

*Dwight*



TECHNICAL  
NOTES  
U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
MICHIGAN

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AGRONOMY #4 (REV.)

SUBJECT: Identification of Cereal Grains  
and Grasses Without Seed Heads

DATE: August 1989

To: All Offices

CEREAL PLANT IDENTIFICATION IN THE VEGETATIVE STAGE

Wheat, oats, rye and barley are the common small grains grown in Michigan. They are usually grown as cereal or grain crop but sometimes as green manure, cover or companion crops.

It is often desirable to identify cereal plants before they produce seed heads. This is possible with a reasonable degree of accuracy by the examination of certain distinguishing characteristics of the leaves and stems.

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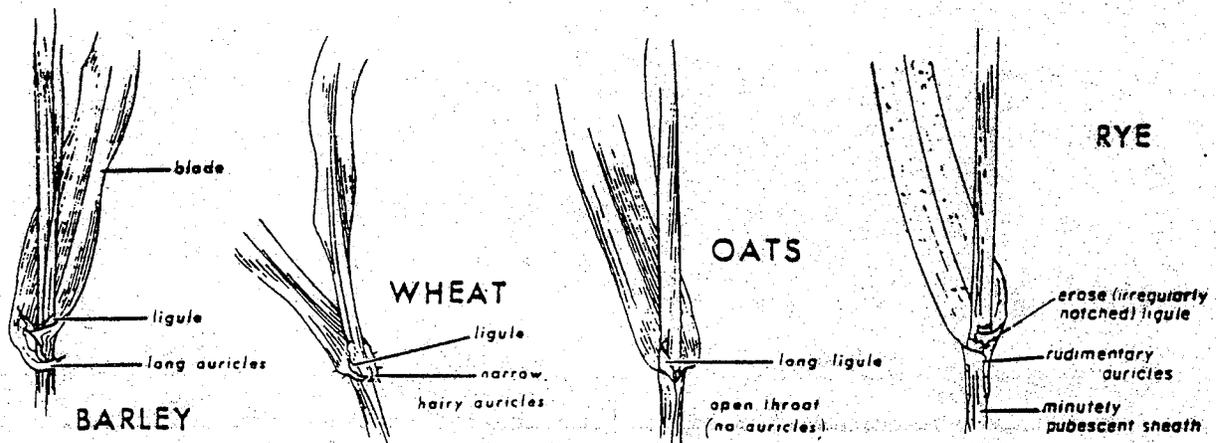
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Definitions:

Auricles - ear-like lobes or lateral extensions of the leaf collar, which is the thickened, hinge-like part of the leaf serving as a joint between leaf blade and leaf sheath. Auricles occur in pairs and project around the stem.

Ligule - a thin appendage on the upper and inner side of the leaf blade where it joins the leaf sheath.



Distinguishing Characteristics in the Vegetative Stage

Barley has long, smooth, clasping auricles and a small ligule.

Wheat has short, narrow, hairy auricles and a ligule which is prominent but shorter than that of oats.

Oats have no auricles (the sheath has an open throat) and a long ligule.

Rye has rudimentary auricles and a small ligule which is irregularly notched. Sheath and leaf blade are minutely pubescent.

### IDENTIFYING COMMON GRASS PLANTS

The easiest key to use in identification of grasses is the key using floral characteristics (seedhead). Many times we may wish to identify grasses during the stage of immaturity. Identification is much more difficult at this stage. The attached key is based on vegetative characteristics before reaching the mature stage.

This key was developed to help in identifying some common grass species in the northcentral states. It is not intended as a complete vegetative key to the 2,000 species which may be found in this area.

