Journal of Veterinary Science & Animal Husbandry
Volume 7 | Issue 1
ISSN: 2348-9790

Research article Open Access

# Post-Weaning Growth Performance of Guinea Pigs (*Cavia porcellus L*) Fed on *Panicum maximum* Supplemented with Graded Levels of *Arachis glabrata* in the Diet

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**Citation:** Miegoué E, Tendonkeng F, Mweugang NN, Fossi J, Ntsafack P, et al. (2019) Post-Weaning Growth Performance of Guinea Pigs (*Cavia porcellus L.*) Fed on *Panicum maximum* Supplemented with Graded Levels of *Arachis glabrata* in the Diet. J Vet Sci Ani Husb 7(1): 102

**Received Date:** November 26, 2018 **Accepted Date**: April 22, 2019 **Published Date:** April 24, 2019

## Abstract

In order to determine the level of inclusion of *Arachis glabrata* in the diet of guinea pig (*Cavia porcellus L.*) fed with *Panicum maximum* on post-weaning growth performance, reproduction and growth were conducted at the Animal Production and Nutrition Research Unit (LAPRONAN) of the Faculty of Agronomy and Agricultural Science (FAAS) of the University of Dschang between December 2016 and April 2017. At the end of the reproduction and pre-weaning growth, trial which were carried out in 4 treatments of 41 three weeks old piglets of local light breed and weighing 133.55 ± 50g were used for post-weaning growth. These animals were kept on the same food as their mothers and received iso-nitrogenous (17% protein) rations associated with *P maximum*. Animals of batch PMA0 received a concentrated feed without *Arachis glabrata* and *P. maximum* at will (PMA0), while those of the other lots received in addition to *P. maximum* a compound feed containing respectively 10 (PMA10), 15 (PMA15) and 20% of *Arachis glabrata* (PMA20). From the trial, it came out that the inclusion of graded level of *Arachis glabrata* significantly affected the weight of animals at 8 weeks. Inclusion of 20% of *Arachis glabrata* in the diet resulted in a significantly higher weights at 8 weeks (331.75g and 246.67g respectively with males and females) fed to the ration containing 20% of *Arachis glabrata* (PMA20). Similarly, this ration yielded the significantly highest total gains (TG) (130g) and average daily gains (ADG) (3.71g / d) in males. In females, the significantly highest total gains (GT) and average daily gains (ADG), (106.80g and 3.05g / d respectively), were recorded with the diet containing 15 % of *Arachis glabrata* (PMA15). Regardless of sex, the inclusion of 20% of *Arachis glabrata* in the diet resulted in a significantly higher weight at 8 weeks (295.29g). This same ration allowed in terms of total gain (TG) and average daily gain (ADG), recorded significantly highest values (112.75g and 3.22g / d respectively) at 8 weeks. Thus, *Arachis glabrata* can be included up to 20% in the ration as a source of protein for improving the post-weaning growth performance of guinea pigs in a farm environment.

**Keywords:** *Arachis Glabrata*; *Panicum maximum*; Guinea Pigs; Growth

## Introduction

In Cameroon, food security in general and protein in particular is a challenge in most regions [1]. The population is growing at a rate of 2.241% per year [2]. This population explosion observed in recent years in developing countries in general and in Cameroon in particular, results in food insecurity, environmental degradation and the threat of biodiversity [3]. The increasing demand for animal protein from local populations is leading to increased pressure on wildlife. This is now a serious threat to the survival of these animal species [4,5]. To combat this scourge, the development of production of unconventional species such as guinea pig is one of the best opportunities [6,7]. These animals are one of the cheapest sources of animal protein in local markets. Its good quality as well as its high protein and low fat content contribute to the improvement of the nutritional status of local populations [8]. The breeding of guinea pig or caviaculture does not require large investments and most often requires a basic diet consisting of leftovers, fodder crops in gardens or along roads [9]. In the light of all the above, the improvement of the productivity of the guinea pig is indispensable. In livestock in general and in caviaculture in particular, food plays a role of choice [6,10,11]. The intensification of caviacole production goes mainly through the improvement of food [11]. From this fact, food remains one of the main handicaps to the development of caviaculture (breeding of guinea pigs) in Africa in general and in Cameroon in particular. However, in Cameroon, several plant species have a certain forage potential but not yet explored in caviaculture [12]. The control and development of the food resources available in our environment are prerequisites for the success of livestock farming in developing countries [13]. Even in species that may be predominantly dependent on marginal forages such as guinea

pigs, a diet containing optimal amounts of protein has been shown to improve growth and reproduction performance [11,14-16]. Better preweaning viability was observed in guinea pigs receiving fresh leaves and dried, crushed leaves of the protein-rich *Arachis glabrata* in the diet and fed *Pennisetum purpureum* and *Panicum maximum* [12,17]. Given the high cost of spruce supplements commonly used in animal feed, it appears that the optimal use of *Arachis glabrata* in guinea pigs' diet could reduce their cost of production without affecting their performance [12]. The objective of this work is therefore to determine the optimal level of inclusion of *Arachis glabrata* in the diet of guinea pig in West Cameroon.

