

YELLOW BRISTLE GRASS

The Ute Guide



Ministry of Agriculture and Forestry
Te Manatū Ahuwhenua, Ngāherehere



FUNDED BY NEW ZEALAND
DAIRY FARMERS THROUGH



Dairy InSight

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Yellow Bristle Grass is a very serious threat to pastures:

- **Cows don't willingly eat it**
- **Stock avoidance leads to open pastures in winter/spring resulting in rapid re-infestation**
- **An extremely aggressive annual seeding plant which spreads rapidly through clean pasture**
- **There are currently no selective herbicides for this grass**
- **Yellow bristle grass is difficult to see until it produces a seed head, and by then its seed is probably viable and dropping for next season**

Actions!

- **Don't ignore this Grass Weed**
- **Learn to recognise it now**
- **If only a small patch – isolate and take action to control**
- **Don't allow it onto your farm in supplement stock food or on contractor machinery etc.**

Affected farmers
June 2007 survey

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Contents

| | |
|--|----|
| Preface | 1 |
| Yellow bristle grass (<i>Setaria pumila</i>) | 2 |
| Identification | 4 |
| Biology | 6 |
| Control | 8 |
| Grass identification | 10 |
| Identification and similar grasses: | |
| Yellow bristle grass | 12 |
| Knot-root bristle grass | 14 |
| Crowfoot grass | 16 |
| Barnyard grass | 18 |
| Summer grass | 20 |
| Smooth witchgrass | 22 |
| Veld grass | 24 |
| Annual ryegrass | 26 |
| Research needs | 28 |



Preface

The Yellow Bristle Grass Action Group was established in June 2006 in response to growing concern that this annual summer grass was spreading rapidly onto dairy pastures on a number of farms in the Waipa district. The grass is avoided by stock, difficult to control, invasive and management techniques not yet fully understood.

The Group, comprising dairy farmers, AgResearch, Environment Waikato, Nufarm and Dexcel meet on a regular basis to monitor and discuss management issues and have been successful in securing funding from the MAF Sustainable Farming Fund and Dairy InSight enabling it to produce this book and also carry out field trials. This is regarded as a first step in an ongoing programme aimed at promoting awareness of this weed grass, examining management systems aimed at minimising its spread, and assessing the economic impact.

Royden Hooker

Chairman, Yellow Bristle Grass Action Group

3 September 2007

Yellow Bristle Grass (*Setaria pumila*)

There are eight species of *Setaria* in New Zealand. Most are annuals. Overseas they are commonly called foxtails or millets.

Yellow bristle grass is an annual species which originally came from southern Europe where it is...

“A relatively good natural grazing species, although leaf production is moderately low. It is a serious weed in some areas, especially since it only germinates late in the season once most control measures have already been applied. In some areas this grass plays an important role in stabilising bare soil to protect it from erosion.”

Yellow bristle grass is now widespread throughout Europe, Africa, South America and Australia.

Although common on roadsides throughout New Zealand, yellow bristle grass has only recently ‘jumped the fence’ and become a big problem in the Waikato.

Yellow bristle grass on roadside and around a cultivated field



Identification

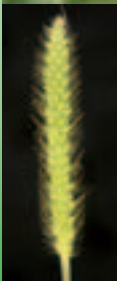
Yellow bristle grass is an upright annual growing 25–45 cm high, although in open pasture its first leaves are typically parallel to the ground. The leaves are yellow-green to green in colour and usually red or purple at the base. They are flat, hairless, soft and twisted. The leaf sheath is flattened. There are no ears (auricles) at the junction of the leaf blade and sheath. The ligule consists of a fringe of hairs 0.5–1.5 mm long.

The seed head is a cylindrical 'spike', 2.5–10 cm long. It consists of many densely packed spikelets, with each spikelet bearing a single seed. At the base of each spikelet are five to ten bristles, 5–8 mm long. Initially the bristles are green, but soon change to a golden-brown. It is the colour of these bristles that give the grass its name. Most other *Setaria* species have fewer bristles in their seed heads.

