

## THE EFFECT OF TIME OF WEANING ON BODY MASS AND GAIN OF KIDS

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**Abstract:** A group control system experiment was carried out to investigate the effect weaning time of kids on their health status and growth rate achieved up to 6 months of age. The experiment was done on kids obtained from crossbred domestic white x domestic Balkan goats and Alpino bucks. Investigations were done on a total of 120 kids, divided into 4 groups. Kids were weaned at 2 (Group 1), 20 (Group 2), 35 (Group 3), and 60 (Group 4), days. After weaning, kids in Group 1 and Group 2 were fed milk replacer containing 22% protein up to 35 days of age, while Group 3 and Group 4 were fed concentrates and hay. The lowest body weight, both by individual control periods, and at the end of the experiment, was established for kids in Group 2, weaned at 20 days of age. The also had the highest mortality. Highest body weight at this age (180 days) was found in kids in Group 4, weaned at 60 days. Established results permit the conclusion that kids can successfully be weaned as early as 35 days of age, and that weaning at an earlier age should not be done under our conditions, since it is not economically justified.

**Key words:** kids, early weaning, growth rate of kids, mortality

### Introduction

Intensive production of kid meat in countries with developed goat production is becoming more interesting. In addition, systems contributing to resolving the problem of early weaning of kids, i.e. a transition to feeding dry feeds as fast as possible are especially important. Starting from various circumstances, directing breeders to wean early, it is easy to conclude that the need to wean kids at an age at which they can already eat exclusively solid food, which is more simple and cheaper than feeding artificially appears more frequently (*Memiši and Bauman, 2003a*). In connection with this, the question arises relevant to the most appropriate moment to wean kids, keeping their further raising economically justified, including also economic issues, which can be achieved by milking their mothers. In recent decades, much research was done in the world (*Memiši and Bauman, 2003b*;

*Ugur et al., 2004; Fehr, 1991; Nagpal et al., 1995; Ugur et al., 2004; Atasagly et al., 2008*) and indicate that lambs as well as kids can be weaned early and can be successfully raised using concentrate mixtures, produced by the industry.

The moment of weaning is a critical phase for rearing kids, which is accompanied by a decrease or complete stagnation of weight gain. The force and presentation of shock at weaning depend on several factors, especially on the age and body weight of kids at the time of weaning, as well as on their nutrition prior to weaning.

Age at the time of weaning can differ very much. According to preformed research the transition to feeding only dry feed, can be implemented successfully already at 3 weeks of age (*Fehr, 1991*), and the later this is done the halt in weight gain caused by rejection is less pronounced, success in fattening more certain, and transition to feeding dry feeds more simple. In addition to age the body weight of kids at weaning is very important. In an experiment of early weaning of lambs (*Fehr, 1991*) based on body weight as the basic criterion, it was shown that lambs weaned with higher weights (8.5 and 10.0 kg), did not show any halt of growth after weaning, while the weight gain of the lightest lambs (7.0 kg) lagged considerably. Similar conclusions were reached also by other authors (*INRA, 1978; Ugur et al., 2004*).

However, the body weight of kids at weaning is not a sure indicator, because it can be negatively correlated with the development of stomach compartments. In view of the fact that at approximately 3 weeks of age kids are not physiologically capable to use other food but milk (at least not to any greater extent), a decision to feed exclusively dry feed is not recommended before this time. Finally, the feeding regime before weaning kids is also important for the success of early weaning. The higher the consumption of milk before weaning, the more pronounced the halt in growth will be after weaning. For this reason it is a prerequisite to accommodate kids to an additional meal of dry feed (concentrate mixture and hay) before weaning.

Having in mind the above, and in view of the fact that in our country there is not much interest for breeding goats, and that the problem of rearing kids still presents unknown territory under our conditions, in this paper we wished to offer a contribution to illuminating issues in connection with effects of early weaning of kids.

## **Materials and Methods**

Research was done on goat farm "Čoka" which is located in the Čoka municipality. The experiment was done on kids obtained from crossbred domestic white x domestic Balkan goats and Alpino bucks. Investigations were done on a total of 120 kids, divided into 4 groups. Each group contained 30 kids (15 male and

15 female). Kids were weaned at 2 (Group 1), 20 (Group 2), 35 (Group 3), and 60 (Group 4), days. After weaning, kids in Group 1 and Group 2 were fed milk replacer containing 22% protein up to 35 days of age, followed by concentrate mixture and hay, while Group 3 and Group 4 were fed concentrates and hay.

