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INFLUENCE OF WEANING AGE ON DEVELOPMENT OF LIVE-WEIGHT AND FOOD CONSUMPTION IN YOUNG RABBITS

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Abstract

The experiment reported compared the influence of weaning at 25, 28, 31, and 35 days of age on the development of live-weight and food consumption during the pre- and post-weaning period in hybrid rabbits.

Results of 44 does and 949 offspring showed that late weaning exerted a positive influence on live-weight development in comparison with already weaned kits of the same age. In all weaning age groups a depression in growth occurred shortly after weaning which was compensated thereafter. There was no significant difference between treatments with regard to total food consumption of does and offspring. This lack of difference was due to the high food intake of lactating does after weaning that surpassed maintenance requirements.

Introduction

Under a fixed interval of 42 days between parturitions achieved by synchronized insemination, the young rabbits can be weaned between 21 and 37 days of age. The adequate weaning age should meet several criteria. The food intake of the young rabbits should be sufficiently high and does should have a rest period of 5 days prior to the next birth. In addition, food consumption of does and offspring required for rabbit meat production should be taken into consideration.

It is generally thought, that food directly consumed by the kits is more efficiently turned into body mass than via prior conversion into milk by the doe. Accordingly, early weaning should reduce feeding costs. These assumptions are confirmed by the results of Schlolaut and Lange (1971) and De Blas et al. (1981). The authors, however, only considered the food consumption of the doe until weaning of the kits. This procedure appears to be justified if the does give birth to offspring within few days after weaning. However, when the interval between parturitions is 42 days, the doe's food consumption should be taken into account for the entire period.

The objective of this report was to study the effects of weaning ages of 25, 28, 31, and 35 days on (1) food consumption of does and offspring and (2) the body weight development of the young rabbits.

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Materials and Methods

Forty four female "Zika" hybrid rabbits were used. The does were inseminated four times at 42 day intervals. Four treatment groups were established with weaning taking place at 25, 28, 31, or 35 days of age. On the average, each weaning age group included 29 litters with a total of 237 offspring. Animals were kept in three houses in wire cages (50 x 70 cm, width x length, i.e., 3500 cm^2). The same cage type was used for does and growing rabbits. The offspring was kept with the doe in the same cage until weaning, after which the young rabbits were transferred to the growing house, where a temperature of 22^0 C was maintained. Growing rabbits were kept in groups of eight animals per cage until 42 days of age when group size was reduced to four per cage. Sexes were intermingled.

Does and growing rabbits were fed ad libitum the same commercial diet for rabbits containing 19% crude protein and 15.6% crude fibre. During the suckling period, young rabbits had free access to the feeder of the does. Water was allowed ad libitum with nipple drinkers.

Live-weight of young rabbits was individually measured at birth and 25, 28, 31, 35, 39, 42, 56, and 70 days of age when the offspring was slaughtered. Food consumption was recorded at the same intervals. For technical reasons food intake during the preweaning period was measured for both does and kits. Accordingly, feed conversion was calculated as follows:

(1) Combined feed conversion: food consumed by the kits and the doe between two parturitions/ weight gain of the kits.
(2) Feed conversion of the kits: food consumed by the kits from weaning/ weight gain of the kits.

For technical reasons the experimental does were assigned to three blocks and inseminations were conducted at 2-week intervals. Accordingly, parturitions occurred on several dates. The effect of parturition dates was included in the statistical model of the analysis of variance.

Results

The development of live-weight of the kits is shown in Table 1. The weaning age exerted no consistent influence on live-weight. The ranking between weaning age groups remained the same from 25 days of age until 70 days.

The mean daily weight gains from 1 to 25 days of age of about 13g were very low (Table 2). After 25 days of age daily weight gains were superior in suckled kits (weaning age groups 28, 31, and 35) than in those already weaned (weaning age group 25). Apparently, growth intensity was depressed by weaning. This growth depression, however, can be compensated as indicated by the highest daily weight gains (36 to 43 days of age) achieved by the kits of the early weaning age (25 days).