Mature yellow bristle grass



Seed head
with bristles



Immature yellow bristle grass



Biology

As a summer growing annual, yellow bristle grass reproduces only by seed. Seeds are dispersed by water, soil movement, animals, and as contaminants of crop seed and hay. The barbed seeds are often carried in fur, feathers, or clothing. Seeds are hard-coated and most float on water. Seed production and germination requirements are variable, depending on several factors, including environmental conditions. Optimal temperatures for germination are typically between 20 and 35°C. **Germination typically starts in mid October and peaks in mid November. Early seed heads appear in mid to late December but mostly in January and February.** Mature plants and empty seed heads will persist until the first frost.

Yellow bristle grass seeds are usually dormant at maturity and require about 2–4 months of after-ripening before they can germinate. Most seeds survive only a few years under field conditions, although some deeply buried seed may survive for up to 10 years or more. Seedlings can emerge from soil depths of up to 10 cm, but optimal germination is at 1–2 cm depth. **Counts have shown seed numbers up to 20,000/m² but typically 5–10,000/m² under light infestations.**

Yellow bristle grass occurs in areas with adequate summer rainfall, usually where the annual rainfall exceeds 500 mm per annum, although it can tolerate dry conditions once established. **It grows in areas where the soil has been disturbed, including cultivated areas, old pastures and along footpaths and the side of roads, especially where water collects.** Yellow bristle grass has a C₄ photosynthetic pathway so it grows best at higher temperatures and is frost tender. It is not toxic to stock but they might avoid grazing the seed head.

Yellow bristle grass fills a similar environmental niche to other C₄ summer annual grasses such as crowfoot grass, summer grass and smooth witchgrass. However, due to the bristly nature of the seed it is more readily spread than the other species. It is moderate to slow-growing, especially if the weather remains cool, and generally should not establish and compete in vigorous ryegrass/white clover swards. **Yellow bristle grass establishes in run-out or damaged pastures that have been opened up due to pugging, over-grazing or the death of winter annuals such as flat weeds or annual poa.**

Control

The biology of yellow bristle grass means that it will grow well in pastures that are weakened over winter or early spring. Once established in a weakened pasture it is difficult to remove. The only herbicides that might control yellow bristle grass selectively are Dalapon® and Teedal®, although neither has specific label claims for this weed and both may slow the growth of other grasses. **A split application at low rates may be required to cover the extended period of yellow bristle grass emergence. Only small seedlings will be controlled.**

Many farmers are using hand weeding or selective use of glyphosate in a bid to control this weed. However, neither of these are practical long term solutions, and the use of glyphosate may lead to other weed problems. **Also, glyphosate will not kill the seeds once the seed head is fully emerged from the sheath.**

If you don't already have this weed consider imposing effective farm biosecurity. Sources of infestation could be: seasonally grazed stock, outsourced feed supplements (hay and balage), roadside grazing, agricultural contracting machinery, earth/road works and vehicles.

Long term management of yellow bristle grass should probably focus on three key areas:

1. **Better pasture competition**, which means reducing or eliminating damage to pastures at the time when yellow bristle grass germinates, between October and December.
2. **Elimination of seed production** by removing seeds by early topping (before viable seed are set), heavy grazing or chemical spray topping.
3. For poor pastures complete **renovation** is the best option, either by going through a summer crop such as chicory (where grass weeds are easily controlled) or by spraying out with glyphosate in early autumn. In either case a strong sward needs to be established before winter. If winter weeds are present they should be sprayed with 2,4-DB or MCPB, which don't damage clovers, so as not to leave gaps in the new pasture in early summer. Pasture grasses and clovers appropriate to local conditions should be used in the grass mixture.

Grass identification

Grass plants have several characteristics that can be used to differentiate species and for identification. The most important are labelled in the illustrations below.

