

The infrared thermography of the scrotal surface in the long scrotum bull. Preliminary comparisons to normal scrotum sound for breeding bulls.

J. Chacón, L. Sadewater, A. Chacón-Obando and B. Vargas

Research Program on Applied Animal Andrology, Veterinary Medicine School,
Universidad Nacional (UNA)-Costa Rica.

Long scrotum bulls (LS) (i.e the scrotum apex surpassing the hock joint level) have been reported with a high culling rate compared to normal scrotum sires (NS) (scrotum apex above the hock joint), due to seminal and chronic abnormalities in the reproductive system, such as varicocele and testicular degeneration. Although a higher risk of undergoing scrotal trauma is suggested to play a role on this relationship, other pathophysiological mechanisms are still indeterminate, including the infrared thermogram of the scrotal surface (IR). Then, we aimed to compare the IR values in LS versus NS.

IR files from 72 breeding bulls: LS n=35 and NS n=37 (5.9±2.4 and 3.5±1.4 years-old respectively) extensively reared in Costa Rica, were recorded from the posterior scrotal surface. Files were software processed (LumaSpec Offline Analyzer®) (isotherm set to 0.7C°) to obtain temperature values (C°) from regions of interest (ROI) in left and right testicle separately as follows: Top-bottom neck gradient (SNG), Top-bottom testicular gradient (STG), Average testicular (AST), Average epididymal cauda (AET), Gradient average testicular-average epididymal cauda (AST-AET). NS averages were used as reference values for means contrast.

All NS revealed a thermal pattern characterized by decreasing concentric isotherm bands from the scrotum base to its apex, including left to right symmetry. This array was missing in 100% LS, displaying 60% (n=21) isotherms mixing specially over the testicular area, while 40% (n=14) showed a homogenous isotherm from top to testis apex. LS exhibited lower STG for left and right testicles compared to NS (0.64±0.59 and 0.67±0.48 versus 1.12±0.52 and 1.08±0.91 respectively, both comparisons P<0.01). Likewise, AST-AET were lower for LS (0.64±0.43 and 0.52±0.47 versus 1.07±0.42 and 0.97±0.42 respectively, both contrasts P<0.0001). Moreover, LS had higher SNG than NS (1.54±0.78 and 1.53±0.79 versus 1.05±0.44 and 1.12±0.45, P=0.001 and P=0.01 respectively). AST and AET were not statistically different between LS and NS.

The IR in LS resembles a decreased top-bottom temperature gradient in both gonads, as well as a lower testicle-epididymal cauda gradient compared to NS sound for breeding bulls. These findings, plus the lack of concentric isotherm bands with mixing cold and hotter temperatures suggest chronic testicular degeneration in LS.