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Table 1. Influence of weaning age on development of live-weight in young rabbits (g, means)

Age of kits (days)	Weaning age (days) 25	28	31	35
0	61.2[a]	62.3[a]	60.4[a]	62.1[a]
25	398[a]	394[a]	373[b]	416[c]
43	1082[a]	1080[a]	1050[b]	1136[c]
70	2344[a]	2314[a]	2277[b]	2380[c]

Table 2. Mean daily live-weight gain (g) of the young rabbits as influenced by weaning age

Age of kits (days)		Weaning age (days) 25	28	31	35
1 - 25		13.5	13.3	12.5	14.2 Pre-
26 - 28		23.3	35.0	33.0	36.0 weaning
29 - 31	Post-	35.7	33.3	40.0	41.7
32 - 35	weaning	36.5	31.0	35.3	41.8
36 - 39		45.3	44.8	36.5	41.8
40 - 43		45.0	44.5	42.8	38.3

Food consumption of the does is shown in Table 3. For technical reasons food intake of the does recorded during the pre-weaning period also included food consumed by the kits, while the food consumption after weaning was measured for the doe alone. The considerable increase in food consumption until weaning is mainly due to the high food intake of the kits. It is of particular

interest to note, that food consumption of the does shortly after weaning was not reduced to maintenance requirements but remained rather high.

Table 3. Mean daily food intake (g) of does [1,2] as influenced by weaning age

Control period (days after kindling)		Weaning age (days) 25	28	31	35	
1 - 21		403[a]	420[a]	403[a]	429[a]	Pre-
22 - 25		536[a]	517[a]	572[a]	549[a]	weaning[1]
26 - 28	Post-	443[a]	698[b]	672[b]	699[b]	
29 - 31	weaning[2]	308[a]	421[b]	703[c]	752[c]	
32 - 35		248[ab]	230[a]	303[b]	794[c]	
36 - 39		209[a]	221[a]	246[a]	364[b]	
40 - 43		201[a]	214[ab]	208[ab]	231[b]	

[1] Pre-weaning: combined food intake of doe and kits. The food intake of kits was very low until 21 days of age
[2] Post-weaning: food intake of doe only

[a,b,c] Means bearing different letters in the same row are significantly different (P<.05)

Table 4 shows the effect of age at weaning upon daily food consumption and the mean feed conversion of the young rabbits after weaning. Shortly after weaning the food consumption for the different weaning age groups is always lower than for those of the same age but already weaned.

Feed conversion was very close to 1 until 31 days of age, in particular in the early weaning group (25 days). The feed conversion after weaning was remarkably good in spite of the simultaneous depression in growth rate (Table 4).

Table 4. Mean daily food intake (FI) and feed conversion (FC) of the young rabbits as influenced by weaning age

Age of kits (days)	Weaning age (days) 25 FI (g)	25 FC	28 FI (g)	28 FC	31 FI (g)	31 FC	35 FI (g)	35 FC
26-28	25.9	1.10	-	-	-	-	-	-
29-31	43.8	1.24[a]	38.5	1.14[b]	-	-	-	-
32-35	58.8	1.68[a]	49.6	1.61[b]	51.7	1.47[c]	-	-
36-39	81.0	1.83[a]	83.2	1.86[a]	68.7	1.82[a]	72.1	1.80[a]
40-43	95.9	2.20[a]	93.2	2.15[a]	90.0	2.17[a]	89.4	2.31[b]

FI: Food intake, g; FC: Feed conversion = food consumed by the kits (g)/ weight gain of the kits (g)

[a,b,c] Means for feed conversion bearing different letters in the same row are significantly different (P<.05)

Table 5 combines the results obtained for does and kits. Daily food consumption until 43 days of age per young rabbit was calculated from intake of both does and offspring. Accordingly, feed conversion until 43 days of age also included the food eaten by the doe.

Between 25 and 35 days of age the highest food consumption (does plus kits) was found in the late weaning age groups (28, 31, and 35 days). No further apparent differences between weaning treatments were found. For the entire period (25 to 70 days) mean food consumption per offspring was rather similar for all weaning age groups.

Daily weight gains of the kits were superior in the late weaned groups in the beginning but decreased between 36 and 43 days of age. Thereafter, influences of weaning treatments were very low. Across the total experimental period (25 to 70 days) daily weight gains were similar for all weaning age groups.

