

TRITICALE (*X Triticosecale* Witt.) DESCRIPTORS

III CHARACTERISATION AND EVALUATION DESCRIPTORS

Cereal genetic resources evaluation methodology:

Plot size: minimum 5m², at least 3 replications, random plot layout. Seed rate: winter wheat, oat - 500, spring wheat, spring barley, triticale, rye 400 seeds able to germinate per m². Non-treated seed is used. 3 year average data is transformed to 1-9 scale and used for final evaluation.

Characterization of testing location:

- a. Country of characterization
- b. Institute name and address
- c. Institute site (latitude, longitude, elevation)
- d. Sowing date
- e. Harvest date
- f. Percentage seed germination
- g. Percentage field establishment
- h. Plot size
- i. Number of replications
- j. Fertilizer (types, doses)
- k. Plant protection

ENVIRONMENT CHARACTERISTIC

- l. Soil type
- m. Relief
- n. Soil pH
- o. Soil organic matter content
- p. Soil texture
- q. Temperature range (year and/or the seasonal mean, maximum, minimum)
- r. Frost (date and lowest temperature of most recent frost)

Descriptor code	Number of trait in other descriptors	Descriptor Scale (score)	Reference values	Remarks
Characterisation				
III/1		Seasonality		
	¹ IPGRI 4.1	1 Winter		

	² UPOV 26	2 Facultative (intermediate) 3 Spring		
III/2		Ploidy		
	UPOV 1	4 tetraploid 6 hexaploid 8 octoploid		
III/3		Growth habit		
	IPGRI 6.1.1. UPOV 3	1 Erect 3 Semierect 5 Intermediate 7 Semiprostrate 9 Prostrate	0 -10° 11-34° 35-56° 57-79° 80-90°	The trait should be assessed in plant development stage 25-29 (Decimal code for the growth stages of cereals by Zadoks) The growth habit should be assessed visually from the angle formed by the outer leaves and tillers with an imaginary middle axis
III/4		Plant: frequency of plants with recurved flag leaves		
	UPOV 4	1 absent or very low 3 low 5 medium 7 high 9 very high	all flag leaves are rectilinear about ¼ of the plants with recurved flag leaves about ½ of the plants with recurved flag leaves about ¾ of the plants with recurved flag leaves all flag leaves are recurved	The trait should be assessed in plant development stage 47-51 (Decimal code for the growth stages of cereals by Zadoks)
III/5		Coleoptile: anthocyanin coloration		
	UPOV 2	1 absent or very weak 3 weak 5 medium 7 strong 9 very strong		The trait should be assessed in plant development stage 09-11 (Decimal code for the growth stages of cereals by Zadoks) Set up 20 grains on moistened filter paper in Petri Dish during germination. After the coleoptiles have reached a length of about 1 cm in darkness, they are placed in

				artificial light 12000-15000 lux for 3-4 days
III/6		Time of ear emergence		
	IPGRI 4.2.1 UPOV 6	3 early 5 medium 7 late	< 160 days 161-166 days > 167 days	*Number of days from 1 January to heading when first spikelet is visible on 50 % of plants
III/7		Flag leaf – glaucosity of sheath		
	UPOV 7	1 absent or very weak 3 weak 5 medium 7 strong 9 very strong		The trait should be assessed in plant development stage 55-65 (Decimal code for the growth stages of cereals by Zadoks)
III/8		Flag leaf: length of blade		
	UPOV 10	3 short 5 medium 7 long	< 14 cm 14-19 cm > 19 cm	*The trait should be assessed in stage of anthesis for 5 plants from each replication and the mean has calculated
III/9		Flag leaf: width of blade		
	UPOV 11	3 narrow 5 medium 7 broad	< 1.3 cm 1.3-1.7 cm > 1.7 cm	*The trait should be assessed in stage of anthesis for 5 plants (the widest point of leave) from each replication and the mean has calculated
III/10		Stem: density of hairiness of neck		
	IPGRI 4.2.2 UPOV 13	1 absent or very weak 3 weak 5 medium 7 strong 9 very strong	Figure 1, Appendix.	The trait should be assessed in stage of anthesis
III/11		Plant: length (stem and ear)		
	IPGRI 4.1.2 UPOV 14	1 very short 3 short 5 medium 7 high 9 very high	< 71 cm 71-90 cm 91-110 cm 111-130 cm > 130 cm	The trait should be assessed in plant development stage 80-92 (Decimal code for the growth stages of cereals by Zadoks) * Measured from the ground to the top of spike, excluding awns, for 5 plants per

