

## Zadoks Growth Scale - Cereals

0 - Germination	
Code	Description
00	Dry seed
01	Start of imbibition (water absorption)
02	
03	Imbibition complete (germination, seed swollen)
04	
05	Radicle (root) emerged from caryopsis (seed)
06	
07	Coleoptile (shoot) emerged from caryopsis (seed)
08	
09	Leaf just at coleoptile tip

1 - Seedling growth	
Code	Description
10	First leaf through coleoptile (emergence)
11	First leaf emerged (more than half visible)
12	2nd leaf emerged (more than half visible)
13	3rd leaf emerged (more than half visible)
14	4th leaf emerged (more than half visible)
15	5th leaf emerged (more than half visible)
16	6th leaf emerged (more than half visible)
17	7th leaf emerged (more than half visible)
18	8th leaf emerged (more than half visible)
19	9 or more leaves emerged

2 - Tillering	
Code	Description
20	Main shoot only
21	Main shoot and 1 tiller
22	Main shoot and 2 tillers
23	Main shoot and 3 tillers
24	Main shoot and 4 tillers
25	Main shoot and 5 tillers
26	Main shoot and 6 tillers
27	Main shoot and 7 tillers
28	Main shoot and 8 tillers
29	Main shoot and 9 or more tillers

3 - Stem elongation	
Code	Description
30	Pseudostem (leaf sheath) and erection
31	First node detectable
32	2nd node detectable
33	3rd node detectable
34	4th node detectable
35	5th node detectable
36	6th node detectable
37	Flag leaf just visible
38	
39	Flag leaf ligule just visible

4 - Booting	
Code	Description
40	
41	Flag leaf sheath extending (early boot stage)
42	
43	Boots just visibly swollen (mid boot stage)
44	
45	Boots swollen (late boot stage)
46	
47	Flag leaf sheath opening
48	
49	First awns visible

5 - Inflorescence (ear/panicle) emergence	
Code	Description
50	First spikelet of inflorescence just visible
51	
52	Inflorescence 25% emerged
53	
54	
55	Inflorescence 50% emerged
56	
57	Inflorescence 75% emerged
58	
59	Emergence of inflorescence completed

6 - Anthesis (flowering)	
Code	Description
60	
61	Beginning of anthesis
62	
63	
64	
65	Anthesis half-way
66	
67	
68	
69	Anthesis complete

7 - Milk development	
Code	Description
70	
71	Caryopsis (kernel) water ripe (clear liquid)
72	
73	Early milk (liquid off-white)
74	
75	Mid milk (increase in solids)
76	
77	Late milk (increase in solids)
78	
79	Very late milk (half solid/half liquid)

8 - Dough Development	
Code	Description
80	
81	Very early dough (mostly solids when kernel crushed)
82	
83	Early dough (kernels soft and almost dry)
84	
85	Soft dough (kernels firm but finer nail impression not held)
86	
87	Hard dough (finer nail impression held)
88	
89	

9 - Ripening	
Code	Description
90	
91	Caryopsis hard (difficult to divide)
92	Caryopsis hard (not dented by thumbnail)
93	Caryopsis loosening in daytime
94	Over-ripe straw dead and collapsing
95	Seed dormant
96	Viable seed giving 50% germination
97	Seed not dormant
98	Secondary dormancy induced
99	Secondary dormancy lost