Proceedings 4th World Rabbit Congress, 10-14 October 1988, Budapest Hungary, Vol. 2, 465-471

INVESTIGATIONS ON SEMEN ABNORMALITIE OF ANGORA RABBITS

(preliminary report)

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The aim of the Angora Rabbit Production Ltd. Kaposvár is to improve the breeding stocks of HUNGANGORA member farms either by giving the breeding animals of high performance or by giving the semen of highest genetic value for the inseminations.

The later scope of duties requires not only the improving effect of the bucks on the field of wool production but also on the fertilization ability of the semen. It is well-known the low fertility of the Angora rabbits and this makes necessary to investigate all the possibilities for increasing the prolificacy.

Therefore, new investigation methods should be developed to predict reliably the possible fertilization ability. In this case, the animals being not suitable to fertilization in due time could be detected. By this way, the losses caused by the low conception rate could be decreased.

Based on literary data of the pig breeding (Wekerle, 1987) it could be stated that the fertilization ability of the bucks could not be detected by macroscopic investigations on the density, motility and colour of the sperm. Only between the ratio of abnormal spermatocytes and the fertilization ability could be stated practical usable relationships (Wekerle, 1987).

From the investigations on meat rabbit breeds a high frequency of sperm abnormalities was stated by various authors.

Breed	Percentage of abnormal semen	Author
New Zealand White	9.5 ± 3.56	Cervajel et al., 1985
New Zealand White	9.5 ± 5.04	Mendez, 1984
Buszkati	22.14	El-Ezz et al., 1985
Chinchilla	27.72	El-Ezz et al., 1985
Buszkati x Bladi	12.57	El-Ezz et al., 1985
Chinchilla x Bladi	21.33	El-Ezz et al., 1985

There are great differences in the reproduction of various animal breeds. Therefore, we deemed it necessary to study the relationships between the spermiogram and the fertilization ability and also the use of these experiences in the breeding work. At first, we estimated the frequency of semen abnormalities in our Angora rabbit breeding stock.

Material and methods

Investigations were carried out on the breeding stock involving 150 does and 50 bucks using natural matings. The does of the member farms were inseminated by semen diluted and transported to the farms.

The does were housed in wire-floor flat-deck cages and the bucks in round spot-welded network cages with 3 levels. All the animals were fed with concentrates (crude protein 18 % and crude fiber 12 %) and alfalfa hay ad libitum.

Depending on the litter size the does were remated 10-50 days after kindling. So far, the determination of the spermiogram of 17 bucks at the age of 1-3 years were carried out. The morphological studies were performed by Wekerle's method (1982).

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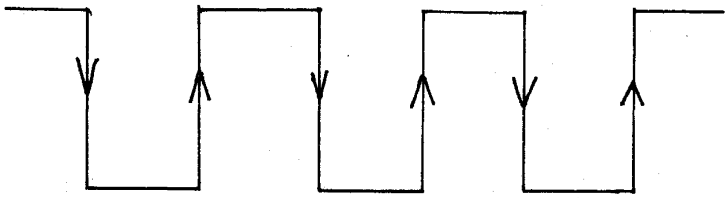
Course of the investigations

From the fresh diluted and stirred semen a smear was made on carefully degreased (with chloroform, ether, or alcohol) slide and dried on room temperature. It is most important that the semen layer should be thin because the thick layer makes difficult the evaluation. The air-dry smear was put into dry beck containing the diluted solution of congo red. After taking out in 20 sec., and flushing with running water it was put into the diluted solution of crystal violet for 5 sec. After flushing again with running water it will be dried on room temperature. This was followed by microscopic morphological studies of the smear magnified thousand times, and 100 semen were counted to determine the percentage of abnormalities. To reach the highest accuracy, a great part of the slide must be controled. It is reasonable to make the countings on various areas of the slide following the next direction.



Results and discussion

The incidence of the abnormalities is shown on the Table 1. The percentage of the normal semen amounted to 67.6 and that of the abnormals amounted to 32.4 (extreme values: 45 and 90 for the normal semen and 55 and 10 for the abnormalities). This percentage is greater than that of the meat rabbits published by various authors. Our results are similar to those of Hu et al. (1983), for Angora rabbits imported from Germany (50 % for the abnormalities in summer and 23,42 % in the fall).

Acrosomal lesions were found in 8.5 % and deformations of the head in 10.8 %. An often occurring abnormality is the deformation of the tail (7.6 %). Seldom occurred plasma droplets (4.6 %) and neck abnormalities were only found in 6 animals (0.9 %).

The microscopic picture of the spermas of Angora rabbits is similar to those of the boars (pigs). Based on the studies also the frequency of the incidence of abnormalities seems to be similar. The permissible highest abnormality percentages according to Wekerle (1987) are as follows:

Semen abnormalities	Permissible highest value, %
Proximal droplet	10
Distal droplet	30
Bent tail	15
Looped tail	15
Simple bent tail	15
Head deformations	10
Knobbed	5
Pseudo Dag defect	5
SME defect	5
Double neck	10
Retroaxial tail	5
Head-coiled tail	5
Total abnormalities of the semen	30

The abnormality percentages in our investigations were found under the highest values of the pigs.