				plot from each replication and the mean has calculated
III/12		Ear: distribution of awns		
	IPGRI 4.2.5 UPOV 15	1 tip awned 2 half awned 3 fully awned	Figure 2, Appendix.	The trait should be assessed in plant development stage 80-92 (Decimal code for the growth stages of cereals by Zadoks)
III/13		Awns above the tip of ear: length		
	IPIGRI 4.2.4 UPOV 16	3 short 5 medium 7 long	< 3 cm 3-7 cm > 8 cm	The trait should be assessed in plant development stage 80-92 (Decimal code for the growth stages of cereals by Zadoks) * Measured for 5 plants per plot from each replication and the mean should be calculated
III/14		Lower glume: length of first beak		
	UPOV 17	1 very short 3 short 5 medium 7 long 9 very long	Figure 3, Appendix.	The trait should be assessed visually in plant development stage 80-92 (Decimal code for the growth stages of cereals by Zadoks) for spikelets in mid-third of ear
III/15		Lower glume: hairiness on external surface		
	UPOV 19	1 absent 9 present		The trait should be assessed visually in plant development stage 80-92 (Decimal code for the growth stages of cereals by Zadoks) for spikelets in mid-third of ear
III/16		Ear: density		
	UPOV 22	3 lax 5 medium 7 dense	< 22 22-29 > 29	The trait should be assessed in plant development stage 92 (Decimal code for the growth stages of cereals by Zadoks) * The average number of spikelets per 10 cm length of spike for 5 plants per plot from each replication must be determined

III/17		Ear: length excluding awns		
	UPOV 23 IPIGRI 4.2.3	3 short 5 medium 7 long	< 10 cm 10-12 cm > 12 cm	The trait has been assessed in plant development stage 92 (Decimal code for the growth stages of cereals by Zadoks) * The spike length for 5 plants per plot from each replication should be determined and the mean calculated
III/18		Grain: coloration with phenol		
	UPOV 25	1 nil or very light 3 light 5 medium 7 dark 9 very dark		Evaluated for 20 grains after 16-20 hours soaking in water
III/19		Winterhardiness		
	IPIGRI 7.1.1	1 very low 3 low 5 intermediate 7 high 9 very high	< 30 % 30-50 % 50-70 % 70-90 % > 90 %	* The number of plants per m ² in autumn and spring must be counted in each replication and percent of survived plants calculated
III/20		Yield level		
		3 low 5 intermediate 7 high	< 4 t ha ⁻¹ 4.1 – 7 t ha ⁻¹ > 7.1 t ha ⁻¹	* Recalculated to 14 % moisture
III/21		Resistance to lodging		
		1 very low 3 low 5 intermediate 7 high 9 very high		*The trait should be assessed in plant development stage 90-92 (Decimal code for the growth stages of cereals by Zadoks)
III/22		Resistance to preharvest sprouting		
	³ SIN 39 IPIGRI 6.3.1	1 very low 3 low 5 intermediate 7 high	> 20 % 11-20 % 3-10 % < 30	*Representative sample from all replications - 25 ears should be harvested, percent of germinated grain from total harvested number of grains calculated.