## Materials and Methods

### Experimental site

The study was conducted between December 2016 and May 2017 at the Research and Application Farm (FAR) of the University of Dschang, Located in the Western Highlands of Cameroon at an altitude of 1420m, at the east longitude of 09° 85' 10° 06' and at the northern latitude from 5° 36' to 5° 44'. This region receives 1500 to 2000mm of water per year with an average temperature of 18 °C between July-August and 25 °C between February-March. Its relative humidity varies from 40 to 97% with an insolation of 1800 hours. The climate is equatorial of the Cameroonian type altitude with a long rainy season from mid-November to mid-March and a short dry season from mid-March to mid-November.

### Animal material and housing

41 weaned (3 weeks after birth) piglets of light breed including 19 females and 22 males weighing 133,5±50g were used.. These animals were raised in four boxes made of plywood (1m long, 0.8m wide and 0.6m high) each equipped with lighting and electric heating equipped with 2 feeders in wood for the concentrated feed and two concrete drinker in one of the livestock buildings made at the Research and Application Farm of University of Dschang. Animals were raised on the ground, on a litter of 5cm thick made up of untreated dry wood chips. The litter was renewed every 2 days to avoid accumulation of feces and urine. The different lodges were equipped with a cover of small mesh to protect animals from mice and other predators that may accidentally enter the livestock building. Each batch of animals was conducted at the same conditions of those of their mother, subjected to the same iso-nitrogenous rations (17% of proteins) made up of *P. maximum* supplemented with a diet containing or not graded levels of *A. glabrata.*

### Plant material

The plant material was *Panicum maximum* and *Arachis glabrata. P. maximum* was harvested at the pre-bloom stage, pre-faded before being directly served to animals. For *A. glabrata*, it were harvested before flowering as *P. maximum* on the fodder plot of FAR farm, dried, crushed and incorporated to the concentrated feed. A sample of 100 g of each of those forages as well as the concentrate feed was collected dried at 60 °C to constant weight in a ventilated oven of mark Gallemkamp (Table 1). The samples were subsequently milled to 1 mm mesh and kept in plastic bags for different bromatological analyzes [18] (Table 1).

| Ingredients (%) | Different rations | | | | Forages | |
|---|---|---|---|---|---|---|
| | PMA0 | PMA10 | PMA15 | PMA20 | *P. maximum* | *A. glabrata* |
| Remoulding | 31 | 27.5 | 26.5 | 25 | - | - |
| Corn | 30 | 27 | 25.5 | 24 | - | - |
| Cotton seed cake | 5 | 4.5 | 4 | 4 | - | - |
| Palm kernel cake | 25 | 22.5 | 21 | 20 | - | - |
| Soybean meal | 2 | 2 | 2 | 1.5 | - | - |
| Fishmeal | 3 | 2.5 | 2.5 | 2.5 | - | - |
| Shell powder | 2 | 2 | 1.5 | 1.5 | - | - |
| Premix | 1 | 1 | 1 | 1 | - | - |
| Cooking salt | 1 | 1 | 1 | 1 | - | - |
| *Arachis glabrata* | 0 | 10 | 15 | 20 | - | - |
| TOTAL | 100 | 100 | 100 | 100 | - | - |

| | | | | | | |
|---|---|---|---|---|---|---|
| Dry matter (%) | 97.82 | 97.28 | 97.68 | 97.54 | 91.76 | 95.29 |
| Organic matter (% DM) | 86.06 | 87.76 | 88.44 | 87.45 | 85.88 | 87.82 |
| Crude protein (% DM) | 16.79 | 16.83 | 16.85 | 17.05 | 13.45 | 19.53 |
| Crude fiber (% DM) | 15.80 | 17.93 | 17.80 | 17.46 | 33.08 | 20.94 |
| Ash (% DM) | 13.94 | 12.24 | 11.56 | 12.55 | 14.12 | 12.18 |

**MS**: dry matter; **PMA20**: *Panicum maximum* + concentrate containing *A. glabrata* 20%; **PMA15**: *Panicum maximum* + concentrate containing *A. glabrata* 15% ; **PMA0**: P*anicum maximum* + concentrate without legume; **PMA10**: *Panicum maximum* + concentrate containing A. glabrata 10%.

**Table 1:** Formulation and chemical composition of different forages and iso-nitrogenous rations used

## Experimental diet and design

The weaned young animals were sexed and kept in their mothers' boxes and subjected to different rations. These diets (PMAO, PMA10, PMA15 and PMA20 contained 0, 10, 15 and 20% of *Arachis glabrata*, respectively) formulated were used during this post-weaning growth period.

The proportions of different ingredients purchased from the agricultural by-products resellers in the city of Dschang for the manufacture of the concentrate are presented in (Table 1).

The experimental rations were constituted as follows:

PMA0: *Panicum maximum ad libitum* + 40g of concentrate + 0% of *A. glabrata* / animal / d
PMA10: *Panicum maximum ad libitum* + 40g of concentrate + 10% of *A. glabrata* / animal / d
PMA15: *Panicum maximum ad libitum* + 40g of concentrate + 15% of *A. glabrata* / animal / d
PMA20: *Panicum maximum ad libitum* + 40g of concentrate + 20% of *A. glabrata* / animal / d

100 g of the different diets sample were dried at 60 °C in an oven until a constant weight was obtained, milled and kept in plastic bags for evaluation of the chemical composition according to the method described by AOAC [18].

