



# farmers and graziers warning/alert

Cold, wet and windy weather can have a disastrous impact on livestock, particularly freshly-shorn sheep, as well as young animals such as lambs and calves.

From September to April, the Bureau of Meteorology in Victoria can issue a farmers and graziers warning when the weather poses a potential threat to livestock.

How does the Bureau decide when to issue a warning?

Warnings are issued at the discretion of senior forecasters, but there are various guidance tools at their disposal, such as the chart shown at right.

The chart – known as a nomogram – takes into account temperature, wind speed and rainfall during the critical weather period.

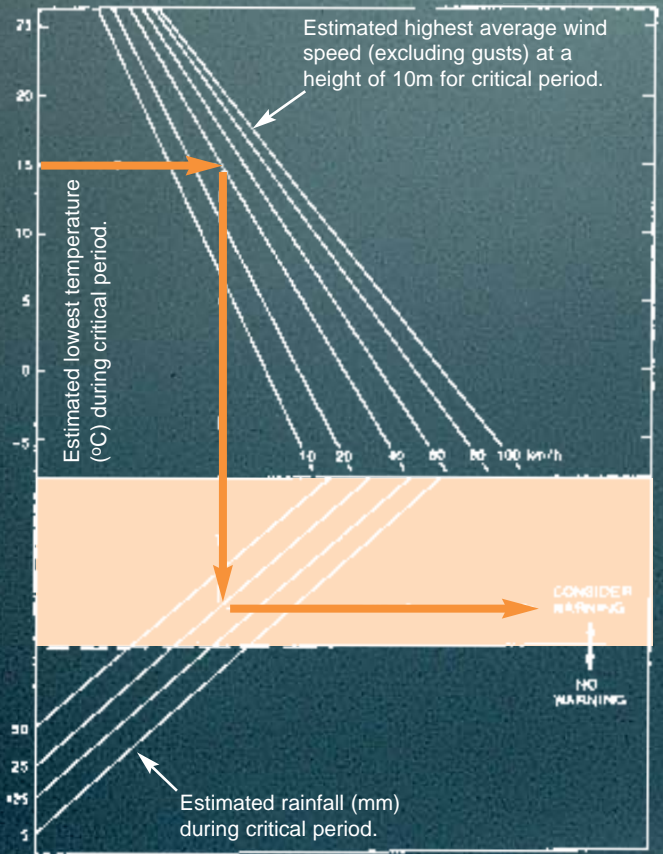
The example (red arrows) shows that with an estimated lowest temperature of 15 degrees Celsius, an estimated highest average wind speed of 20 kilometres an hour, and an estimated rainfall of 25 millimetres during the critical period, the forecaster should consider issuing a warning.

Another factor taken into account is that the most significant livestock losses occur when a spell of warm, dry weather is followed by the outbreak of cold, wet and windy conditions with a chill factor of 230 or more.

The following combinations of wind, rain, and temperature produce a chill factor of 230:

Temperature (°C)	10	10	15	15	20
Wind (knots)	10	15	10	15	15
Rainfall (mm)	10	8	20	17	30

However when conditions are already cool, in early spring for example, a brief cold outbreak does not pose a serious threat. A warning would only be justified with prolonged periods of severe weather.





# weather warnings for crops

The weather not only affects human comfort levels, it can also have a serious impact on agricultural crops. Warm, humid conditions can make you feel lethargic, but they also facilitate fungal diseases that reduce crop yields and spoil fruit. The Bureau of Meteorology in Victoria issues warnings when conditions favor the fungal diseases brown rot and black spot.

For an outbreak to occur, fungal spores must be in contact with liquid water on the fruit or leaves for a period of time. That time varies with temperature – the higher the temperature the less time it takes for an outbreak to occur.

For a light infection (brown rot) to occur, the fruit or leaves must be wet for 140 degree hours – that is, the number of hours of wetness multiplied by the mean temperature (degrees Celsius). This is known as the Mills period. The Mills period for a moderate fungal infection is 200 degree hours, while for a heavy infection (black spot) it is 300 degree hours.

In deciding whether to issue a weather warning for fungal outbreaks, the mean temperature is relatively easy to forecast. Estimating how long the fruit or leaves will stay wet is more difficult, partly because trees will dry unevenly. Some latitude must be allowed in estimating the period of wetness.

It can, however, be assumed that after an initial wetting, fruit or leaves stay wet while the relative humidity is near or more than 80 per cent. There is a good chance that the relative humidity will stay near 80 per cent into the night if clouds persist after sunset.

For example, the forecast is for rain from 3pm with cloud cover until after sunset. There is a reasonable possibility that the relative humidity will stay around 80 per cent until at least midnight. If the forecast mean temperature for the period is 16 degrees, then the forecast Mills period is  $16 \times 9 = 144$  degree hours. This would justify a brown rot warning.