		9 very high	0 %	The trait should be tested only in years, when sprouting is determined
III/23		1000 kernel weight		
	IPIGRI 4.3.3	1 very low 3 low 5 intermediate 7 high 9 very high	< 31 g 31-38 g 39-46 g 47-51 g > 54 g	*Representative sample from all replications. 2 x 500 kernels are counted.
III/24		Protein content		
	SIN	1 very low 3 low 5 intermediate 7 high 9 very high	< 8 % 8-10.9 % 11.0-12.9 % 13.0-15.9 > 16.0 %	*Representative sample from all replications. Measured as percentage of dry weight The conversation factor used as either N x 6.25 Testing method should be indicated
III/25		Test weight		
	SIN	1 very low 3 low 5 intermediate 7 high 9 very high	< 640 g l ⁻¹ 640-669 g l ⁻¹ 670-699 g l ⁻¹ 700-729 g l ⁻¹ > 730 g l ⁻¹	*Representative sample from all replications. Average data of three years
III/ 26		Lysine content in protein		
	IPIGRI 6.3.4	3 Low 5 Intermediate 7 High	< 3.2 g 3.2-3.8 g in 100g of protein > 3.8 g	*Representative sample from all replications. Average data of three years Testing method should be indicated
III/27		Starch content (%)		
		1 very low 3 low 5 intermediate 7 high 9 very high	< 61 61.0-63.9 64.0-66.9 67.0-68.9 >69	*Representative sample from all replications. Average data of three years. Measured as percent of dry weight. Testing method should be indicated
III/28		Falling number		
		3 low 5 intermediate 7 high	< 80s 81-180 s > 180 s	*Representative sample from all replications. Average data of three years.

III/29		Susceptibility to snow mould (<i>Microdochium nivale</i>)		
	IPIGRI 8.2.5	1 very low 3 low 5 intermediate 7 high 9 very high	< 2 % 2-20 % 21-50 % 51-70 % > 70 %	* Surface of infection is determined and the average is calculated. Average data of three years.
III/30		Susceptibility to stripe rust (<i>Puccinia.striiformis</i>)		
	⁴ SINS	1 very low 3 low 5 intermediate 7 high 9 very high	< 5 % 5 - 10 % 11 – 25 % 26 - 50 % >50 % Figure 4, Appendix.	The susceptibility should be assessed in plant development stage 70-79 (Decimal code for the growth stages of cereals by Zadoks) * Flag leaf and second leaf from top for 5 plants in each replication should be estimated and mean calculated
III/31		Susceptibility to glume blotch (<i>Staganospora nodorum</i>)		
	SINS	1 very low 3 low 5 intermediate 7 high 9 very high	< 5 % 5 - 10 % 11 – 25 % 26 - 50 % >50 % Figure 5, Appendix	The susceptibility should be assessed in plant development stage 71-77 (Decimal code for the growth stages of cereals by Zadoks) * The 5 ears in each replication should be estimated and mean calculated
III/32		Susceptibility to Powdery mildew (<i>Erysiphe graminis</i>)		
	IPIGRI 8.2.3	1 very low 3 low 5 intermediate 7 high 9 very high	< 1% 2-10 % 11-25 % 26-50% > 50% Figure 6, Appendix.	The susceptibility should be assessed in plant development stage 70-79 (Decimal code for the growth stages of cereals by Zadoks) * Flag leaf and second leaf from top for 5 plants in each replication should be estimated and mean calculated
III/33		Susceptibility to leaf rust (<i>Puccinia recondita f.sp. tritici</i>)		
	SINS	1 very low 3 low 5 intermediate 7 high	< 1% 2-10 % 11-25 % 26-50%	The susceptibility should be assessed in plant development stage 70-79 (Decimal code for the growth stages of cereals by Zadoks)

		9 very high	> 50%	* Flag leaf and second leaf from top for 5 plants in each replication should be estimated and mean calculated
			Figure 7, Appendix.	
III/34		Susceptibility to leaf blotch (<i>Septoria.tritici</i>)		
	SINS	1 very low 3 low 5 intermediate 7 high 9 very high	< 5% 6-25 % 26-50 % 51-75% > 75 %	The susceptibility should be assessed in plant development stage 70-79 (Decimal code for the growth stages of cereals by Zadoks) * Flag leaf and second leaf from top for 5 plants in each replication should be estimated and mean calculated
			Figure 8, Appendix.	
III/35		Notes		Any other additional information
III/36		Cytological characteristics and identified genes		
III/37		Molecular markers		
III/38		Pictures		

Explanations and references

* Trait evaluation according “Cereal genetic resources evaluation methodology”

¹ Descriptors for rye and triticales, IPGRI, 1985;

² Guidelines for the conduct of tests for distinctness, homogeneity and stability. Triticales. TG/121/3, Geneve, 1989;

³ Metodika labību šķirņu saimniecisko īpašību novērtēšanai (ZM instrukcija Nr.4, 06.05.2003;

⁴ Metodika labību šķirņu izturības vērtēšanai pret slimībām un kaitēkļiem (ZM instrukcija Nr.5, 15.05.2003).