## Collection of data

Regarding the evaluation of post-weaning growth performance, each piglet was sexed, identified and maintained in the fattening batch corresponding to the mother's diet. Their weights were also recorded weekly until the 8th week.

The rations described above were distributed daily between 8 and 9 o'clock and the left-over of the different rations were collected every morning and weighed using a digital scale of 7 kg capacity and sensitivity 1 g before a new distribution. For the assessment of weight growth, pup weights were also recorded at the beginning of the test before being weighed weekly up to 8 weeks of age. These data made it possible to evaluate the post-weaning weight gain of the young from the 3rd to the 8th week as well as their weight gains (T G and ADG).

## Statistical analyzes

Data collected were subjected to two-way analysis of variance (inclusion level of *A. glabrata* and sex) and SPSS. 20.0 software was used. When the differences were significant between treatments, the means were separated by the Duncan test at the 5% threshold [19].

# Results

## Effects of level of *Arachis glabrata* on food intake of post-weaned piglets

| Ingestions (DM / d / animal) | Treatments | | | | *SEM* | P-value |
|---|---|---|---|---|---|---|
| | PMA0 | PMA10 | PMA15 | PMA20 | | |
| Total dry matter | | | | | | |
| ***P. maximum*** | 40.05$^{a}$ | 38.12$^{a}$ | 40.44$^{a}$ | 40.87$^{a}$ | 0.65 | 0.483 |
| **Compound feed** | 27.53$^{b}$ | 30.89$^{a}$ | 28.53$^{b}$ | 18.03$^{c}$ | 0.17 | 0.000 |
| total DM | 67.58$^{a}$ | 69.01$^{a}$ | 68.97$^{a}$ | 58.90$^{b}$ | 1.10 | 0.000 |
| Organic material | | | | | | |
| ***P. maximum*** | 34.40$^{a}$ | 32.74$^{a}$ | 34.73$^{a}$ | 35.10$^{a}$ | 0.56 | 0.483 |
| **Compound feed** | 23.69$^{b}$ | 27.11$^{a}$ | 25.23$^{b}$ | 15.77$^{c}$ | 1.03 | 0.000 |
| Total OM | 58.09$^{a}$ | 59.85$^{a}$ | 57. 97$^{a}$ | 50.87$^{b}$ | 0.97 | 0.000 |
| Crude protein | | | | | | |
| ***P. maximum*** | 05.39$^{a}$ | 05.13$^{a}$ | 05.44$^{a}$ | 05.50$^{a}$ | 0.87 | 0.483 |
| **Compound feed** | 04.41$^{b}$ | 05.08$^{a}$ | 04.44$^{b}$ | 02.83$^{c}$ | 0.20 | 0.000 |
| total CP | 09.80$^{a}$ | 10.21$^{a}$ | 09.88$^{a}$ | 08.33$^{b}$ | 0.18 | 0.000 |
| Crude cellulose | | | | | | |
| ***P. maximum*** | 13.25$^{a}$ | 12.61$^{a}$ | 13.38$^{a}$ | 13.52$^{a}$ | 0.21 | 0.483 |
| **Compound feed** | 04.35$^{d}$ | 05.54$^{a}$ | 05.08$^{b}$ | 03.15$^{c}$ | 0.21 | 0.000 |
| total CC | 17.60$^{ab}$ | 18.15$^{a}$ | 18.46$^{a}$ | 16.67$^{b}$ | 0.24 | 0.025 |

$^{a, b, c}$: Averages with the same letters on the same line are not significantly different at the 5% level; **PMA20**: *Panicum maximum* + concentrate containing *A. glabrata* 20%; **PMA15**: *Panicum maximum* + concentrate containing A. glabrata 15%; **SEM**: Standard Error of mean; P-value: Probability; **A. compound**: compound feed; **DM**: Dry matter; **OM**: Organic matter; **CP**: Crude Protein; **CC**: Crude cellulose; **PMA0**: *Panicum maximum* + concentrate without legume; PMA10: *Panicum maximum* + concentrate containing *A. glabrata* 10%

**Table 2:** Feed intake of post-weaned piglets according to the level of inclusion of *A. glabrata*

Inclusion of the increasing rate of *Arachis glabrata* in the diet had no significant influence (P> 0.05) on *P. maximum* ingestion but, significantly (P <0.05) increased the ingestion of the compound feed of different rations (Table 2).

The inclusion of 10% of *Arachis glabrata* in the compound feed significantly improved (P <0.05) ingestion of DM. Similarly, intake of OM, CP, and CC in the compound feed containing 10% of *Arachis glabrata* was significantly higher (P <0.05) than that of other diets containing *Arachis glabrata*. Inclusion of 10% of *Arachis glabrata* in the diet significantly improved intake of total DM, total OM, and total CP compared to other diets. Regarding CC, it is the inclusion of 15% of *Arachis glabrata* in the diet that has significantly improved its intake.

