KRMIVA

THE INFLUENCE OF PROTEIN SUPPLY OF LACTATING DOES ON REARING PARAMETERS OF YOUNG RABBITS

UTJECAJ OPSKRBE BJELANČEVINAMA ŽENKI DOJILJA KUNIĆA NA PARAMETRE UZGOJA MLADIH KUNIĆA

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ABSTRACT

Protein or amino acid requirements in lactating rabbit does are not exactly known. A uniform complete feed mixture containing app. 16% of crude protein (CP) for all categories of rabbits is usually used. To achieve intense production, high feed intake of lactating doe has to be assured. During the lactation peak the ability to consume enough feed is certainly a limiting factor for milk production as well as for the growth of the young. In the selection rabbit center the data of 749 weaning New Zealand White and Californian rabbits from the first quarters of years 1990 and 1994 were compared. In 1990 standard feed mixture (Kun/stand) for all the categories of rabbits (17% CP) was fed. In 1992 a special feeding program for lactating does and weaning rabbits was introduced. Production of special supplementary feed mixture Kun/lakt (23% CP) started. A mixture of about one third of Kun/lakt and two thirds of standard complete feed mixture (Kun/stand) was fed from the second week of lactation period to weaning. Lactating does were fed ad lib.. Weanlings were fed about 60 g of this mixture (1/3 Kun/lakt + 2/3 Kun/stand) 5 days after weaning. After 5 days of adjustment period rabbits were given *ad lib* standard feed (Kun/stand). Rearing parameters (live weight of the young, weight gain before and after weaning) showed a significant improvement. Preliminary results show that nutritional program of lactating does and weanlings, basing on better protein supply, is very successful.

INTRODUCTION

Protein or amino acid requirements in rabbits in specific production periods (early growth, lactation, production of angora wool, etc.) are not exactly known. Based on available literature, protein requirements for lactating does are equal to app. 17% of crude proteins (CP) in complete feed mixture, when does are feed *ad libitum* (Nutrient ... rabbits, 1977; Schlolaut, 1982). In most of the rabbitries a uniform feed mixture for all categories of rabbits is usually used, therefore protein content in feed has to be appropriate for all production phases (in most cases such complete feed mixture contains about 16% of CP).

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Production of lactating does with offspring is outstanding. It produces app. 300 g of milk per day. According to Schlolaut (1982) the content of dry matter, protein and fat is higher than in cow's milk (30 - 45%, 12-18%, 14-23%, respectively). To achieve such production, high feed intake of lactating doe has to be assured. During the lactation peak the ability to consume enough feed is certainly a limiting factor for milk production, for the growth of the young, as well as for condition index of the does.

Feed intake is increasing with age and does not reach the optimum before the fourth litter (Maertens, 1995). Increasing energy and protein concentrations in feed is not enough to meet all the requirements of lactating does. The quality of proteins is of particular importance.

According to Patridge and Allan (1982, cit. by Cheeke, 1987) higher content of CP in feed (20.1% of CP instead of 13.5%) increased milk production in 28 days long lactating period from 3.89 kg to 5.27. Quantity of milk in lactation period is of great importance for offspring growth. The young increase their birth weight tenfold to weaning, mainly on the basis of milk. Preweaning mortality decreased as well as mortality after weaning, because weanlings were heavier and had fewer difficulties connected to stress at weaning. Morisse (1986) found 2.5 times higher mortality in rabbits, weighing 500 g at weaning, than in those weighing 800 g; the latter ones retained their advantage during the whole trial period.

Messager (1993). used feed with 20.5% of CP for the young before weaning and later found an increased growth and lower mortality. Feed with an increased content of high quality proteins in the most similar to doe's milk. Consequently, the nutritional stress at weaning is greatly diminished.

MATERIAL AND METHODS

In the Slovene selection center for rabbits located at Zootechnical Department, Biotechnical Faculty, University of Ljubljana, the data of 749 weaning New Zealand White and Californian rabbits from the first quarter of years 1990 and 1995 were processed.

In 1990, complete feed mixture Kun/stand with 17% of CP (Table 1) was fed during all production phases. Lactating does were fed *ad lib*. The young were weaned at the age of 32 days. In the first week after weaning, rabbits were given about 60 g of Kun/stand per day and were later (from 40 days to 75 days of age) fed *ad libitum*.

