

## DESCRIPTORS FOR RYE (draft – September 2013)

Evaluation methodology:

Plot size: recommended 5m<sup>2</sup>, at least 3 replications, random plot layout. Seed rate: 400 seeds/m<sup>2</sup>.

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. Plot size
  - g. Number of replications
  - h. Fertilizer (types, doses)
  - i. Plant protection
- ENVIRONMENT CHARACTERISTIC
- j. Soil type
  - k. Relief
  - l. Soil pH
  - m. Soil organic matter content
  - n. Soil texture
  - o. Temperature range (year and/or the seasonal mean, maximum, minimum)
  - p. Frost (date and lowest temperature of most recent frost)

Descriptor code	Number of trait in other descriptors	Descriptor Scale (score)	Reference values	Remarks
<b>Characterisation</b>				
<b>1</b>		<b>Seasonality</b>		
	<sup>1</sup> IPGRI 4.1	1 Winter		
	<sup>2</sup> UPOV 22	2 Facultative (intermediate)		
		3 Spring		

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<b>2</b>		<b>Ploidy</b>		
	UPOV 1	2 diploid		
		4 tetraploid		
<b>3</b>		<b>Growth habit of young plant</b>		
	IPGRI 6.1.1. UPOV 3	1 Erect	0 -10°	Appearance during tillering, but before jointing. 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
		3 Semi-erect	11-34°	
		5 Intermediate	35-56°	
		7 Semiprostrate	57-79°	
		9 Prostrate	80-90°	
<b>4</b>		<b>Coleoptile: anthocyanin coloration</b>		
	UPOV 3	1 absent or very weak		The trait should be assessed in plant devel. 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
		3 weak		
		5 medium		
		7 strong		
		9 very strong		
<b>5</b>		<b>Time of ear emergence</b>		
	IPGRI 4.2.1 UPOV 9	3 early	winter rye < 150 days	* Winter rye - number of days from January 1 <sup>st</sup> to heading when first spikelet is visible on 50 % of plants * Spring rye - number of days from sowing to heading when 50 % of plants have started heading.
		5 medium	spring rye 151-156 days	
		7 late	> 157 days	
<b>6</b>		<b>Stem: density of hairiness of neck</b>		
	IPGRI 4.2.2 UPOV 13	1 absent or very weak	Figure 1. Appendix.	The trait should be assessed in stage of anthesis
		3 weak		
		5 medium		

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		7 strong		
		9 very strong		
<b>7</b>		<b>Plant: height</b>		
	IPGRI 4.1.2 UPOV 14	1 very short	< 50 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
		2	50-70 cm	
		3 short	71-90 cm	
		4	91-110 cm	
		5 medium	111- 130 cm	
		6	131-150 cm	
		7 high	151-170 cm	
		8	171-190 cm	
		9 very high	<190 cm	
<b>8</b>		<b>Stem: length of the upper internode</b>		
	Descriptor list for rye Est	1 very short	< 15,0 cm	The trait should be assessed in plant development stage 80-92 (Decimal code for the growth stages of cereals by Zadoks) * Measured length of the upper internode for 5 plants per plot from each replication and the mean has calculated
		2	15.0-25	
		3 short	25.1-35	
		4	35.1-45	
		5 medium	45.1-55	
		6	55.1-65	
		7 high	65.1-75	
		8	75.1-85	
		9 very high	>85	
<b>9</b>		<b>Leaf: second upper length</b>		
	Descriptor list for rye Est	1 very short	<10.0 cm	The trait should be assessed in plant development stage 80-92 (Decimal code for the growth stages of cereals by Zadoks) * Measured length of the second upper leaf for 5 plants per plot from each replication and the mean has calculated
		2	10-12 cm	
		3 short	12.1-14 cm	
		4	14.1-16 cm	
		5 medium	16.1-18 cm	
		6	18.1-20 cm	
		7 high	20.1-22 cm	
		8	22.1-24 cm	
		9 very high	>24 cm	
<b>10</b>		<b>Spike: length of awns</b>		
	IPGRI 4.2.4 UPOV 16	1 absend	0	The trait should be assessed in plant development stage 80-92 (Decimal code
		3 very short	<10 mm	

