Preface

Weed management can be one of the cheapest inputs to growing a maize crop, but can also be the most challenging. If it goes wrong, substantial yield loss can result. In particular, early identification of grass weeds is vital to ensure the best control strategies are used. The FAR maize research committee hopes this booklet will become a valued tool that all maize growers will use during crop scouting to enable more effective weed control for improved profitability.
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Grass weeds of arable crops grown in warmer climates

These grasses are frequently weeds of summer crops such as maize and sweetcorn. The growth of most of these grasses responds directly to temperature so that they grow faster in warmer conditions. These grasses also use water more efficiently so are very competitive when there is reduced moisture.

Grass weeds of arable crops grown in cooler climates

These grasses are frequently weeds of both winter and summer cereal crops grown in cooler conditions. The growth of most of these grasses is independent of temperature and they usually grow best when soil moisture is high. They require less light and growth of some is actually limited by warmer conditions.
Identification of weedy grasses

Many grasses can only be accurately identified after their inflorescences have emerged. However, for practical reasons farmers need to be able to identify grass weeds at earlier growth stages so that the best decisions on their management are made. This guide aims to help identify grass weeds at the seedling or early vegetative growth stage.

Grass plants have several characteristics that can be used to differentiate species before flowering. The most important are labelled in the illustrations below. A hand lens might sometimes be required to examine the junction of the leaf blade and the sheath as, after the flower and seed head, this is the most diagnostic part of the plant.
Emerging leaf

Leaf base detail
- Rib
- Blade
- Groove
- Collar
- Ligule
- Auricle
- Sheath

Ligule types
- Membrane
  - pointed
  - frayed
  - toothed
  - smooth

Fringe of hairs
- long
- short

Grass Weeds of Arable Crops Ute Guide
Key for warm climate weedy grasses

BEGIN HERE… Select plants with three or more blades and use the newest blades for examination

- **Ligule present**
  - **Auricle present**
  - **Blades shiny with prominent veins**
    - **Emerging blade rolled**
      - E.g., Annual ryegrass, page 46
    - **Emerging blade folded** (rolled in older tillers)
      - E.g., Perennial ryegrass, page 48
  - **Blades not shiny, veins not prominent**
    - E.g., Couch, page 16
  - **Leaf collar hairy**
    - **Leaf collar very hairy**
      - E.g., Mercer grass, page 24
    - **Leaf collar or sheath hairy**
      - **Leaf collar with few hairs**
        - **Ligule large, membranous**
          - Summer grass, page 10
        - **Ligule very small and hairy/ciliate**
          - **Leaf sheath hairy**
            - Barnyard grass, page 12
          - **Leaf collar hairy**
            - Indian doab, page 8
    - **Ligule absent**
      - **Collar very hairy**
        - Perennial ryegrass, page 48
      - **Sheath very hairy**
        - Kikuyu, page 26
Key for Warm Climate Weedy Grasses

- **Blades very hairy**
  - Leaf sheath round (rolled leaf)
  - Witchgrass page 18

- **Blades with few or no hairs (except when very young), leaf sheath usually hairy**
  - Leaf blade narrow 3–5.5 mm
    - Smooth witchgrass page 20
  - Leaf blade broad 6–20 mm
    - Broom corn millet page 22

- **Leaf sheath flat (folded leaf)**
  - Sheath green
    - Rough bristle grass page 30
  - Sheath silvery with distinct green lines
    - Crowfoot grass page 14

- **Sheath green**
  - Yellow bristle grass page 28
Indian doab (Cynodon dactylon)
Indian doab (Cynodon dactylon)

**Characteristics:**
Wiry, sprawling perennial with long slender stolons favouring dry conditions
Leaves short, triangular, often blue-green
Emerging leaf rolled but flat, appears folded
Ligule short, hairy, 0.5 mm long
Auricles absent
Sheath rounded with long hairs next to the collar
Seed head similar to but smaller than summer grass

