How much and how long to graze dual purpose wheat

Dual purpose cereals are usually grazed between GS24, when they are sufficiently anchored to not be pulled out by stock, until GS30 when the spike begins rising above ground level increasing the risk of being damaged by grazing. The amount grazed can be varied by the stocking rate and duration of grazing. Several trials were run in wheat between 2010 and 2014 to look at the interaction of grazing intensity by timing to quantify the effects on grain yield. All trials were cut with mowers so the quantity of feed removed could be accurately set and measured.

Two cutting heights were chosen to replicate a light intensity of grazing, where a large residual leaf area and stem biomass remains, and a heavy intensity of grazing, where nearly all the leaf is removed. Each cutting was applied at two times GS24 and GS30. The specific cutting heights varied for different years and times. Examples of initial and residual ground cover are shown in figure 1.

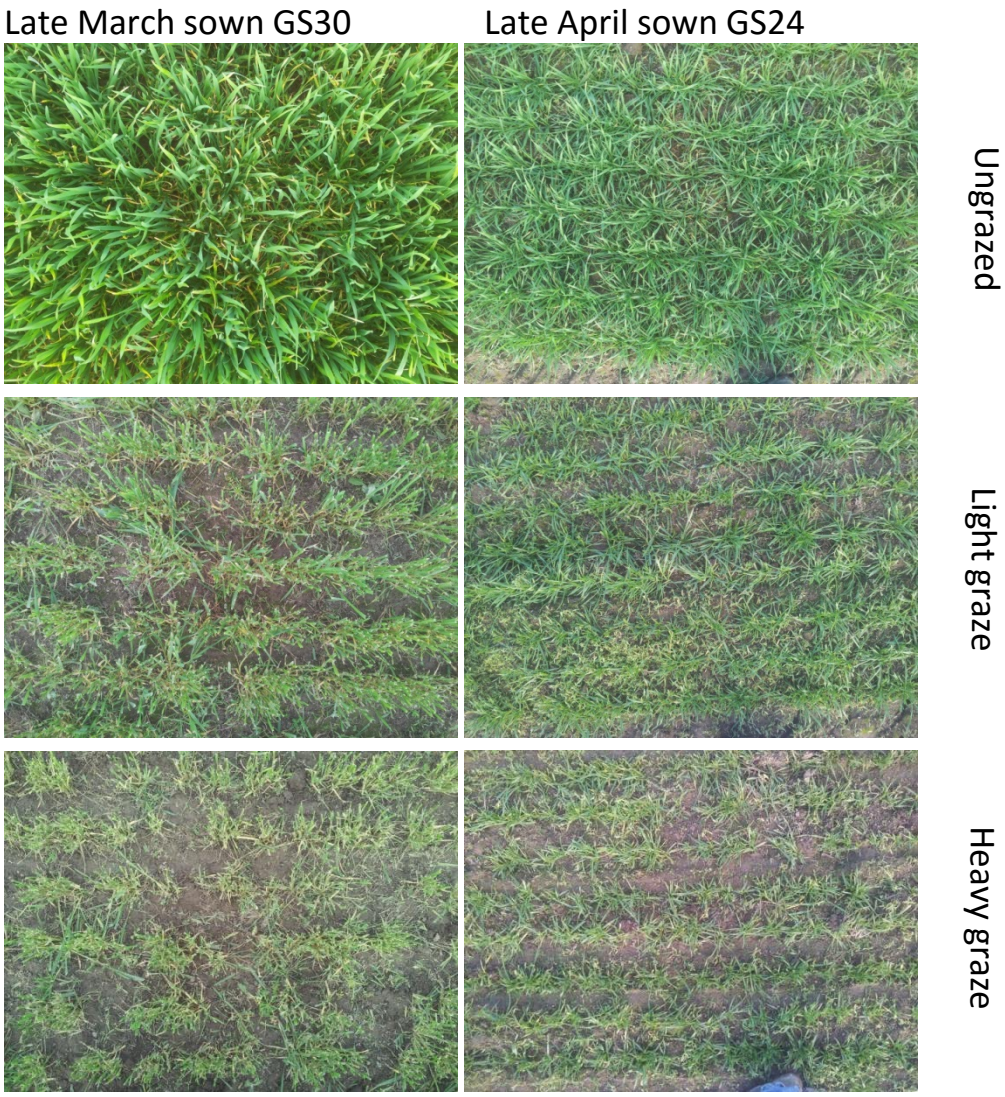

Figure 1. Differences in initial and final leaf area of un-cut, light cutting and heavy cutting for late March and late April sowings in 2014.

