



Evaluation of Dietary Fiber Content (NDF) on the Zoo Technical Performances of Local Rabbits Does and Young Rabbits in Benin

SOULADJOU ALASSANE^{1,2*}, MAHAMADOU DAHOUDA^{1,2}, IGNACE DOTCHÉ², SERGE AHOUNOU², JEAN-PAUL DEHOUX⁴, ISSAKA YOUSAO ABDOU KARIM², JEAN-LUC HORNICK³

¹University of Abomey-Calavi, Faculty of Agronomic Sciences, Department of Animal Production, 01BP: 526, Cotonou, Republic of Benin; ²University of Abomey-Calavi, Laboratory of Animal Biotechnology and Meat Technology (LBATV), Polytechnic School of Abomey-Calavi, Benin; ³Department of Veterinary Management of Animal Resources (DRA), Faculty of Veterinary Medicine, University of Liège, Vallée 2, Avenue de Cureghem, B-4000 Liège, Belgium; ⁴Animal House Facility Unit, Faculty of Medicine, Catholic University of Louvain, 55/70, Avenue Hippocrate, Brussels, Belgium.

Abstract | This study aimed to investigate the effects of dietary Neutral Detergent Fiber (NDF) level on the reproductive performance of local rabbit does in Benin. Twenty-four nulliparous does, average body weight 2505.3 ± 21.8 g, were evenly distributed into four groups. Each group was randomly assigned to one of four treatments with linear increase level of fiber: Diets A (lowest fiber content) and B (highest fiber content) were used to formulate two intermediate fiber level diets: Ab (composed of 70% A and 30% B) and Ba (composed of 70% B and 30% A). Feed intake significantly varied ($P < 0.05$) among the diets provided to the reproductive does. Diet B was consumed the most compared to the others. None of the dietary regimens had a significant effect ($P > 0.05$) on overall litter size (total born, at birth, and at 21 days of age). However, the lowest rates of stillborn kits (2.33%) and the lowest birth-to-weaning mortality rate (14%) were observed in does feed with the diet Ba, ($P < 0.05$). This diet provided also the best growth performance of kits under the doe (average weight at 21 days of age and at weaning, and average daily gain). This study proved that the diet with the intermediate high level of fibers could lead to improved reproductive performance in breeding does.

Keywords | Rabbit does, Dietary fiber, Local breed, Benin

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***Correspondence** | Souladjou Alassane, University of Abomey-Calavi, Faculty of Agronomic Sciences, Department of Animal Production, 01BP: 526, Cotonou, Republic of Benin; **Email:** alsourath@gmail.com

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INTRODUCTION

Rabbit farming holds a significant position in the agricultural sector in Benin, contributing not only to food security but also to income generation for many rab-

bit breeders (Tiemoko *et al.*, 2018). Despite its socio-economic importance, the development of rabbit production in tropical African regions remains constrained by several challenges, among which reproductive inefficiency is prominent. While many studies have investigated optimal fiber

levels in rabbit diets, most have been conducted under temperate conditions. However, in tropical African regions, including Benin, limited research exists on how dietary fiber influences reproductive performance in local rabbit breeds raised under hot and humid conditions. This gap hinders the development of context-specific feeding strategies aimed at improving productivity in smallholder systems.

