

# GROWTH STAGES OF CEREALS

## SEEDLING

## TILLERING

WEEKS FROM SOWING – This figure will vary with climatic conditions and cereal varieties

2 weeks

2 to 3 weeks

3 to 4 weeks

4 to 6 weeks

5 to 8 weeks

7 to 12 weeks

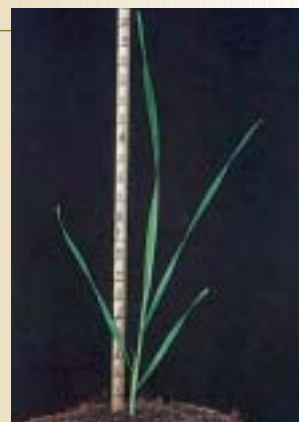
One leaf

Two leaf

**LEAF NUMBER main shoot only**  
Three leaf

Four leaf

Five leaf



Zadoks 11

Z 12

Z 13, 20

Z 13, 21

Z 14, 22

Z 15, 22

### ONE LEAF

### TWO LEAF

### THREE LEAF

### START OF TILLERING

### EARLY TILLERING

### TILLERING

When the first leaf is unfolded, the growing point from which the leaves, tillers, and ears are formed is below ground level. The first leaf has a blunt tip while all subsequent leaves have a pointed tip.

The third leaf is present, but not fully expanded.

The first tiller appears from between the leaf sheaf and the main shoot. This generally occurs between the three and four leaf stage.

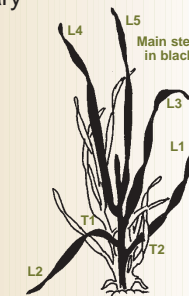
Tillers are counted separately to the main shoot.

When the main shoot has four to five leaves, two or more new tillers have formed.

Tillers continue developing through this stage. All tillers have been initiated by the time the main shoot has five to seven leaves. Secondary roots develop during tillering.

#### Zadoks (Z)

Zadoks decimal growth scale is based on ten cereal growth stages. These are: 0 germination; 1 seedling growth (leaves on main stem); 2 tillering; 3 stem elongation (nodes); 4 booting; 5 ear emergence; 6 flowering; 7 milk development; 8 dough development; 9 ripening. Each primary growth stage is then sub-divided into 10 secondary stages extending the scale from 00 to 99. So Z, 15, 22, 31 indicates a plant with 5 leaves on the main stem, two tillers and one node on the main stem.



Later Post Emergent herbicide application

Early Post Emergent herbicide application

Tissue testing / Sap Nitrate / NIR testing

## JOINTING

## BOOT

## FLOWERING

## GRAIN FILL

WEEKS FROM SOWING – This figure will vary with climatic conditions and cereal varieties

12 to 14 weeks  
First node



Zadoks 16, 21, 31

### START OF JOINTING

Jointing commences when the first node can be found on the main stem.



The first node can be found by peeling back the leaves on the main stem to expose the node underneath. You will be able to feel the swelling with your fingers

13 to 16 weeks



Z 18, 22, 37

### JOINTING

As jointing progresses more leaves are produced and the young head (yellow arrow) continues to move up through the shoot. The last leaf to appear is the flag leaf.

15 to 18 weeks  
Early boot



Z 19, 24, 38, 41

### EARLY BOOT/ POLLEN FORMATION

The flag leaf has fully appeared (red arrow). The developing head can be felt as a swelling of the shoot between the second and third leaf from the top (yellow arrow). Flower development is nearly completed. Pollen is formed at this stage.

16 to 19 weeks  
Full boot



Z 19, 24, 49

### FULL BOOT

The young head swells the area between the flag leaf and the second leaf from the top (yellow arrow). In barley, triticale and awned wheats, awns (red arrow) appear at the base of the flag leaf but cannot be seen. The flowers of the young head are now fully formed.

18 to 21 weeks



Z 19, 24, 59, 61

### FLOWERING (ANTHESIS)

At flowering or anthesis, final grain number has been determined. In barley, flowering occurs while the head is in the sheath.



Flowering is easily identified by the yellow anthers (red arrow) hanging freely from the ear.

25 to 28 weeks  
Milk → Dough → Maturity



### MILK/DOUGH TO MATURITY

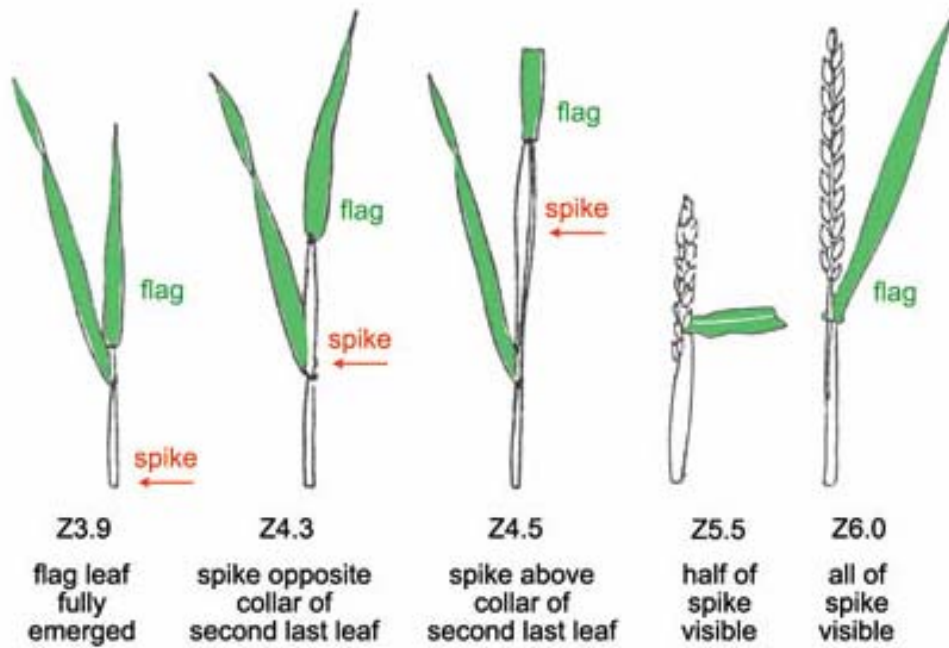
As the grains in the head develop, they go through the milk development ① then the dough stage ② before going through the ripening stage to reach maturity. ③

Source:  
Rural Solutions, SA.  
Reprinted 2005.

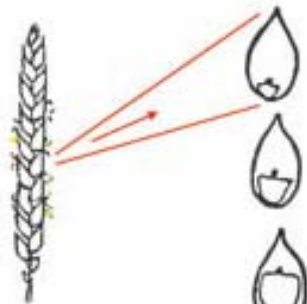


**No more Capeweed  
or volunteer Legumes**

Crop at most risk from frost



based on the adaptation by M Stapper from Ann. appl. Biol. 93: 221-234



Source: *Cereal Growth Stages - The Link to Crop Management* published by the GRDC - September 2005.