Influence of age on reproductive performance of the Improved Boer goat doe

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Data from 826 Improved Boer goat does obtained between 1976 and 1982 from the Adelaide Research Farm were examined to determine the influence of doe age on reproductive performance. The does reached maximum bodymass at the age of 4 years. The maximum number of kids born (1,90) and weaned (1,64) per doe mated, and the maximum number of kids born (2,26) and weaned (1,96) per doe kidded occurred at the age of 3,5 years. The incidence of multiple births was relatively high, with 7,6% being born as singles, 56,5% as twins, 33,2% as triplets, 2,4% as quadruplets, and 0,4% as quintuplets. The highest kid mortality was observed in kids born as triplets and quadruplets.
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Data van 826 veredelde boerbokooie is vanaf 1976 tot 1982 van die Adelaide Proefplaas verkry om die invloed van ooi-ouderdom op reproduksieprestasie te bepaal. Die ooie het op 4-jaar-ouderdom maksimum liggaamsmassa bereik. Die hoogste lampersentasie is op 'n ouderdom van 3,5 jaar behaal. Die maksimum aantal lammers gebore (1,90) en gespeen (1,64) per ooi gepaar, en die maksimum aantal lammers gebore (2,26) en gespeen (1,96) per ooi gelam is ook op 'n ouderdom van 3,5 jaar bereik. Die voorkoms van meerlinggeboortes was relatief hoog, met 7,6% gebore as enkellinge, 56,5% as tweelinge, 33,2% as drielinge, 2,4% as vierlinge en 0,4% as vyflinge. Die hoogste lammortaliteite het by die drie- en vierlinge voorgekom.
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Introduction

Age structure has a direct influence on production, reproduction and genetic progress of a breeding flock (Turner & Young, 1969). Although there is no definite age at which reproductive functions cease abruptly during life (Hafez, 1968), reproductive effectiveness should be maximized to establish an economical and effective breeding programme.

Determining the age at which optimum reproductivity is achieved is thus essential, and is an important step in establishing such a programme. However, the literature reveals that little is known about the influence of age structure on reproduction in the Improved Boer goat.

Procedure

Data from 826 Improved Boer goat does from the Adelaide Research Farm during the period 1976 – 1982 were gathered for subsequent analysis. The BMDP/5R package for polynomial regression analysis was used. Data from the 1981 season were incomplete and therefore omitted.

The does were run on the False Thornveld of the eastern Cape, veld type 21 (Acocks, 1975). Only does with three or more kids received 1 kg of ewe/lamb cubes from kidding to 3 weeks of age. Group mating took place in March. The doe:ram ratio was 45:1 for mature does, and 35:1 for maiden does. Kidding occurred during August.

Results and Discussion

The age structure of the flock is shown in Table 1. An increase in doe age was associated with a decrease in the number of does mated.

The significant ($P<0,01$) curvilinear regression line describing the influence of age on livemass indicates an increase in bodymass up to the age of 4 years (Figure 1), which compares favourably with that of 3,5 years for the Dormer (Van der Merwe, 1976) and 5,5 years for the Merino (Turner & Young, 1969) and Dohne Merino (Fourie & Heydenrych, 1983), but is relatively young compared to the 6,5 years in the Angora doe (Landman, 1984).

The kidding percentage was relatively low in the Boer goat flock (Figure 1). The occurrence of abortion may be one of the factors which influenced this parameter. Losses owing to abortion and retained placentas were found to vary between 5 and 8% in a survey conducted by Steinhagen, Barnard & Fourie (1983). At the Adelaide Research Farm annual losses owing to abortion were 8,6; 9,7; 29,8; and 27% between 1976/1977 and 1979/1980 respectively (Aucamp, 1983). In 1981/82 the annual loss decreased to 4%. However, these losses could have been higher since we were unable to detect