Except:

Proximal droplet	35 %	(1D-6001)
Coiled tail	32 %	(3-6101)
Head deformations	22 %	(4-6147)
Head deformations	20 %	(P53 55227)
Knobbed	15 %	(W414 178)
Retroaxial tail	8 %	(W102 1717)

Further studies should be carried out to determine the changes in the abnormalities depending on the age of males and the interval between the shearings (length of wool) and on the influence of abnormal semen on the conception rate and litter size.

Data of collection should be extended over the farms carrying out artificial inseminations. A great number of data is needed to determine the diagnostic value being characteristic for the breed. By this way, the males with decreased fertility or the barren ones could be in good time selected and the low conception rate of the females could be increased.
Besides it, the spermiogram gives an indirect information about the reactivity of germ epitelium on the environmental effects, on the reproductive fitness.

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Results of morphological studies on sperms

Ear tag / Defect	P53 114420	P53 44136	P53 2591	P53 45254	P53 55227	P53 25149	P53 2540	W102 175	W102 1778	W414 178	W102 1717	W405 171	1D 6001	4 6147	2 6194	3 6101	2 6202	Total	Percent
Akrosome deficiences																			
- total deficiency	-	-	6	2	6	6	2	2	-	-	-	1	-	-	1	1	-	27	1,6
- partial deficiency	-	-	5	-	9	9	2	-	1	1	6	6	-	-	7	2	-	48	2,8
- retraiting	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0,1
- swollen	-	2	-	2	-	-	-	-	-	10	18	-	-	-	1	-	-	33	1,9
- knobbed	-	-	8	-	2	-	-	-	-	15	-	1	1	-	1	4	2	34	2,0
Plasma droplets																			
- proximall	-	-	-	2	10	3	-	10	7	-	2	6	35	-	-	-	1	76	4,5
- distal	-	-	-	-	2	-	-	7	-	1	-	1	2	-	-	-	-	13	0,8
Tail defects																			
- simple bent tail	-	2	-	1	1	3	-	1	-	-	8	-	-	-	-	-	3	19	1,1
- bent tail	4	2	11	-	4	1	-	10	1	3	4	5	-	-	6	9	3	63	3,7
- looped tail	-	-	10	-	-	1	-	2	1	1	2	1	-	-	7	32	3	60	3,5
- dag defect	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Head defects																			
- SME defect	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- pear-shaped	6	14	2	2	4	5	6	2	10	-	-	5	3	8	3	-	8	78	4,6
- round	-	-	1	-	-	-	-	-	1	-	2	1	2	-	-	-	-	7	0,4
- gigant	2	-	-	-	-	-	-	-	-	-	2	-	-	-	-	1	-	5	0,3
- micro	-	-	-	-	3	1	8	3	1	-	-	1	1	5	-	-	1	24	1,4
- multiple	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
- elongate	14	4	2	1	13	5	8	1	3	1	2	2	-	9	1	1	2	69	4,0
Neck defects																			
- double	-	-	-	-	1	-	-	2	-	-	-	-	-	-	-	-	-	3	0,2
-retroaxial	-	-	4	-	-	-	-	-	-	-	8	-	-	-	2	-	-	14	0,8
Total:	26	26	49	10	55	34	26	40	25	32	54	30	44	22	29	50	23	575	32,4
Normal	74	74	51	90	45	66	74	60	75	68	46	70	56	78	71	50	77	1125	67,6

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The decreased fertility of Angora rabbits compared to the meat breeds makes serious problems for the Angora rabbit production. Besides the negative correlation between wool production and fertility and unnatural management conditions, the effect of other factors could play an important role too. Assuming these, we begun to investigate the reproductive ability of males.Therefore, we tried to find the best prediction value for the reproductive ability. Because some parameters from semen investigations - semen concentration, motility, - did not give good connections with reproductive ability, we begun to investigate the diagnostic value of the spermmorphology. It could be stated that the ratio of abnormal spermatocytes gives the most reliable informations about the expected reproductive ability.

UNTERSUCHUNG DER SPERMAABNORMITäTEN BEI ANGORAKANINCHEN

Die niedrige Fertilität der Angorakaninchen im Vergleich zu Fleischrassen erbringt schwere Probleme in der Zuchtung. Neben der negativen Korrelation zwischen der Wollproduktion und der Fertilität der männlichen Tieren - ausser den nicht naturgemässen Haltungsmethoden - spielen auch andere Faktoren eine Rolle. Aufgrund dieser Überlegungen haben wir mit der Befruchtungsfähigkeit der männlichen Tieren begonnen. Wir wollten die beste Voraussage für diese auffinden. Da einige Parameter der Spermien-Untersuchungen - Dichte, Motilität -, keine richtigen Zusammenhange mit der Befruchtungsfähigkeit zeigten, haben wir mit den Untersuchungen der morphologischen Werte der Spermien angefangen. Aus den Untersuchungen geht hervor, dass der Anteil der abnormalen Samenzellen dei besten Werte für die zu erwartenden Befruchtungsfähigkeit ergeben kann.