Appendix

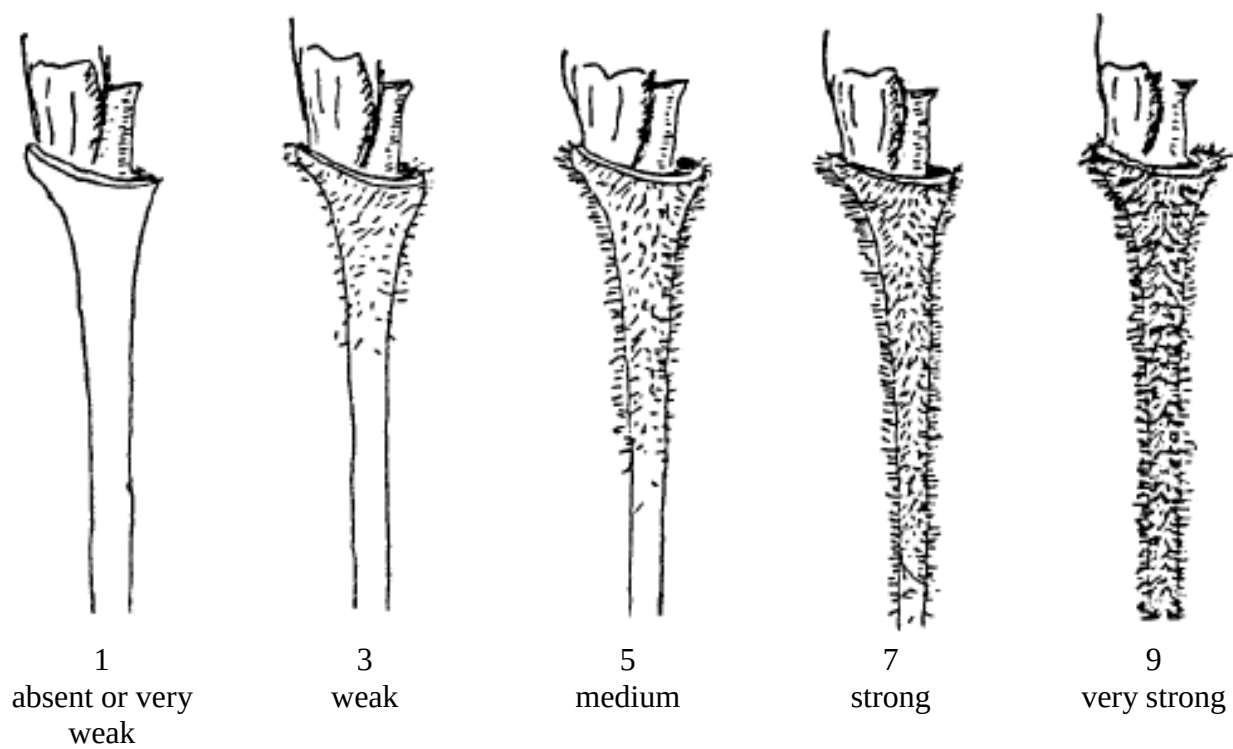


Figure 1. **Stem: density of hairiness of neck**

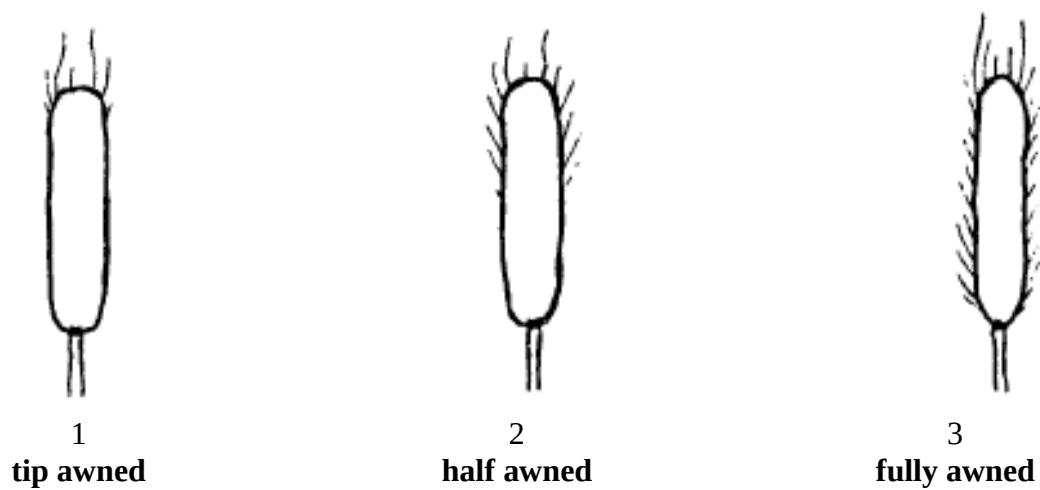


Figure 2. **Ear: distribution of awns**

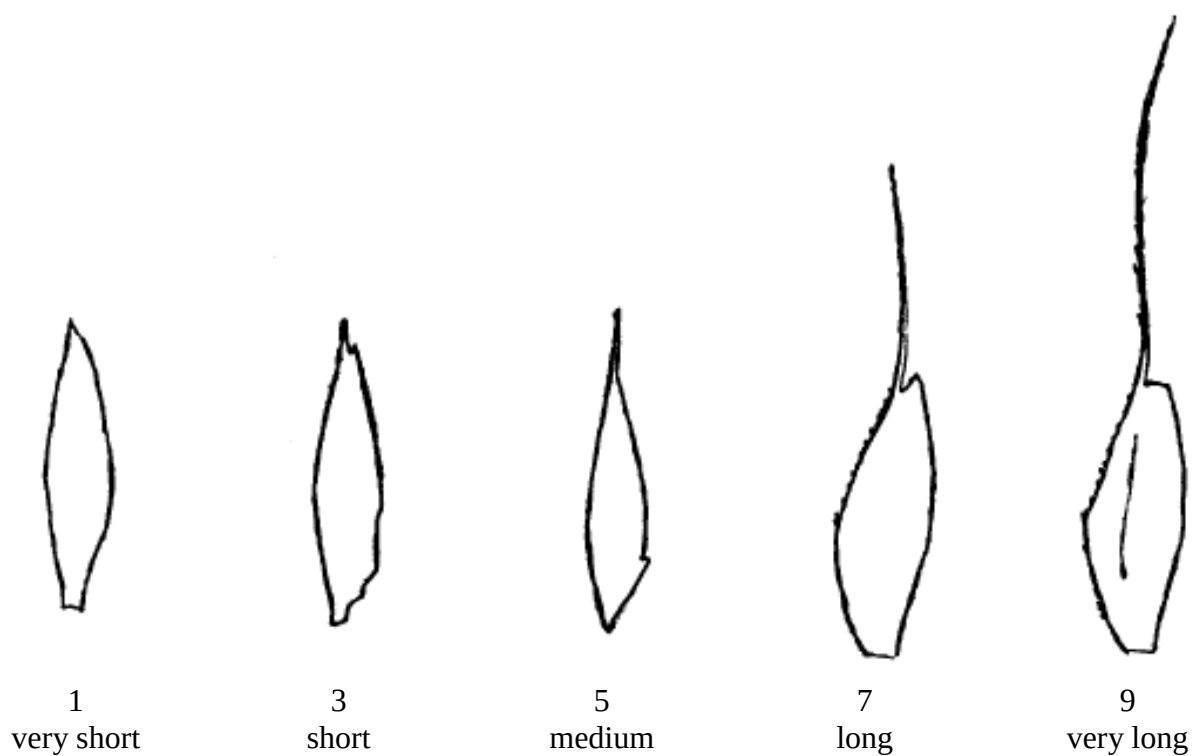


