

Morning versus afternoon cutting for silage and hay

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Is the quality fodder better if cut in the afternoon rather than in the morning? As with many answers, it depends. In recent years there has been some research, mainly in the USA, Canada and UK, investigating the quality of am versus pm cut but also grazed fodder and the effect on quality and animal production. Research with grazing cows has shown increased milk production from lucerne cut in the afternoon but not always with pasture. Animals have also often been shown to usually prefer afternoon cut forages to those cut in the morning, but not always.

Science will help sort out this quandary.

Pros for pm cutting – Photosynthesis: Once the sun comes up plants start to photosynthesise its heat (solar radiation) using carbon dioxide and water to produce sugars and starch. These are produced quicker than they can be translocated to root, lower stem and crown reserves in lucerne and some pasture plants, resulting in the sugar content of plants, especially the leaves, being at maximum by the end of a sunny day.

However, during the night the plant continues to translocate sugars from the leaves to the roots and crown reserves but also uses up some of the stored sugars for respiration. End result is that the sugars contained in the harvestable forage (leaves and stems) will be at their lowest content in the morning, before the process begins again. This is why many farmers and contractors think that cutting late in the day should maximize the highly digestible sugars, starches and pectins, referred to as non-structural carbohydrates (NSC) of fodder and palatability of the hay. This is backed up by some research, but it depends.

It is ironic that the reverse happens to well-sealed silage if exposed to air, and heating hay if too moist, producing carbon dioxide + water + heat.

Cons against pm cutting - Plant Respiration: When a forage plant is cut, it will keep “living,” i.e. respiring, using its soluble sugars until limited by lack of moisture so that plant metabolism slows and eventually stops. Often respiration overnight can lead to greater losses of NSC than what is gained by delaying cutting to the afternoon. The longer the period of wilting for silage or hay curing, especially the initial drying phase down to about 60 to 65 per cent moisture (35 – 40 per cent DM), the greater the respiration losses which actually are DM and quality losses. Research has shown this to be the case in some cases in the USA. This is contrary to statements above. Confused?

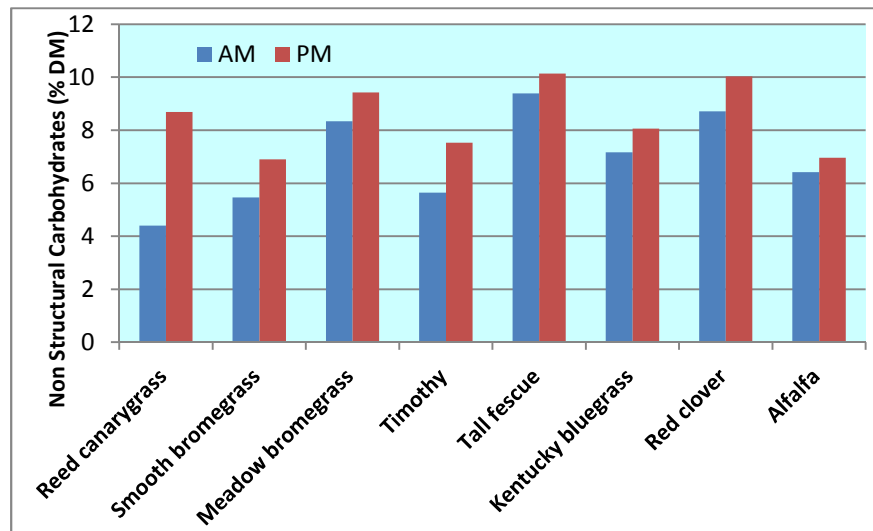
Silage needs sugars to ferment well and the higher the amount of sugar in the final products of both silage and hay, the higher the nutritive value of each. So, in theory, pm mowing is the go! But again, it depends!

A caveat for this article. There has been very little research carried out in Australia to compare the effect of am versus pm cutting of any forage species on fodder quality, much less any animal production work from these conserved fodders. Hence the majority of this article is based on USA and Canadian research but the principles should still apply although individual species do vary in concentration of plant sugars between am and pm.

Figure 1 shows effect of cutting in the morning (between 8.00 and 10.00 am) and afternoon (between 3.00 and 4.15 pm) on non-structural carbohydrates levels over two springs over a range of Canadian

grass and legume species. As shown in Figure 1, the grass species varied in their NSC contents from am to pm cutting to varying degrees. Reed Canary grass increased by over 4 per cent NSC from am to pm cut whereas all other species increased by less than 1 per cent including the two legumes. The actual NSC contents of all species ranged from 4.4 to 9.4 in the morning and 7 to 10 per cent in the afternoon. Unfortunately, we do not have similar measurements for ryegrass in Australia.

Figure 1. Effect of am vs pm cutting on Non-structural Carbohydrates (NSC % DM) in spring over a range of pasture species



Source: Pelletier et al. 2010. Agron. J.:1388

Effect of Drying Conditions, Humidity and Night Time Temperatures: The above conflicting research results are probably related to climatic conditions during the drying period of these trials and could be interpolated to similar conditions in Australia. Areas in the USA and Canada where overnight respiration losses were greater were measured in areas with higher temperatures and humidity, warmer nights and more likelihood of rain so that morning cutting is preferable.

Other research has shown that afternoon cutting was beneficial in the hotter states of the US such as Utah and Idaho, usually experiencing ideal, fast drying conditions with low humidity and intense sunlight. These findings would equate to similar areas in Australia where hay is baled in the evening with some dew on the swaths to reduce excessive leaf loss and also have cooler nights, which reduces respiration.

What does this mean for Australia? In many areas of Australia afternoon cutting will often add another day to the wilting or curing period to reach target DM or moisture contents for safe storage. In these areas this substantially increases the likelihood of rain events and this will by far outweigh any soluble sugar advantage in the pm cut silage or hay. Also advanced maturity from delayed cutting because the weatherman forecaster can't always reliably forecast the extra day, can easily offset any intended advantage. For practical purposes, many contractors and farmers cut in the morning to spread the workload, and baling usually takes place in the afternoon some days later.

Bottom Line: In my opinion, the time of day to cut forage for silage or hay to ensure it reaches its correct DM or moisture contents as quickly as possible, is when you're confident of doing so before the next rain is likely to arrive. Unless you have excellent, extended drying conditions forecasted, this generally means cutting in the morning with a mower-conditioner, leaving swath boards as wide as possible to leave forage in a less dense layer. Tedding immediately after mowing will also greatly

increase the rate of wilting or curing. Ideally, wait for the dew to lift before starting. To maintain forage quality, wilt or cure and harvest as fast as possible.