EXPOSURE OF BOARS TO ELEVATED AMBIENT TEMPERATURE: MORPHOLOGICAL STUDIES OF THE EJACULATED SEMEN.

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Experimental exposure of boars to elevated ambient temperature has been shown to cause lowered fertility (Wetteman et al, 1977), decreases in total sperm number and per cent motile spermatozoa and increase in per cent abnormal spermatozoa (McNitt and First, 1970: Wetteman et al, 1977). Also local heat treatment to the scrotum causes disturbances in the testicular function in boars (Holst, 1949: Mazzari et al, 1968). The information concerning influence of exposure time is however limited. The object of the present study was therefore to investigate the influence of 24 hrs and 100 hrs exposure of boars to elevated temperature on sperm morphology of the ejaculated semen.

Sixteen mature, 9 - 12 months old, purebred Swedish Landrace boars were used. The exposure to elevated temperature (+35°C) took place in a climatic room (3.5m x 3.5m) in which the relative humidity was kept at 40%. Four boars were maintained in the climatic room at +20°C and a relative humidity of 60-70% (group I). Four boars were maintained in the climatic room at the elevated temperature for 24 hrs (group II) and 8 boars for 100 hrs (group III). Before and after the exposure period the boars were kept in a conventional barn, the temperature being c. +18°C. Semen was collected twice a week, beginning 6 weeks before and ending 3 or 8 weeks after exposure. No collection of semen took place during the ecposure period. Semen collection was performed by the gloved-hand technique and the boars were allowed to mount the dummy sow in their own pens. Semen morphology was assayed by phase contrast microscopy of formol-saline fixed wet preparations and by light microscopy of stained dry smears. Sperm concentration was measured by haemocytometric counting. All boars exposed to elevated temperature for 24 hrs and 4 boars exposed for 100 hrs were castrated 3-4 weeks after the end of the exposure period for histological examination of the testicular tissue.

The results are presented in the Table as means. The values refered to as "before" represent 8 ejaculates from each boar. The highest sperm number per ejaculate was as a rule obtained at the first collection after exposure, probably due to a longer interval to the previous collection. The per cent motile spermatozoa decreased in group III boars, approximately starting at day 16, and had returned to "before exposure" values at day 41. No deviations in sperm motility were seen in boars belonging to groups I and II. Only minor and inconsistent morphological alterations were observed in the ejaculates from boars exposed for 24 hrs. The most consistent increases of sperm abnormalities were proximal cytoplasmic droplets and abnormal sperm heads. Maximum percentages were reached c. 3 weeks after exposure and "before exposure" levels were found c. 6 weeks after exposure. The morphological alterations of the ejaculated spermatozoa from boars exposed to elevated temperature for 100 hrs are in accordance with earlier reports. The morphological examination of the testicular tissue 3 weeks after exposure revealed no lesions in boars exposed for 24 hrs and only mild testicular degenaration in boars exposed for 100 hrs.

Since only minor and inconsistent alterations were found in semen from boars exposed to +35°C for 24 hrs it is obvious that the duration of exposure to elevated ambient temperature is of great importance for the serverity of testicular disturbance.

Table: Total sperm number, per cent progressively motile spermatozoa, and sperm morphology in ejaculates collected before and after 100 hrs exposure to 20°C (group I), 24 hrs exposure to 35°C (group II) and 100 hrs exposure to 35°C (group III) in a temperature controlled room. Means within groups.

Group	I	II	III	I	II	III
	Total sperm number ($\times 10^9$)			Per cent motile		
Before exposure	38.7	68.1	45.4	73	69	75
Days after exposure						
3-5	61.3	87.4	74.8	68	71	69
6-10	56.9	45.9	52.4	73	71	72
11-15	44.5	64.5	49.6	72	70	68
16-20	49.3	77.9	47.6	74	70	55
21-25	57.3		53.1	76		55
26-30	53.2		49.1	74		64
31-35	63.1		60.9	75		64
36-40			59.8			66
41-45			41.2			75
46-50			57.5			72
	Abnormal heads (%)			Proximal droplets (%)		
Before exposure	2.6	1.9	2.2	0.9	0.7	1.2
Days after exposure						
3-5	2.3	2.2	3.2	1.5	0.4	5.7
6-10	2.9	2.6	3.2	0.7	0.5	9.6
11-15	3.5	2.3	4.2	0.8	0.9	23.8
16-20	1.8	2.6	16.5	0.8	0.8	29.4
21-25	1.5		20.1	0.1		26.3
26-30	2.1		11.7	0.4		17.9
31-35	2.5		4.2	0.3		6.7
36-40			3.5			4.1
41-45			1.9			6.8
46-50			2.1			4.3
	Abnormal midpieces (%)			Bent/coiled tails (%)		
Before exposure	2.4	1.1	1.4	0.3	0.6	0.7
Day after exposure						
3-5	2.3	2.6	1.4	0.5	1.1	3.8
6-10	1.3	1.0	1.6	0.8	0.5	4.9
11-15	0.9	4.8	2.1	0.0	1.1	2.5
16-20	1.3	3.1	3.4	0.2	2.3	4.0
21-25	1.9		3.3	0.3		2.8
26-30	1.8		4.5	0.5		3.3
31-35	0.9		1.5	2.8		1.5
36-40			1.8			1.3
41-45			1.3			0.5
46-50			1.0			0.4

Acknowledgement: This study was supported by grants from the Swedish Council for Forestry and Agricultural Research.

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