All selected animals were healthy, vital, and in good condition. When experimental groups were formed, an attempt was made, as far as possible, for the kids to be uniform relevant to body weight, sex and age. Before the beginning of the experiment measures of prevention were undertaken, and during the experiment itself the health status of experimental kids was monitored on a daily basis. In addition to feeding milk replacer, kids in Groups 1 and 2 were fed a concentrate mixture (prepared on the farm) with a standard chemical composition, with 18% protein, and from 60 days of age a switch was made to a mixture with 15% protein. In addition to basic feeding with complete mixes of feeds, kids in all four groups were also fed alfalfa hay. Kids in all groups were fed feed mixtures and hay ad libitum.

Experimental kids were measured individually, at birth, and then on days 30, 60, 90 and 180. Initial and final weights of kids were established by three measurements on three consecutive days. Obtained results were processed by standard statistical analysis, and differences were tested using LSD test.

## Results and Discussion

Data in production results for early weaned kids by individual periods of growth are presented in Table 1. In the initial period of the experiment, body weight of kids between experimental groups was very uniform ( $p < 0.05$ ). After different periods post weaning, already at the age of 30 days, results for trends of body weight and average daily gain for kids show significant differences ( $p < 0.01$ ) between experimental groups. At the same time, body weight at this age was lowest in the group weaned at 20 days of age. At the end of the experimental period, at 180 days of age, obtained differences for body weights of kids are highly statistically significant ( $p < 0.01$ ), Groups I and II compared to Groups III and IV. The lowest body weight, both by individual control periods, and at the end of the experiment, was established for kids in Group 2, weaned at 20 days of age. The also had the highest mortality (13.33%). Highest body weight at this age (180 days) was found in kids in Group 4, weaned at 60 days. Body weight of kids in Group 3, as compared to Group 4, was lower by 1.4 kg on the average, while the average difference between Group 1 and Group 2 was 4.0 kg. Similar values and distributions between experimental groups were established also for values of average daily gain, which for the entire control period was the highest in Group IV (133 g), and the lowest in Group II (107 g), with statistical significance ( $p < 0.01$ ).

Results of this research show that early weaning of kids caused stress accompanied by lower weight gain established in Group 1, Group 2, and partially in Group 3 during the first few days after weaning. The kids manifested this transition by pronounced anxiety during the first few days after weaning, i.e. transition to feeding milk replacers or exclusively solid foods (Group III). Kids in Group IV did not have any special problems in the post weaning period, which is apparent also from the results for gain established in this group, which were also the highest up to 6 months of age.

During the experiment there were clinical signs of health disorders of kids, with flatulence and diarrhea, present to a somewhat higher level in Groups I and II, so that differences between kids in these two groups were minimal. Although certain measures were undertaken to correct this (antibiotics and symptomatic therapy), during the experiment a certain number of animals died, and mortality was more pronounced in Groups I and II, compared to the other two groups.

**Table 1. Production traits of early weaned kids in different age-periods, kg.**

Factors	Group of trial			
	I	II	III	IV
Body weight at birth	3.14 <sup>a</sup>	3.20 <sup>a</sup>	3.18 <sup>a</sup>	3.15 <sup>a</sup>
Body weight at 30 days, Average daily gain, (0 – 30 days)	7.42 <sup>b</sup> 0.142	7.15 <sup>a</sup> 0.131	8.25 <sup>c</sup> 0.169	8.07 <sup>c</sup> 0.164
Body weight at 60 days, Average daily gain, (30 – 60 days)	11.17 <sup>b</sup> 0.125	10.87 <sup>a</sup> 0.124	12.03 <sup>c</sup> 0.126	12.39 <sup>c</sup> 0.144
Body weight at 90 days, Average daily gain, (60 – 90 days)	14.23 <sup>a</sup> 0.102	14.14 <sup>a</sup> 0.109	15.69 <sup>b</sup> 0.122	16.02 <sup>c</sup> 0.121
Body weight at 180 days, Average daily gain, (90 – 180 days)	23.23 <sup>a</sup> 0.100	22.60 <sup>a</sup> 0.094	25.68 <sup>b</sup> 0.111	27.09 <sup>c</sup> 0.123
Average daily gain, (0 – 180 days)	0.111 <sup>a</sup>	0.107 <sup>a</sup>	0.125 <sup>b</sup>	0.133 <sup>c</sup>
Total mortality, number of animals	3	4	2	2
0 – 30 days	2	1	1	1
30 – 60 days	1	2	1	-
60 – 90 days	-	1	-	-
90 – 180 days	-	-	-	1
Mortality, %	10.00	13.33	6.66	6.66
Occurrence of diarrhea, %				
0 – 90 days,	22.14	31.16	15.15	13.13
90 – 180 days,	16.41	10.21	8.14	6.64

