

# Poster Presentation Annual Meetings of the Endocrine Society of Australia and Society for Reproductive Biology and Australia and New Zealand Bone and Mineral Society 2016

Days	<b>Tropical summer induces sperm DNA damage in boars which can be mitigated by antioxidant therapy (#458)</b>	^
Sunday, 21st Au...	<b>Santiago T. Peña, Jr.</b> <sup>1 2 3</sup> , Bruce Gummow <sup>2</sup> , Anthony J. Parker <sup>4</sup> , Damien B.B.P. Paris <sup>3</sup>	∨
Monday, 22nd A...	1. College of Veterinary Medicine, Visayas State University, Baybay, Leyte, Philippines	∧
Tuesday, 23rd A...	2. Discipline of Veterinary Science, College of Public Health, Medical & Veterinary Sciences, James Cook University, Townsville, Queensland, Australia	
Wednesday, 24t...	3. Discipline of Biomedical Science, College of Public Health, Medical & Veterinary Sciences, James Cook University, Townsville, Queensland, Australia	
Search	4. College of Food, Agricultural & Environmental Sciences, Ohio State University, , OH 44691, USA, Wooster, Ohio, United States of America	
Speakers (/spea...		

Summer infertility due to heat stress grossly affects reproductive performance in pigs, particularly in the tropics, and causes over \$300 million in annual losses to the US swine industry. Boar's inefficient capacity to sweat; non-pendulous scrotum and the high susceptibility of boar sperm to temperature shock makes this species particularly vulnerable to heat stress. While traditionally considered a sow problem, recent studies demonstrate that heat stress-induced sperm DNA damage can result in early embryo loss in mice. Our study aimed to demonstrate higher sperm DNA damage during summer in boars and trial antioxidant therapy to alleviate the problem.

Progressive motility of sperm obtained from n=5 Large White boars housed in the dry tropics of Townsville, North Queensland, Australia was characterized by Computer-Assisted Sperm Analysis but did not differ between spring, summer and winter ( $41.7 \pm 2.8\%$  vs.  $35.4 \pm 7.0\%$  vs.  $46.6 \pm 4.0\%$ ;  $P \geq 0.05$ ), while total motility was higher during winter ( $90.2 \pm 4.2\%$ ) than spring ( $70.8 \pm 5.5\%$ ;  $P \leq 0.05$ ) but not summer ( $71.3 \pm 8.1\%$ ;  $P > 0.05$ ). Sperm DNA integrity in twenty-thousand spermatozoa/boar/treatment, evaluated using TUNEL and flow cytometry, revealed >8-fold higher DNA damage in summer than spring and winter ( $16.1 \pm 4.8\%$  vs.  $1.9 \pm 0.5\%$  vs  $1.0 \pm 0.2\%$  respectively;  $P \leq 0.05$ ). However, boar feed supplemented with antioxidants during summer significantly reduced sperm DNA damage to  $9.9 \pm 4.5\%$  and  $7.2 \pm 1.6\%$  ( $P \leq 0.05$ ) after 42 and 84 days treatment respectively. Total and progressive motility were not altered by the supplement.

In summary sperm DNA integrity is compromised in boars during summer, suggesting boar factors may contribute to embryo loss in sows. Moreover, such damage appears undetectable using traditional measures of sperm motility. Antioxidant supplementation during summer alleviates the negative impact of heat stress on sperm DNA integrity.