FEED INTAKE OF REPRODUCTIVE RABBIT DOES OF TWO POPULATIONS RAISED IN ALGERIAN CONDITIONS

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ABSTRACT

The objective of this study was to evaluate feed intake of rabbit does from two populations raised in Algeria (local population does and white population does). Sixty nulliparous rabbit females, 30 of each population, submitted to a semi-intensive reproductive rhythm were controlled over 3 reproductive cycles, at the experimental farm of the University of Tizi-ouzou (Algeria). Feed intake (g/d), digestible energy intake (DE kcal/d), and live weight were measured in pregnant, lactating and pregnant-lactating females. The feed intake and digestible energy intake were significantly higher in white does than in local ones both in pregnant, pregnant-lactating females (+18, +10% respectively, P<0.001) and lactating does (+9%; P = 0.0011). The reproductive cycle had not a significant effect on feed intake but had influenced does live weight at mating. The feed intake sharply decreased for both females during the last week of pregnancy.The live weight was significantly higher for white does than for local ones, whatever the stage of the reproductive cycle (P <0.001).

Keywords: Rabbit does, local, population, feed intake.

INTRODUCTION

In Algeria, two rabbit populations are used for meat production. The rabbits so-called “local” colored, have an adult weight lower than 3kg, and are characterized by high variability in their coat color (Zerrouki *et al*., 2005). The second population of rabbits issued from commercial French hybrid rabbits imported in Algeria in 1985-1986, is characterized by an adult weight of 3.34 kg and is called “white population” because of its albino phenotype (Zerrouki *et al*., 2007). Several studies have investigated reproductive performance of these two populations (Zerrouki *et al.*, 2005; Zerrouki et *al*., 2007; Gacem *et al.*, 2009). Intake capacities of these does were not previously studied, although the feed intake of females is greatly linked to their productivity. Therefore, the aim of this study was to evaluate the feed intake of females from these two populations during the reproductive cycle. Final goal is to develop feeding programs suitable for animals profitable for breeders.

MATERIALS AND METHODS

Rearing conditions

The experiment was carried out at the experimental farm of the University of Tizi-Ouzou (Algeria) between January and May 2005. Females were individually housed in wire cages arranged in flat-deck on one level. Cages were equipped with a hopper for food and an automatic watering system. Lighting was natural.

Animals and management

A total of 60 nulliparous female rabbits, 30 local does and 30 white does were controlled during 3 reproductive cycles. The first mating was held at about 4.7 months of age at an average weight of 2345g for the local does, and 2990 g for the white does. The mating was natural, reproductive rhythm was semi-intensive (theorical kindling-mating interval: 11 days). The diagnosis of pregnancy was made by abdominal palpation 10 days after mating. Weaning took place 28 days after parturition. The rabbits were fed *ad libitum* with a commercial pelleted diet (maize 2.7%, alfalfa 41.6%, hard wheat bran 28%, barley 23%, soybean meal 3.7%, minerals and vitamins premix 1%). The diet contained 88% DM, 2285 kcal DE/kg DM,15% crude protein and 15% crude fiber. The weight of does was recorded at mating, at the 15^{th} day of pregnancy and at kindling, during 3 reproductive cycles. Daily feed intake was controlled weekly from mating to weaning. The physiological status of females was recorded (3 levels: pregnant, lactating, pregnant-lactating). Digestible energy intake was calculated from feed intake and energy content of the diet.

Statistical analysis

For each physiological status (pregnant, lactating and pregnant-lactating does), the daily feed intake (g/d), the digestible energy intake (kcal DE/d), the live weight (g) were studied using an analysis of variance (software STATISTICA6) taking into account the fixed effects of the phenotype (2 levels: local *vs* white), of the reproductive cycle (3 levels: cycle 1, cycle 2, cycle 3) and their interaction.

RESULTS AND DISCUSSION

The population influenced all the parameters studied (Table 1). The feed intake was higher in white does than in local does regardless of the physiological status of females. The difference was particularly high during pregnancy (+18%, $P < 0.001$). Feed intake was 9% higher ($P = 0.0011$) in lactating white does than in local does and 10% higher ($P < 0.001$) in simultaneously pregnant and lactating white females. Such a difference could be explained by the higher body weight of white does compared to local does (Table 1) as previously shown by Zerrouki *et al.* (2008). Moreover Fortun-Lamothe and Bolet (1998) reported a higher feed intake during lactation in large size does than in smaller ones. However, feed intake in pregnant females of both phenotypes was lower than the values recorded by Lebas (1975) in Californian females fed *ad libitum* (140 *vs* 200 to 240 g/d). On the other hand, intake of lactating and pregnant-lactating white does (191g/d and 201g/d, respectively) and local does (175g/d and 183g/d, respectively) remained lower than that reported by Gidenne and Lebas (2005) on French strains lactating does (400g/d). The digestible energy intake varied in the same manner as feed intake. It was significantly higher in white does compared to local does regardless of physiological status. It was respectively 307 kcal/d *vs* 258 kcal/d in pregnant females ($P < 0.001$) and 386 kcal/d *vs* 354 kcal/d ($P = 0.0011$) in lactating white and local does respectively. Simultaneously pregnant and lactating white females ingested 407 kcal/d *vs* 370 kcal /d for local ones ($P < 0.001$). The digestible energy intake in rabbits of both phenotypes, at all physiological stages remains lower than that reported by Fortun and Lebas (1994) on lactating INRA 1067 does fed a diet containing 2400 kcal DE/kg DM (690 kcal/d). A low feed intake and dietary energy content explain this result. Indeed, 2285 kcal/kg DM is below the nutritional recommendations for does submitted to a semi-intensive rhythm (2600kcal DE/kg, Lebas, 2004). In addition, Fortun-Lamothe *et al.* (2005) showed in lactating females that a reduction in a dietary energy content lead to a lower energy intake. Parigi Bini and Xiccato (1993) reported that DE intake was higher for higher energy diets than in the lower energy diet. Reproductive cycle didn't affect does feed intake. Rizzi et *al.* (2008) also showed similar feed intake on the first and the second lactations (310 *vs* 315g/d). As well as, Guillén *et al* (2008), no effect of

