

Meteorological analysis for days with high and normal chicken broiler mortality induced by heat waves

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Objective

The present study has the aim of understanding, through a meteorological analysis, the atmospheric patterns that favor weather conditions that lead to such broiler chicken losses. With that purpose, meteorological variables associated to high chicken broiler mortality at aviaries around the region of Amparo, Sao Paulo state, Brazil, from 2002 to 2007.

Materials and Methods

Meteorological data such as temperature and relative humidity were obtained from a station located at Monte Alegre do Sul, SP (CIIAGRO-IAC, at 20 km from Amparo) and the automatic weather station from Campinas, SP (CEPAGRI/FEAGRI – UNICAMP, at 35 km from Amparo). Air pressure and wind speed information were obtained from Meteorological Aerodrome Reports (METAR), at Campinas. Reanalysis fields, generated by the National Center for Environmental Prediction and National Center for Atmospheric Research (NCEP/NCAR) were also used for the variables surface temperature, surface relative humidity, air pressure, atmospheric thickness between the 500 and 1000 hPa pressure levels, wind speed and direction at 850 hPa. Meteorological data were then analyzed using software Grid Analysis and Display System (GRADS). Zootechnical data regarding chicken mortality were obtained from 200 documentation forms from broiler chicken flocks originated at the Amparo region integrated broiler operations. Through these data, chicken mortality was classified as high (HM) or normal (NM), depending on the average mortality percentage for each year and chicken age. HM refers to mortalities for a given age that exceed the average by one standard deviation. The mortality rates were studied then by randomly selecting 5 NM and 5 HM cases.

Results

Results show that during HM days there is, in general, a high-pressure system whose center located in the ocean, to the east of the region, therefore directly influencing the local atmospheric circulation and driving low wind speeds. Such circulation carries dry hot air from the continent interior to Amparo region, causing very low relative humidity at daytime, and the consequent high chicken broiler mortality. Such low relative humidity changes the air thermal resistance, allowing the solar radiation to severely affect the daytime temperature elevation. Such mechanism may lead to the high chicken broiler mortality by not allowing the proper bird acclimation. It was observed that in these days the maximum temperature (averaged for the 5 cases) was 30 C and the minimum relative humidity (again, averaged for the 5 cases) was around 30%, driving high mortality. On the other hand, during NM cases the average minimum relative humidity was higher, around 50 %, while the average maximum temperature was similar to that observed in the HM cases, around 30 C.

Conclusions

In this study was concluded that low relative humidity, which was due to the presence of dry air

masses associated with high pressure system to the east of Amparo, was a key factor for the onset of mortality in chickens.

References

NIENABER, J. A.; HAHN, G. L. **Engineering and management practices to ameliorate livestock heat stress.** [CD-ROM]; Proceedings of the International Symposium of the CIGR; 2004; Evora, Portugal.

VALE, M. M. et al. **Data mining to estimate broiler mortality when exposed to heat wave.** Scientia Agricola, v.65, n.3, p.223-229, 2008.

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