

Identifying Leaf Stages in Small Grain

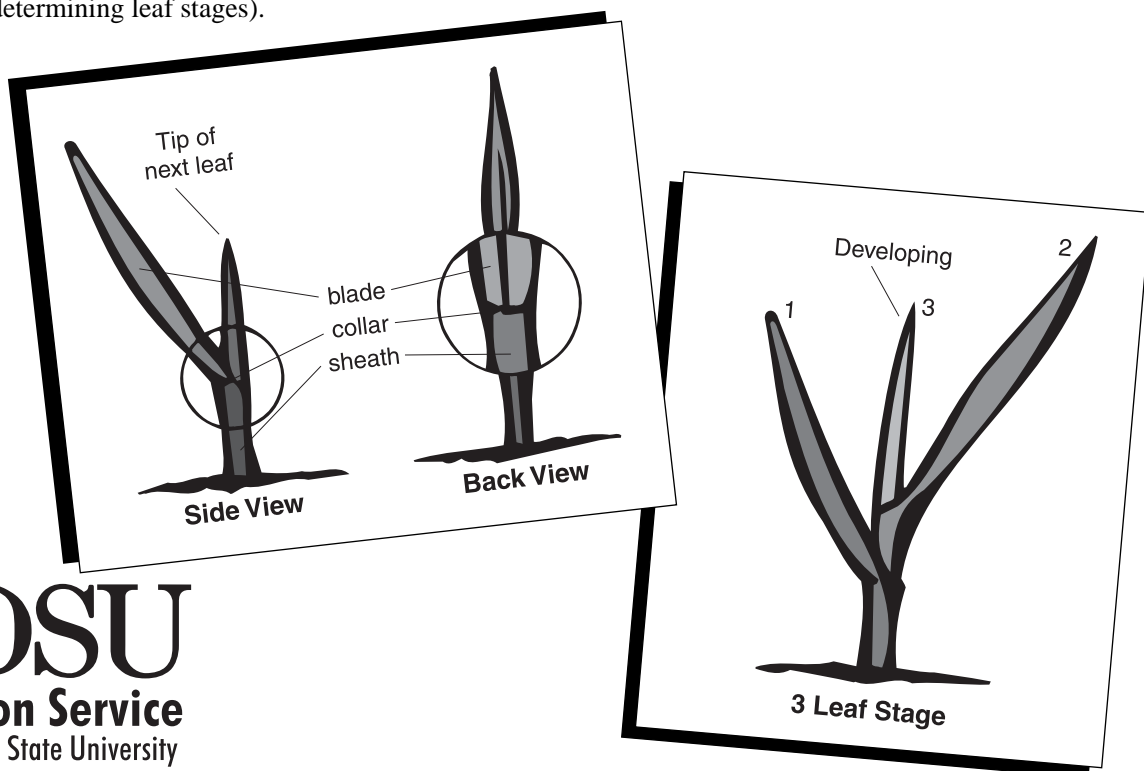
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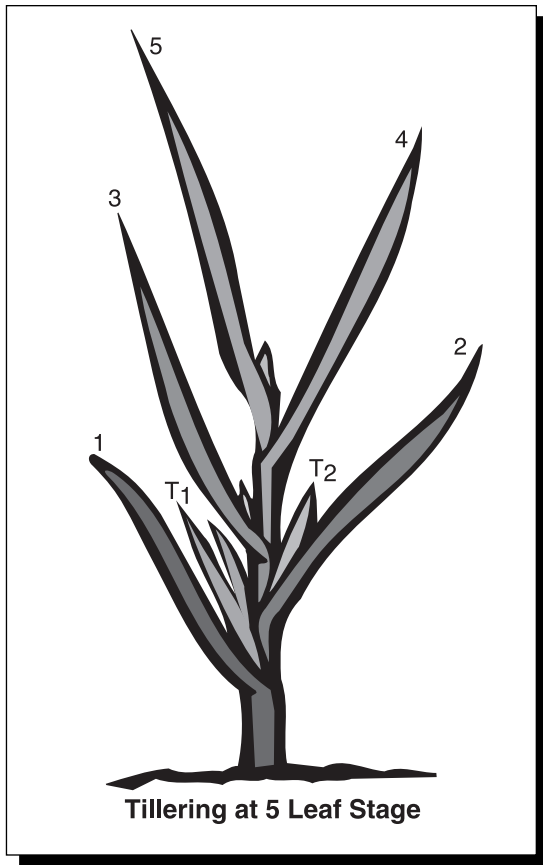
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Recommendations for postemergence applied herbicides include leaf stages of crops and weeds to describe the optimum treatment time. For example, achieving maximum wild oat control with Avenge (difenzoquat) or minimizing crop injury from Banvel/Clarity (dicamba) requires proper timing of herbicide applications. The drawings in this circular illustrate wheat growth stages but also represent any cereal or annual grassy weed. Weed control recommendations made annually by North Dakota State University in Extension Circular W-253, North Dakota Weed Control Guide, use this method of describing growth stages. The numbering on the drawings represents the following: 1=1st leaf on the main stem, 2=2nd leaf on the main stem, (etc.), and T=tiller (not counted as a leaf when determining leaf stages).

