

The Swedish Collection of Barley Mutants held at the Nordic Genebank

Udda Lundqvist
SvalöfWeibull AB.
SE-268 81 Svalöv, Sweden
e-mail: udda@ngb.se

The induced barley mutants that were isolated by Swedish researchers (Ehrenberg *et al.* 1961, Franckowiak and Lundqvist 2002, Gustafsson 1941, 1947, 1954; Gustafsson and von Wettstein 1956/57; Gustafsson *et al.* 1969; Hagberg *et al.* 1958; Jende-Strid *et al.* 1999, Lundqvist 1991, 1992; Lundqvist and Franckowiak 2003; Lundqvist and Lundqvist 1987; Nybom 1954; Persson and Hagberg 1969; von Wettstein *et al.* 1959) have been incorporated in the Nordic Genebank (www.ngb.se; nordgen@ngb.se); (Davis *et al.* 1997, Lundqvist and Huldén, 2004). The mutants were collected from 1937 to 1990 and maintained at The Swedish Seed Association, later SvalöfAB and SvalöfWeibull AB, Svalöv, Sweden, until transfer to the Nordic Genebank during 1981 to 2001. As the viable mutants were isolated, they were placed in phenotypic groups. These groups were identified as UL groups when the material was placed in more permanent collection. Individual mutants are listed in UL dB-databases which are transferable to Microsoft Excel. The phenotypic groupings for the UL databases are listed in Table 1. For the UL groups, corresponding phenotypic descriptors and, in some cases, group locus names are provided. Also, Table 1 contains a list of assigned or suggested three-letter locus symbols for mutants placed in each UL group.

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Acknowledgements: I gratefully express my sincere and warmest thanks to Professor Jerry Franckowiak, North Dakota State University, Fargo, ND, USA, for all the very fruitful and enthusiastic suggestions and discussions of the many mutants and genes.

Table. 1. The UL database groupings used when the Swedish barley mutants were placed in the Nordic Genebank, phenotypic classification of mutants, and suggested locus codes.

Code	Group name	Phenotype, other names	Locus symbol
UL01	Praematurum	Early heading	eam, mat
UL02	Eceriferum	Glossy leaf, glossy sheath	cer, glf, gsh
UL03	Upright	Erect growth habit	
UL04	Irregular spikes	Deformed spike	def
		Branched spike	brc
		Irregular row number	vrs
UL05	Mildew resistant mutants	Powdery mildew reaction	ml, Reg
UL06	Breviaristatum	Short awn	ari, lks, sca
		Brachytic	brh
UL07	Laxatum	Lax spike	lax
	Compositum	Branched spike	com, brc
UL08	Globosum	Globe shaped grain	glo
UL09	Anthocyanin mutants	Anthocyanin-less	ant
		Proanthocyanidin-free	ant
		Anthocyanin rich, red stem	Rst, Ant
UL10	Hexastichon	Six-rowed spike	vrs1 alleles
UL11	Intermedium	Six-rowed spike	int, vrs
UL12	Maculosus	Scattered necrotic flecks	mac
UL13	Gigas	Giant plant	gig
UL14	Macrolepis	Elongated outer glume	eog
UL15	Erectoides	Dense spike	ert, dsp
	Pyramidatum	Pyramid shaped spike	Pyr
	Zeocriton	Dominant compact spike	Zeo
UL16	Extra floret	Extra central spikelet	flo
UL17	Calcaroides	Subjacent hood	cal, sbk
UL18	Bracteatum	Third outer glume	bra, trd
UL19	Double seeds	Double kernel	dub
UL20	Exauriculum	Liguleless	lig
UL21	Curly awn	Twisted awn	caw
UL22	Wilting awn	Weak awn	waw
		Dehiscent awn	daw
UL23	Long awn	Long awn	law
UL24	Scirpoides leaf	Folded leaf	scl
UL25	Narrow leaf blade	Narrow leaf, angustifolium	nlf, fol
UL26	Latifolium	Broad leaf blade	blf
UL27	Wilting leaf blade	Leaf blade collapse	wlt
UL28	Short culm mutants	Semidwarf	sdw

Table 1. (contin.)