**Distinguished by:**
- Long, slender creeping stolons
- Small leaves
- Very hairy leaf base
Summer grass (*Digitaria sanguinalis*)
**Characteristics:**
Tufted, hairy, sprawling annual which often roots at the nodes
Leaves broad, very hairy underneath, light green, soft
Emerging leaf rolled
Ligule membranous, 1–2 mm long
Auricles absent
Sheath light green, usually densely hairy with 3–4 mm hairs
Seed head umbrella-like with up to six branches

**Distinguished by:**
- Broad hairy leaves
- Prostrate growth habit

**Summer grass** (*Digitaria sanguinalis*)
Barnyard grass (*Echinochloa crus-galli*)
Characteristics:
Generally a tall, upright growing annual plant
Leaves long, broad, hairless
Emerging leaf rolled but flattened, sometimes appears folded when young
Ligule absent
Auricles absent
Sheath flattened sometimes sparsely hairy (particularly at the collar), light green to purplish in colour
Seed head green to dark red

Distinguished by:
- Its upright growth habit
- Absence of a ligule

Barnyard grass (*Echinochloa crus-galli*)
Crowfoot grass (*Eleusine indica*)
**Characteristics:**
Low growing, light green annual with tough leaves
Leaves hairless near base, blunt tipped
Emerging leaf folded
Ligule a thin fringe of hairs, 1–2 mm long
Auricles absent
Sheath flattened and hairless except for its upper margin
Seed head umbrella-like, thicker than summer grass or Indian doab

**Distinguished by:**
- Veins clear lines when held to light
- Green stripes on pale leaf sheath
- Leaf sheath flat, never coloured at its base

Crowfoot grass (*Eleusine indica*)
Couch or Twitch (*Elytrigia repens*)
Characteristics:
Tufted perennial regrowing from long white rhizomes each summer
Leaves dull with very short hairs, often blue-green
Emerging leaf rolled
Ligule very short, 0.5 mm long
Auricles pointed, 3–6 mm long
Sheath with many short hairs
Seed head similar to that of ryegrass, but spikelets set sideways

Distinguished by:
- Blue-green leaves
- Long white underground rhizomes
- Vigorous early growth (no seedling stage)

Couch or Twitch (*Elytrigia repens*)
Characteristics:
Upright growing, very hairy annual with broad leaves
Leaves broad, hairy, bright green
Emerging leaf rolled
Ligule short, hairy, 1–2 mm long
Auricles absent
Sheath densely hairy, green or occasionally red tinged, rounded
Seed head like a witches broom, very small seed

Distinguished by:
- Very hairy sheath
- Hairy leaves
- Large drooping seed head
- Very small seed

Witchgrass (*Panicum capillare*)
Smooth witchgrass (*Panicum dichotomiflorum*)
**Characteristics:**
Tufted, sprawling annual with deep red sheaths
Leaves hairy when young, soon becoming hairless, bright green
Emerging leaf rolled
Ligule short, hairy, 1–2 mm long
Auricles absent
Sheath rounded, very hairy when young, hairless and shiny later, deep red
Seed head very open with small seeds

**Distinguished by:**
- Leaves narrower than most other summer annuals
- Red coloured, hairy leaf sheath

Smooth witchgrass (*Panicum dichotomiflorum*)
Broomcorn millet (*Panicum miliaceum*)
Characteristics:
Large, quick growing annual plant
Leaves broad, with long hairs near collar
Emerging leaf rolled
Ligule hairy, 2–4 mm long
Auricles absent
Sheath hairy, rounded, light green or straw coloured
Seed head large, drooping, with large black seeds

Distinguished by:
- Very broad leaves
- Large drooping seed head
- Large black seeds