parturition order was detected on does feed intake. But Nizza *et al*. (1997) showed higher feed intake in multiparous lactating does than in primiparous ones (115.8 *vs* 111.0 g DM/kg LW $^{0.75}$/d). Reproductive cycle has affected does live weight at mating as previously reported by Zerrouki *et al*.(2005), who showed that local Algerian population does are lighter in the first parity; females having not finished growing. Interaction population*reproductive cycle was not significant on any variables. The feed pattern of both types of does during the reproductive cycle (Figure 1) was comparable to that described by Gidenne and Lebas (2005). It was characterized by a sharp decline during the last week of pregnancy and an increase during lactation and gestation-lactation.

Table 1: Mean daily feed intake, digestible energy intake, does live weight according population and reproductive cycle (mean ± standard error).

	No does	Daily feed intake(g/d)	DE intake (kcal/d)	Does live weight (g)		
				at mating	at 15th day of pregnancy	at kindling
Population		***	***	***	***	***
Local	*30*	-	-	2451±284	2679±227	2508±235
Pregnant does		128±30	258±60	-	-	-
Lactating does		175±43	354±86	-	-	-
Pregnant lactating doses		183±36	370±74	-	-	-
White	*30*	-	-	3301±413	3434±416	3377±393
Pregnant does		152±26	307±52	-	-	-
Lactating does		191±41	386±84	-	-	-
Pregnant lactating does		201±43	407±87	-	-	-
Reproductive cycle		NS	NS	***	NS	NS
Cycle 1	*30*	170±45	343±91	2638±497[a]	3020±484	2880±533
Cycle 2	*30*	176±44	356±89	2916±509[b]	3088±465	3023±530
Cycle 3	*30*	170±44	344±89	3074±570[b]	3260±554	3110±558
Population*cycle		NS	NS	NS	NS	NS

Means with different letters (a,b) are significantly different (P<0.05).

Live weight was higher in white rabbits than in local rabbits (P<0.001) at mating (3301g *vs* 2451g), at the 15th day of gestation (3434g *vs* 2679g) and at kindling (3377g *vs* 2508g). This difference could be explained by the difference in size of both types of rabbits since adult weight was lower in local rabbits (2890g) compared to white rabbits (3340g; Zerrouki *et al*., 2001 & 2007).

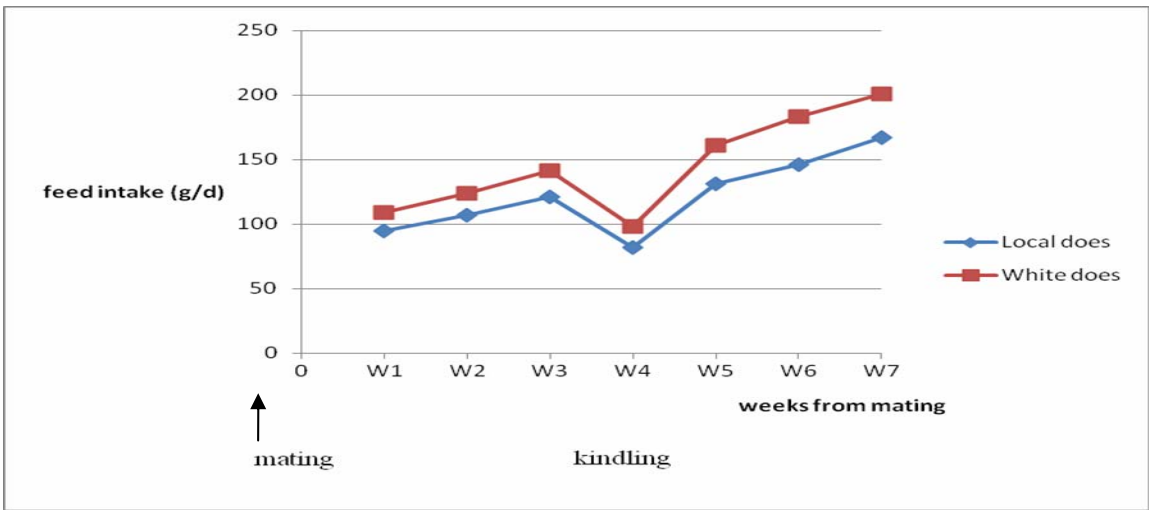

Figure 1: Evolution of feed intake of the white does and the local does during the reproductive cycle

CONCLUSION

Our data evidenced that the two populations of rabbits raised in Algeria have different intake capacity in relation with different live weight. Furthermore feed intake and live weight of does greatly vary during the reproductive cycle, in both rabbit populations. It would be interesting to study the body composition and reproductive performance of females, to propose feeding programs better adapted to each population, by taking into account their needs at all physiological stages.

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