Cereal growth stages

**Seedling growth**
- **GS10** First leaf through coleoptile
- **GS11** First leaf unfolded (ligule visible)
- **GS13** 3 leaves unfolded
- **GS15** 5 leaves unfolded
- **GS19** 9 or more leaves unfolded

**Tillering**
- **GS20** Main shoot only
- **GS21** Main shoot and 1 tiller
- **GS23** Main shoot and 3 tillers
- **GS25** Main shoot and 5 tillers
- **GS29** Main shoot and 9 or more tillers

**Stem elongation**
- **GS30** Ear at 1cm (pseudostem erect)
- **GS31** First node detectable
- **GS32** Second node detectable
- **GS33** Third node detectable
- **GS37** Flag leaf just visible
- **GS39** Flag leaf blade all visible

**Booting**
- **GS41** Flag leaf sheath extending
- **GS43** Flag leaf sheath just visibly swollen
- **GS45** Flag leaf sheath swollen
- **GS47** Flag leaf sheath opening
- **GS49** First awns visible (if an awned variety) *Barley only*

**Ear emergence**
- **GS51** First spikelet of ear just visible above flag leaf ligule

**Dough development**
- **GS83** Early dough
- **GS85** Soft dough
- **GS87** Hard dough (thumbnail impression held)

**Flowering**
- **GS61** Start of flowering
- **GS65** Flowering half-way
- **GS69** Flowering complete

**Ripening**
- **GS91** Grain hard (difficult to divide)
- **GS92** Grain hard (not dented by thumbnail)
- **GS93** Grain loosening in daytime

**Milk development**
- **GS71** Grain watery ripe
- **GS73** Early milk
- **GS75** Medium milk
- **GS77** Late milk

**Half of ear emerged above flag leaf ligule**
- **GS55**

**Ear completely emerged above flag leaf ligule**
- **GS59**

**Barley only**
- **First awns visible**
- **Flag leaf sheath opening**
- **Flag leaf sheath swollen**
- **Flag leaf sheath extending**
- **First leaf through coleoptile**
- **First leaf unfolded**
- **3 leaves unfolded**
- **5 leaves unfolded**
- **9 or more leaves unfolded**
Correct timing of sprays and fertiliser treatments is critical to success in growing cereals. Many instructions and guides state ‘Apply at GSXX.’ This guide aims to help you understand the decimal growth stage (GS) key.

**Sampling crops**

Take 5-10 typical plants from across the field, ideally digging them up rather than pulling up to avoid damaging stems and leaves.

<table>
<thead>
<tr>
<th>Spray timing</th>
<th>Winter wheat</th>
<th>Winter barley</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>GS31-33</td>
<td>GS30-32</td>
</tr>
<tr>
<td>T2</td>
<td>GS39</td>
<td>GS39-49</td>
</tr>
<tr>
<td>T3</td>
<td>GS61-65</td>
<td>–</td>
</tr>
</tbody>
</table>

**Spray timings and Growth Stages**

*T0 is not defined by Growth Stage*

+ To identify if emerging leaf is Leaf 3, unroll its sheath to check that only two further leaves remain to emerge.

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**GROWTH STAGE 09**

*Leaf at coleoptile tip (peri-emergence)*

**GROWTH STAGE 13, 21**

3 leaves unfolded, 1 tiller

A leaf is unfolded when its leaf collar, at the junction between blade and sheath, has emerged from the sheath of the preceding leaf.

*Two numbers reflect GS of main shoot and tillering respectively, eg GS13 – 3 leaves unfolded on main shoot, GS21 – main shoot and 1 tiller.

**GROWTH STAGE 15, 23**

5 leaves unfolded on main shoot, 3 tillers

**GROWTH STAGE 30**

*Ear at 1 cm (pseudostem erect)*

**GROWTH STAGE 31**

1st node detectable

An internode is 1 cm or more but the internode above is less than 2 cm

**GROWTH STAGE 32**

2nd node detectable

2nd and subsequent nodes counted when the internode below them exceeds 2 cm

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