Broomcorn millet (*Panicum miliaceum*)
Mercer grass (*Paspalum distichum*)
Characteristics:
Stout perennial with long running stolons often tinged red, favours wet ground
Leaves hairy near base and underside, lower half with whitish midrib
Emerging leaf rolled
Ligule membranous, 3–4 mm long
Auricles absent
Sheath without hairs except at the collar and leaf edge, tinged red to purple
Seed head V-shaped

Distinguished by:
- Thick, long creeping rhizomes
- Membranous ligule
- V-shaped seed head

Mercer grass (*Paspalum distichum*)
Kikuyu (*Pennisetum clandestinum*)
Characteristics:
Perennial plant with long running stolons and many light green leaves
Leaves short, hairy, usually light green
Emerging leaf folded
Ligule a fringe of hairs, 2–3 mm long
Auricles absent
Sheath very hairy, pale green to white
Flowers hidden in leaf sheath, sexual parts only emerge on long white filaments

Distinguished by:
- Branched creeping stolons
- Light green leaves
- Long hairy ligule

Kikuyu (*Pennisetum clandestinum*)
Yellow bristle grass (*Setaria pumila*)
Yellow bristle grass (*Setaria pumila*)

**Characteristics:**
- Tufted, sprawling to upright annual
- Leaves pale green when young, hairless except for several long hairs near collar
- Emerging leaf rolled
- Ligule a fringe of hairs, 1 mm long
- Auricles absent
- Sheath flattened, hairless, usually tinged red at base
- Seed head compact, many yellow awns originate from below each seed

**Distinguished by:**
- Flattened, hairless leaf sheath
- Long hairs at base of rough-edged leaves
- Sheath reddish purple at base
Rough bristle grass (*Setaria verticillata*)
Characteristics:
Upright growing annual with bristly seed head
Leaves bright green, soft, hairless but often with long hairs next to collar
Emerging leaf rolled
Ligule hairy, 0.6–1.5 mm long
Auricles absent
Sheath flattened when very young becoming rounded, usually pale green,
Seed head has barbed awns that stick together

Distinguished by:
- Upright seedling
- Sheath usually green
- Ligule a fringe of hairs
- Seed heads that stick to each other

Rough bristle grass (*Setaria verticillata*)
Key for cool climate weedy grasses

BEGIN HERE… Select plants with three or more blades and use the newest blades for examination

Auricles absent

- Sheath very hairy
  - Leaves wide: Prairie grass, page 44
  - Leaves narrow: Seed with long awns: Ripgut brome, page 40
  - Seed with short awns: Soft brome, page 42

- Plant not hairy
  - Ligule large, membranous
    - Leaf sheath flat (folded leaf): Kentucky blue grass, page 56
  - Ligule very small, hairy/ciliate
    - Leaf sheath round (rolled leaf): Vulpia bromoides, page 60

Auricles present

Refer to Ryegrass entries in Warm Climate Key on pages 6 and 7

- Seed head usually straight
  - Vulpia myuros, page 62

- Seed head usually curved
Leaves narrow (<5 mm wide)

- Shorter leaves (<10 cm) frequently with a crinkle
  - Annual poa page 54

- Longer leaves rarely crinkled
  - Rough-stalked meadow grass page 58

Leaves wide (>5 mm wide)

- Leaves with few very short hairs
  - Blade with 3–4 mm hairs on leaf margins
    - Wild oats pages 36 / 38
  - Blade with clear yellow lines when held to the light
    - Tall oat grass page 34

- Leaves with no hairs
  - Base of sheath swollen and often reddish, seed head long
    - Phalaris page 50
  - Base of sheath not swollen and not red, seed head short
    - Lesser canary grass page 52
Tall oat grass (*Arrhenatherum elatius*)
Characteristics:
Tall growing tufted perennial, sometimes with swollen internodes at the sheath base
Leaves long and broad, rather harsh with scattered short hairs
Emerging leaf rolled
Ligule membranous, not pointed, 2–4 mm long
Auricles absent
Sheath usually hairless, smooth, rounded, red or yellow tinged, sometimes with hairy nodes
Seed head large, upright to slightly drooping with large round spikelets