## Effects of the level of *Arachis glabrata* on some performances of young guinea pigs at post-weaning period

The highest viability rate (100%) with males was recorded in animals fed on ration containing 20% of *Arachis glabrata* followed by that of guinea pigs fed the control diet (90.90%) and the lowest (66.67%) in those fed with 10% *Arachis glabrata* diet (Table 3). In females, the highest viability rate (100%) was obtained with the control diet and the ration containing 20% of Arachis glabrata and the lowest (66.67%) with the diet containing 10% of *Arachis glabrata*. In addition, the ration containing 20% of Arachis glabrata recorded the lowest mortality rate (0%) and the ration containing 10% of *Arachis glabrata* the highest rate (33.33%). The lowest mortality rate and the highest viability were recorded in animals fed at 0% of *Arachis glabrata* regardless of sex.

| Characteristics | Treatments | | | |
|---|---|---|---|---|
| | PMA0 | PMA10 | PMA15 | PMA20 |
| **weaning piglets** | | | | |
| ♂ | 6 | 6 | 6 | 4 |
| ♀ | 5 | 6 | 5 | 3 |
| ♀♂ | **11** | **12** | **11** | **7** |
| **piglets at 8 weeks** | | | | |
| ♂ | 5 | 4 | 5 | 4 |
| ♀ | 5 | 4 | 4 | 3 |
| ♀♂ | **10** | **8** | **9** | **7** |
| **piglets dead before 8 weeks** | | | | |
| ♂ | 1 | 2 | 1 | 0 |
| ♀ | 0 | 2 | 1 | 0 |
| ♀♂ | **1** | **4** | **2** | **0** |
| **Post-weaning viability rate (%)** | | | | |
| ♂ | 83.33 | 66.67 | 83.33 | 100 |
| ♀ | 100 | 66.67 | 83.33 | 100 |
| ♀♂ | **91.66** | **66.67** | **83.33** | **100** |
| **Post-weaning mortality rate (%)** | | | | |
| ♂ | 16.67 | 33.33 | 16.67 | 0 |
| ♀ | 0 | 33.33 | 16.67 | 0 |
| ♀♂ | **8.33** | **33.33** | **16.67** | **0** |

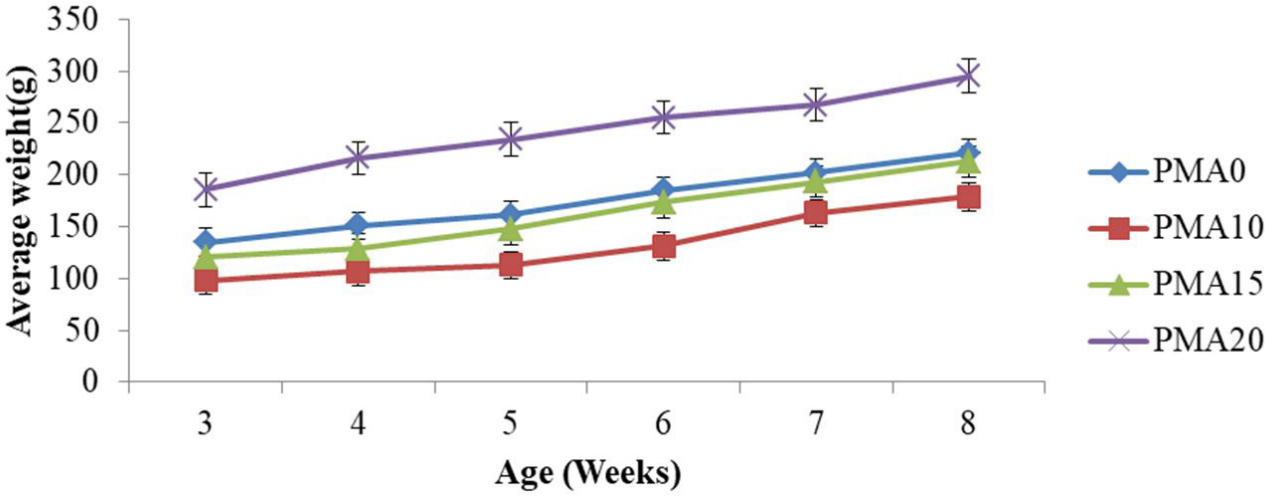
**PMA20**: Panicum maximum + concentrate containing *A. glabrata* 20%; **PMA15**: *Panicum maximum* + concentrate containing *A. glabrata* 15%, **PMA0**: *Panicum maximum* + concentrate without legume; **PMA10**: *Panicum maximum* + concentrate containing *A. glabrata* 10%

**Table 3:** Performances of animals during the post-weaning period according to treatments and sex

## Effects of the level of *Arachis glabrata* on the post-weaning weight gain of young guinea pigs

The weights of the animals were increasing from the 4th to the 8th week regardless of the inclusion level of the powder of *Arachis glabrata* (Figure 1). From analysis, it appears that the addition of 20% of *Arachis glabrata* to the diet resulted in a significant increase (P <0.05) in weaning weight in the 8th week. Indeed, during this period, the average weight of guinea pigs fed on diet containing 20% of *Arachis glabrata* increased from 185.29g to 295.29g. Those animals fed diets containing 0, 10 and 15% of *Arachis glabrata* increased from 134.82g to 220.80; 98.25g to 178.75g and 118.60g to 212.89g respectively. The total weight growth recorded during this period is 86.20g; 80.50g; 96.40g and 112.75g respectively for lots PMAO, PMA10, PMA15 and PMA20. From the 5th to the 8th week, the mean weight of the animals fed the 0 and 15% *Arachis glabrata* diets remained comparable (p> 0.05) but significantly (p <0.05) higher than that obtained in guinea pigs fed the ration containing 10% of *Arachis glabrata*. On the other