Figure 3. Lower glume: length of first beak

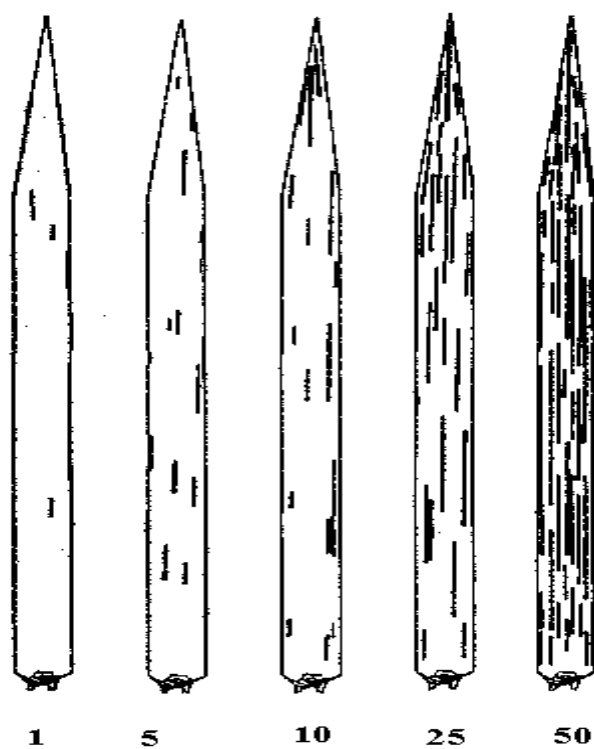


Figure 4. Susceptibility to stripe rust (*Puccinia striiformis*), %

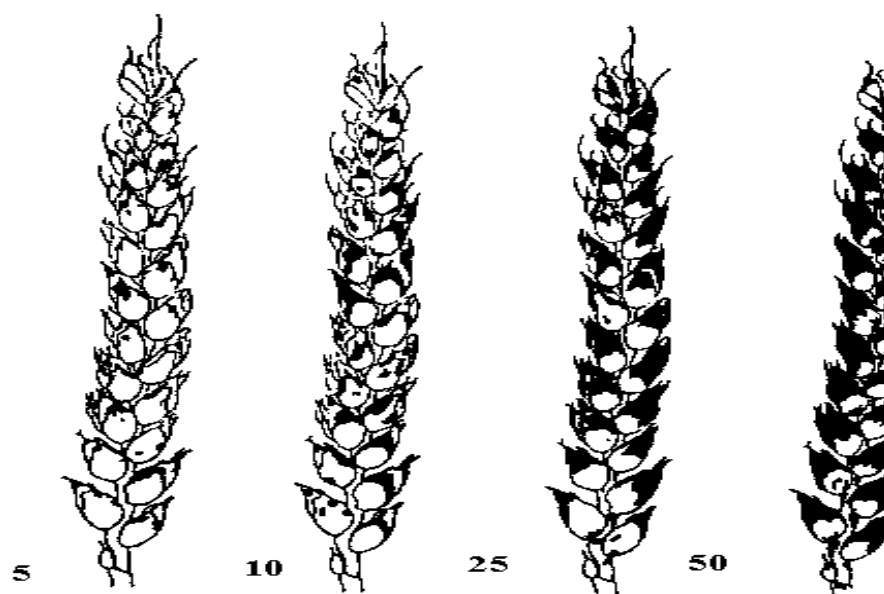