Thus, promoting efficient rabbit reproduction is crucial for enhancing productivity. However, improving reproductive performance is linked to several factors, among which nutrition plays a crucial role. Nutrition is central to enhancing rabbit reproductive performance as it influences biological processes such as growth, reproductive health, conception and embryo development (De Blas, 2013; Martínez-Paredes *et al.*, 2012) and milk production (Delgado *et al.*, 2018). The quality of the diet can significantly impact reproductive performance in does (De Blas, 2013). A balanced diet rich in essential nutrients (proteins, fibers fermentation products, lipids, vitamins, and minerals) contributes to improve production and reproductive performance (Combes *et al.*, 2013; Fortun-Lamothe, 2006; Fortun-Lamothe and Gidenne, 2003; Gidenne *et al.*, 2020; Gidenne *et al.*, 2015). An optimal diet can also help mitigating physiological stress in rabbits (El-Gindy *et al.*, 2023; Liu *et al.*, 2019), promoting an optimal reproductive environment (El-Ratel *et al.*, 2021), as stress can negatively affect reproductive hormone production in rabbits, leading to fertility issues and embryonic development disorders (Castellini *et al.*, 2010; El-Kholy *et al.*, 2021; Mutwedu *et al.*, 2021). Additionally, best nutrition, especially energy-rich diets, is necessary to support reproduction through adequate energy reserves (Martínez-Paredes *et al.*, 2012), essential for fetal growth, postpartum recovery, and female milk composition (Morsy *et al.*, 2020; Saidj *et al.*, 2021). The quality of the female's milk is essential for the survival and growth of kits (Song *et al.*, 2024). About milk quality, research by Morsy *et al.* (2020) has shown that a high-fiber diet can support lactation by providing an added energy source through bacterial fermentation of dietary fibers. However, improving the fiber content in rabbit diets is essential to have positive implications for intestinal transit regulation and reproductive performance (De Blas, 2013; Delgado *et al.*, 2018; Nicodemus *et al.*, 2010). Indeed, regular intestinal transit can affect overall health by promoting optimal digestive health in rabbits (Gidenne, 2013; Gidenne, *et al.*, 2020). However, the nature of dietary fibers must be considered in determining fiber levels in diets due to their impacts on intestinal microflora composition, which is essential for better nutrient absorption, favorable to improving reproductive performance (Cronin *et al.*, 2021; De Blas, 2013; Farías-Kovac *et al.*, 2020). Adjusting the fiber content in rabbit diets should be done carefully, considering their specific nutritional needs and reproductive stage. Given the significant variability of raw materials and fiber sources in

rabbit diets, further research in this regard is essential, especially in tropical African regions. Therefore, it becomes necessary to evaluate the impact of dietary fiber on reproductive performance under local farming conditions, especially in indigenous breeds. A better understanding of this relationship may lead to tailored feeding strategies that improve productivity and animal welfare.

In this context, this study aims to explore the effects of diet composition on the reproductive performance of local rabbit breeds in Benin by closely examining the interaction between dietary fiber content and reproductive performance. It could lead to formulating recommendations tailored to the specific needs of this breed, thus contributing to optimizing breeding practices in the context of rabbit farming in Benin. Thus, this research aligns with a comprehensive perspective of improving agricultural practices, seeking to provide tangible contributions to the sustainability and profitability of rabbit farming in Benin.

MATERIALS AND METHODS

EXPERIMENTAL SITE

The study was conducted at the Rabbit Research and Information Center (CeCURI) located on the campus of Abomey-Calavi. This center consists of two breeding buildings, each measuring 210 m² with a height of 3.5 m, with brick walls and roofs covered with corrugated tile lanterns. Ventilation is ensured by a lengthwise opening at the roof's peak as well as by sufficient and varied air inlets found in the middle and lower parts of the building. Each building contains four batteries of galvanized metal cages arranged in a flat-deck configuration above a pit approximately 1 m deep. Electrical lighting installed in the buildings allows for extending the lighting duration as needed.

ANIMALS, EXPERIMENTAL DESIGN AND DIETS

To assess reproductive performance, the experiment was conducted on twenty-four nulliparous does of local breeds. (The term "Local breed" refers to domesticated rabbits commonly raised in Benin that have not yet been subject to formal phenotypic characterization or breed standardization. These rabbits represent a heterogeneous population with mixed genetic backgrounds that have adapted to local conditions over generations. In Beninese rabbit farming systems, these animals are collectively referred to as 'local breed' due to the current impossibility of assigning them to specific, standardized breed classifications). The does were randomly distributed into four groups, with each group consisting of six rabbits. Each group of does was identifiable by the type of diet distributed two weeks before mating. Feed was provided daily, on an *ad libitum* basis. Two weeks prior to the start of the experiment, the does were individually housed and underwent a dietary transition to avoid any imbalance related to changes in feed or housing.