Table 1. Declaration of standard feed mixture Kun/stand for all categories of rabbits

Tablica 1: Prikaz standardne krmne smjese Kun/stand za sve kategorije kunića

KUN/STAND Complete feed mixture for all categories of rabbits Potpuna krmna smjesa za sve kategorije kunića			
Nutrients (g/kg of feed): - Hranjive tvari (g/kg hrane)			
Crude protein - Sirove bjelančevine	min 170	Ca	5.0
Crude fibre - Sirova vlaknina	min 140	P	4.4
Crude ash - Sirovi pepeo	max 70	Na	2.2
Components - Sastojci:			
Dehydrated alfalfa meal, cereals, byproducts of mill, oil and sugar industry, binder, charcoal, antimicotic, mineral and vitamin mix. Dehidrirana lucerna, žitarice, nusproizvodi mlinarske, uljne i šećerne industrije, vezivo, drveni ugljen, antimikotici, mješavina minerala i vitamina			

Table 2. Declaration of supplementary feed mixture Kun/lakt for lactating does and weaned rabbits
Tablica 2. Prikaz dodatne krmne smjese Kun/lakt za ženke dojilje i odbite kuniće

KUN/LAKT Supplementary feed mixture for lactation does and weaned rabbits Dodatna krmna smjesa za ženke dojilje i odbite kuniće			
NUTRIENTS (g/kg of feed): - Hranjive tvari (g/kg hrane)			
Crude protein - Sirove bjelančevine	min 230	Ca	9.2
Crude fibre - Sirova vlaknina	min 130	P	4.6
Crude ash. - Sirovi pepeo	max 70	Na	2.3
Components - Sastojci:			
Dehydrated alfalfa meal, cereals, milk substitute, brewery yeast, fish meal, soya oil, byproducts of mill, oil and sugar industry, binder, charcoal, antimicotic, farmatan, mineral and vitamin mix. Dehidrirana lucerna, žitarice, nadomjestak mlijeka, pivski kvasac, riblje brašno, sojino ulje, nusproizvodi mlinarske, uljne i šećerne industrije, vezivo, drveni ugljen, antimikotik, farmatan, mješavine minerala i vitamina			

In 1992, production of a special feed mixture Kun/lakt (Table 2) with 23% of high quality proteins (partly of animal origin) and 11.2 MJ of digestible energy started. A mixture of app. one third of Kun/lakt and two thirds of standard complete feed mixture (Kun/stand) was fed from the second week of lactation period to weaning. The ration between Kun/stand and Kun/lakt was adjusted to the litter size and condition index of does. Does with great litters (10 and more) were fed with more concentrated mixture (to 2/3 of Kun/lakt + 1/3 Kun/stand). This way 19% - 21% of CP was assured in mixture. Lactating does were fed ad lib... A standard mixture Kun/stand (as in 1990) was fed before as well as after the period during which the mentioned mixture was used. Switching the diets in both, does and weanlings, represents a very vulnerable period during which a special care is needed.

Weanlings were fed about 60 g of this mixture (one third of Kun/lakt + two thirds of Kun/stand) 5 days after weaning. During the next 5 days of adjustment period, rabbits were given *ad lib.* standard feed (Kun/stand).

Production parameters from the first quarter of the year 1994 were compared with the same period of 1990, before this feeding program was introduced.

Both feed mixtures were prepared and peleted in Experimental blend unit Homec at Zootechnical Department. The following rearing parameters were established: number of liveborn offspring in litter, number of weaned offspring in litter, live weight at 32^{nd}, 42^{nd} and 75^{th} day of life, daily weight gain before and after weaning, mortality before and after weaning.

The date were processed using SAS statistical program on PC computer (SAS/STAT, 1990). Differences between years were tested using F-test. Linear regression was used to eliminate the influence of litter size on live weight at 32^{nd}, 42^{nd} and 75^{th} day and on weight gain before weaning.

RESULTS - REZULTATI

Results are shown in Figures 1, 2, 3 and 4.

