Status of *Tilletia* spp. in Serbia – Past, Present, Future

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- *Tilletia caries* (DC.) Tul. is predominant in Serbia.
- The presence of *T. foetida* (Wall.) Liro and putative hybrid of *T. caries* and *T. foetida* was also reported.
- Quarantine species for Serbia include both *T. contraversa* Kühn and *T. indica* Mitra.

PAST

PRESENT

FUTURE

The first report of *Tilletia* spp. in Serbia was made in the 19th century (Simić, 1895)

T. foetida predominated in the middle of the 20th century (Minev, 1951)

T. caries predominates over _T. foetida_ after 1990 (Jevtić et al., 1997)

In the 1960s common bunt was successfully controlled but in the 1990s, because of the economic embargo imposed on our country, common bunt had a severe impact on wheat seed production.

PAST

PRESENT

FUTURE

In that time, 6% of wheat production area was lost.

Outbreaks of *Tilletia* spp. were favored by:

- **sowing undeclared seed,**
- **discontinuation of fungicide treatments,**
- **appearance of new races,**
- **prevalence of disease-conducive environment**

PAST

PRESENT

FUTURE

Nowadays, common bunt is successfully controlled in conventional production, but there are investigations that open the questions on *Tilletia* spp. control in the future.

1. More than 70 % of basic and certified seed samples were contaminated with < 100 teliospores per 50g subsample.

2. Teliospores with prominent gelatinous sheath were recorded in commercial wheat production.

3. Great variability in susceptibility response of artificially infected non-resistant varieties in fungicide efficacy trials was find out.

1. The survey on the presence of *Tilletia* spp. in wheat production revealed that more than 70 % of seed samples were contaminated with < 0.1 teliospore per seed.

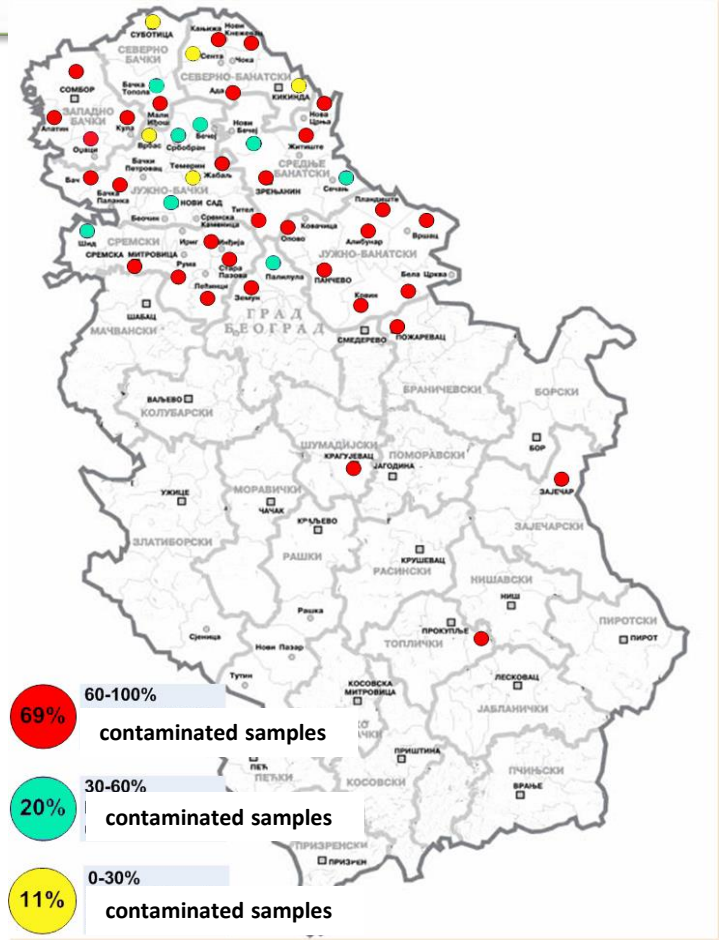
Table 2. Contamination level of *Tilletia* species teliospores found in conventionally produced non-processed wheat seed (Županski et al., 2012).