Table 1   Influence of age on reproductive performance of Boer goat does

Mating age (years)	Does mated (No)	Does kidded (No)	Kids born (No)	Kids weaned (No)	Does kidded per doe mated	Kids born per doe		Kids weaned per doe	
						mated	kidded	mated	kidded
1,5	252	179	364	317	0,71	1,44	2,03	1,26	1,77
2,5	205	162	335	278	0,79	1,63	2,07	1,36	1,72
3,5	154	129	292	253	0,84	1,90	2,26	1,64	1,96
4,5	130	102	220	198	0,78	1,69	2,16	1,52	1,94
5,5	62	50	96	87	0,81	1,55	1,92	1,40	1,74
6,5	23	18	38	32	0,78	1,65	2,11	1,39	1,78
Total/mean	826	640	1 345	1 165	0,79	1,64	2,09	1,43	1,82
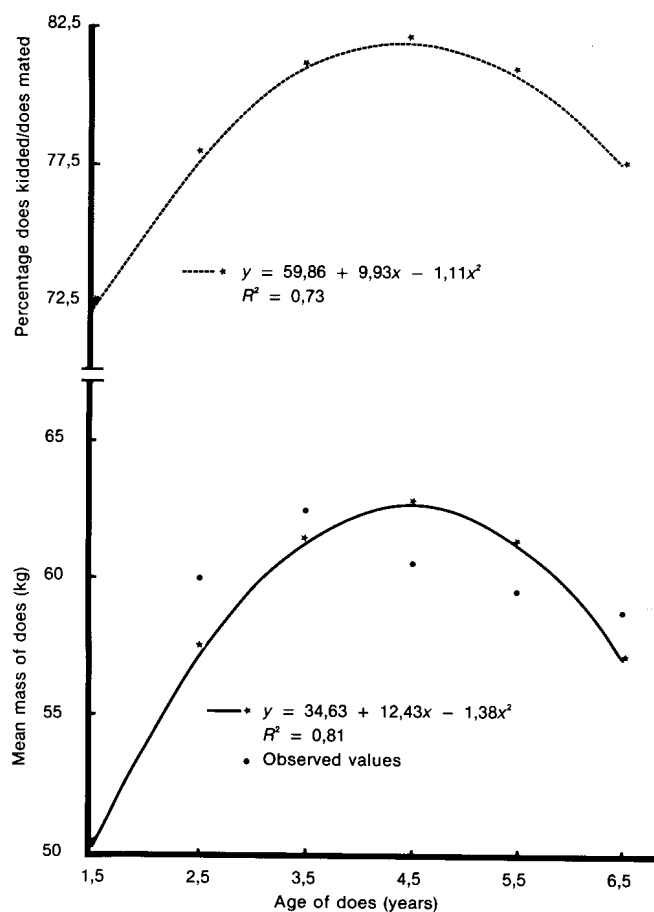
Figure 1   Regression of mass and kidding percentage on age of Boer goat does.
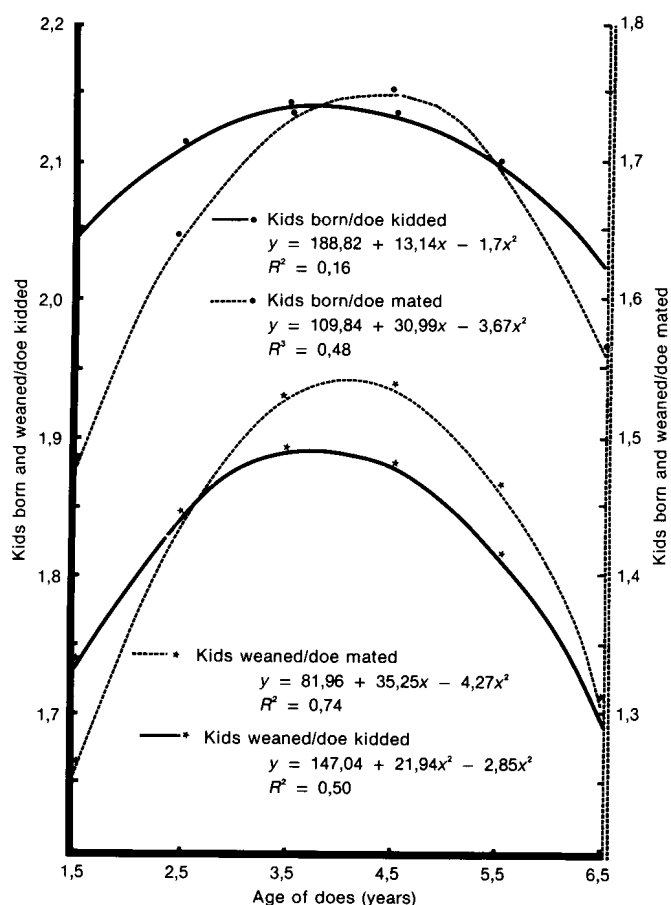
Figure 2   Regression of reproductive performance on age of Boer goat does