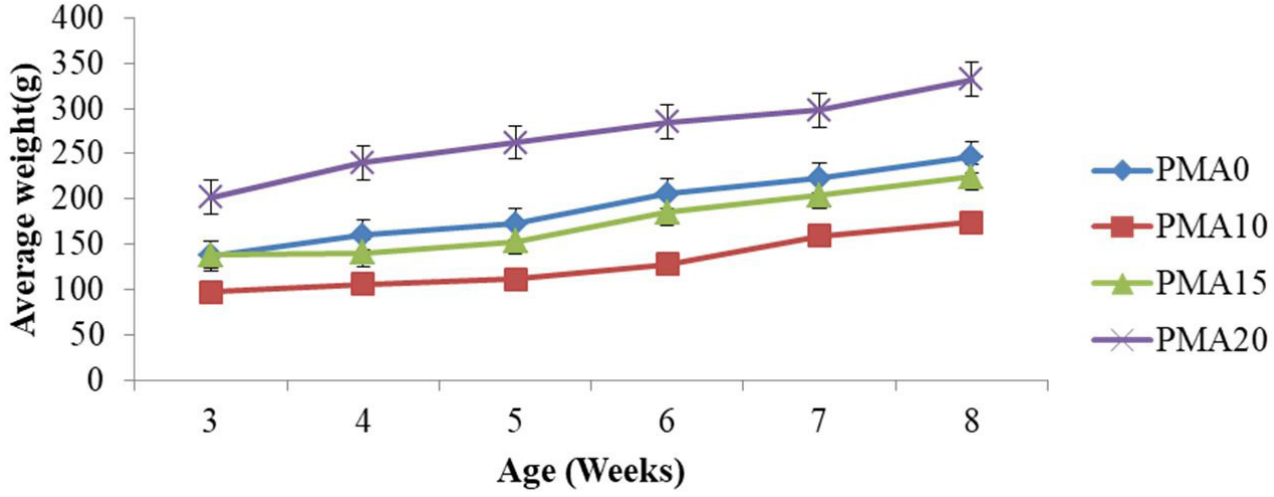
hand, at week 8, the average weight of the animals receiving the 20% diet of *Arachis glabrata* was significantly (p <0.05) higher than those of the other animals receiving the other diets. Similarly, from weeks 3 to 8, the weights of guinea pigs receiving diets containing 0, 10 and 15% of *Arachis glabrata* remained comparable (p> 0.05). Animals receiving the diet containing 10% *Arachis glabrata* had the lowest average weights (P> 0.05) during this period.




PMA: *Panicum maximum*+ concentrate containing *Arachis glabrata;* 0, 10, 15 and 20: inclusion rate of the legume
**Figure 1:** Weight change after weaning of young guinea pigs according to different rations

## Effects of the level of *Arachis glabrata* in the diet on the post-weaning weight gain of young males

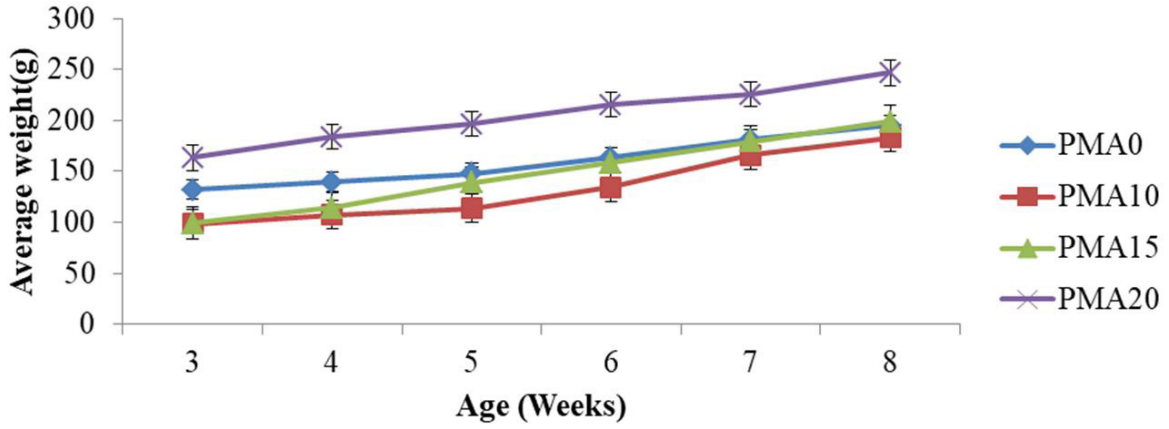
During this period between the 3rd to the 8th week, the average weight of male guinea pigs receiving the ration containing 20% of *Arachis glabrata* increased from 201.75g to 331.75g (Figure 2). Those animals fed diets containing 0, 10 and 15% of *Arachis glabrata* increased from 137g to 246.20g; 98.33g at 174.25g and 138g at 224.89g respectively. The total weight growth recorded during this period is 109.20g; 75.92g; 86g and 130g respectively for lots PMAO, PMA10, PMA15 and PMA20. From 4th to 8th week, the mean weight of the young males receiving the 0 and 15% rations of *Arachis glabrata* remained comparable (p> 0.05) but significantly (p <0.05) higher than that obtained in guinea pigs fed a ration containing 10% of *Arachis glabrata*. On the other hand, from week 3 to week 8, the average weight of the animals receiving the 20% diet of *Arachis glabrata* was significantly (p <0.05) higher than those of the other animals receiving the other diets. Similarly, from weeks 4 to 8, weights of guinea-pigs receiving diets containing 0, 10 and 15% of Arachis glabrata remained comparable (p> 0.05). Animals receiving the diet containing 10% *Arachis glabrata* had the lowest average weights (P> 0.05) during this period