To ensure that each doe consumed her feed adequately, the amount of feed ingested by each doe was rigorously monitored from mating to litter weaning. The initial weight of each doe was recorded before the start of the experiment. The average weight of the animals was 2505.3 ± 21.8 g. Mating of a doe was performed upon detection of heat, and the presence or absence of gestation was confirmed by transrectal palpation fourteen days after mating. Dates of parturition, number of kits per litter, litter weight at birth, at 21 days, and at weaning, number of stillborn kits, and number of deaths from birth to weaning were recorded.

Four experimental diets (Table 1) were formulated using two base diets: Diet A (low-fiber, LF) and Diet B (high-fiber, HF). Two intermediate diets were obtained by blending these base diets in different proportions: Diet Ab (70% Diet A and 30% Diet B) and Diet Ba (30% Diet A and 70% Diet B) (Figure 1).

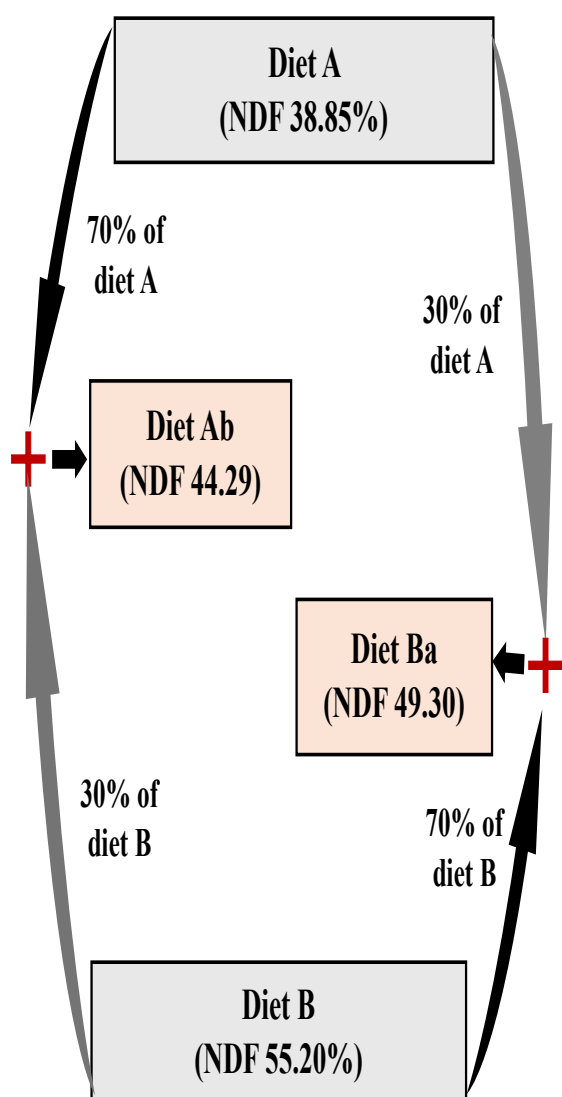


Figure 1: Schematic diagram of experimental diets formulation by blending base diets A and B to create intermediate diets (Ab and Ba) with Graduated Neutral Detergent Fiber (NDF) levels.

Table 1: Ingredients and chemical composition of the different diets.

Ingredients (% of complet diet)	A	Ab	Ba	B
Corn grain (INRA 82)	18	15	11	8
Wheat bran	13	12.7	12.3	12
Corn bran (INRA 122)	14	13.4	12.6	12
Whole roasted soybean	17	13.1	7.9	4
Cottonseed meal	13	11.5	9.5	8
Rice bran	2	3.5	5.5	7
Palm kernel meal	6	9	13	16
Soybean meal	0	2.4	5.6	8
Panicum maximum 'C1'	15	17.4	20.6	23
Oyster shells	1	1	1	1
Salt (NaCl)	0.5	0.5	0.5	0.5
Lysine	0.3	0.3	0.3	0.3
Methionine	0.2	0.2	0.2	0.2
Chemical composition				
Dry matter (DM)	91.48	90.1	92.66	93.9
Crude protein (CP. % DM)	17.15	17.11	17.07	16.9
Neutral detergent fiber (NDF)	38.85	44.29	49.3	55.2
Acid detergent fiber (ADF)	20.38	21.49	25.63	28.8
Gross energy, (MJ/kg DM)	17.42	17.33	17.19	17.1

INRA 82 and INRA 122: French nutritional standards for rabbit diets established by the National Institute for Agricultural Research (INRA). INRA 82 refers to the 1982 edition for growing rabbits; INRA 122 is the 2020 update including reproductive does. Panicum maximum "C1" (improved cultivar developed for enhanced forage yield and digestibility) was used as the main roughage source in the diets.