Category of wheat seed	Number of teliospores per 50g subsample	Number of teliospores per seed	Number of samples	Total number of samples	Allowed contamination level (percent of bunted seed)
Basic	< 100	≤0.1	13	14	0%
	0[a]	0[a]	1		
Certified	< 100	≤0.1	100	121	
	0[a]	0[a]	21		
Commercial	< 1,000	<1	7	16	0,01%[b]
	from 1,000 to 300,000	from 1 to 300	5		
	> 900,000	>900	4		
Total				151	

[a] Non-contaminated seed samples with confidence level of 99%

[b] One bunted seed per 10 000 seeds means 600 to 900 teliospores per seed (Josifović, 1948)

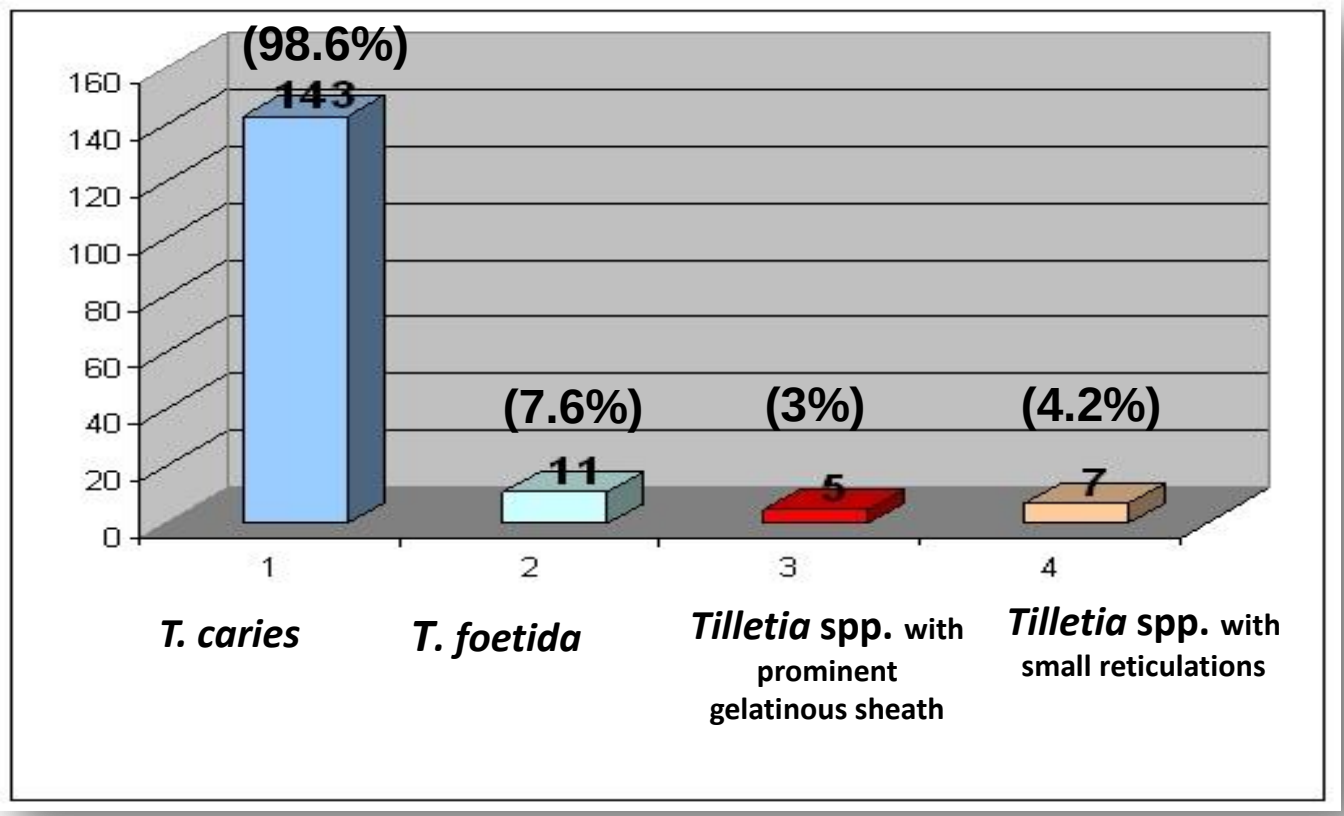
4 of the 16 commercial seed samples were contaminated above the threshold level of 0.01% determined for mercantile wheat by the Ministry of Agriculture, Trade, Forestry and Water Management.