PMA: *Panicum maximum*+ concentrate containing *Arachis glabrata*; 0, 10, 15 and 20: inclusion rate of the legume
**Figure 2:** Weight change after weaning of young males according to different rations

## Effects of the level of *Arachis glabrata* in the diet on the post-weaning weight gain of young females

The weights of the young females were increasing from the 4th to the 8th week regardless of the inclusion level of the *Arachis glabrata* powder (Figure 3). From the analysis of this figure, it appears that the addition of 20% of *Arachis glabrata* in the diet resulted in a significant increase (P <0.05) in the weight of young females from weaning to 8th week. The average weight of female guinea pigs receiving the 20% diet of *Arachis glabrata* increased from 163.33g to 246.67g. One of the young females receiving the diets containing 0, 10 and 15% of Arachis glabrata passed from 132.20g to 195.40g; 98.17g at 183.25g and 92.20g at 199g respectively. The total weight growth recorded during this period is 63.20g; 85.08g; 106.80g and 83.34g respectively for lots PMAO, PMA10, PMA15 and PMA20. From week 4 to week 8, the mean weights of young females receiving diets containing 0 and 15% of *Arachis glabrata* remained comparable (p> 0.05) but significantly (p <0.05) higher than that obtained in guinea pigs fed a ration containing 10% of Arachis glabrata. On the other hand, from week 4 to week 8, the average weight of young females fed the 20% diet of *Arachis glabrata* was significantly (p <0.05) higher than those of other females. Similarly, from weeks 4 to 8, weights of guinea-pigs receiving diets containing 0, 10 and 15% of *Arachis glabrata* remained comparable (p> 0.05). Animals fed the diet containing 10% *Arachis glabrata* had the lowest average weights (P> 0.05) during this period in young females.




**PMA:** *Panicum maximum*+ concentrate containing *Arachis glabrata*; 0, 10, 15 and 20: inclusion rate of the legume
**Figure 3:** Weight change after weaning of young females according to different rations

## Effects of the level of *Arachis glabrata* on weight gains and average daily earnings of young post-weaned guinea pigs

The inclusion of *Arachis glabrata* in the diet significantly (P <0.05) affected the weight of the animals at 8 weeks (Table 4). In fact, the inclusion of 20% of *Arachis glabrata* in the diet resulted in the highest (P <0.05) weights in both sexes and regardless of sex. On the other hand, regardless of sex, the lowest mean weights, TGs and ADGs were obtained in animals receiving 10% of *Arachis glabrata* in the diet. However, animals receiving the ration containing 20% of *Arachis glabrata* had the highest TG and ADG in both males and regardless of sex. In females, the highest GT and GMQ (P <0.05) were obtained in animals receiving 15% of *Arachis glabrata* and the lowest in those of the control group.

| Charactéristics | Treatments | | | | *SEM* | P-value |
|---|---|---|---|---|---|---|
| | PMA0 | PMA10 | PMA15 | PMA20 | | |
| **Weight at weaning** | | | | | | |
| ♂ | 137.00$^{a}$**(6)** | 98.33$^{c}$**(6)** | 138.00$^{b}$**(6)** | 201.75$^{a}$**(4)** | 11.02 | 0.050 |
| ♀ | 132.20$^{a}$**(5)** | 98.17$^{b}$**(6)** | 92.20$^{b}$**(5)** | 163.33$^{a}$**(3)** | 10.51 | 0.040 |
| ♀♂ | 134.82$^{a}$**(11)** | 98.25$^{c}$**(12)** | 118.60$^{b}$**(11)** | 182.54$^{a}$**(7)** | 7.78 | 0.024 |
| **Weight at 8 weeks (g)** | | | | | | |
| ♂ | 246.20$^{b}$**(5)** | 174.25$^{c}$**(4)** | 224.00$^{b}$**(5)** | 331.75$^{a}$**(4)** | 14.64 | 0.000 |
| ♀ | 195.40$^{b}$**(5)** | 183.25$^{b}$**(4)** | 199.00$^{b}$**(4)** | 246.67$^{a}$**(3)** | 6.93 | 0.004 |
| ♀♂ | 220.80$^{b}$**(10)** | 178.75$^{c}$**(8)** | 212.89$^{bc}$**(9)** | 295.29$^{a}$**(7)** | 8.99 | 0.000 |
| **Total gain (g)** | | | | | | |
| ♂ | 109.20$^{ab}$ | 75.92$^{c}$ | 86.00$^{bc}$ | 130.00$^{a}$ | 6.13 | 0.005 |
| ♀ | 63.20$^{b}$ | 85.08$^{ab}$ | 106.80$^{a}$ | 83.34$^{ab}$ | 5.75 | 0.029 |
| ♀♂ | 86.20$^{ab}$ | 80.50$^{b}$ | 96.40$^{ab}$ | 112.75$^{a}$ | 4.46 | 0.035 |