Distinguished by:
- Non-pointed ligule
- Leaves with yellowish lines when held against light

Tall oat grass (*Arrhenatherum elatius*)
Wild oats (*Avena fatua*)

Wild oats (left)
Cultivated oats (right)
Characteristics:
Tall growing, wide leaved annual
Leaves long and broad, green to blue-green, hairs on the margins only
Emerging leaf rolled
Ligule membranous, 3–6 mm long
Auricles absent
Sheath rounded, green sometimes red tinged when older, base usually with scattered hairs
Seed head large, open with long awned seed and standing above the crop

Distinguished by:
- Grows mostly in summer
- Open seed head
- Counter-clockwise twist in the leaf when viewed from above

Wild oats (Avena fatua)
Winter wild oats (*Avena sterilis* subsp. *ludoviciana*)
**Characteristics:**
Tall growing wide leaved annual
Leaves long and broad, green to blue-green, hairs on the margins only
Emerging leaf rolled
Ligule membranous, 3–6 mm long
Auricles absent
Sheath rounded, green sometimes red tinged when older, base usually with scattered hairs
Seed head large, open with long awned seed and standing above the crop
Wild oats and winter wild oats are very similar to each other in structure and effect, but winter wild oats are more likely to be present in winter crops
Ripgut brome (*Bromus diandrus*)
Characteristics:
Rough textured tufted annual
Leaves hairy, shorter and narrower than prairie grass
Emerging leaf rolled
Ligule membranous, jagged, 4–6 mm long
Auricles absent
Sheath rounded, green, covered in short soft hairs with many longer hairs closer to collar
Seed head large, drooping, seed with very long awns

Distinguished by:
- Hairy sheath and leaves
- Membranous ligule with jagged edge
- Seed head with very long awns

Ripgut brome (*Bromus diandrus*)
Soft brome (*Bromus hordeaceus*)
**Characteristics:**

Blue-green tufted annual
Leaves soft, hairy, very twisted when young
Emerging leaf rolled, appear folded when young
Ligule membranous with serrated hairy rim, 2–3 mm long
Auricles absent
Sheath densely covered in 2 mm long hairs, rounded, green
Seed head upright to drooping, spikelets rounded, seed with short awns

**Distinguished by:**
- Hairy sheath and leaves
- Short membranous ligule with hairy edge
- Seed head with short awns

**Soft brome (Bromus hordeaceus)**
Prairie grass (*Bromus willdenowii*)
**Characteristics:**

Very tall, rough textured tufted perennial

Leaves very long and broad, rough, strongly keeled

Emerging leaf rolled but may appear folded

Ligule membranous, jagged, 3–5 mm long

Auricles absent

Sheath slightly flattened, densely covered in long soft hairs, green

Seed head large with flattened spikelets and very short awns

**Distinguished by:**

- Wide leaves
- Very hairy sheath
- Membranous ligule

Prairie grass (*Bromus willdenowii*)
Annual ryegrass (*Lolium multiflorum*)
Annual ryegrass (Lolium multiflorum)

**Characteristics:**
Tufted annual with long shiny backed leaves
Leaves long, shiny, hairless, with well developed midribs
Emerging leaf rolled (NB for perennial ryegrass the emerging leaf is folded)
Ligule membranous, 1–2 mm long
Auricles long, clasping
Sheath base often tinged pink in colour
Seed with short awns

**Distinguished by:**
- Long clasping auricles
- Hairless, shiny backed leaves
Perennial ryegrass (*Lolium perenne*)
Characteristics:
Tufted perennial with long, shiny backed leaves
Leaves long, shiny, hairless, with well developed midribs
Emerging leaf folded in young tillers, rolled in older ones
Ligule membranous, 1–2 mm long
Auricles sometimes short and difficult to see
Sheath tinged red, hairless, smooth
Seed without awns