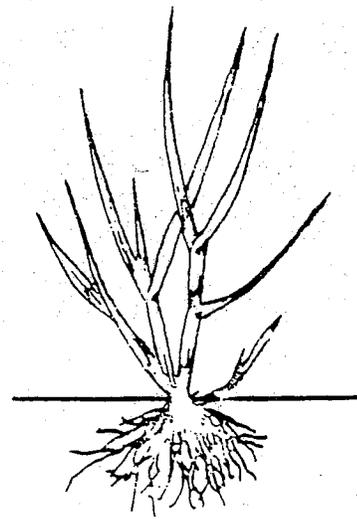
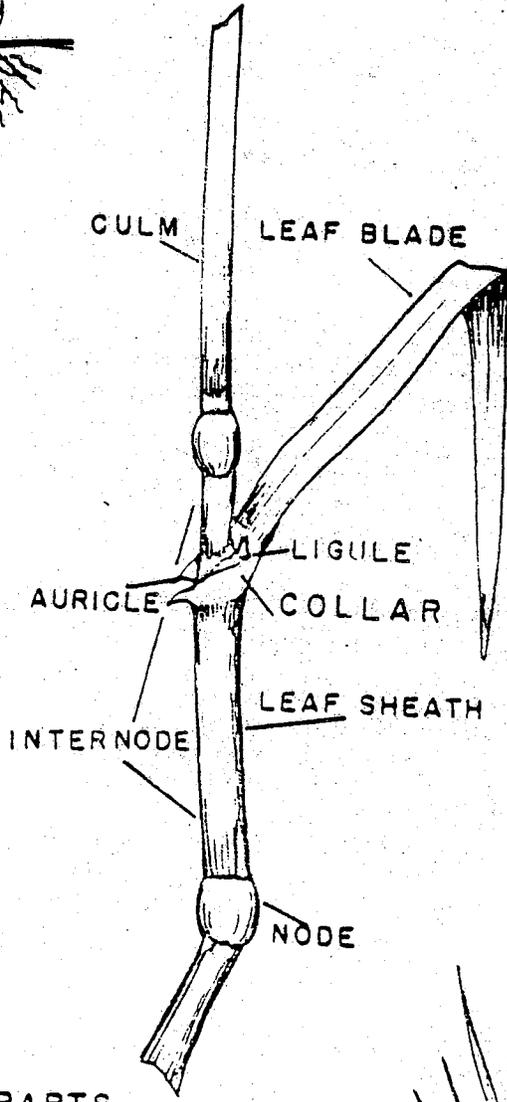
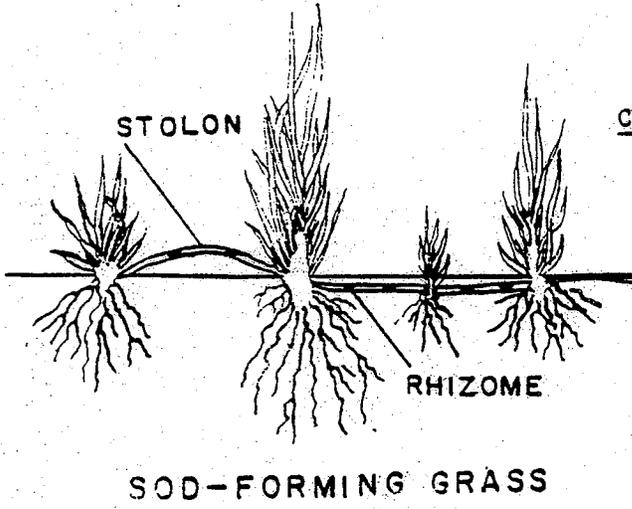
Many grasses are somewhat variable in their vegetative characters. These differences may be partly due to climatic conditions, and other factors such as age, fertility, moisture, etc. Therefore, some of the sizes listed, such as the width of blade, should be considered as a general guide.

A magnifying glass is helpful in identifying minute plant characters.

Several characteristics, such as the following, may be used to differentiate grasses from grass-like plants.

<u>Character</u>	<u>Grasses</u>	<u>Sedges</u>	<u>Rushes</u>
Stem	Usually hollow, round or flattened.	Usually 3-sided, pithy, rarely hollow.	Round and filled with spongelike pith.
Nodes	Conspicuous	Indistinct	Indistinct
Leaf Arrangement	In 2 vertical rows.	In 3 vertical rows	In 3 vertical rows
Collar	Distinct band	Indistinct	Indistinct

CHARACTERS OF GRASSES



BUNCH GRASS

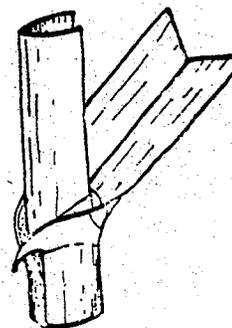
GRASSES

Group I - Leaves folded in the bud shoot.

