

ECOBREED PROJECT AND COMMON BUNT FIELD INOCULATION TRIALS AT THE CROP RESEARCH INSTITUTE



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IMPROVING CROPS

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INTRODUCTION

Common bunt caused by *Tilletia caries* (DC.) Tul. & Tul. (syn. *T. tritici* (Bjerk.) G. Winter in Rabenh.) and *T. foetida* (Wallr.) Liro (syn. *T. laevis* Kühn in Rabenh.) and dwarf bunt caused by *T. controversa* J.G. Kühn can cause yield losses that may exceed 80%. Bunt diseases threaten farming systems whenever the routine use of chemical seed treatment is not possible. Organic wheat production therefore requires alternative means of common bunt and dwarf bunt control. Breeding for bunt resistance offers an efficient and sustainable plant protection strategy particularly for organic production systems.

MATERIAL AND METHODS

Seed inoculation was done by shaking 250 seeds with 0,1 g of teliospores in Erlenmeyer flasks for 1–2 min. Inoculations and sowing in rows 1 m long, 0,2 m apart were carried out by hand in October. The total amount of spikes and total amount of infected spikes per replicate was counted in July. The reaction to bunt was expressed as a percentage of all the spikes in the row exhibiting bunt. For the purpose of race identification an infection incidence above 10% of the spikes indicates virulence.

RESULTS

Tab. 1. Comparison of common bunt incidence in ECOBREED trials in Prag (inoculum mixture RUKR) and in Tulln in 2021

RUNID	Genotype	CB% Prag	CB% Tulln
1	Aristaro	0,5	0,0
2	SEC-290-08-1a	77,1	41,0
3	SEC-313-10-1a (Blickfang)	91,4	73,5
4	Spontan	6,6	9,5
5	Tillexus	2,3	45,0
6	Tillstop	0,0	46,0
7	516_EX01-10G	10,9	2,0
8	516_EX01-11G	16,0	3,0
9	516_EX01K-N-0547	56,5	34,0
10	516_EX01G-N-0547	21,4	6,0
11	517_EX02-11K	13,6	4,0
12	517_EX02K-N-0532A	18,3	2,0
13	517_EX02G-N-0532A	48,5	33,0
14	518_EX03-8G	11,1	1,0
15	518_EX03-11G	7,2	14,0
16	518_EX03K-N-0533B	14,3	9,0
17	518_EX03G-N-0533B	1,8	-
18	559_EX06-4	1,1	0,0
19	559_EX06-9G	2,2	5,0
20	559_EX06-8G	6,9	-
21	521_EX08-3K	33,4	14,0
22	521_EX08K-N-0533B	6,4	18,0
23	521_EX08G-N-0533A	10,4	5,0
24	522_EX09-4G	0,8	1,0
25	522_EX09G-N-0543	23,6	39,0
26	522_EX09K-N-0543	27,9	19,0
27	561_EX13-7K	0,0	39,0
28	561_EX13K-N-0540A	53,4	42,0
31	Butaro	21,3	29,5
32	Genius	2,3	9,0
33	Graziaro	0,0	59,0
34	Tilliko	0,0	17,0
-	UI SRG	0,0	0,0
-	Deloris	0,5	1,5
-	Ursita	10,4	35,0