Figure 5. Susceptibility to glume blotch (*Stanganospora nodorum*), %

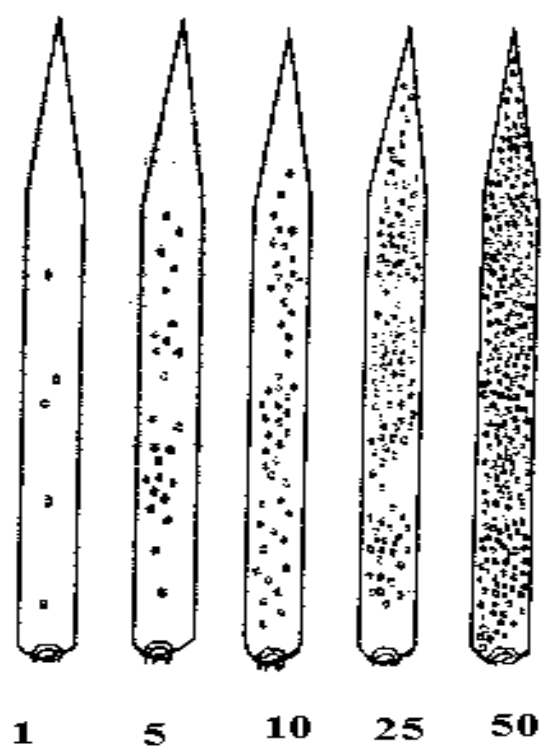


Figure 6. Susceptibility to powdery mildew (*Erysiphe graminis*), %