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		5 short 7 medium 9 long	10-30 mm 31-60 mm >60 mm	for the growth stages of cereals by Zadoks) * Measured for 5 plants per plot from each replication and the mean should be calculated
<b>11</b>		<b>Spike: density</b>		
	UPOV 17	1 very lax 3 lax 6 medium 7 dense 9 very dense	< 20 20-26 27-32 33-38 39 -41	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
<b>12</b>		<b>Spike: length (excluding awns)</b>		
	UPOV 16 IPGRI 4.2.3	1 very short 3 short 5 medium 7 long 9 very long	< 2,1 cm 6-10 cm > 10-14 cm 14-18 cm > 18 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
<b>13</b>		<b>Spike: position</b>		
	UPOV 18	1 erect 3 semi-erect 5 horizontal 7 nodding 9 very nodding	< 15° 15-45° 46-90° 91-135° >135°	The spike position at full ripeness for 5 plants per plot from each replication should be determined and the mean calculated
<b>14</b>		<b>Grain: shape</b>		
	IPGRI 4.3.2	1 ovate 3 ovate oblong 5 barrel-shaped 7 compressed on each side 9	Figure 2. Appendix	The trait has been assessed in plant development stage 92 (Decimal code for the growth stages of cereals by Zadoks) Evaluated for 60 grains of representative sample from all replications
<b>15</b>		<b>Grain: coloration with phenol</b>		
	UPOV 21	1 nil or very light 3 light 5 medium		Evaluated for 20 grains after 16-20 hours soaking in water

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		7 dark 9 very dark		
<b>16<sup>4</sup></b>		<b>Winter hardiness</b>		
	IPGRI 7.1.1 SIN	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 <sup>2</sup> in autumn and spring must be counted in each replication and percent of survived plants calculated
<b>17</b>		<b>Resistance to lodging</b>		
	IPGRI 7.7SIN	1 very low 3 low 5 intermediate 7 high 9 very high	> 90% 51-90 % 16-50 % 6-15 % < 5 %	*The trait should be assessed in plant development stage 90-92 (Decimal code for the growth stages of cereals by Zadoks)
<b>18</b>		<b>Resistance to pre-harvest sprouting</b>		
	SIN 39 IPGRI 6.3.1	1 very low 3 low 5 intermediate 7 high 9 very high	> 20 % 11-20 % 3-10 % < 30 0 %	*Representative sample from all replications - 25 ears should be harvested, percent of germinated grain from total harvested number of grains calculated. The trait should be tested only in years, when sprouting is determined
<b>19</b>		<b>1000 grain weight</b>		
	IPGRI 4.3.3 UPOV 19	1 very low 3 low 5 intermediate 7 high 9 very high	< 20 g 21-30 g 31-40 g 41-60 g > 61 g	*Representative sample from all replications. 2 x 500 kernels are counted.
<b>20</b>		<b>Protein content</b>		
	IPGRI 6.3.3 SIN 52.3.3	1 very low 3 low 5 intermediate 7 high 9 very high	< 8 % 8-9.9 % 10.0-11.9 % 12.0 -13.9 14.0 - 15.0 %	*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
<b>21</b>		<b>Test weight</b>		
	SIN 51	1 very low	< 600 g l <sup>-1</sup>	

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		3 low 5 intermediate 6 7 high 9 very high	601-650 g l <sup>-1</sup> 651-680 g l <sup>-1</sup> 681-700 g l <sup>-1</sup> 701-730 g l <sup>-1</sup> > 730 g l <sup>-1</sup>	
<b>22</b>		<b>Starch content (%)</b>		
	SIN 52	1 very low 3 low 5 intermediate 7 high 9 very high	< 60 % 61.0-62.0 % 63.0-64.0 % 65.0-66.0 % > 66 %	Measured as percent of dry weight. Testing method should be indicated
<b>23</b>		<b>Falling number</b>		
	SIN 52.3.2	1 Very low 3 low 4 5 intermediate 7 high 9 very high	< 80s, 220s 80-90 s, 201-220 s 91-109s 110-119s, 171-200 s 120-139 s 140-170 s	
<b>24<sup>4</sup></b>		<b>Susceptibility to snow mould (<i>Microdochium nivale</i>)</b>		
	IPGRI 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
<b>25</b>		<b>Susceptibility to powdery mildew (<i>Erysiphe graminis</i>)</b>		
	IPGRI 8.2.3	1 very low 3 low 5 intermediate 7 high 9 very high	< 1% 2-10 % 11-25 % 26-50% > 50%  Figure 3. 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
<b>26</b>		<b>Susceptibility to brown rust (<i>Puccinia recondita</i>)</b>		
	SIN	1 very low 3 low	< 1% 2-10 %	The susceptibility should be assessed in plant development stage 70-79 (Decimal

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		5 intermediate 7 high 9 very high	11-25 % 26-50% > 50%	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
<b>27</b>		<b>Susceptibility to stem rust (<i>Puccinia graminis</i>)</b>		
	IPGRI 8.2.1 SIN	1 very low 3 low 5 intermediate 7 high 9 very high		The susceptibility should be assessed in plant development stage 70-79 (Decimal code for the growth stages of cereals by Zadoks) * Stem from 5 plants in each replication should be estimated and mean calculated
<b>28</b>		<b>Susceptibility to eye spot (<i>Cercospora herpotrichoides</i>)</b>		
<b>29</b>		<b>Notes</b>	Any other additional information	
<b>30</b>		<b>Cytological characteristics and identified genes</b>		
<b>31</b>		<b>Molecular markers</b>		
<b>32</b>		<b>Pictures</b>		

**Explanations and references**

\* Trait evaluation according “Cereal genetic resources evaluation methodology”

<sup>1</sup> IPGRI descriptors (1985.)