The plant leaf stage is determined by the number of leaves present on the main stem. Leaves arise on opposite sides of the stem and develop a collar at the junction of the leaf sheath and the leaf blade. Small grains should be positioned with the first leaf pointing to the left. The first leaf has a blunt tip. When positioned correctly, all leaves on the left side of the main stem are designated with an odd number and on the right side with an even number. Count the youngest leaf when it is at least one-half the length of the leaf below it. For example, a plant with two fully expanded leaves with the third leaf approximately one-half the length of the second leaf is staged as a 3-leaf grass plant. Follow this procedure to determine the proper growth stage of grass plants.



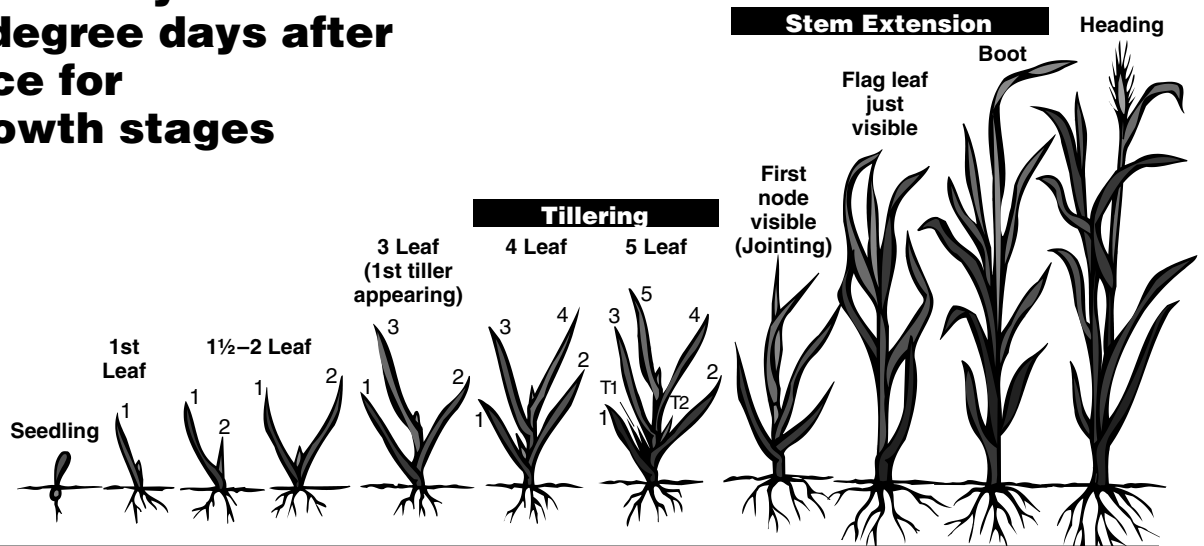


Tillers (stooling) usually start to appear at the third to fifth leaf stage. Most tillers arise between the main axis (stem) and leaf. A coleoptilar tiller may also be present. The coleoptilar tiller originates below the soil (near the seed) and is located on the opposite side of the stem from the first leaf. Frequently, tiller leaves are confused with the leaves of the main stem when determining the leaf stage. Remember to count the leaves on the main stem, **but do not include tiller leaves in the leaf stage count.**

Leaf stage determination in the field often is complicated by the loss of some of the older leaves; for example, the first and second leaves may have been removed from the plant by abrasion from wind blown soil, frost, disease, or some other form of weathering. The base of the stem should be carefully examined for evidence of scars from lower leaves which may have been removed. Such leaves must be counted when making a leaf stage determination.