Distinguished by:
- Leaves with glossy underside
- Emerging leaf flat
- Leaves usually narrower than annual ryegrass

Perennial ryegrass (Lolium perenne)
Phalaris (*Phalaris aquatica*)
Characteristics:
Very tall growing tufted perennial
Leaves long and broad, hairless but slightly rough, green to blue-green, very twisted
Emerging leaf rolled
Ligule membranous, pointed, 5–10 mm long
Auricles absent
Sheath hairless, rounded, tinged pink
Seed head long, cylindrical

Distinguished by:
- Round, hairless, brownish sheath
- Long membranous ligule

Phalaris (*Phalaris aquatica*)
Lesser canary grass (*Phalaris minor*)
Lesser canary grass (*Phalaris minor*)

**Characteristics:**
- Tall growing tufted annual
- Leaves green to blue-green, hairless, usually very twisted
- Emerging leaf rolled
- Ligule membranous, pointed, 4–7 mm long
- Auricles absent
- Sheath hairless, rounded, usually pale green
- Seed head compact, cylindrical

**Distinguished by:**
- Round, hairless, light green sheath
- Long membranous ligule
- Twisted leaf
Annual poa (*Poa annua*)
Characteristics:
Low growing tufted annual with soft leaves
Leaves hairless, soft, bright green with a canoe shaped tip
Emerging leaf folded
Ligule membranous, 3–5 mm long
Auricles absent
Sheath hairless, flattened, green but sometimes white in older plants
Seed head small, seeds tiny

Distinguished by:
- Short, soft green leaves
- Crinkle in young leaves
- Canoe-shaped leaf tip

Annual poa (*Poa annua*)
Kentucky blue grass (*Poa pratensis*)
Kentucky blue grass (*Poa pratensis*)

**Characteristics:**
Loosely tufted erect perennial with rhizomatous roots
Leaves dark green to blue-green, narrow with canoe shaped tip and short hairs around collar
Emerging leaf folded
Ligule membranous, 0.5–2 mm long
Auricles absent
Sheath usually hairless, flattened
Seed head open, usually purple coloured

**Distinguished by:**
- Dark blue-green leaves
- Canoe tip on leaf
- Very short ligule
- Dark coloured seed head
Rough-stalked meadow grass (*Poa trivialis*)
Characteristics:
Narrow leaved tufted perennial with short stolons
Leaves narrow, hairless, turning darker green sometimes tinged red, canoe shaped tip
Emerging leaf folded
Ligule membranous, pointed, 3–10 mm long
Auricles absent
Sheath hairless, flattened, often rough and with a purple tinge
Seed head similar to annual poa but much larger

Distinguished by:
- Red sheath
- Very long pointed ligule
- Long narrow leaves with canoe tip

Rough-stalked meadow grass (Poa trivialis)
Vulpia hair grass (*Vulpia bromoides*)
Characteristics:
Tufted, very narrow leaved annual
Leaves only 1–2 mm wide but usually rolled inwards, slightly rough at the tip
Emerging leaf rolled
Ligule membranous, 0.5 mm long
Auricles absent
Sheath rounded, some scattered very short hairs, tinged brown
Seed head upright, opens up when mature, straight

Distinguished by:
- Narrow leaves
- Very short ligule
- Seed head usually straight

Vulpia hair grass (*Vulpia bromoides*)
Vulpia hair grass (*Vulpia myuros*)
**Characteristics:**
Tufted, very narrow leaved annual
Leaves only 1–2.5 mm wide but usually rolled inwards, slightly rough at the tip
Emerging leaf rolled
Ligule membranous, 0.5 mm long
Auricles absent
Sheath rounded, some scattered very short hairs, tinged brown
Seed head upright, opens up when mature, usually curved or drooping

**Distinguished by:**
- Narrow leaves
- Very short ligule
- Seed head usually curved

Vulpia hair grass (*Vulpia myuros*)