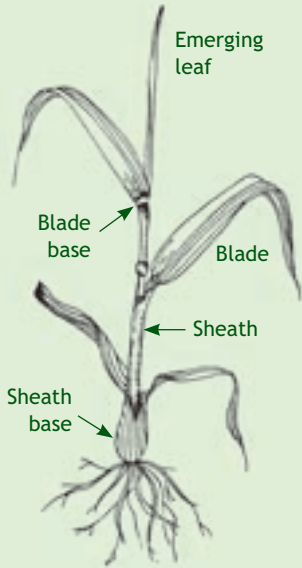
These plant characters are used to separate grass species that are sometimes confused with yellow bristle grass, especially at the seedling stage. A hand lens might sometimes be required to examine the junction of the leaf blade and the sheath as, after the flower and seed head, this is the most diagnostic part of the plant.



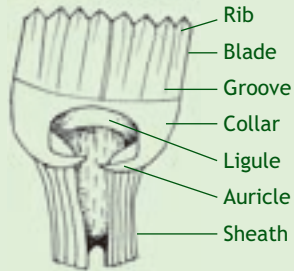
Cross section of a folded leaf



Cross section of a rolled leaf



Leaf base detail



Ligule types

Membrane

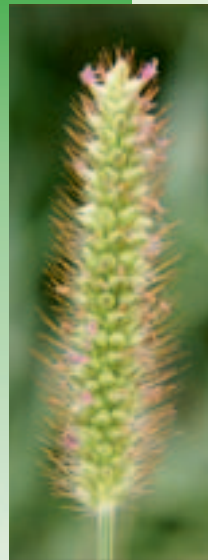


Fringe of hairs



Yellow bristle grass (*Setaria pumila*)

12



Characteristics:

Emerging leaf rolled

Ligule a ring of hairs about 1 mm long

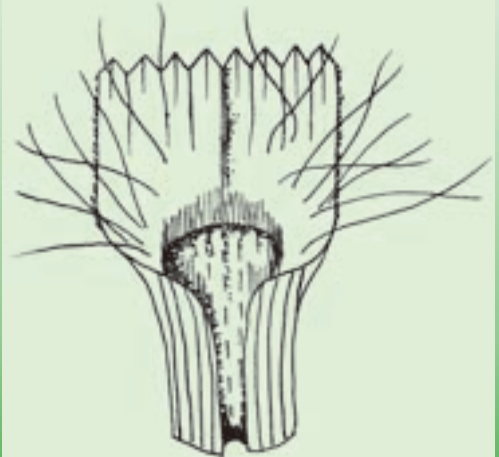
Auricles absent

Sheath flattened and hairless

Leaves slightly rough on the edges, with long hairs only at the base

Distinguished by:

- Flattened, hairless leaf sheath
- Long hairs at the base of the rough-edged leaves
- Leaf sheath often turning reddish purple



Yellow bristle grass (*Setaria pumila*)

Knot-root bristle grass (*Setaria gracilis*)

14



Yellow bristle grass is sometimes confused with knot-root bristle grass

Characteristics:

A perennial grass with thin, strong leaves with a few long hairs on the collar

Ligule short, hairy

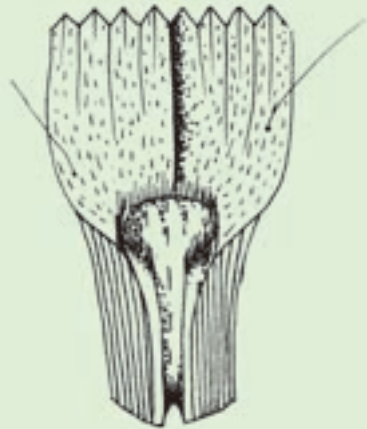
Auricles absent

Short, slender, knotty rhizome

Grows in waste places and in particular along roadsides

Distinguished from yellow bristle grass by:

- Thinner, tougher leaves
- A thinner seed head which lacks the yellow tinge
- Rhizomatous roots



Knot-root bristle grass (*Setaria gracilis*)

Crowfoot grass (*Eleusine indica*)

16



Characteristics:

Emerging leaf folded

Ligule a thin fringe of hairs 1–2 mm long

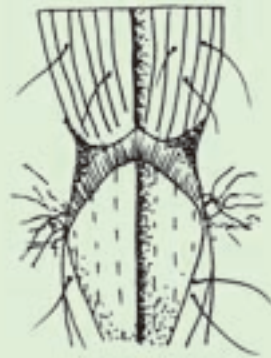
Auricles absent

Leaf sheath flat and hairless except for its upper margin

Leaves hairless except at their bases

Distinguished by:

- Long hairs at the leaf base
- Vertical green stripes on the pale leaf sheath
- Leaf sheath flat, never coloured at its base



Crowfoot grass (*Eleusine indica*)

Barnyard grass (*Echinochloa crus-galli*)

18



Characteristics:

Emerging leaf rolled, but becoming flat later

Ligule absent

Auricles absent

Sheath without hairs, light green to purplish in colour

Distinguished by:

- Its upright growth habit
- Absence of a ligule



Barnyard grass (*Echinochloa crus-galli*)

Summer grass (*Digitaria sanguinalis*)

20



Characteristics:

Emerging leaf rolled

Ligule membranous, 1–2 mm long, blunt

Auricles absent

Leaf blades very hairy underneath when young, and only a few long hairs at base when mature

Leaf sheath light green usually densely hairy with 3–4 mm hairs

Distinguished by:

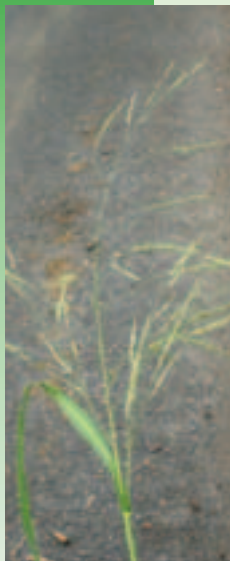
- Broad hairy leaves
- Prostrate growth habit



Summer grass (*Digitaria sanguinalis*)

Smooth witchgrass (*Panicum dichotomiflorum*)

22



Characteristics:

Emerging leaf rolled

Ligule a rim of 1–2 mm long hairs

Auricles absent

Lower leaf sheath hairy when young,
usually strongly red in colour

Leaves of young plants with hairs on
underside and a few long hairs near the
base, hairless with shiny underside on
older plants

Distinguished by:

- Narrow leaves
- Red coloured, hairy leaf sheath



Smooth witchgrass (*Panicum dichotomiflorum*)

Veld grass (*Ehrharta erecta*)

24



Characteristics:

Emerging leaf rolled

Ligule membranous, jagged, 3–8 mm long

1–2 mm long hairs at the junction of leaf and sheath

Leaves broad and soft

Seed head with hanging branches appearing to originate on one side

Distinguished by :

- Long, milky white, jagged ligule



Veld grass (*Ehrharta erecta*)

Annual ryegrass (*Lolium multiflorum*)



Characteristics:

Emerging leaf rolled when young
(NB for perennial ryegrass the emerging shoot is folded)

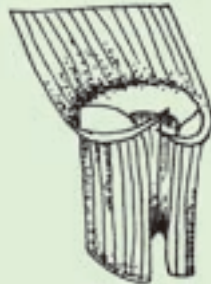
Leaves long, shiny, hairless with well developed midribs

Auricles long, clasping

Sheath base often tinged pink in colour

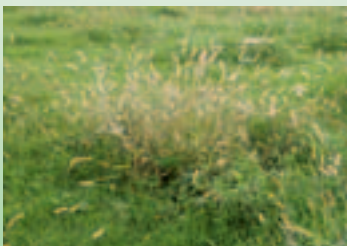
Distinguished by:

- Long clasping auricles
- Hairless, shiny backed leaves



Research needs

1. Effect of grass species and cultivars and on the establishment of yellow bristle grass.
2. Effect of pasture management on yellow bristle grass establishment, growth and reproduction.
3. Examination of factors affecting seed longevity.
4. Studies on how the seed is spread.
5. Effect of soil fertility on yellow bristle grass and its interactions with other pasture species.
6. Best management options for yellow bristle grass during the seed production stage.
7. Seed viability after passing through the gut of a cow or bird.
8. Effective methods to kill seed (on plants and in soil).





cm

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14