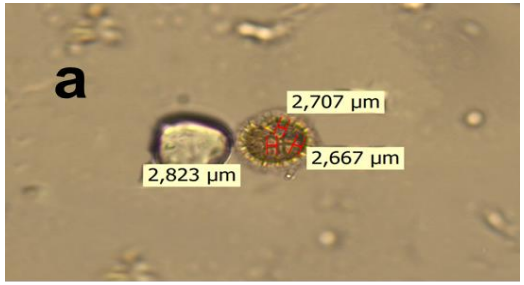


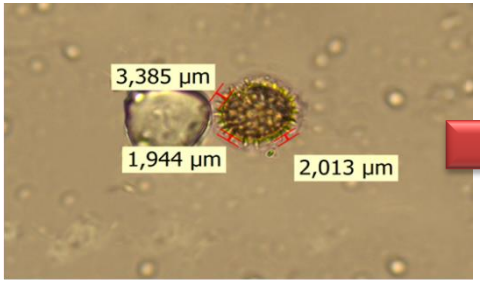
These findings indicated on great potential for seed infection and contamination with *Tilletia* spp. in Serbia which could pose serious trait for organic production.

Urge for more investigation on risk assessment of occurrence of *Tilletia* spp. in Serbia!

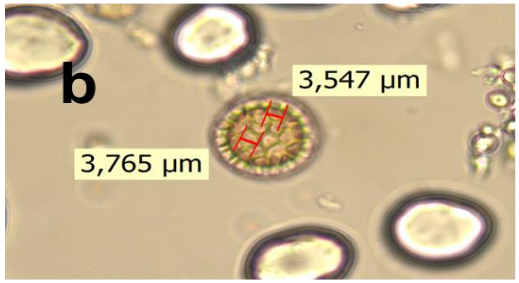
2. Teliospores with prominent gelatinous sheath were recorded in commercial wheat production.