1. Auricles narrow and clawlike, clasping the stems; glabrous (without hairs) throughout.

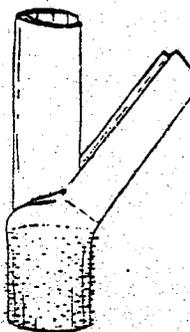
Leaf blade smooth, glossy below; ligule very short; sheath flattened, smooth, split.

Perennial rye-grass  
(*Lolium perene*)



2. Rootstalks present, creeping; sheath flattened, split only part way; ligule very short.

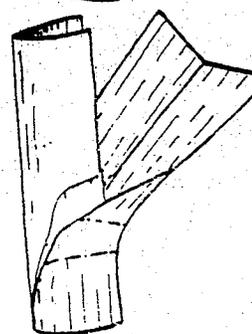
Red fescue  
(*Festuca rubra*)



3. leaf blade flat, not bristle like, not veined on upper surface; sheath split.

Leaf blade mostly smooth, broad, 1/4 inch wide or wider; tip of blade taper pointed, margins rough; no white lines along midnerve; plants tufted; ligule very large to 1/4 inch; sheath distinctly flattened.

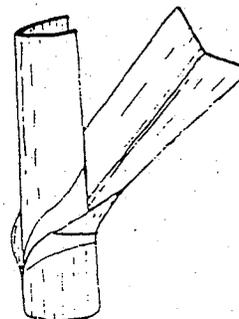
Orchard grass  
(*Dactylis glomerata*)



4. leaf blade narrow, tip of blade boat shaped, a white line can be seen on each side of midnerve with a lens.

Rootstalks absent; ligule long--about 1/16 inch; sheath flattened, smooth.

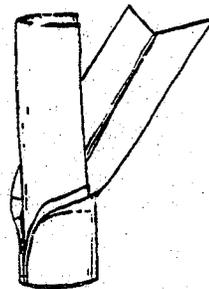
Annual bluegrass  
(*Poa annua*)



5. Rootstalks present.

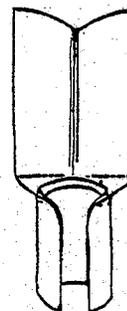
Bluish green leaves, ligule about 1/16 inch, flattened stem.

Canada bluegrass  
(*Poa compressa*)



6. Dark green leaves; ligule very short, round smooth stem.

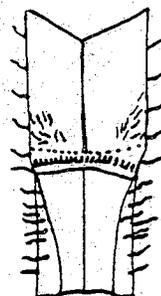
Kentucky bluegrass  
(*Poa pratensis*)



7. Ligule a membrane, collar hairy on margins.

Collar not divided by midnerve; sheath flattened, hairy at top; ligule very small, sometimes short ciliate; blade wide 1/4 inch or more, sparse long hair near base above, smooth and keeled below.

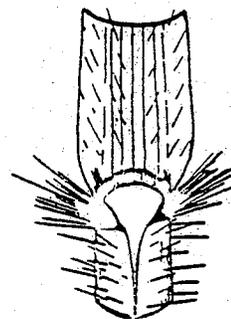
Goose grass  
(*Eleusine indica*)



8. Ligule a fringe of hairs.

Leaf blades about 1/8 inch wide sharply pointed, upper surface dull green, ridged near center, under surface bright green; plant tufted; long hairs on margin of collar.

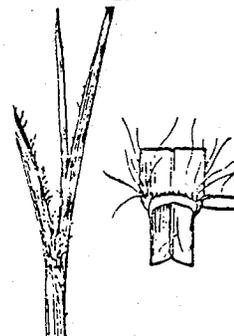
Poverty grass  
(*Danthonia spicata*)



9. Blades 1/4 inch wide or wider.

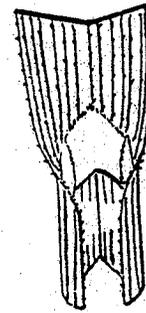
Collar divided by the midnerve, mostly hairy on margins; sheath distinctly flattened, smooth, margins hairy; ligule ciliate, very small; blade 1/8 to 1/4 inch, hairy near base, margins rough and long hairy.