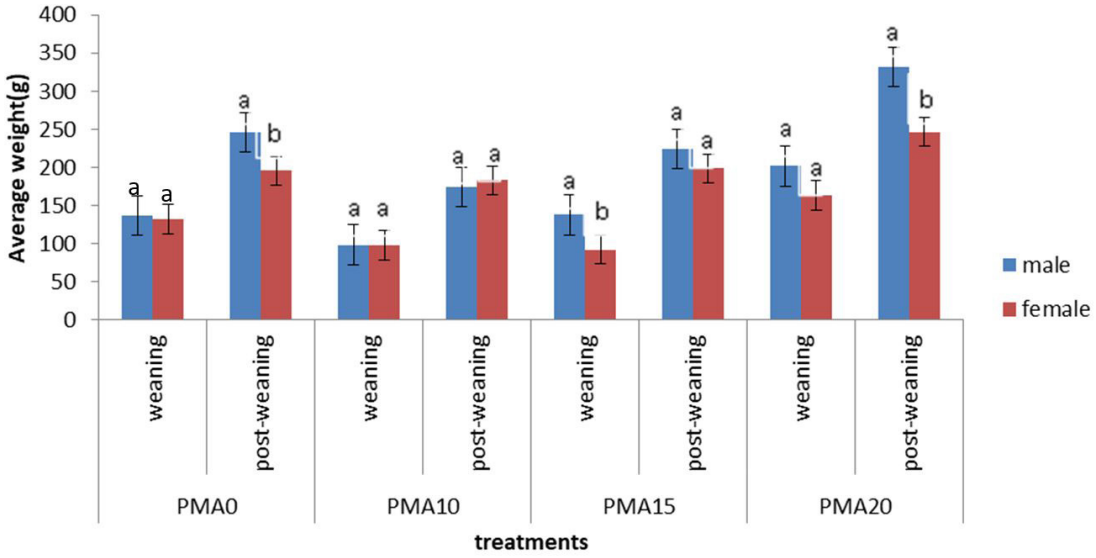
| ADG (g/d) | | | | | | |
|---|---|---|---|---|---|---|
| ♂ | 3.12[ab] | 2.17[c] | 2,46bc | 3.71[a] | 018 | 0.005 |
| ♀ | 1.81[b] | 2.43[ab] | 3,05[a] | 2.38[ab] | 0.16 | 0.029 |
| ♀♂ | 2.46[ab] | 2.30[b] | 2,76[ab] | 3.22[a] | 0.13 | 0035 |

[a, b, c]: Averages with the same letters on the same line are not significantly different at the 5% level; **ADG**: Average daily gain; **SEM**: Standard error of mean; *P-value*: Probability, (): effective size of piglets. **PMA20**: Panicum maximum + concentrate containing *A. glabrata* 20%; **PMA15:** Panicum maximum + concentrate containing *A. glabrata* 15%; **PMA0:** *Panicum maximum* + concentrate without legume; **PMA10**: *Panicum maximum* + concentrate containing *A. glabrata* 10%.

**Table 4:** Total Gain and Average Daily Gain of young post-weaned guinea pigs according to different frations

### Effects of the level of *Arachis glabrata* in the ration on the mean weight compared between males and females at birth, weaning and at 8 weeks

With the exception of the ration containing 10% of *Arachis glabrata*, males receiving the other diets were significantly heavier (P <0.05) than females from the 3rd to 8th week of age, depending on rations (Figure 4). The lowest mean weights in males were recorded with the diet containing 10% *Arachis glabrata* at the 8th week. Similarly, this last ration made it possible to obtain the mean weights which were the heaviest (P <0.05) in females at the 8th week of age. For the other treatments, no significant difference (P> 0.05) was observed.