The effects of grazing after GS31 were simulated by setting the mower height to remove 50% of

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spikes once the crop had begun stem elongation. The capacity to recover yield was assessed in tiller number, grains/ear and grain size.

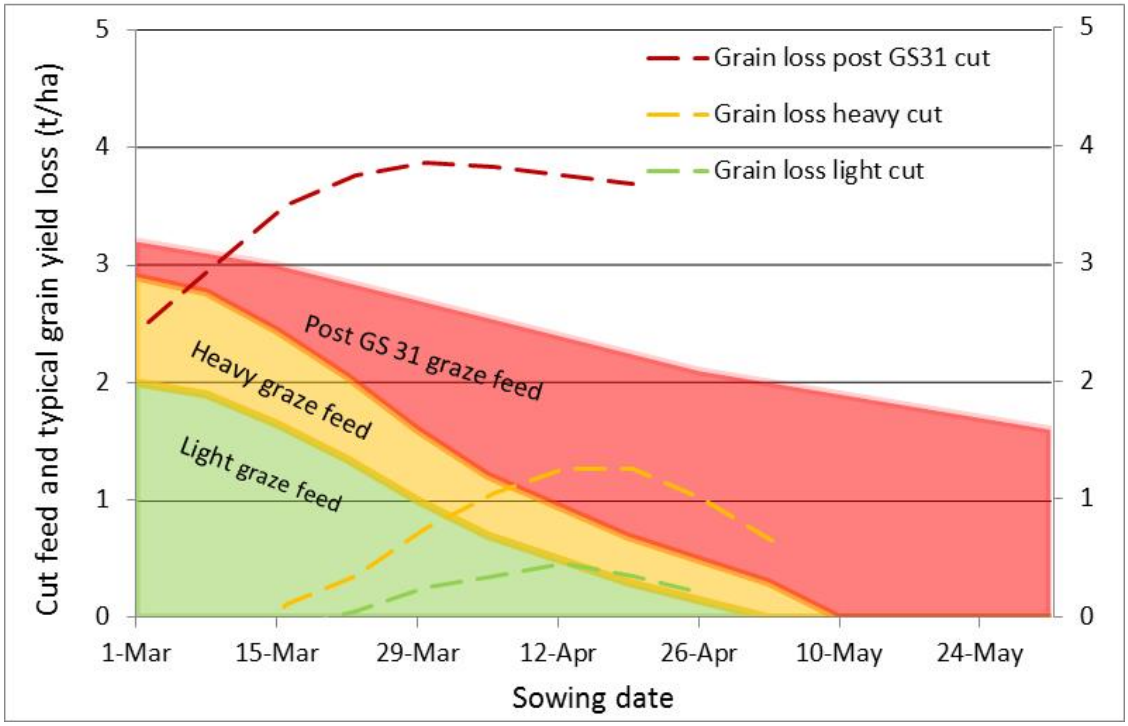

Figure 2. Interaction of cutting intensities on grain yield of wheat for different sowing dates from March to the end of May. Shaded areas grazing feed (t/ha), lines grain loss (t/ha) based on trial results from 2010 to 2014.

The amount of cutting can affect grain yield and this relationship varies depending on the sowing date which is summarised in Figure 2, where three cutting strategies are shown, green for early light cutting, yellow for later heavy cutting and red for post GS31 cutting. This is derived from individual trial data where the amount of cut feed was correlated with harvested grain for the nine combinations of cutting treatments in each trial (Figure 3).

