Over the course of the 2017 and 2018 breeding seasons, researchers from the University of Newcastle studied stallions at four thoroughbred studs in the Hunter Valley in New South Wales. With the aim of understanding how heat-stress affects fertility and reproduction, the researchers monitored two crucial factors:

1. **Ambient climate** – weather loggers were installed in stables and paddocks, taking temperature and humidity readings every three minutes.

2. **Stallion fertility** – was monitored by testing post-coital dismount samples for sperm motility (ability to move), morphology (size and shape) and any damage to the DNA. Libido assessments and pregnancy test results were also measured to determine stallion fertility.

After collecting the data, the research team was able to map ambient temperature and fertility rate across each breeding season to ascertain a correlation between the two.

As the world continues to adapt to increasing temperatures, Australian researchers have undertaken a study to understand how hotter summers are affecting the fertility of thoroughbred stallions. New guidelines, formed as a result of this study, are helping to inform owners and stud managers on how the impact of these conditions can be mitigated to protect stallion fertility and enhance animal welfare standards.

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**Figure 1** A comparison of the maximum (A) and mean temperatures (B) showed that stables tend to retain heat for long periods of time, while paddock temperatures drop efficiently.
Understanding the results

• Analysis of the collected information showed that there is a distinct relationship between heat stress events and a reduction in stallion fertility rates, with some stallions more susceptible to the effects of heat stress than others.

• In susceptible stallions, the research showed that as temperatures and relative humidity increase, stallion libido, fertility and sperm quality decline.

• The data also showed that stables retain heat and maintain a higher temperature, even at night when paddock temperatures drop. This is of particular significance as fertility seems to be most affected by night time temperatures.

• Heat stress was observed to damage the DNA in sperm, which could lead to an increased risk of pregnancy losses and developmental issues in foals.

Implementing the recommendations

Based on the findings the researchers identified three simple management strategies for stallion owners and stud managers to implement to reduce the ill effects of heat stress on the fertility of stallions:

1. Alter grazing routines – In order to reduce the incidence of heat stress allow stallions to graze at night and stable them during the day. Alternatively, stallions can graze outdoors between 7am-11am and 4.30pm-9pm daily, providing eight hours of daily paddock time. Grazing during these times (or stabling from 11 am - 4.30 pm) will limit exposure to high ambient temperatures.

2. Ensure access to adequate shade – Stallions should have access to adequate shade in paddocks, either through man-made structures (tarpaulins, shade cloth), or under the canopy of trees. Trees should be dense-leaved, around 5 metres in height and planted strategically to provide all-day protection from the sun.

3. Monitor stallion fertility – Ongoing monitoring of all stallions will identify those sires that experience reduced fertility due to heat stress.
   • Install temperature and humidity loggers in stables and paddocks. Loggers should be installed out of direct sunlight, and calibrated before use.
   • Collect weekly dismount samples from all stallions during the breeding season. Ensure samples are snap frozen immediately and stored for future assessment.
   • Continually review fertility data against environmental conditions, for all stallions. Reviews should include the current week’s temperature and humidity data, plus the three previous week’s. This should provide stud managers with an understanding of which stallions are most at risk of decreased fertility due to heat stress.
   • Tailor management practises in line with the needs of specific stallions.

This fact sheet is a summary of project PRJ-011268 Understanding and reducing the effects of heat stress on thoroughbred stallion fertility.

For the full report and final report summary please visit agrifutures.com.au/heat-stress-stallion-fertility