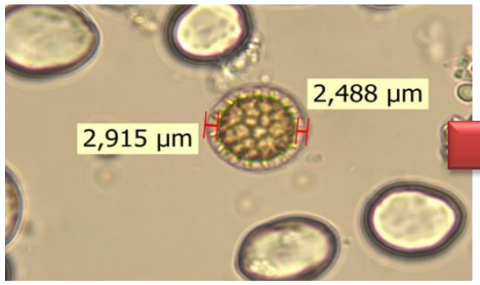




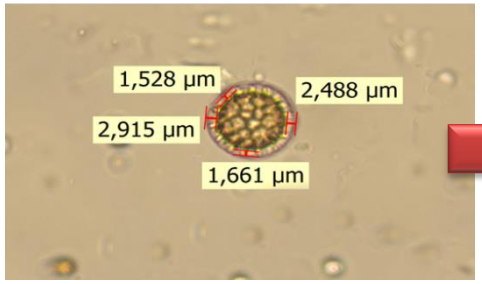


Neither *T. contraversa* nor *T. bromi*





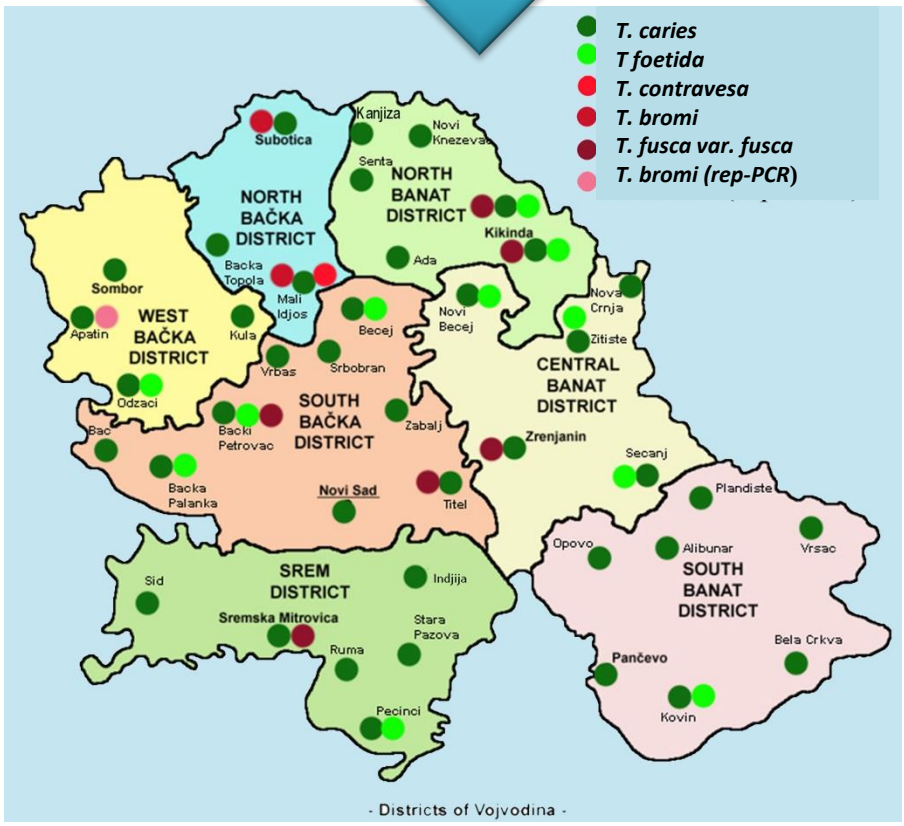
T. bromi



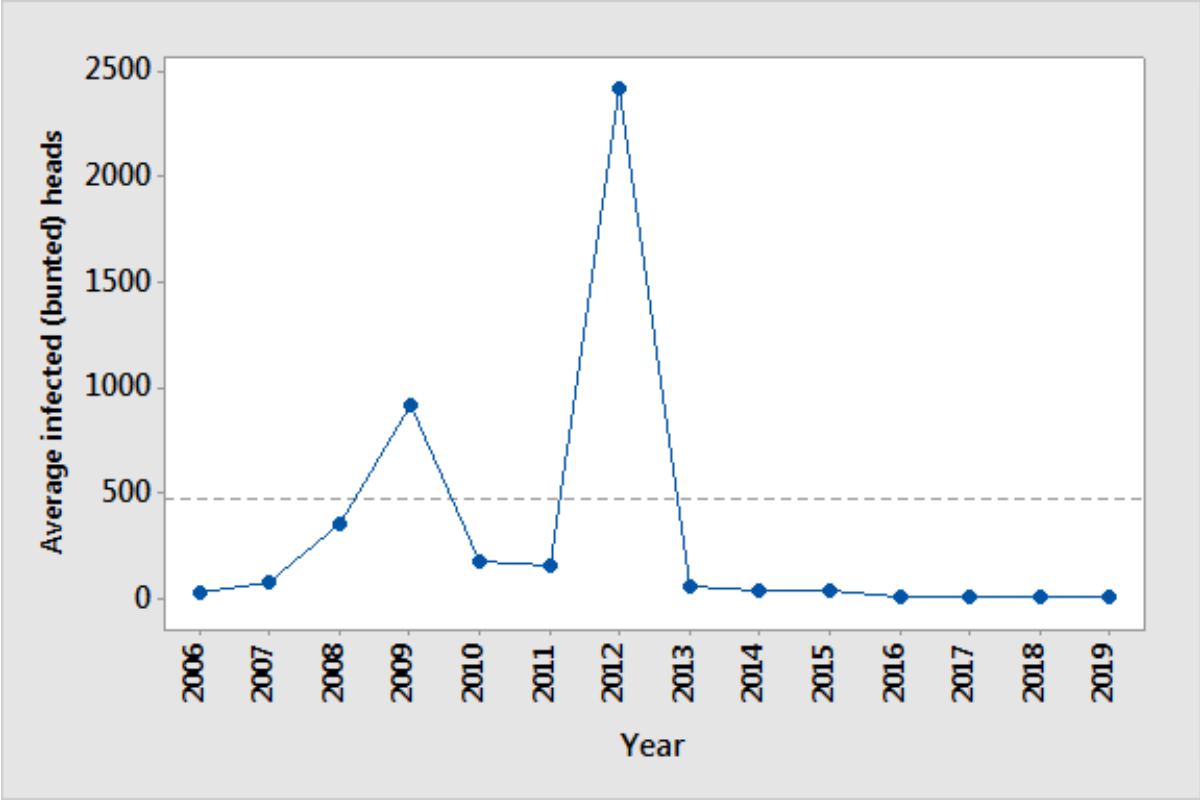
T. contraversa or *T. bromi*

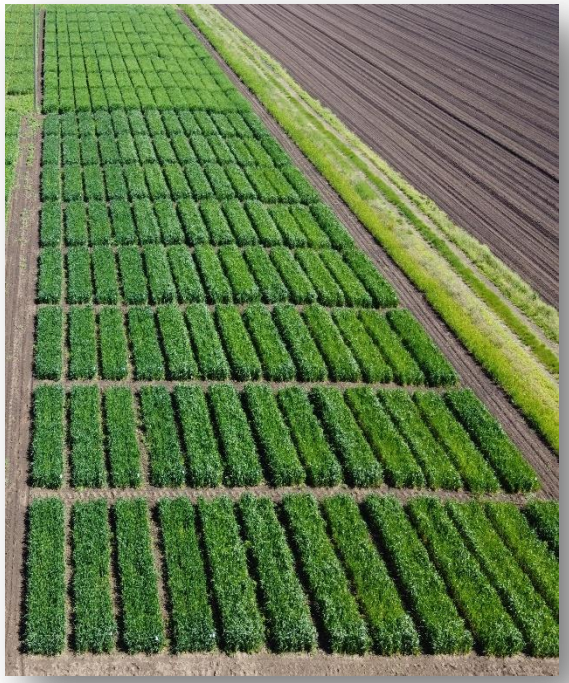
Teliospore	Areolae diameter		Sheath thickness	
	T. contravesa 3 - 5µm	*T. bromi* 2 – 5- (7) µm	*T. contraversa* 1.5 – 5 µm	*T. bromi* 1 – 2.53 (3) µm
a	-	2.67 – 2.83	2. 01 – 3.39	-
b	-	2.73 – 3.47	2.49 – 2.92	2.49 – 2.92
c	3.19 – 3.22	3.19 – 3.22	1.56 – 2.56	1.56 – 2.56

Predominance of grass bunt in the north part of the Serbia



3. **Great variability in susceptibility response of artificially infected non-resistant varieties in fungicide efficacy trials.**





Non- stable resistance/susceptibility response of commercial varieties tested for resistance in field conditions in different localities within an interval of eight years.

Tab. 1 — Resistance of some commercial winter wheat cultivars to *Tilletia tritid*

Cultivar	2005. Kragujevac			2006. Kragujevac			Leposavić		
	I	II	III	I	II	III	I	II	III
Pobeda	86	11	12.79	82	72	87.80	26	17	65.38
Evropa	32	15	46.88	63	57	90.48	70	67	95.71
NS Rana 5	42	19	45.24	57	47	82.46	24	17	70.83
Lasta	31	0	0.00	63	0	0.00	49	4	8.16
Tiha	67	20	29.85	77	65	84.42	77	5	6.49
Balkan	56	8	14.29	78	60	76.92			
KG-100	40	18	45.00	83	48	57.83			
KG-56S	62	25	40.32	62	44	70.97			
Vizija	18	4	22.22	69	43	62.32			
Ana Morava	82	30	36.58	50	33	66.00			
Kraljevica	59	20	33.90	77	71	92.21			
Partizanka	24	1	4.17	61	39	63.93			