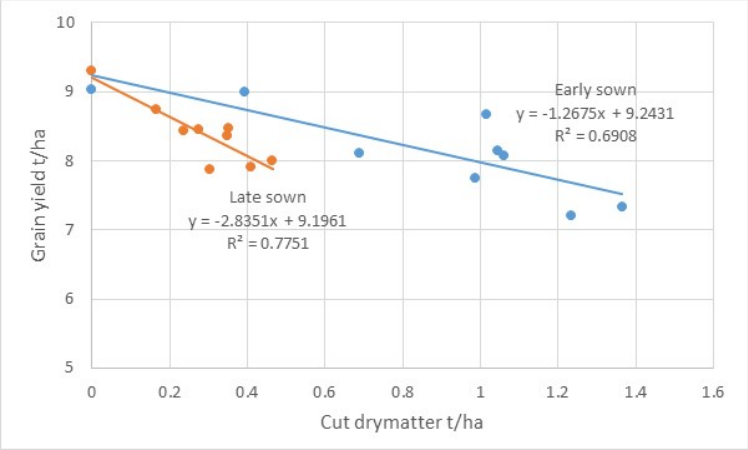

Figure 3. Correlation of cut dry matter with grain yield for early (March) and late (April) sowing times.

An early sown crop, sown before mid-March, can tolerate both light and heavy cutting up to GS30 with no apparent loss in grain production. When sowing is delayed to mid-April even light cutting is likely to have a small negative effect on grain yield. Heavier and later cutting at GS30 will lead to a larger reduction in grain yield. Crops sown after April do not produce enough feed to warrant grazing. These trends were consistent in the waterlogged trial of 2013 despite much of the leaf area

of the uncut crop being killed through waterlogging. The cutting did not reduce or exacerbate the effect of waterlogging.

Cutting beyond GS31 led to an additional 1 to 1.8 t/ha of feed dry matter and a grain yield reduction of 2.8 to 3.9 t/ha (table 1). There was no indication of yield recovery by new tiller growth, larger seed size or more grains per tiller. There was a slight improvement of grain yield in 2012, but this could be due to the December rain favouring the later flowering post GS31 cut plots.

Table 1. Effect of grazing up to GS30 and beyond GS31 on grain yield of wheat.

	Grain yield (t/ha)			Additional feed
	Uncut	Cutting to GS30 only	Cutting after GS31	from cutting after GS31
March 2011	9.17	8.19	4.69	2.41
March 2012	8.73	8.69	5.3	3.09
March 2013	7.27	7.55	3.69	2.7
April 2013	7.52	5.42	2.61	1.79

There were interactions of grain yield with grazing intensity in some years. A light grazing at GS24 appears to be better tolerated, with the possibility of a grain yield increase in March sown crops while heavy grazing at GS30 more often had no effect on grain yield. This may be the result of a more even tiller distribution by suppression of the primary tiller from the GS24 grazing. There is also the potential for a reduction in disease pressure by removing excess leaf area, which was seen in a barley cutting trial in 2013. Tiller condition was scored in 2014 from the March sown crop and shows an increase in both vigorous and average condition tiller densities from the light early GS24 cutting but a decrease in vigorous and average condition tillers following the heavy later GS30 cut. The differences were not as pronounced in grain yield but are consistent with grain yield trends seen in other years.