<sup>2</sup> UPOV – DUS test guidelines, TG/58/6, 1999-03-24,

<sup>3</sup> SIN

<sup>4</sup> Only for winter rye accessions

Descriptor list rye. Estonia

Appendix

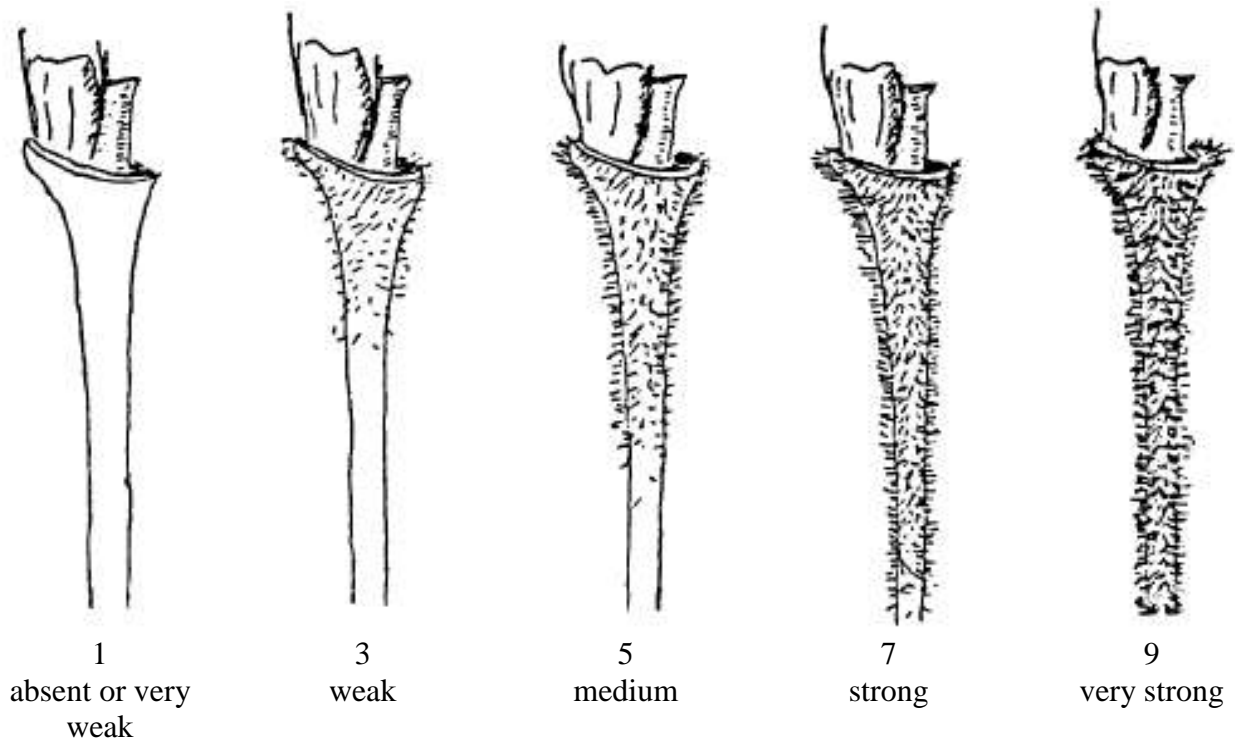


Figure 1. Stem: density of hairiness of neck