Tab. 2. Common bunt incidence on genotypes included in ECOBREED trials

Genotype	CB%	Year	Inoculum
Aristaro	0,0	2019	mixRUKR
	0,0	2020	mixRUKR
	0,5	2021	mixRUKR
Begra	14,6	2019	ISOQuebon
	27,4	2019	mixRUKR
	15,2	2020	mixRUKR
Blizzard	0,0	2020	ISOPI119333
	0,7	2021	mixRUKR
Bonneville	0,0	2020	ISOPI119333
	0,0	2021	mixRUKR
Butaro	0,0	2019	mixRUKR
	1,8	2020	mixRUKR
	21,3	2021	mixRUKR
Deloris	0,0	2020	mixRUKR
	0,7	2021	mixRUKR
Genius	0,0	2019	mixRUKR
	0,3	2020	mixRUKR
	2,3	2021	mixRUKR
Graziaro	0,0	2019	mixRUKR
	0,2	2020	mixRUKR
	0,0	2021	mixRUKR
Jularo	17,0	2020	mixRUKR
	45,2	2021	mixRUKR
Spontan	6,6	2021	mixRUKR
Thomaro	44,8	2020	mixRUKR
	57,2	2021	mixRUKR
Tillexus	0,6	2020	mixRUKR
	0,8	2021	mixRUKR
Tilliko	0,0	2019	ISOQuebon
	0,0	2019	mixRUKR
	0,0	2020	mixRUKR
	0,0	2021	mixRUKR
Tillstop	0,0	2020	mixRUKR
	0,0	2021	mixRUKR
Tulsa	33,1	2019	ISOQuebon
	54,8	2019	mixRUKR
	19,3	2020	mixRUKR
UI SRG	0,0	2020	mixRUKR
	0,0	2021	mixRUKR
Ursita	16,8	2020	mixRUKR
	10,4	2021	mixRUKR
Xenos	10,2	2019	ISOQuebon
	11,1	2019	mixRUKR
	19,7	2020	mixRUKR



Tab. 3. Common bunt incidence on a standard set of differential lines carrying different resistance genes (inoculum mixture RUKR)

Gene	Genotype	CB% 2019	CB% 2020	CB% 2021	CB% Mean
Bt0	PI 209794	50,0	54,1	53,8	52,6
Bt1	PI 554101	58,6	21,0	62,6	47,4
Bt2	PI 554097	22,3	7,4	18,2	16,0
Bt3	CI 6703	35,1	2,3	12,4	16,6
Bt4	PI 11610	58,6	41,5	60,1	53,4
Bt5	CI 11458	37,0	29,3	63,6	43,3
Bt6	CI 10061	10,9	4,0	22,0	12,3
Bt7	PI 554100	13,8	35,7	47,6	32,4
Bt8	PI 554120	0,0	0,0	0,0	0,0
Bt9	PI 554099	0,5	0,2	0,0	0,2
Bt10	PI 554118	0,0	0,0	0,0	0,0
Bt11	PI 554119	0,0	0,0	8,4	2,8
Bt12	PI 119333	1,1	0,8	0,0	0,6
Bt13	PI 181463	0,0	0,0	0,0	0,0
Btp	PI 173437	0,0	0,0	0,0	0,0



Tab. 4. Dwarf bunt incidence in 2021 on genotypes previously evaluated as resistant to common bunt

Genotype	DB%
Cardon	0,0
Crest	0,0
Franklin	0,0
Hansel	0,0
Lewjain	0,0
Manning	0,0
Meridian	0,0
Philaro	0,0
Promontory	0,0
Sprague	0,0
Stava	0,0
SW Magnifik	0,0
Ute	0,0
Wasatch	0,0
Winridge	0,0
Heines VII	3,6
- susceptible control	3,6

Tab. 5. Dwarf bunt incidence on genotypes included in ECOBREED trials

Genotype	Year	DB%
Aristaro	2012	0,4
	2020	0,4
	2019	0,6
Blizzard	2013	0,0
	2014	0,0
	2015	0,0
	2016	0,0
Bonneville	2010	0,0
	2015	0,0
	2016	0,0
	2014	0,1
	2013	0,1
Butaro	2019	2,4
	2020	4,7
Deloris	2021	0,0
Genius	2019	0,4
	2020	1,2
	2016	2,0
	2018	2,6
	2017	5,7
Graziaro	2019	1,2
	2012	1,2
	2020	4,2
Tillexus	2021	0,0
Tilliko	2021	6,4
UI SRG	2021	0,0

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