Code	Group name	Phenotype, other names	Locus symbol
UL29	Dwarf	Extreme dwarf	dwf
UL30	Densinodosum	Many noded dwarf	den, mnd
UL31	Long shaped grain	Long kernel	lgk
UL32	Seminudoides	Semi-naked caryopsis	smn
UL33	Acute lemma on lateral spikelets	Pointed lateral spikelet	
UL34	Late maturity	Delayed heading	
UL35	Flavum	Yellow head	yhd
UL36	Rachisextensum	Accordion basal rachis internode	rac, abr
UL37	Short spike	Lesser rachis internode number	lin
UL38	Light green foliage		
UL39	Deficiens	Small lateral spikelets	sls, vrs
UL40	Necroticans	Necrotic leaf fleck, necrotic leaf spot	nec
		Severe leaf necrosis	pmr
		Dark necrotic blotch	ncd
		Concentric rings	
UL41	Weak rachisextensum	Elongated basal rachis internode	rac, lbi
UL42	Exligulum	Small or no ligule	eli
UL43	Stiff straw		
UL44	Tall culm	Tall plant	
UL45	Dark grain	Brown kernels	brk
UL46	Smooth awn	Smooth awn, few barbs	raw
UL47	Eburatum	Albino lemma	ebu, alm
UL48	Long spike	More kernels	
UL49	Rich wax coating	Waxy spike	wxs
UL50	Brittle culm and spike	Fragile stem and rachis	fst, btr
UL51	Fast growing	Elongated plants	slp
UL52	Robiginosum	Orange lemma	rob
UL53	Viviparoides	Delayed spike development	viv
UL54	Bent culm	Weakly curly	cur
UL55	Bikini	Curly	cur2
UL56	Small kernel	Small kernel	smk
UL57	Large kernel	Large kernel	lrk
UL58	Accordionrachis	Accordion rachis	acr
UL59	Uniculme	One tiller, curly tillers	cul
		Low number of tillers	lnt

Table 1. (contin.)

Code	Group name	Phenotype, other names	Locus symbol
UL60	Upper half spike sterile	Tip sterile	tst
UL61	Narrow spike mutants	Granum, thin kernel	gra
UL62	Irregular tillers	Malformed tillers	mft
UL63	Weak culms	Easily lodged plants	
UL64	Elongated glumes	Elongated outer glume	eog
UL65	Prostate growth habit	Lazy, serpentina	srp
UL66	Changed lateral spikelet		
	Large lateral spikelet [3]	Large lateral spikelet	vrs, int
	Curled lateral spikelet [2]	Curly lateral spikelet	crl
UL67	Triaristatum	Triple awned lemma	trp
UL68	Changed awn mutants		
	Soft awns [4],		
	Yellow awns [2]	Yellow awn	yaw
UL69	Changed leaf blade mutants		
	Changes into yellow [6], yellow leaf blade [3]	Yellow leaf	ylf
	White spotted leaf blade [3]	White leaf spots	wls
	Curly leaf blade [3]	Coiled leaf blade	cur
	Rolled leaf blade [3]	Tube leaf	tlf
	Darkgreen leaf blade [1]		
	Brachytic leaf blade [3]	Leafless (small leaf blade)	lfl
	Onion-like plant [1]		
	Crenatum leaf blade [1]	Dented leaf margin	cre
UL70	Scirpoides	Sciroides spike	sci
UL71	Changed flag leaf	Leafless (small blade)	lfl
UL72	Opposite spikelets	Variable rachis internode length	ops
UL73	Different mutants		
	Orange necrosis [2]	Necrotic blotches	nec3
	Hanging spike [1]	Nodding spike	
	Many glumes on lateral spikelets [1]		
	Lesser internode number [1]		
	Nodeless [1]	Single internode dwarf	sid
	Brachytic [1]	Brachytic dwarf	brh
UL74	Intermedium double mutants	Combinations of int mutants	int + int