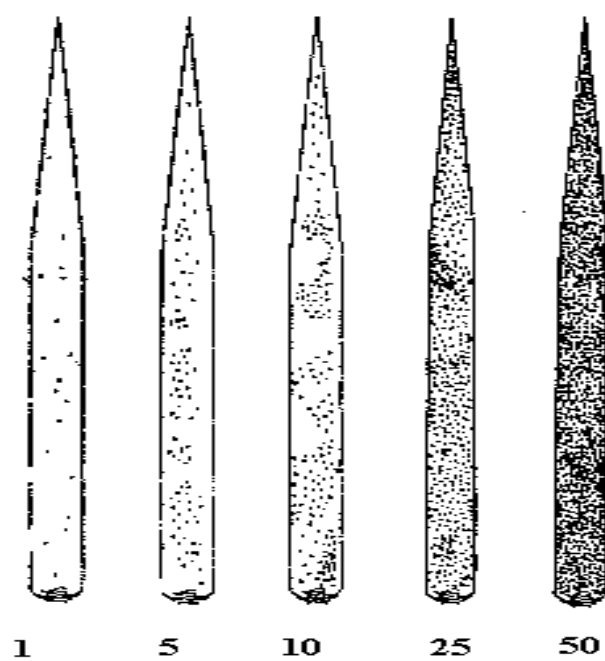


Figure 7. Susceptibility to leaf rust (*Puccinia recondita f.sp. tritici*)

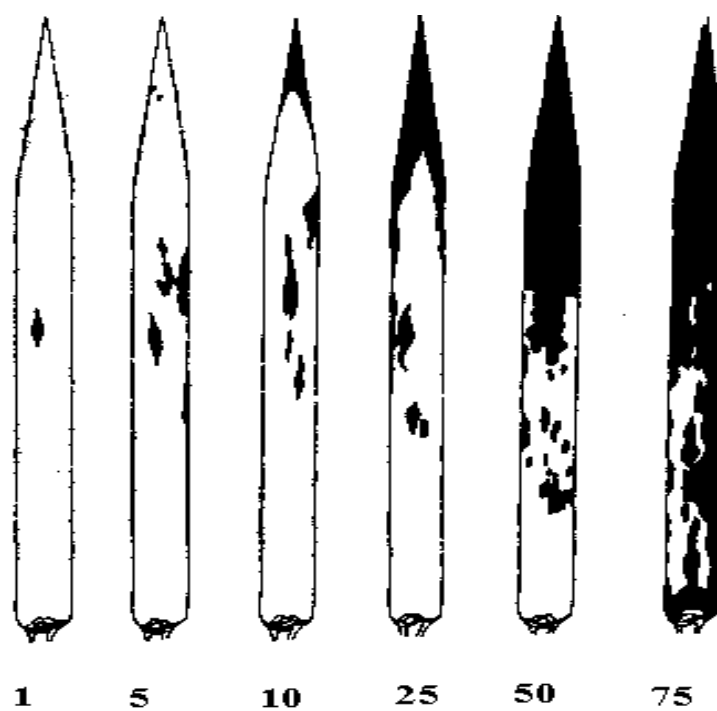


Figure 8. Susceptibility to leaf blotch (*Septoria tritici* sp.)