Plant growth rates varies considerably, and the approximate days after emergence for a given leaf stage to appear is influenced most by temperature. Daytime highs less than 55 degrees Fahrenheit delay development, while daytime highs greater than 75 F advance development. Days to emerge can vary greatly depending on soil temperature and moisture.

Approximate days or growing degree days after emergence for wheat growth stages



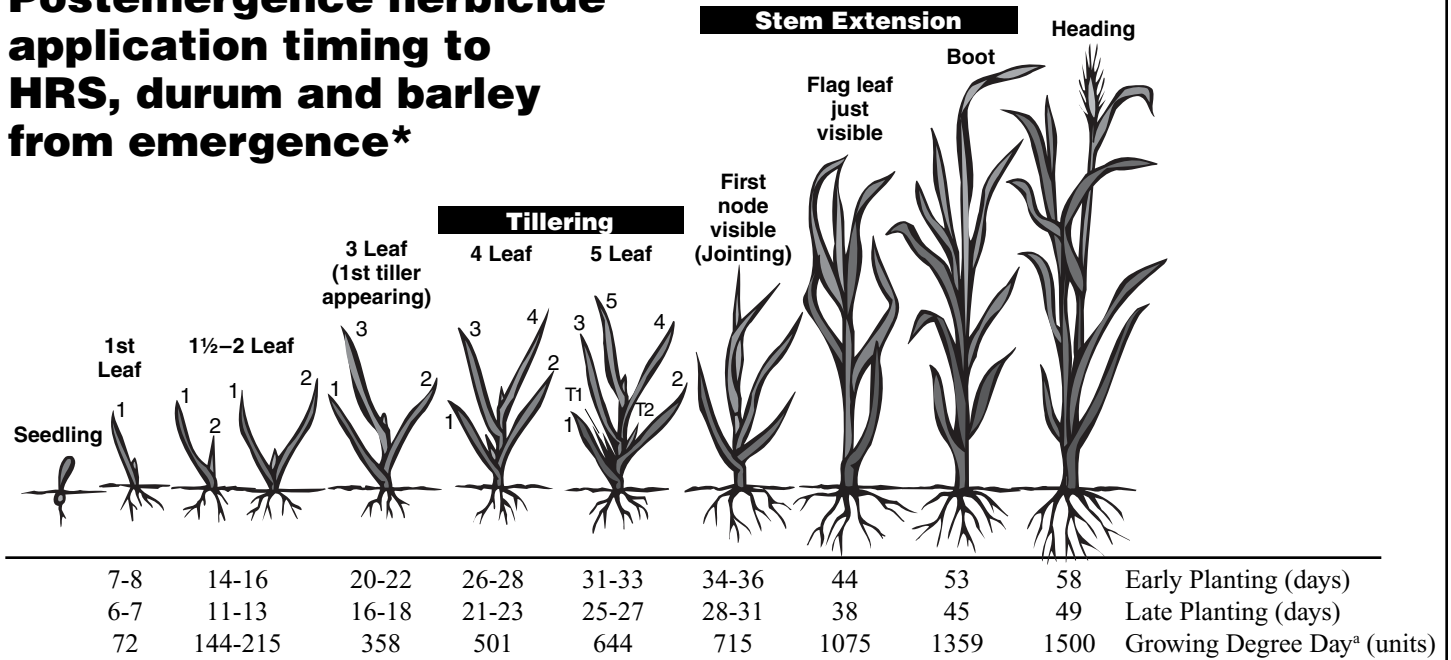
Early Planting (days)	7-8	14-16	20-22	26-28	31-33	34-36	44	53	58
Late Planting (days)	6-7	11-13	16-18	21-23	25-27	28-31	38	45	49
Growing Degree Day* (units)	72	144-215	358	501	644	715	1075	1359	1500

The lettering on the drawing represents the following: 1=1st leaf on the main stem of the plant; 2=2nd leaf on the main stem; 3=3rd leaf on the main stem; 4=4th leaf on the main stem; 5=5th leaf on the main stem and T=Tiller – not counted as a leaf when determining leaf stages.

*Growing Degree Day Units = $\frac{\text{Maximum Day Temperature} + \text{Minimum Day Temperature}}{2} - 32$

See extension circular EB-37, Use of Growing Degree Days to Determine Spring Wheat Growth Stages, for details about what development and use of growing degree day units.

