

# Forage-temperature and solar interaction on Feed Intake

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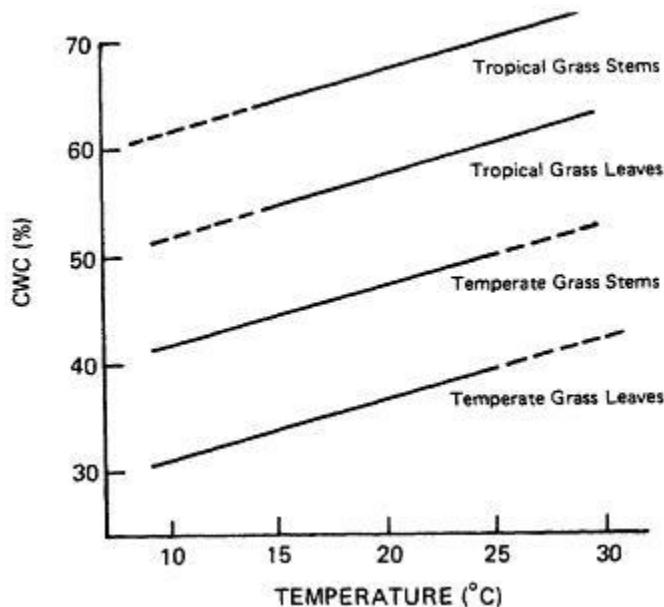


During the summer months grazing animals may show signs of distress with only short periods of grazing from mid-morning to late afternoon and spending other times in the shade. The restricted grazing is usually attributed to the direct effects of temperature and solar radiation on the animal, but this is not necessarily the case as climate-forage interaction also contributes to animal response. In other words, the grazing animal may have to work harder (metabolically) to digest the forage.

**Temperature Effects:** High ambient temperatures bring about rapid rate of maturity of forages and a rise in cell wall content. This occurs in the stems and leaves of both temperate (cool season) and tropical (warm season) grasses, but the change is more pronounced in warm season forages. The rate of plant maturation rises with temperature.

For example: alfalfa grown at 63 degrees F may take 52 days to reach early bloom but only 21 days at 90 degrees F. As forages mature, there is an increase in cell wall content and a decrease in the digestibility of the cell wall.

Figure 1: Effect of temperature on cell wall content (CWC).



**Light Intensity:** High light intensity increases the content of water-soluble carbohydrates, whereas, high temperature decreases water-soluble carbohydrates. With high light intensity, cell wall content decreases. For example, during the spring, alfalfa grows under longer day length and lower temperature, thus its cell wall content is lowest and digestible dry matter is at its highest. The higher temperature during mid-summer causes an increase in cell wall content with a corresponding decrease in digestible dry matter. Therefore, alfalfa harvested at this time is at its lowest quality. Both temperature and light contribute to cell wall content. A rise in cell wall content can lower digestibility and intake by grazing animals.

**Forage Quality:** Forages grown under high temperatures have a higher stem to leaf ratio. Grazing animals prefer leaves. When the animals select leaves instead of consuming the whole plant, bite size and the rate of intake are decreased. Hence, leaf to stem ratio, can be related to cell wall content.

Feeds that have high cell wall content have higher heat increment (part of the metabolic work of breaking down feed) even at similar intake energy levels. Thus, the cell wall content of forages grown during summer can impact utilization of energy and cell wall content can be altered by temperature, solar radiation.