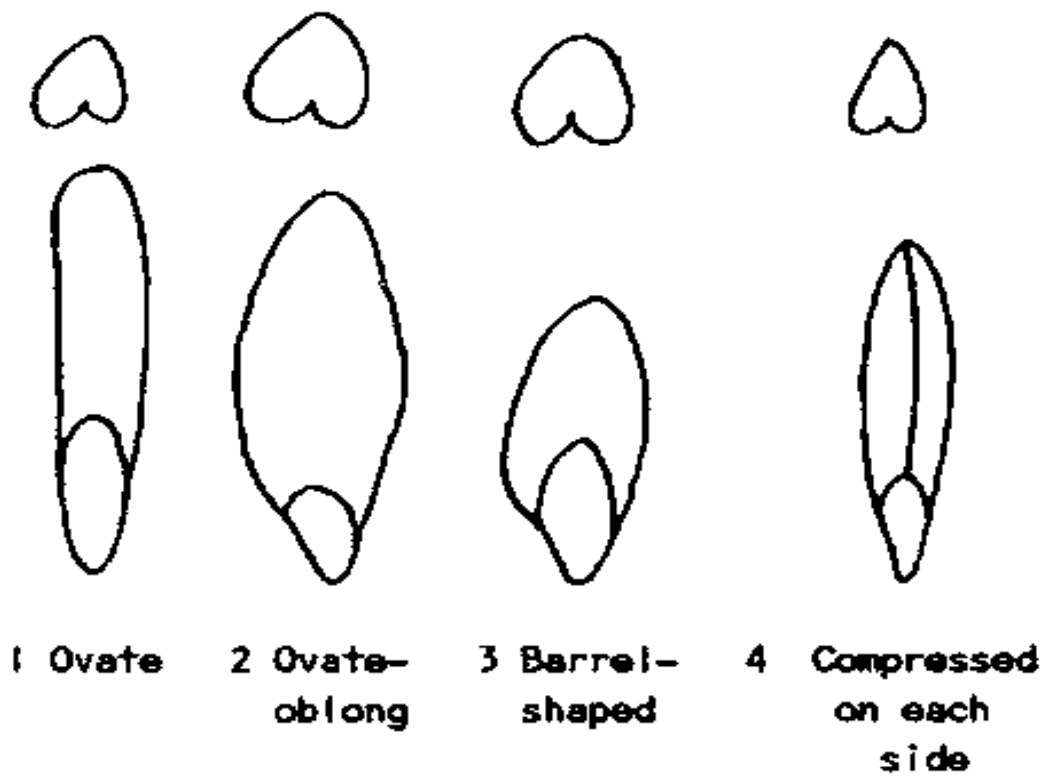


Figure 2. Grain shape



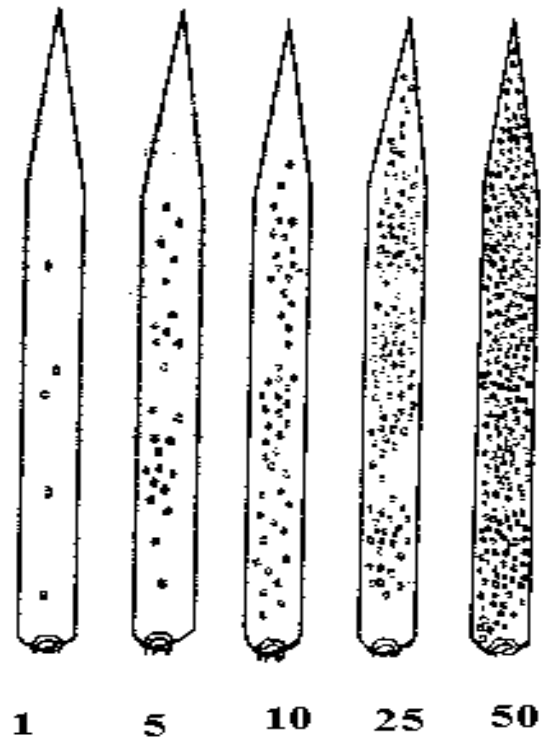


Figure 3. Susceptibility to powdery mildew (*Erysiphe graminis*), %

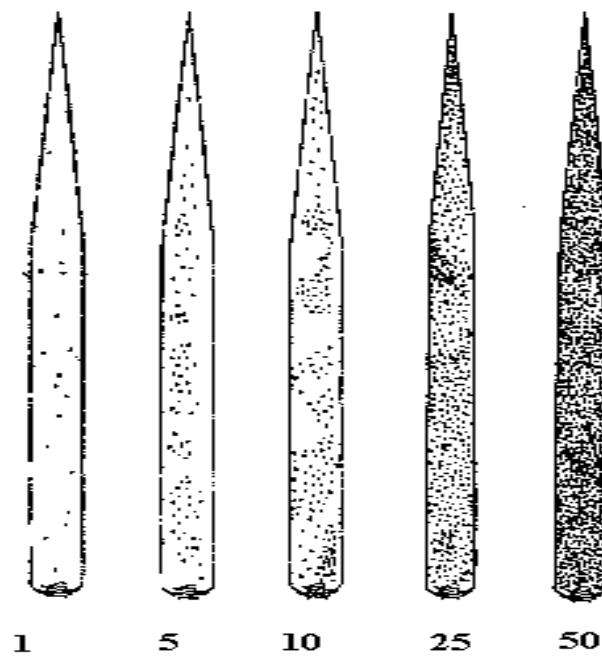


Figure 4. Susceptibility to leaf rust (*Puccinia recondita*), %