Broom sedge  
(*Andropogon virginicus*)



10. Collar broad light green, without hair; ligule membranous and ciliate (fringed with hairs); sheath flattened, upper sheath margin glabrous (or sparingly hairy); leaf bluntly pointed, veins distinct, scabrous (rough to the touch) above, and smooth below.

Little bluestem  
(*Andropogon scoparius*)



Group II - Leaf-blade rolled in the bud shoot.

1. Auricles narrow and clawlike.

Leaf blades shining beneath; auricles not hairy; sheath round, smooth, split.

Leaf margins smooth; ligule short, 1/25 inch; auricles small.

Annual rye-grass  
(*Lolium multiflorum*)

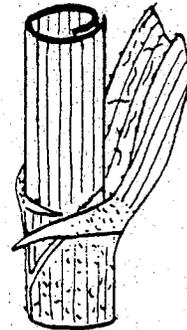


2. Leaf blades not shining underneath.

Leaf usually pilose on top.

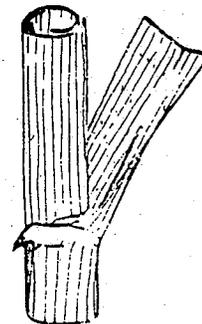
Collar minutely pubescent; leaf blade about 1/4 inch wide, has W marking, midrib not pronounced on under surface of leaf, upper surface not prominently ridged; sheath split, with short pubescence; ligule very short.

Quackgrass  
(*Agropyron repens*)



3. Collar glabrous (free of hairs); midrib conspicuous on under surface of leaf; upper surface prominently ridged, ligule very short.

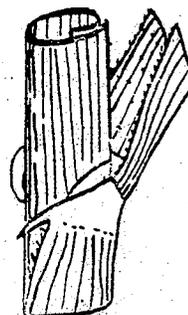
Crested wheatgrass  
(*Agropyron cristatum*)



4. Leaf and sheath free of hairs, midrib conspicuous on under side of leaf blade.

Margin of sheath ciliate; leaf blade about 3/8 inch wide, smooth underneath, slightly rough above, margin rough; ligule short, may be ciliate.

Canada wildrye  
(*Elymus canadensis*)



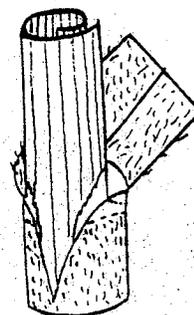
5. Auricles absent or very small.

Ligule membraneous.

Sheath round and closed; pinched "W" in leaf blade visible.

Sheath and blade pubescent, ligule 1/16 inch, no creeping roots.

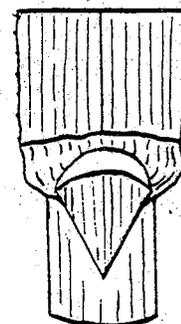
Downy brome  
(*Bromus tectorum*)



6. Leaf blade usually without hairs; sheath usually smooth but may be short hairy on lower sheaths.

Ligule small 1/32 inch; creeping roots; leaf blade 3/8 inch or more in width, smooth; sheath smooth or short hairy on lower sheath.

Smooth brome  
(*Bromus inermis*)



7. Leaf blade usually hairy above and below, margins rough or short hairy; sheath mostly smooth, sometimes sparsely hairy.

Ligule tooth, 1/16 inch; no creeping roots; leaf blade may be 3/8 inch or more in width.

Cheat  
(*Bromus secalinus*)



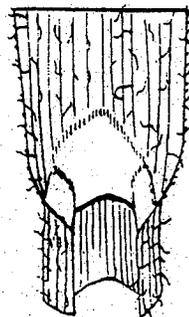
8. Sheath open (margins generally overlapping).

Sheath hairy.

Leaf blade hairy.

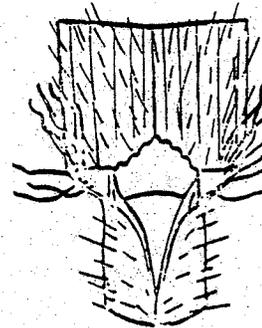
Blade hairy above, smooth below, about 3/8 to 1/2 inch wide; ligule membraneous and ciliate (fringed with hairs on margin).