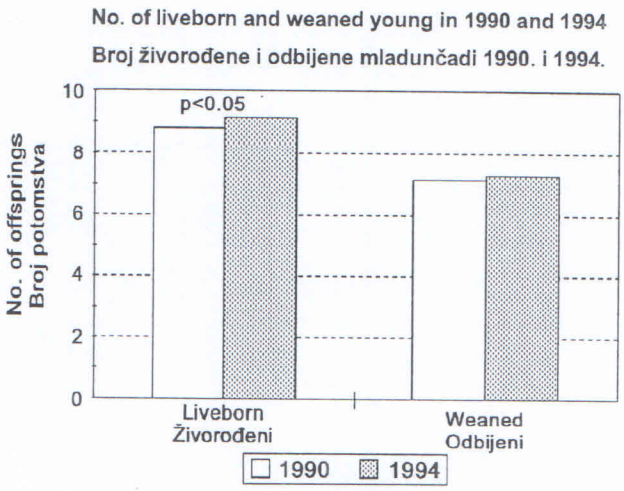

Figure 1: Influence of protein supply on litter size and number of weanwd rabbits (17% CP in 1990; 19% CP in 1994)

Slika 1: Utjecaj opskrbe bjelančevinama na veličinu legla i broj odbijenih kunića

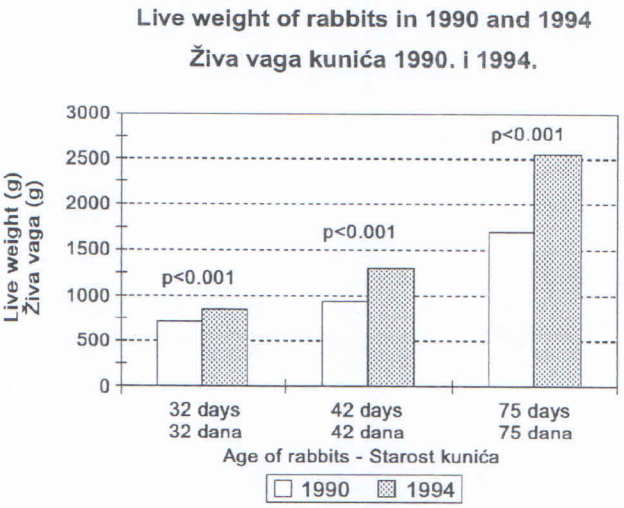

Figure 2:Influence of protein supply on weight of weaned rabbits (17% CP in 1990; 19% CP in 1994)

Slika 2: Utjecaj opskrbe bjelančevinama na težinu odbijenih kunića (17% SB u 1990; 19% SB u 1994.)

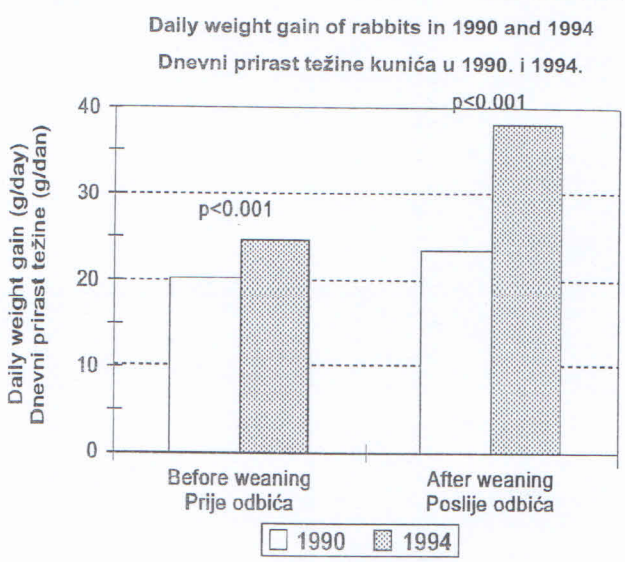

Figure 3: Influence of protein supply on daily weight gain before and after weaning (17% CP in 1990; 19% CP in 1994)

Slika 3: Utjecaj opskrbe bjelančevinama na dnevni prirast težine prije i poslije odbića (17% SB u 1990; 19% SB u 1994.)