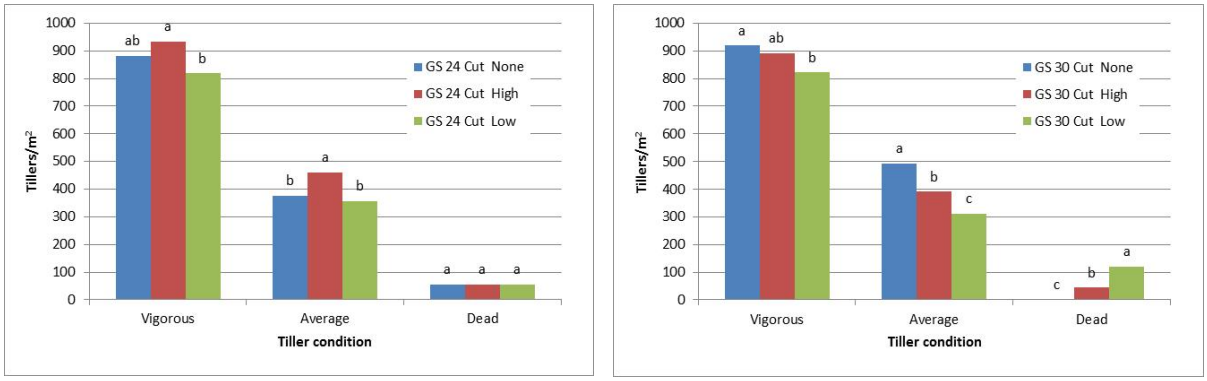

Figure 4. left, Tiller density by condition on the 4th of September, 44 days after the GS24 cut, on March sown wheat. Right, Tiller density by condition on the 4th of September, 14 days after the GS30 cut, on March sown wheat.

Fodders for waterlogged sites

Winter waterlogging is a common occurrence for much of the Midlands of Tasmania. Fodders resilient to waterlogging can be useful to remove the excess water, supress weed growth and provide valuable winter feed. Legume fodders have the additional benefit of fixed nitrogen.

The tic beans handled the waterlogged conditions well with no apparent check to growth in the waterlogged year of 2013 compared to the dry year of 2014. The tic beans were actively growing and flowering during waterlogging. The dry matter yield from wheat and ryegrass was substantially reduced in the waterlogged winter compared to the dry winter yield (Figure 5). The grazing and fodder cuts were delayed by the wet conditions in 2013 and grazing was not begun until the 17th of September. In both years the stock ate the ryegrass first, then the wheat and moved to the tic beans last.

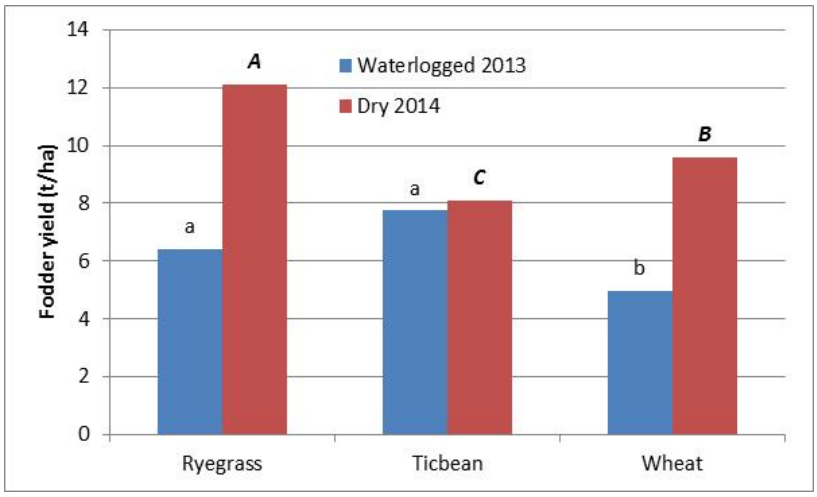

Figure 5. Fodder yields of ryegrass, wheat and tic beans in waterlogged winter of 2013 and dry winter of 2014.

Figure 6. Effect of grazing, left overview of trial after grazing, right grazing of tic beans in the trial and through the fence.

Tic beans are easily grown and appear to be a palatable feed (Figure 6), though the relative growth rate of sheep fed on tic beans compared to ryegrass or wheat is not known. Spraying then cutting is the preferred method for fodder control as it provides a good kill of the fodder. However, tic beans are readily killed at flowering by just cutting, which allows the option to spray after cutting. This has added benefits as the lower plant density of tic beans allows some weed growth that is hard to

control under the full canopy of tic beans. Tic beans readily fix nitrogen, even after waterlogging, and residual nitrogen may have a substantial benefit for subsequent crops.