* genome



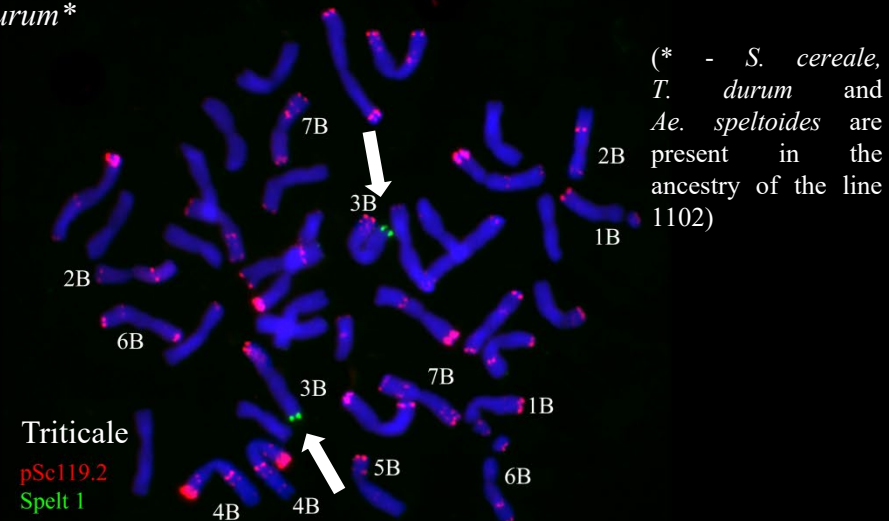
3. Detection of translocations from *Ae. speltooides*\* genome



4. Identification of translocations from *Ae. speltooides*\* genome



5. Testing if Spelt1 signals on the chromosome 3B are translocations from *Ae. speltooides*\* genome or it is inherited from *T. durum*\*



(\* - *S. cereale*,  
*T. durum* and  
*Ae. speltooides* are  
present in the  
ancestry of the line  
1102)

To find genes or QTLs that influence on formation of spherical grains and short stem we conducted hybridization of the studying line with contrast spring varieties of bread wheat. For now we obtained seeds of F2-population plants ( F2-population will be phenotyped and genotyped with Illumina Infinium 25 k Wheat platform (more than 13000 SNP markers) for making genetic maps).

We also tested already known genes of reduced height in the line 1102:

specific markers for Rht-B1a, Rht-B1b, Rht-D1a, Rht-D1b;

microsatellite markers for Rht4, Rht5, Rht8, Rht9.



Marker	Gene/allele	1102	Kinelskaya 40	Lutescens 85	Chinese Spring
Specific marker	Rht-B1a	+	+	+	+
	Rht-B1b	-	-	-	-
	Rht-D1a	+	+	+	+
	Rht-D1b	-	-	-	-
Microsatellite marker	Rht4	~150 bp	~ 120 bp	~ 120 bp	~ 110 bp
	Rht5	~140 bp	~ 120 bp	~ 120 bp	~ 150 bp
	Rht8	-	-	-	-
	Rht9	~250 bp	~ 230 bp	~ 230 bp	~ 220 bp

# Conclusions:

- The studying line 1102 has standard bread wheat karyotype according to hybridization with probes pSc119.2 and pAs1. Some translocations from rye or *Ae. speltoides* haven't been found despite complex origin of the line.
- It is also determined that the line 1102 has wild-type allele *Rht-B1a* with no contribution to reduction of the stem length.

In the future work we will conduct an additional molecular-genetic analysis of the line 1102, genotyping of F2-population and QTL-analysis.

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