For feed conversion, parallel results were found. With increased prolongation of the suckling period the feed conversion first increased (26 and 43 days of age).Early weaned rabbits (25 days)

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Table 5. Mean daily combined food consumption of does and kits, mean daily weight gain (kits) and combined feed conversion (does and kits) as influenced by weaning age

Age of kits (days)		Weaning age (days)			
		25	28	31	35
Daily food consumption per one young rabbit (g)[1]					
25 - 35 (10 days)	DK	82.5	81.5	83.4	87.9
36 - 43 (8 days)	DK	112.7	113.8	105.6	111.1
44 - 56 (13 days)	K	137.7	131.0	127.9	135.2
57 - 70 (14 days)	K	164.3	162.7	154.6	163.8
25 - 70 (45 days)	**DK**	**129.3**	**126.8**	**122.3**	**129.4**
Daily weight gain per one young rabbit (g) (kits)					
26 - 35		32.3	32.9	36.0	40.0
36 - 43		45.1	44.6	39.6	40.0
44 - 56		49.8	48.3	49.4	47.6
57 - 70		43.9	42.6	41.8	44.6
26 - 70		**43.2**	**42.7**	**42.3**	**43.6**
Feed conversion per one young rabbit[2] (food (g)/gain (g))					
26 - 35	DK	2.55	2.48	2.32	2.20
36 - 43	DK	2.50	2.55	2.67	2.78
44 - 56	K	2.77	2.71	2.59	2.84
57 - 70	K	3.74	3.82	3.70	3.67
26 - 70	**DK**	**2.99**	**2.97**	**2.89**	**2.97**

[1] combined food consumption of doe and kits (DK); food consumption of kits only (K)

[2] combined feed conversion of doe and kits (DK); feed conversion of kits only (K)

required 2.55 kg food per kg weight gain between 26 and 35 days, while late weaned kits (35 days) only required 2.20 kg during the same time (with the does' food consumption included). For feed conversion between 36 and 43 days of age, however, ranking of weaning age groups was completely reversed with best performances in the early weaned group (25 days) and worst in the late weaned group (35 days). Between 44 and 70 days of age feed conversion was considerably deteriorated. Differences between weaning age groups, however, were not consistent. The feed conversion calculated for the entire experimental priod (26 to 70 days of age) shows that the choice of weaning age had no significant influence on the total food consumption (combined food intake of does and kits) required for rabbit meat production.

Discussion

The different length of suckling period resulted in differences in live-weight development in the young rabbits which were soon compensated. By day 42 only minor differences in live-weight were found that remained small until slaughter. These results are in agreement with reports by Schlolaut and Lange (1971), Bednarz and Frindt (1978), Chen et al. (1978), Sinkovics et al. (1980) and De Blas et al. (1981). In contrast, higher final live-weights were found in offspring weaned at later ages (Adám et al., 1986).

In the present study results for weaning age group 31 deviated from expectation for several traits (Tables 1-5). This was apparently due to several does randomly assigned to the group with good reproductive performances but retarded growth of offspring. Since 25 offspring were evaluated per doe in each treatment such random maternal effects might strongly bias the results.

With regard to total food consumption (combined food intake of doe and kits) the present results are completely opposite to the prevailing conception (Table 5). Contrary to expectation, feed conversion was deteriorated in the early weaning group (25 days) but not in the groups with extended suckling period. Between 36 and 43 days of age early weaning age groups had improved feed conversions. Shortly after weaning feed conversion was deteriorated for all weaning ages when based on food intake of both does and kits. This is contrary to expectation, since favorable feed conversion ratios were found in kits shortly after weaning (Table 4). The bad feed conversion calculated from the combined food intake of does and kits (Table 5) is due to the high food intake of the lactating females in relation to the prior milk yield. Accordingly, feed conversion after weaning is influenced simultaneously by two effects: (1) decreased weight gain of the kits due to weaning and (2) high food intake of the doe surpassing the maintenance requirement considerably. Although all weaning age groups were equally influenced by both effects, mainly the early weaned kits (25 days) were affected. Apparently, the surplus food intake of the early weaned does (25 days) compares with the increased food consumption required for higher milk production in the later

weaned does, thus levelling differences between treatment groups when the total period (25 to 70 days of age) is considered.

The present results indicate that under a breeding scheme of 42 days the choice of the weaning age is of minor importance with regard to total food consumption required for rabbit meat production. Instead, weaning age can be determined considering other criterias such as space availability in the doe's cage, vitality of the kits or energy balance of the doe.

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