This gradient in fiber content allowed for assessing the impact of dietary fiber levels on does rabbit reproductive performance.

EVALUATION OF REPRODUCTIVE PARAMETERS

The recorded data allowed for the calculation of several reproductive parameters in local breed does in Benin. The assessment of results enabled the nutritional potential of each type of diet to be evaluated on the reproductive performance of common breed rabbits in Benin.

- Number of live births per parturition (LB); Number of stillborn per parturition (Stb)
- Total number of births per parturition (TB) = $LB + Stb$
- Birth – to – weaning mortality rate = $\frac{\text{Number of deaths birth – to – weaning}}{\text{Total Number of live births}} \times 100$
- Weight of the Litter at Birth = $\Sigma (\text{Weight of all kits live births})$
- Live Weight = $\frac{\text{Weight of the Litter at Birth}}{\text{Total Number of Live Births}} \times 100$
- Feed Intake of Pregnant Does from Gestation to Weaning of

$$\text{Kits (IngAFem)} = \frac{\text{Quantity of feed served} - \text{Quantity refused}}{\text{Total number of kits alive at weaning}} \times 100$$
$$\text{Survival Rate} = \frac{\text{Total number of kits alive at weaning}}{\text{Total number of live births}} \times 100$$
$$\text{Stillbirth Rate} = \frac{\text{Total number of stillborn kits}}{\text{Total number of births}} \times 100$$

STATISTICAL ANALYSES

The collected data were analyzed using SAS 9.4 software. The parameters considered in data processing were feed intake of does, total number of births, number of live births or litter size at birth, number of stillbirths, stillbirth rate, birth-to-weaning mortality rate, average litter weight at birth, at 21 days of age, and at weaning at 35 days of age, average daily weight gain of kits. The *Proc GLM* procedure was used for analysis of variance, and Fisher's LSD (Least Significant Difference) test determined the significance of the effect of diet type on doe feed intake and kit growth. Due to the nature of the data (count data, rates, or ratios), the *Proc glimmix* procedure of SAS was used to calculate means of live births, stillbirths, and total births, mortality rates, and viability rates. These means were compared using Student's t-test for means and Z-test for percentages.

RESULTS

FEED INTAKE OF DOES

The effect of dietary fiber (NDF) content on feed intake in does is shown in Table 2. Feed intake was similar across diets in Week 1 and Week 4 ($P > 0.05$) but significantly influenced from Week 2 onward ($P < 0.05$). Does fed the high-fiber diets (Ba and B) had higher intake, particularly in late gestation and lactation (Figure 2) (Weeks 7–9, $P < 0.01$). Over the entire cycle, total feed intake increased with fiber content, with diet B showing the highest intake and diet Ab the lowest ($P = 0.010$). This suggests that higher fiber levels enhance feed consumption in reproductive does.

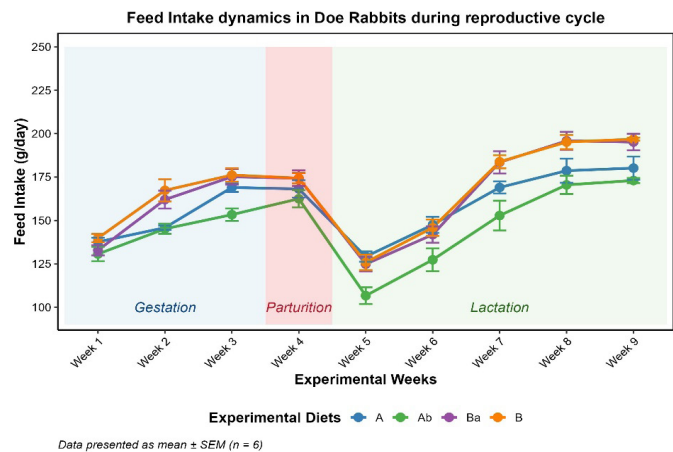


Figure 2: Feed intake dynamics during reproductive periods (gestation, parturition, and lactation) in rabbit doe