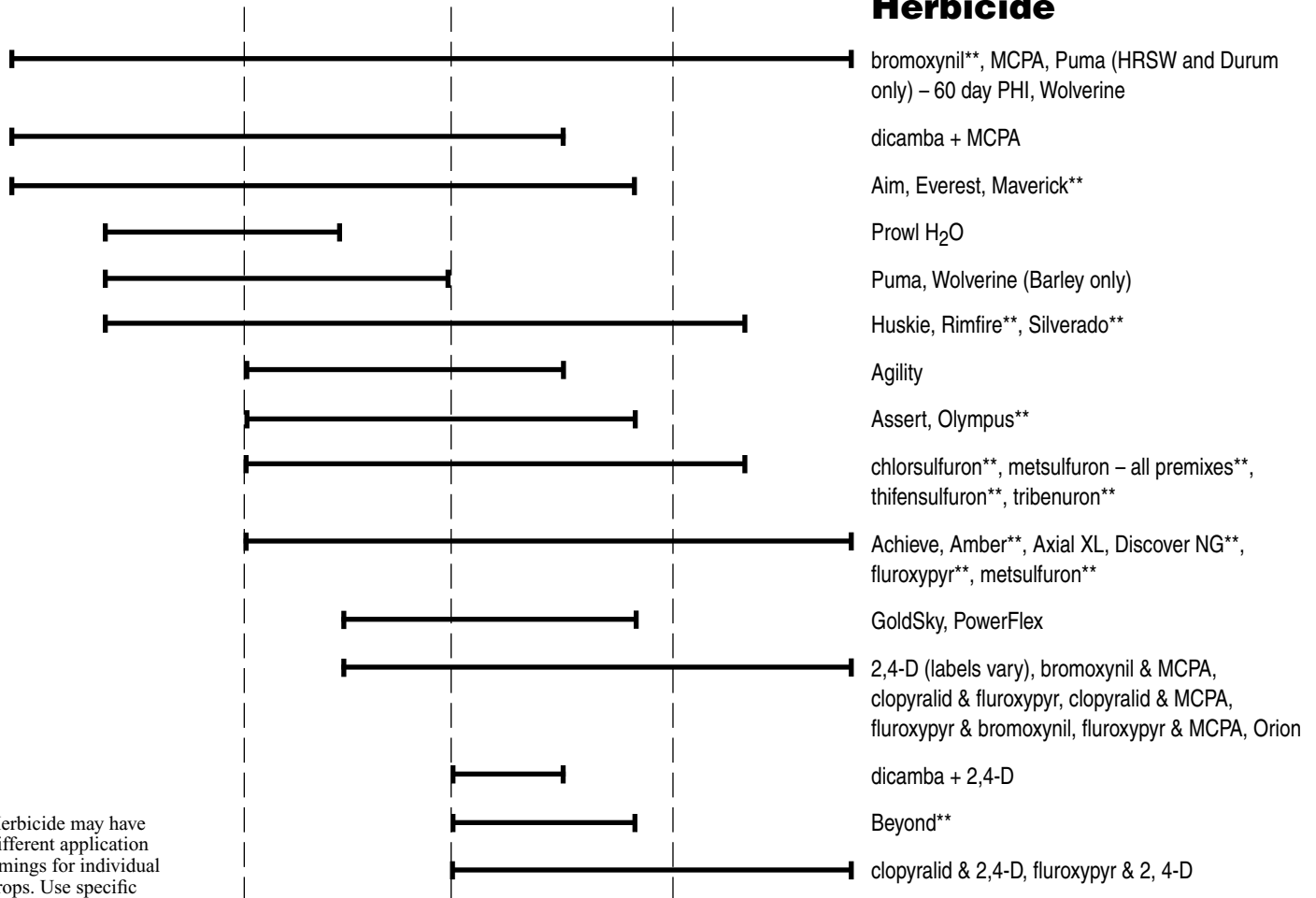
Postemergence herbicide application timing to HRS, durum and barley from emergence*



The lettering on the drawing represents the following: 1=1st leaf on the main stem of the plant; and so forth to 5=5th leaf on the main stem; and T=Tiller – not counted as a leaf when determining leaf stages.

$$^a \text{Growing Degree Day Units} = \frac{(\text{Maximum Day Temperature} + \text{Minimum Day Temperature}) - 32}{2}$$

Herbicide



* Herbicide may have different application timings for individual crops. Use specific label information for individual crops.

** The addition of MCPA or bromoxynil does not restrict application timing. The addition of 2,4-D generally restricts the earliest application to the 4-leaf stage. The addition of dicamba generally restricts application to the 2- to 4-leaf stage.

Remember to always follow the label — it's the law!

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