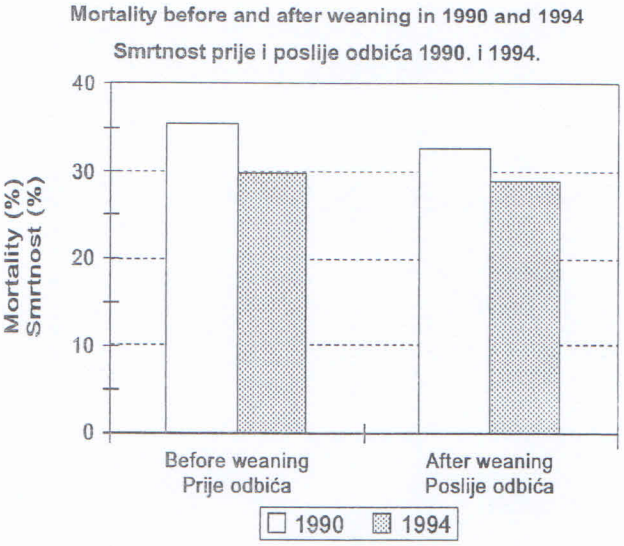

Figure 4: Influence of protein supply on mortality before and after weaning (17% CP in 1990; 19% CP in 1994)

Slika 4: Utjecaj opskrbe bjelančevinama na smrtnost prije i poslije odbića (17% SB u 1990; 19% SB u 1994.)

Differences in live weight and weight gain are highly statistically significant. We can assume that a certain genetic improvement was achieved between years 1990 and 1994, but nevertheless an important improvement of milkiness in does was achieved through better protein supply during location period.

CONCLUSIONS

Preliminary results show, that nutritional program of lactating does, based on better protein supply during lactation peak, is very successful. Live weight of rabbits at weaning and growth after weaning show highly significant improvement in the year 1994, when the supply of does with proteins was better. Mortality before and after weaning did not differ significantly between the two years.

LITERATURE

1. Cheeke, P. R. (1987): Rabbit feeding and nutrition. Orlando, Academic Press, 372 pp
2. Maertens, L. (1995): Energy and nutrient requirements of does and their youngs. In: 9. Arbeitstagung über Haltung und Krankheiten der Kaninchen, Pelztiere und Heimtiere. Celle, 1995-05-10/11 (in print)
3. Messager, B. (1993): Un aliment de prévevrage réservé aux lapereaux. Cuniculture, 20, 110, 77-78.
4. Morisse, J. P. (1986): Pathologie digestive: alimentation et zootechnie. L'eleveur de Lapin, No. 9, Fev-Mar 1986, 51-55
5. Nutrient requirements of rabbits. (1977): Second revised edition. Washington, National Academy of sciences, 30
6. SAS/STAT User's guide. Caryn, North Carolina, SAS Institute inc., 1990
7. Schlolaut, W. (1982): The nutrition of the rabbit. Basel, Roche, Information Service, Animal Nutrition Department, 60

SAŽETAK

Potrebe za bjelančevinama ili amino-kiselinama u ženka dojilja kunića nisu točno poznate. Obično se daje jedinstvena potpuna krmna smjesa što sadrži približno 16% sirovih bjelančevina za sve kategorije kunića. Da bi se postigla intenzivnija proizvodnja valja osigurati bogatu hranidbu ženki dojilja kunića. Na vrhuncu razdoblja dojenja sposobnost konzumiranja dovoljne količine krmne smjese svakako je ograničavajući čimbenik proizvodnje mlijeka kao i rasta mladunčadi. U centru za odabiranje kunića uspoređeni su podaci iz prve četvrti godine 1990. i 1994. za 749 novozelandskih bijelih i kalifornijskih kunića u odbiću. Godine 1990. sve su kategorije kunića hranjene (Kun/stand) standardnom krmnom smjesom (17% sirovih bjelančevina). Godine 1992. uveden je poseban program hranidbe za ženke dojilje i mladunčad u odbiću. Započela je proizvodnja posebne dodatne krmne smjese Kun/lakt (23% sirovih bjelančevina). Od drugog tjedna razdoblja dojenja do odbića davana je oko jedna trećina Kun/lakt krmne smjese i dvije trećine standardne potpune krmne smjese (Kun/stand). Ženke dojilje kunića hranjene su *ad libitum*. Mladunčad u odbiću dobivala je 5 dana po odbiću oko 60 g te krmne smjese (1/3 Kun/lakt + 2/3 Kun/stand). Nakon 5 dana razdoblja prilagodbe kunići su dobivali standardnu krmnu smjesu (Kun/stand) *ad libitum*. Parametri uzgoja (živa vaga mladunčadi, prirast težine prije i poslije odbića) pokazali su značajno poboljšanje. Preliminarni rezultati pokazuju da je program hranidbe ženka dojilja i mladunčadi u odbiću vrlo uspješan.