REPRODUCTIVE PERFORMANCE OF DOES

The effect of dietary fiber (NDF) content on reproductive

performance is presented in Table 3. No significant differences were observed in doe body weight, total born kits, litter size at birth, or litter size at weaning across diets ($P > 0.05$). However, birth-to-weaning mortality rate was significantly higher in does feed diet B (30.50%) compared to other groups ($P = 0.001$). Similarly, the stillbirth rate was significantly lower in diet Ba compared to Diet Ab and B ($P = 0.002$). These results suggest that while fiber content had insignificant effect on litter size, excessive fiber intake may negatively affect kit survival.

Table 2: Effect of increased dietary fiber (NDF) content on feed intake during reproductive cycle (gestation, parturition, lactation) in does rabbits.

Reproductive cycle	Diets holding variable levels of NDF					
	A	Ab	Ba	B	SE	p-Value
Week1	137.7 ^a	130.7 ^a	132.8 ^a	139.8 ^a	1.39	0.142
Week2	145.8 ^b	145.2 ^b	162.0 ^{ab}	167.3 ^a	2.00	0.003
Week3	169.0 ^{ab}	153.3 ^b	175.2 ^a	176.2 ^a	1.68	0.001
Week4	168.2 ^a	162.5 ^a	174.3 ^a	174.3 ^a	2.02	0.258
Week5	129.3 ^a	106.7 ^b	124.9 ^{ab}	125.8 ^{ab}	1.90	0.005
Week6	147.5 ^a	127.3 ^b	141.8 ^{ab}	145.3 ^{ab}	2.39	0.006
Week7	169.0 ^a	152.7 ^b	183.5 ^a	183.8 ^a	2.70	0.004
Week8	178.7 ^b	170.5 ^b	195.8 ^a	195.2 ^a	2.50	0.008
Week9	180.2 ^{ab}	173.0 ^b	195.2 ^a	196.8 ^a	1.91	0.001
Global feed intake	158.4 ^b	146.9 ^c	165.1 ^{ab}	167.2 ^a	3.15	0.010

Note: Means within the same row (or column) followed by different superscript letters differ significantly at $P < 0.05$, according to Fisher's LSD test. Means sharing the same letter are not significantly different.

Table 3: Effect of increased dietary fiber content on reproduction performance (litter size, stillborn, kits mortality) of does rabbits.

Parameters	Diets containing variable levels of NDF					
	A (n=6)	Ab (n=6)	Ba (n=6)	B (n=6)	SE	p-value
Average weight of does (g)	2500 ^a	2505 ^a	2499 ^a	2514 ^a	20.43	0.986
Total born kits	7.00 ^a	5.50 ^a	6.17 ^a	7.17 ^a	1.03	0.792
Litter size at birth	6.67 ^a	5.00 ^a	6.00 ^a	6.67 ^a	1.00	0.765
Litter size at 21 days	5.83 ^a	4.17 ^a	5.50 ^a	5.33 ^a	0.92	0.679
Litter size at weaning	5.67 ^a	4.17 ^a	5.17 ^a	4.67 ^a	0.89	0.663
Birth-to-weaning mortality rate	16.17 ^b	17.00 ^b	14.0 ^b	30.50 ^a	1.89	0.001
Stillbirth rate	5.50 ^a	8.50 ^a	2.33 ^c	8.17 ^a	0.97	0.002

Note: Means within the same row (or column) followed by different superscript letters differ significantly at $P < 0.05$. Means sharing the same letter are not significantly different.