<sup>a,b,c</sup>. Values in the same row with different letters are significantly different ( $P < 0,01$ )

Mortality was most frequent in periods of the experiment when is individual groups kids were separated from their mothers, and feeding milk replacers began,

which led to a certain depression of feeding, and thus also to the onset of diseases. In kids where diseases were cured growth was usually halted, and was hard to regain in the subsequent period. According to available publications, obtained results for values of body weight by kids obtained from crossbred domestic white x domestic Balkan goats and Alpino bucks, are at the same level as the ones established by researches of *Ugur et al. (2004)*, for kids of Turkish Saanen goat, that were weaned at 45 and 60 days, however, the authors did not establish any statistically significant difference in gain between investigated groups, and they therefore recommend earlier weaning of kids, to enable using more goat milk for the market. Similar results for body weight during individual periods are reported by *Nagpal et al. (1995)* who worked with kids of Sirohi, Marwari and Kutchi breeds and with somewhat later weaning, with 60 and 90 days, with kids subsequently reared in intensive and semi intensive systems. Also, in kids weaned at 55 days, *Atasaglu et al. (2008)* did not establish any significant differences in body weight in experimental groups of kids by individual experimental periods as compared to results of this research.

Results of this research indicate that kids can be weaned early and successfully already at 30 days of age, and that kids before this age should not be separated from their mothers if this is not required, since there were certain health problems (deaths, halt of growth, and diarrhea).

## Conclusion

Obtained results permit the following conclusions:

1. The lowest body weight, both by individual control periods, and at the end of the experiment, was established for kids in Group 2, weaned at 20 days of age. The also had the highest mortality (13,33%). Highest body weight at this age (180 days) was found in kids in Group 4, weaned at 60 days. Body weight of kids in Group 3, as compared to Group 4, was lower by 1,4 kg on the average, while the average difference between Group 1 and Group 2 was 4,0 kg.

2. Mortality was more pronounced in kids in Group 1 and Group 2, as compared to the other two groups, and was most frequent during the period when experimental groups were separated from their mothers and feeding with milk replacers initiated.

## Značaj vremena zalučivanja na telesnu masu i prirast jaradi

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## Rezime

Izveden je ogled po grupno-kontrolnom sistemu u cilju ispitivanja uticaja vremena odlučivanja jaradi na njihovo zdravstveno stanje kao i ostvarene priraste do uzrasta od 6 meseci. Za ogled su korišćena jarad dobijena ukrštanjem koza

meleza domaće bele x domaća balkanska sa jarčevima alpino rase. Ispitivanja su izvedena na ukupno 120 jaradi, podeljenih u 4 grupe. Jarad su odlučivana u uzrastu od 2 (I grupa), 20 (II grupa), 35 (III grupa) i 60 (IV grupa) dana života. Posle odlučivanja jarad I, i II grupe su napajana zamenama za mleko sa 22% proteina do uzrasta od 35 dana, dok su 3 i 4 grupa jaradi posle odlučivanja hranjena koncentratom i senom. Najnižu telesnu masu, kako po pojedinim kontrolnim periodima tako i na kraju ogleđa, imala su jarad II grupe koja su odlučena sa 20 dana starosti. Kod njih je istovremeno zabeležen i najveći mortalitet. Telesna masa u ovoj starosti (sa 180 dana) najveća je u jaradi IV grupe koja su odlučena u uzrastu od 60 dana.

Rezultati ovih istraživanja pokazuju da je rano odlučivanje jaradi izazvalo stres praćen nižim prirastom koji je evidentiran kod prve dve grupe jaradi (a delimično i treće grupe) u prvih nekoliko dana posle odlučivanja. Kod jaradi četvrte grupe nije bilo nekih posebnih problema u periodu posle odlučivanja, što je potvrđeno i rezultatima samih prirasta koji su u ovoj grupi bili najviši sve do uzrasta jaradi od 6 meseci. Mortalitet je bio izraženiji kod jaradi I i II grupe, u odnosu na druge dve, i to najčešće u periodima kada je kod oglednih grupa dolazilo do odvajanja od majki i početka napajanja zamenama za mleko.

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