Big bluestem  
(*Andropogon furcatus*)



9. Blade hairy on both sides, sheath flattened, margins rough.

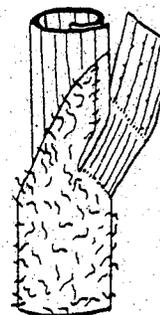
Crabgrass  
(*Digitaria sanguinalis*)



10. Leaf blade free of hair.

Large shovel-shaped ligule 1/4 inch; sheath round, may be hairy at nodes; leaf blade 1/4 inch or wider, narrow at base, keeled below, margins rough.

Indian grass  
(*Sorghastrum nutans*)

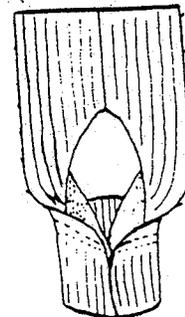


11. Sheaths pale below ground.

Rootstalks more than 1/8 inch in diameter.

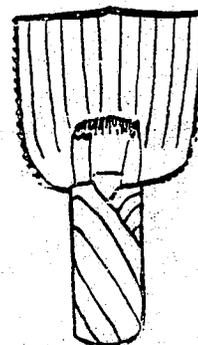
Blade smooth yellowish green, 1/2 inch wide; margins smooth; ligule white papery, acute, 1/4 inch long.

Reed canarygrass  
(*Phalaris arundinacea*)



12. Blade smooth above and below but rough on margins;  
1/2 inch or more wide; midrib prominent below;  
ligule membraneous and ciliate, 1/8 inch long;  
collar may be hairy.

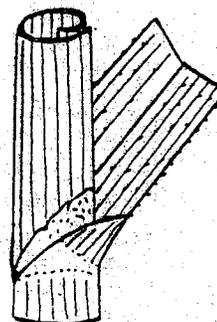
Johnson grass  
(*Sorghum halepense*)



13. Rootstalks less than 1/8 inch diameter.

H. Leaves scabrous (rough to the touch); prominent  
veins on upper surface, 1/4 inch wide; ligule  
thin, shovel-shaped 1/8 inch long or longer.

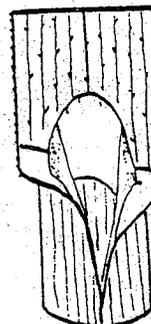
Redtop  
(*Agrostis alba*)



14. Creeping stems (stolons) less than 1/8 inch  
diameter).

Leaf blade pale green, 1/16 to 1/8 inch wide,  
ridged above, rough to the touch on both surfaces  
and margins; ligule about 1/16 inch long, toothed  
or entire; collar smooth, pale green.

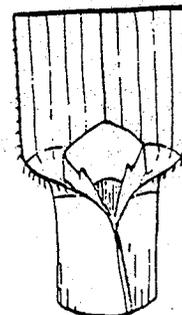
Creeping bent  
(*Agrostis palustris*)



15. Rootstalks or stolons absent.

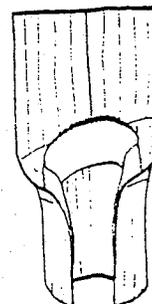
Margin of blades rough; ligule 1/16 inch long with  
one notch at either side; stems with bulbs below  
ground.

Timothy  
(*Phleum pratense*)



16. Margin of blades smooth, ligule without a notch at  
either side, no bulbs below ground.

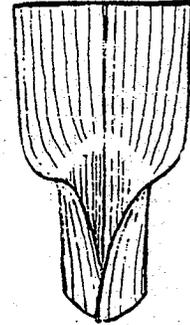
Tall oatgrass  
(*Arrhenatherum  
elatius*)



17. Ligule absent or very small.

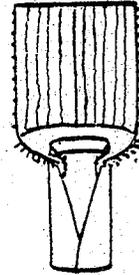
Sheath compressed; plant glabrous but occasionally rough; ligule absent; blade 1/2 or more inches wide, generally rough above, margins rough.

