

KNOW THE 'LEAF TILLER LANGUAGE'

This Insight explains everything you need to know about the leaf formation of plants, especially **wheat** and **cereal crops**.

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Crop emergence in cereals starts with the burst of the coleoptile through the soil while protecting the first leaf.

The leaves appear after a certain number of growing degree days – usually around 100. For example, if the daily temperature range is between 14°C (day maximum) and 6°C (night minimum), the average daily temperature is 10°C. In ten such days, there would be 100 growing degree days needed to produce one leaf. Thus a plant with 3 leaves is sown approximately a month before inspection day.

If you hold a wheat plant with leaf 1 on your right, leaf 2 would be on your left. As shown in the diagram, the final arrangement is that all odd leaves are on one side and all even leaves on the opposite side. Tiller-1 forms at the base of leaf-1 and tiller-2 at the base of leaf-2, and so on.

In some cases a tiller-0 (coleoptilar tiller) emerges before tiller-1 from the coleoptilar node.

The coleoptilar tiller is believed to represent good seed nutrient reserves and seed bed conditions. The seminal roots appear at the seed level during germination. The nodal roots appear some 30 days after germination (after about 300 growing degree days) at both nodes of the coleoptilar internode.

The coleoptilar internode (also known as epicotyl) is the whitish stem-like section that elongates when the seed is deep-sown; this brings leaf-1 closer to the soil surface preventing failed germination and leaf buckling.

Each tiller is named after its leaf – tiller-1 forms at the base of (leaf) L1, and tiller 2 at the base of L2. Because cereal plants develop according to a set pattern, crop inspection gives information about sowing depth, nutritional status and stresses such as drought, frost and disease.

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There should be no more than 3 leaves between the youngest emerged leaf and the youngest tiller. To determine whether a plant is still tillering, count the leaves backwards from the tip of the main stem until you come to the leaf that has a tiller. If there are more than three leaves in your count, the plant has ceased tillering. A good crop of cereal should have finished tillering when it gets to the 5-leaf stage (e.g. it has 5 leaves with 2 tillers).

Main stem tiller and the first two tillers have the potential of producing some 60 to 100 seeds from a single wheat plant. Late tillers may abort or produce less grain. It is therefore essential that the crop that is suspected to be marginal in nutrient status (such as low phosphorus or trace elements) is foliar-sprayed at early tillering before the yield potential is lost. You can use tillering pattern to determine stress events. For example, if your plant has 6.3 leaves on the main stem and has a T0, a T1, and T3 with tiller 2 missing, you could conclude that there has been a severe stress (e.g. sudden cold, herbicide damage, low fertility) near the time that T2 should have emerged – but the stress was removed when T3 was developing.

Herbicide sprays for best efficiency are often recommended between leaf-3 (crow root formation) and leaf-5 stage of growth. Therefore knowing the crop developmental stage is helpful for crop nutritional and herbicide management.

Diagram of wheat plant, explaining leaf and tiller language