[a, b:] Averages with the same letters for the same parameter are not significantly different at the 5% threshold for the same treatment; **PMA:** *Panicum maximum* + concentrate containing *Arachis glabrata*; 0, 10, 15 and 20: inclusion rate of the legume

**Figure 4:** Average weights compared between males and females at 0, 3 and 8 weeks of age according on dietary rations

## Discussion

### Effects of graded level of *Arachis glabrata* on young guinea pigs performances during the post-weaning period

The highest post-weaning viability rate was obtained in guinea pigs receiving 20% of *Arachis glabrata* diet, followed by those receiving the control diet. This difference can be attributed, among other things, to feed. In the case of piglets, feeding is a determining factor of growth [10]. The work of Miégoué pointed out that the post-weaning viability rate was high in guinea pigs fed diet containing *C. calothyrsus* or *D. intortum* [12]. This observation is corroborated by Noumbissi who pointed out that the post-weaning viability rate was better in guinea-pigs supplemented with fresh leaves of *T. diversifolia* [12]. In the present study, the highest post-weaning viability rate (100%) obtained in guinea pigs fed the ration containing 20% *Arachis glabrata* was consistent with that reported by Miégoué, with the viability rate of 100% in guinea pigs supplemented with *C. calothyrsus* or *D. intortum*, but higher than that recorded by Noumbissi, with the post-weaning viability rate of 93.30% in females supplemented with 9g *T. diversifolia* DM / day / animal [12,20]. The highest mortality rate observed in this trial may also be explained by the climate. In fact, in the dry season, the temperature in the night and in the morning can drop to less than 15°

### Effects of level of *Arachis glabrata* on feed intake of post-weaned piglets

With the exception of the ration containing 15% of *Arachis glabrata* which recorded the highest value (18.46%) for ingestion of total CC, the total intake of DM, OM and CP was significantly higher (69.01%, 59.85% and 10.21% respectively) in animals supplemented with diet containing 10% *Arachis glabrata.* This is similar to the observations of Noumbissi et al. Kouakou *et al.* [15,21]. This difference could be explained by the inclusion of *Arachis glabrata* in the diet, given its high protein content, would have allowed sufficient proliferation of intestinal cellulolytic micro-organisms, thus leading to rapid digestion of nutrients, and accelerating the digestive transit; this also caused the animal to consume more and thus allows maximum release of energy necessary to cover their needs. According to Miégoué *et al*. the lower the energy of the ration is, the more it is ingested [12]. The lowest feed intake values were obtained in animals receiving 20% *Arachis glabrata*. Similar results were obtained by Miégoué *et al.* who obtained better DM intake when *P. maximum* was associated with the conventional protein source of the diet compared to supplementation with *Arachis glabrata* [12]. Protein value and the presence of antinutritional factors may therefore have a depressive effect on feed intake.

### Effects of the level of *Arachis glabrata* on post-weaning weight gain of young guinea pigs

At 8 weeks, the mean weight of animals receiving the control diet was comparable to that of the animals receiving the ration containing 15% *Arachis glabrata* and higher than that of PMA10 ration. This would be due to the small amount of *Arachis glabrata* present in the PMA10 ration that, combining with the grass would have affected efficient digestion of feed. Similarly, this could be explained by the fact that the control diet, although not containing *Arachis glabrata*, has all the nutrients necessary to cover the dietary requirements of guinea pigs and the addition of 10% to the PMA10 ration would therefore negatively alter the different proportions of nutrients in the ration. The highest average weight (295.29 g) was obtained in young animals fed a diet containing 20% *Arachis glabrata*. This weight is higher than those observed (221g and 260g) respectively by Zougou *et al*. and Noumbissi [20,22]. This is explained by a good valorization at the level of 17% of PB of Arachis glabrata in the ration by the animals compared to the 16% of PB and the 6 g of MS of *T. diversifolia* used respectively by these authors in their rations. In addition, 20% *Arachis glabrata* would have contributed to an optimal grass / legume combination to reduce the effects of antinutritional factors on the studied parameters. This weight remained comparable to that obtained by Miégoué [16]. This could be explained by the use of the same feed forages.

In this study, whether at birth, at weaning, or at 8 weeks of age, we found that rations containing *Arachis glabrata* with the exception of the one containing 10% yielded better weights. This observation could be attributed to the fact that guinea pigs are herbivorous animals and they would better value plant-based proteins. Furthermore, the drying and incorporation of legume into the compound feed would have mitigated the effect of antinutritional factors.

At 8 weeks, apart from those in the ration containing 10% *Arachis glabrata*, males were heavier than females. This confirms the observation made by Zougou *et al*. Miégoué and Noumbissi according to which, the sexual type influences the weight of the animal since birth and this disparity continues until adulthood [16,20,22].

The highest TGs were obtained with the ration containing 20% *Arachis glabrata*. This would be due to the 20% inclusion rate of the legume, which when combined with grass resulted in better performance. The highest ADGs (3.71 g / day) were obtained from animals receiving treatment containing 20% *Arachis glabrata.* This value is higher than that (3.58 g / day) observed in animals receiving the ration containing *Calliandra calothyrsus* but, lower than (4.94 g / day) in 8 weeks old guinea pigs, receiving ration containing *Arachis glabrata* [16]. This would be due to the crude protein content in the ration which would have been efficiently used by animals.

## Conclusion

This study shows that *Arachis glabrata* as a source of alternative protein in the diet allowed at 20% inclusion to obtain the best average weight of young post-weaned guinea pigs and the ADG at 8 weeks age. In view of these results, it is better for guinea pigs in western Cameroon to incorporate 20% of the *Arachis glabrata* in the ration for post-weaning growth. It would also be desirable to evaluate the effect of the different diets on hematological, biochemical and carcass characteristics of guinea pig in order to better perceive the effect of these diets on the internal physiology of the animal.

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