POSTNATAL GROWTH OF KITS (LIVE WEIGHT, AVERAGE DAILY GAIN)

Effects of diets with varying fiber content on kit growth are presented in Table 4. At birth, kits from does fed Diet Ab had the highest weight (55.8 g), significantly greater than those from Diet A (48.0 g, $P < 0.001$). Kits from Diet Ba (54.75 g) also showed a higher birth weight than those from Diet A but were not significantly different from Diet B (50.1 g).

Table 4: Effects of diets containing varying dietary fiber content offered to does, on live weight of the kits.

Kits live weight	Diets containing variable levels of NDF				SE	p-value
	A n= 32	Ab n= 32	Ba n= 32	B n= 32		
Live weight at birth (g)	48.0c	55.8a	54.75ab	50.1bc	0.59	0.000
Live weight at 7 days(g)	90.0b	105.9ab	113.6a	104.8ab	2.00	0.009
Live weight at 14 days (g)	171.3a	192.8a	203.8a	178.8a	4.31	0.171
Live weight at 21 days (g)	254.4b	272.5ab	312.4a	293.8ab	5.62	0.050
Live weight at 28 days (g)	405.2a	407.1a	441.3a	439.2a	7.08	0.226
Live weight at weaning (g)	583.4b	609.5ab	679.8a	617.5ab	9.00	0.015

Note: Means within the same row (or column) followed by different superscript letters differ significantly at $p < 0.05$, according to Fisher's LSD test. Means sharing the same letter are not significantly different.

Table 5: Influence of does dietary fiber on pre-weaning average daily gain (ADG g/day) dynamics of kits.

ADG variation by age of kits	A	Ab	Ba	B	SE	p-value
ADG at 7days old	6.0b	7.2ab	8.4a	7.8ab	0.25	0.041
ADG at 14days old	11.6a	12.1a	12.6a	10.6a	0.41	0.524
ADG at 21days old	11.9b	11.4b	14.6ab	16.1a	0.38	0.001
ADG at 28days old	21.1a	18.3a	19.6a	19.5a	0.57	0.672
ADG at 35(weaning)	25.9b	28.9ab	34.3a	25.7b	0.63	0.000
Global ADG	13.51b ^c	13.92 ^b	15.99 ^a	14.62 ^b	0.33	<.0001

Note: Means within the same row (or column) followed by different superscript letters differ significantly at $p < 0.05$, according to Fisher's LSD test. Means sharing the same letter are not significantly different.

At 8 days, kits from Diet Ba stayed the heaviest (113.6 g), significantly surpassing those from Diet A (90.0 g, $P = 0.009$), while kits from Diet Ab (105.9 g) and Diet B (104.8 g) showed intermediate values. By 21 days, the

highest weight was recorded in kits from Diet Ba (312.4 g), significantly greater than those from diet A (254.4 g, $P = 0.050$), whereas diet Ab (272.5 g) and Diet B (293.8 g) showed no significant differences.

At weaning (35 days), kits from Diet Ba still had the highest weight (679.8 g), significantly exceeding those from Diet A (583.4 g, $P = 0.015$). Kits from Diet Ab (609.5 g) and Diet B (617.5 g) showed intermediate growth, with no significant differences between them.

These results suggest that maternal fiber intake influences early kit growth, with moderate fiber levels (Ba) favoring higher birth and weaning weights, while low-fiber diets (A) may limit early development.

The Table 5 presents the variation in average daily gain (ADG) of kits during the pre-weaning period, when they rely exclusively on maternal milk, and at weaning.

During the milk-dependent phase (0 - 21 days), ADG was significantly higher in kits from Diet B at 21 days (16.1 g/day) compared to those from Diet A (11.9 g/day, $P = 0.001$). No significant differences were observed at 14 days.

At weaning (35 days), ADG was highest in kits from Diet Ba (34.3 g/day), significantly exceeding those from Diet A (25.9 g/day) and Diet B (25.7 g/day, $P < 0.001$). Over the entire period, kits from Diet Ba maintained the highest overall ADG (15.99 g/day, $P < 0.0001$).

These results highlight the influence of maternal fiber intake on kit growth, with Diet Ba supporting best weight gain at weaning.