Jugoslavija	44	11	25.00	93	69	74.19			
Rodna	45	3	6.67	71	41	57.75			
Kruna	45	17	37.78	83	71	85.54			
PKB Krupna	31	7	22.58	83	63	75.90			
Dejana	76	0	0.00	64	42	65.63			
Danica	16	5	31.25	90	78	86.67			
Toplica	75	26	34.67	99	65	65.66			
Rana Niska	38	9	23.68	70	46	65.71			
MEAN			25.64			70.62			

I — number of analysed spikes; II — number of infected spikes; III —

Only variety Lasta shown stable resistance response (number of affected spikes did not exceed 10%).

Sorta Cultivar	Broj zrn T			
Pobeda	57	41	16	29
NS rana 5	62	9	53	85
Evropa 90	58	0	58	100
Lasta	62	55	7	11
Zlatka	57	21	36	63
Nevesinjka	44	20	24	55
Prima	49	43	6	12
Rodna	63	16	47	75
NS rana 2	51	17	34	67
Sonja	31	5	26	84
Galija	43	7	36	84
Prva	57	25	32	56
Stotka	54	19	35	65
KG-56S	58	8	50	86
Ravanica	63	20	43	68
Studenica	51	11	40	78
Srbijanka	49	17	32	65
Gruža	37	34	3	8
Levčanka	54	8	46	85

Open-ended questions on factors influencing *Tilletia* occurrence in Serbia

CHANGES IN CLIMATIC CONDITIONS followed by extreme fluctuations of climatic factors

Photo: R. Jevtic

CHANGES IN THE PATHOGEN POPULATION proven by later-season infections with *Tilletia* spp.

COMBINED EFFECT OF ABIOTIC AND BIOTIC STRESSORS ON PLANT RESPONSE TO *Tilletia* INFECTION

PAST PRESENT **FUTURE**

MAIN CHALLENGES IN *TILLETIA* SPP. MANAGEMENT IN THE FUTURE

1. ❖ **Risk assessment of occurrence of *Tilletia* spp. in organic production**
2. ❖ **Introduction of new methods in seed quality testing**
3. ❖ **Finding and maintaining genetic resistance resources**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THANK YOU FOR ATTENTION!