9-2024

Windmill grass and its management

Department of Primary Industries and Regional Development, Western Australia

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DPIRD-138

Windmill grass is a native species and the tenth most common summer weed species in the Western Australian (WA) grainbelt. It hosts pests and diseases and utilises stored soil moisture that would otherwise be available to the following crop.

Identification and attributes

Windmill grass (*Chloris truncata*) grows as a tufted grass, but any single tuft of grass may consist of a single plant, or several different plants, at different growth stages.

The seed heads, consisting of 5 to 10 branches in a ‘windmill’ shape, break free from the plant. The wind driven seed heads may disperse over considerable distances, until they become entangled in vegetation or along a fence-line.

The seeds may begin to shed while the seed head is still attached to the plant and continue to shed once the seed head has broken free. The seeds are 2 to 3 mm long and have awns that allow the seeds to be trapped in wool or clothing.

Image 1: Windmill grass in fallow, showing plants linked together by a rhizome

Image 2: Windmill grass seed head

Biology

In the WA grainbelt, windmill grass plants predominantly grow as annuals, germinating in response to spring and summer rainfall. However, germination may also occur in autumn or winter, and plants grow as perennials in some regions.

Small plants (less than 1 g dry biomass, 3 to 5 cm tall) can produce seed heads. A single seed head holds approximately 300 to 500 seeds.

Plant growth and seed head production continues until the plant senesces due to lack of moisture or unfavourable environmental conditions (that is, cold weather in autumn). A single plant can produce up to 50 seed heads, or 20,000 seeds per plant.

Plant density is usually less than 20 plants per m^2. Maximum seed production is approximately 60,000 seeds/m^2 and maximum dry biomass production is approximately 1500 kilograms per hectare (kg/ha).

Windmill grass seeds appear to lose viability after 3 years, however the grass can flower and set seed at most times of year, ensuring a constant supply of new seed.

Why is windmill grass a weed?

As a summer annual weed, windmill grass offers little direct competition with winter crops, but may reduce crop yield potential.

Over summer, windmill grass can host crop pests like aphids and diseases like barley yellow dwarf virus and wheat streak mosaic virus.

Summer weeds utilise soil moisture and nutrients over summer/autumn that would otherwise be available to the following winter crop. The extent of the impact summer weeds can have on crop yield will depend on the amount of rainfall over spring and summer, the growing season rainfall available to the crop, and soil type.

Windmill grass tufts cause an uneven crop seed bed if they are still present in autumn. These are difficult to control in no-till fallows and can reduce the yield of winter crops.

Windmill grass is a prolific seeder, and the seed heads distribute on the wind, enhancing its spread.

Herbicide resistance

Windmill grass populations have evolved resistance to glyphosate and 11 populations of windmill grass from Western Australia, New South Wales, and Victoria have been confirmed resistant to this herbicide.

Tactics for integrated weed management

Windmill grass is a useful pasture species, providing forage over the summer/autumn feed gap. It is tolerant of drought and saline conditions and can be grazed heavily and repeatedly.

Nutritionally, it is comparable to senesced subterranean clover-based pasture or wheat stubble, and sheep will preferentially graze windmill grass prior to seed head production.

Table 1 The characteristics of windmill grass pasture, compared to senesced subterranean clover-based pasture over spring and summer

Pasture characteristic	Windmill grass	Sub clover-based pasture	Wheat stubble
Digestible dry matter (%)	61 to 63	49 to 64	43 to 52
Crude protein (%)	10.4 to 14.2	6.8 to 12.2	2.5 to 6.5
Metabolisable energy (MJ/kg)	8.8 to 9.1	5.7 to 9.0	5.8 to 7.0

Dry biomass of windmill grass over summer in the WA central grainbelt ranges from 0 to 1460 kg/ha, depending on seasonal conditions. Given that paddocks in WA should not be grazed below 500 kg of dry matter/ha to avoid erosion, and sheep will trample/ruin approximately 30% of available dry matter, 1460 kg/ha of dry biomass will provide 877 grazing days/ha (that is, approximately 30 days for 30 sheep/ha). This assumes that sheep are maintained at condition score 2 (a lean but healthy condition).

Herbicides

Windmill grass is difficult to control with herbicides. To potentially improve control, use high water rates and a nozzle type designed for broad coverage to ensure herbicide covers all seedlings (or the entire plant tuft, if spraying mature plants).

Try to apply herbicides 7 to 21 days after summer rainfall, to target young plants. If plants are older, or dry and stressed at the time of spraying, use higher rates of herbicide.

There are few registered herbicide options for windmill grass. Registered herbicides for windmill grass include:

- glyphosate as potassium salt 500 g active ingredient per litre (a.i./L) (for example Touchdown Hi Tech®) can be used for non-selective control.
- butroxydim (for example, Factor®) can be applied to legume crops in the small seedling stage.

Contact us

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More information

Integrated Weed Management Manual | Grains Research and Development Corporation (grdc.com.au)

Ecology of major emerging weeds | Grains Research and Development Corporation (grdc.com.au)

WeedSmart | WeedSmart (weedsmart.org.au)

Refer to the department website at dpird.wa.gov.au for more information about the following:

- Crop weeds
- Integrated management tacts to manage crop weeds
- Summer weeds
- Herbicides

Last updated September 2024

dpird.wa.gov.au