DISCUSSION

INGESTION OF REPRODUCTIVE DOES

The formulated diets met protein and fiber requirements for rabbit does as recommended by recent guidelines (Martínez-Paredes *et al.*, 2022; Xiccato and Trocino, 2020). Excepted for Diet Ab, the results of this study showed a significant correlation between the dietary fiber content and the feed intake of reproductive does. Diet B, with 55% neutral detergent fiber (NDF), elicited the highest feed intake. This aligns with the satiety hypothesis, where less digestible fibers reduce energy density and stimulate compensatory intake to meet energy demands (Pinheiro and Gidenne, 2024). Additionally, indigestible fibers enhance gastrointestinal motility via mechanoreceptor stimulation (Gidenne *et al.*, 2020), further explaining intake variations.

Feed intake also varied significantly with physiological status, including pregnancy, parturition, and lactation.

Comprised between 150 to 200 g/day during gestation and lactation, does feed intake decreased to 100g/day or less during parturition period. These findings align with those of (Gidenne *et al.*, 2015) who reported similar intake trends across reproductive phases. He reported that does feed intake according to physiological stage could reach 150 to 200g/day during gestation, 100g/day or less during birthing, and 200 to 400g/day during lactation. (Nicodemus *et al.*, 2010) corroborated these observations in their evaluation of fiber level and grinding type effects on doe and litter performance. They noted that diets with high fiber and normal grinding or low fiber with coarse grinding improved feed intake in reproductive does. However, they also highlighted that excessive coarse particles in high-fiber diets could limit intake due to reduced palatability and physical gut fill (Nicodemus *et al.*, 2007; Nicodemus *et al.*, 2010).

AVERAGE LITTER SIZE, STILLBIRTH RATE AND BIRTH TO WEANING MORTALITY RATE OF KITS

The dietary fiber content did not significantly influence litter size, or the number of kits born per litter. In our study, the average litter size ranged from 5.50 to 7.17 kits, which is comparable to mean values (5.75 ± 0.57) reported for local rabbit breeds in Benin (Akpo *et al.*, 2008). However, our results are lower than those found by Martínez-Paredes *et al.* (2022), who reported litter sizes of 9.5 ± 0.5 and 9.2 ± 0.5 with diets containing 40.9% and 49.6% NDF, respectively. Similarly, De Blas (2013) recorded litter sizes of 8.1 and 8.2 with diets containing 29.1% and 28.3% NDF, respectively. The observed differences in litter sizes across studies may be attributed to genetic factors and breed differences.

Despite the absence of significant effects on litter size, our study revealed an influence of dietary fiber on stillbirth and pre-weaning mortality rates. The highest birth-to-weaning mortality rates (30.50%) were recorded with Diets B containing high NDF level. These values exceed (13% to 17%) reported by Akpo *et al.* (2008) and Delgado *et al.* (2018) (5.91% to 11.5%), suggesting that excessively high NDF levels may contribute to increased mortality with diets containing similar NDF levels ranging from 38% to 44.2%. The high mortality rates observed in the present experiment may be due to excessive dietary fiber limiting nutrient availability, reducing fetal growth, and compromising kit survival. High indigestible fiber can decrease nutrient absorption, affect maternal milk production, and disrupt gut microbiota, leading to digestive disorders (Gidenne *et al.*, 2020; Nicodemus *et al.*, 2010). Mechanistically, high levels of indigestible fiber can decrease nutrient absorption by accelerating intestinal transit time, limiting the breakdown and assimilation of essential nutrients. This reduction in nutrient availability may impair milk production in does,

as the energy and protein requirements for lactation are not adequately met. Consequently, insufficient milk yield or poor milk quality can negatively impact kit survival and growth during the critical early stages of life. Excessive fiber fermentation may also increase the risk of enteritis, a key factor in pre-weaning mortality.