resorption of the embryo or abortion at an early stage. The maximum number of kids born and weaned per doe mated occurred between the ages of 3,5 and 4,5 years (Figure 2), whilst the maximum kidding and weaning percentages in the Merino (Heydenrych, 1975) and Dohne Merino (Fourie & Heydenrych, 1983) were recorded between the ages of 5 and 6 years. In the Angora, maximum levels were obtained at the ages of 8 and 9 years respectively (Landman, 1984).

The mean number of kids born per doe kidded (2,09) is higher than that reported by Greyling & Grobbelaar (1981) with a value of 1,70 for a high energy ration and 1,78 for a low energy ration, and increased from 1,5 to 3,5 years of age whereafter a decrease occurred (Figure 2). This age of optimum fertility (3,5 years) is appreciably earlier than that of 6 — 7 years in the Angora doe (Landman, 1984) or 6 years in the Dohne Merino (Fourie & Heydenrych, 1983) and

Merino ewe (Heydenrych, 1975).

The relatively high incidence of multiple births is evident from Table 2. The percentages of twins and triplets are higher than those reported by Greyling & Grobbelaar (1981) for Boer goats on a high-energy ration (50% and 10% respectively) and low-energy ration (55,6% and 11,1% respectively). The percentages of single lambs (7,6%) and twins (56,5%) born in the present study are lower than those of 12,7 and 61,4% respectively, reported by Campbell (1979). However, the percentages of triplets (33,2%) and quadruplets (32,4%) are higher than those reported by Campbell (1979) (23,8% and 2,1% respectively). The percentages of singles and multiples weaned followed the same tendency. The average percentages of kids weaned per kids born were 89,2 for single lambs, 91,7 for twins, 79,1 for triplets and 69,8 for quadruplets. The highest kidding mortality occurred in kids born as triplets and

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Table 2 The occurrence of multiple births in the different age groups in Boer goat does

Age (Years)	Singles Born n	%	Singles Weaned n	%	Twins Born n	%	Twins Weaned n	%	Triplets Born n	%	Triplets Weaned n	%	Quadruplets Born n	%	Quadruplets Weaned n	%	Quintuplets Born n	%	Quintuplets Weaned n	%
1,5	29	8,0	24	7,6	232	63,7	213	67,2	99	27,2	78	24,6	4	1,1	2	0,6				
2,5	32	9,6	30	10,8	178	53,1	160	57,6	117	34,9	81	19,1	8	2,4	7	2,5				
3,5	12	4,1	10	4,0	152	52,4	141	56,9	107	36,6	88	4,8	16	5,5	12	4,8	5	1,7	2	0,8
4,5	12	5,5	12	6,1	124	56,4	113	57,1	84	38,2	73	36,9								
5,5	15	15,6	13	14,9	50	52,1	48	55,2	27	28,1	25	28,9	4	4,2	1	1,1				
6,5	2	5,3	2	6,3	24	63,2	22	68,8	12	31,6	8	25,0								
Total/Mean	102	7,6	91	7,8	760	56,5	697	59,8	446	33,2	353	30,3	32	2,4	22	1,9	5	0,4	2	0,2
Kid Mortality %				10,8				8,3				20,8				31,3				

quadruplets (Table 2). The poorer survival rate of the latter could be ascribed to the large incidence of multiple births and the fact that the Boer goat doe has only two functional teats.

In conclusion, the improved Boer goat doe possesses two distinctive qualities, namely early sexual maturity and relatively high fertility and fecundity. The optimum kidding and weaning rates occurred at the ages of 4,5 and 3,5 years respectively. This indicates that to achieve maximum rate of genetic progress and economical return, does should not be retained in the flock for longer than 5,5 years. Furthermore, this age structure is important for attaining optimum repro-duction rates and flock structures. Results obtained in this study suggest that selection for multiple births other than twins is not always desirable because of the relatively high mortality rate. However, it is envisaged that this mortality rate may be drastically reduced with improved management practices. Consequently, selection for triplets and quadruplets may then be feasible.

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