Barnyard grass  
(*Echinochloa crusgalli*)



Sheath round, auricles and ligule very small and practically invisible with the naked eye; collar broad, yellowish, short hairs on margin; blade 1/4 inch wide or more, glossy below with prominent midrib, margins rough, veins on upper leaf blade coarse and raised.

Tall fescue  
(*Festuca arundinacea*)

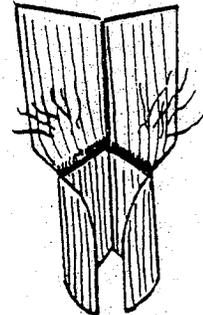


18. Rootstalks absent.

Collar glabrous (free of hair).

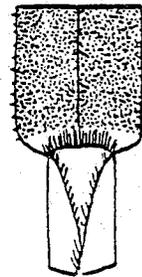
Blade sparsely hairy at base on upper surface, the hairs long and twisted.

Yellow foxtail  
(*Setaria lutescens*)



19. Blade not hairy but rough above, beneath and near margins, blade keeled; sheath keeled, smooth, overlapping margins hairy.

Field sandbur  
(*Cenchrus pauciflorus*)



20. Collar hairy on the back.

Sheaths flattened, smooth, glossy, slightly hairy on upper margins; blades narrowed at base, taper pointed, minutely hairy above, smooth and glossy beneath.

False redtop  
(*Tridens flavus*)

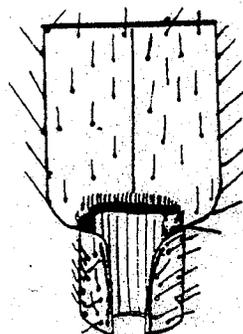


21. Sheath round or oval.

Sheath tinged with purple.

Sheath hirsute (covered with stiff straight hairs); ligule 1/16 inch long; a stout annual plant.

Witch grass  
(*Panicum capillare*)



22. Sheath not hirsute.

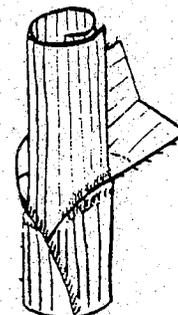
Base of blade pilose (covered with long soft hairs), margin slightly rough; sheath split with one margin hairy.

Switch grass  
(*Panicum virgatum*)



23. Blade with no hairs; margins of sheath pubescent; base of collar fringed with hairs.

Green foxtail  
(*Setaria viridis*)

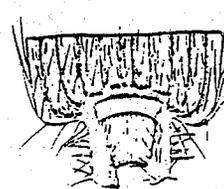


24. Sheath not tinged with purple.

Collar pilose (covered with long soft hairs).

Blade hairy; sheath hairy.

Proso millet  
(*Panicum miliaceum*)



25. Blade mostly free of hairs, but rough above and on margins; sheath margins hairy.

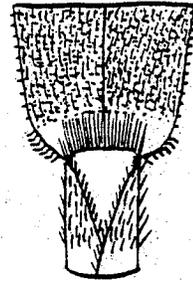
Foxtail millet  
(*Setaria italica*)



26. Collar hairy on margins only.

Sheath hairy at top with margins hairy, (occasionally smooth); ligule a fringe of hairs 1/32 inch long; blade about 1/2 inch wide, rough and short hairy above, smooth and keeled below, margins rough.

Giant foxtail  
(*Setaria faberii*)



References:

1. "Some Grasses of the Northeast" by C. E. Phillips, Field Manual No. 2, July 1962. University of Delaware, Ag. Experimental Station, Newark, Delaware.
2. "The Identification of Certain Native and Naturalized Grasses by their Vegetative Characters", by Clarke, Campbell and Shevkenek. Technical Bulletin No. 50, May 1950, Dominion of Canada, Department of Agriculture, Ottawa.
3. "The Identification of Certain Hay and Pasture Grasses by their Vegetative Characters", by Nowosad, Swales and Dore. Technical Bulletin No. 16, revised March 1938, Macdonald College, Quebec, Canada.
4. "The Identification of 76 Species of Mississippi Grasses by Vegetative Morphology", by Bennett, Hammons and Weissinger. Technical Bulletin No. 31, July 1950, State College, Mississippi.