Stillbirth rates in our study ranged from 2.33% to 8.50%, with the lowest rate observed in Diet Ba (49.30% NDF). These rates are lower than those reported by Martínez-Paredes *et al.* (2022), who recorded stillbirth rates of 7% to 9% with high-fiber diets. High dietary fiber levels promote optimal intestinal motility through increased motilin production, which enhances gastrointestinal movement and supports caecal microbial digestion (Hernández-Martínez *et al.*, 2022). However, an excessive proportion of indigestible fiber, such as lignin, may interfere with nutrient absorption. Conversely, a fiber-deficient diet can lead to intestinal hypomotility, disrupting gut microbiota balance and potentially increasing the risk of stillbirth and pre-weaning mortality (Xiccato and Trocino, 2020). Maintaining an optimal dietary fiber level, specifically between 44% to 50% NDF, is essential to ensure fetal development and maternal milk production, ultimately reducing mortality risks.

VARIATION IN AVERAGE DAILY GAIN AND MEAN WEIGHT OF LITTER IN DOE RABBITS

The average birth weight of kits did not significantly differ among dietary treatments, ranging from 48.38g to 56.55g. These values are consistent with those reported by Delgado *et al.* (2018) but lower than those recorded by Read *et al.* (2016), who found birth weights of 59.5-59.8g with diets containing 30.2% to 41.5% NDF.

Significant differences were observed in kit weight at 21 days and at weaning (35 days), as well as in average daily gain (ADG). Kits from does fed Diet Ba (49.30% NDF) exhibited the highest average weight at 21 days (312g) and at weaning (684.37g), with an ADG of 15.99g/day. The lowest values were recorded in kits from does fed Diet A. The growth performance variations observed in our study may be linked to differences in nutrient composition, particularly protein and energy levels, as previously suggested by Arias-Álvarez *et al.* (2009) and Demeter *et al.* (2023).

Fiber quality and composition also play a crucial role in reproductive performance and kit growth. Studies by Gayard *et al.* (2022), Gayard *et al.* (2023) and Xiccato and Trocino (2020), have demonstrated that diets rich in high-quality fiber sources, such as dehydrated sainfoin or alfalfa, improve kit growth performance and reduce pre-weaning mortality. These benefits are attributed to enhanced maternal digestion, improved nutrient availability, and optimized milk production.

The differences in growth performance between studies may also stem from variations in the amino acid profile, fatty acid composition, and micronutrient content of the experimental diets. As previously highlighted by Gidenne (2015), Gidenne *et al.* (2020), optimal protein-energy balance and fiber digestibility are essential for maximizing reproductive efficiency and kit development.

CONCLUSIONS AND RECOMMENDATIONS

This study confirms the significant impact of dietary fiber content on feed intake, maternal performance, and pre-weaning kit survival in rabbit production. Results demonstrate that a moderate NDF levels (~49.3%) optimize feed intake, promote kit growth (15.99 g/day), and improve pre-weaning viability, likely through enhanced intestinal motility and nutrient absorption. However, excessive NDF levels (>50%), Conversely, excessive NDF levels (>50%) impair nutrient utilization and increase pre-weaning mortality. These findings underscore the necessity of balancing both the quality and quantity of fiber in reproductive doe diets. Based on these findings, an NDF level of approximately 49% (as provided in Diet Ba) is recommended to optimize gut health and reproductive success. Future research should investigate the interactions between maternal metabolism, neonatal gut microbiota, and fiber composition to refine dietary strategies in rabbit production systems.

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NOVELTY STATEMENTS

This research provides the first controlled evaluation of graded dietary Neutral Detergent Fiber (NDF) levels on the reproductive and pre-weaning performance of local rabbit does in atropical African context. These findings fill a critical knowledge gap regarding fiber management in indigenous rabbit genotypes and offer specific recommendations for improving productivity and resilience in small-holder rabbit production systems.

AUTHOR'S CONTRIBUTIONS

Souladjou Alassane conceptualized the study, conduct-

ed the experiments, and drafted the manuscript. Ignace Dotché and Mahamadou Dahouda supervised the research and contributed to data analysis. Serge Ahounou, and Issaka Youssao Abdou Karim participated, Jean-Paul Dehoux and Jean-Luc Hornick provided critical revisions and scientific guidance. All authors read and approved the final manuscript.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest about the publication of this manuscript.

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