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PREFERENCE STUDY OF VARIOUS FORAGES IN A CAFETERIA ARRANGEMENT IN RABBIT PRODUCTION

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ABSTRACT

In Nigeria, plants commonly used as feed by rabbit farmers are those around the environment as weeds. Not much has been reported on the preference of rabbits among such plants which are often of little or no use where they are found. Hence this study was designed to assess the preference of rabbits for selected plants (*Tridax procumbens*, *Euphorbia heterophylla*, *Alternanthera brasiliana*, *Aspilia africana*, *Tithonia diversifolia*) used by farmers. A total of thirty crossbred rabbits were used in a cafeteria arrangement feeding trial to study the preference of rabbits for forages presented. The animals were separated into two groups having fifteen rabbits in each group. The various groups were further divided into three sub-groups. Each sub-group had five rabbits housed in same compartment on a deep litter system. Animals in group A had fresh forages, those in group B had dry forages. The result from this study showed that for weaner rabbits the nature of forage and duration of exposure of rabbits to the forages had no significant effect ($p > 0.05$) on the preferences of the animals. The coefficient of preference (CoP) recorded for *Euphorbia heterophylla* (0.44 ± 0.15) was significantly ($p < 0.05$) highest followed by that of *Tithonia diversifolia* (0.19 ± 0.09) while *Aspilia africana* was the least ($p < 0.05$) preferred with CoP 0.11 ± 0.05 . For the post-weaned rabbits, CoP was not significantly affected ($p > 0.05$) in all the parameters considered. From the results it was concluded that *Euphorbia heterophylla* was the most preferred of all the forages presented.

Keywords: Rabbits; Cafeteria arrangement; Forages; Preference; Weed.

INTRODUCTION

The existing competition between man and livestock for the available conventional feed ingredients is a strong factor causing farmers to consider alternative to livestock feeds. This competition has made feeding more expensive in the livestock industry. This competition can be reduced by raising rabbits on forages since rabbits have the ability to make good use of forages as reported by Okpakpor *et al.* (2021). The presence of caecum in the digestive system of rabbits allows them to digest plant materials (forages) and facilitate absorption of available nutrients.

Forages are livestock feeds that are composed of the various parts of a plant (leaves, stem and roots of such plants). They are abundant in the wet seasons and can be preserved as leaf meals, hays or silages to be used even in the dry season when their productivity reduces (Lamidi and Ologbose, 2014). In Nigeria, many rabbit farmers use plants that grow around the homes or the farms and are of little or no economic value to the farmer. Such

plants some of which includes *Tridax procumbens*, *Aspilia africana*, and *Euphorbia heterophylla* are better described as weeds since they were not originally sown by the farmers. They grow in unwanted places and are not planted by the farmers. The use of these plants in feeding rabbits can be influenced by its availability which could be affected by the fluctuation in seasons, since these forages tend to be in abundance in the rainy season and scarce in the dry season. There is insufficient information on the preference of rabbits for such weeds when used as feed for rabbits. The use of these plants to feed rabbits could be better harnessed rather than remaining a nuisance in the environment as weeds. Hence, this study was designed to assess the preference for selected forages by rabbits.

MATERIALS AND METHODS

The experiment was a $3 \times 2 \times 5$ (3 contact times, 2 forms of forages as dry and fresh, 5 forage species) factorial design involving thirty (30) crossbred weaner rabbits of about five (5) - six (6) weeks of age procured from

reputable farms in Akure, Ondo state. The experimental animals were housed using deep litter system of production. The animals were separated into two groups (Group A and Group B) with fifteen weaner rabbits in each groups. The various groups of rabbits were sub-divided into 3 smaller groups (replicates) of 5 rabbits each. Animals in group A were offered fresh forages while those in group B were offered dry forages. Five forages which are readily available in the surrounding were selected, the selected forages include *Tridax procumbens*, *Euphorbia heterophylla*, *Alternanthera brasiliana*, *Aspilia africana*, *Tithonia diversifolia*. The forages were collected in the surroundings of Federal College of Agriculture, Akure livestock farm. Experimental animal were offered weighted quantity of pelletized concentrate in the morning (7am) while forages was introduced

in the evening at 5pm in a cafeteria arrangement. The forages were withdrawn after 3 hours and quantity of forages left was weighed. The forages left after the first 3hours of introduction was then returned into the pen and left until the following morning. The experiment lasted for a period of 14days. The experiment was then repeated after six weeks to help generate post weaning data. Clean water was offered *ad libitum* to the animals during the experiment. Coefficient of preference (CoP) was calculated as ratio between individual forage consumed and average intake of the five forages offered (Abu and Turner, 2017). All data generated were subjected to statistical analysis using SPSS version 21 and significant differences were separated using Duncan's Multiple Range Test (DMRT) of the same statistical package.

Pictures of Selected Forages used in the study



Tridax procumbens



Euphorbia heterophylla



Alternanthera brasiliana



Aspilia africana



Tithonia diversifolia

RESULTS

Table 1 shows the coefficient of preference (CoP) for weaner rabbits. From this result, it is observed that CoP was below unity (1) for all the parameter considered in this phase of the experiment. The nature of forage and time of exposure of rabbits to the forage did not have any significant effect ($p \geq 0.05$) on the preferences of the experimental animals. The rabbits preferred *Euphorbia heterophylla* over all other forages presented, *Euphorbia heterophylla* (0.44 ± 0.15) recorded the significantly highest value ($p \leq 0.05$) followed by *Tithonia diversifolia* (0.19 ± 0.09) while *Aspilia*

africana had lowest value ($p \leq 0.05$) for CoP. No significant effect ($p \geq 0.05$) was recorded for interaction between time of contact, nature of forages and forage types. Table 2 shows the coefficient of preference (CoP) for post-weaned rabbits presented with five selected forages in a cafeteria experiment. The coefficient of preference CoP was not significantly affected ($p \geq 0.05$) by all the parameter considered. CoP for *Euphorbia heterophylla* equal unity (1.00) making it the most preferred but was not significantly different from those of other forages considered.

Table 1a. Coefficient of Preference (CoP) of Weaner Rabbits Presented with Five Selected Forages in a Cafeteria Experiment

Duration Of Access	Nature	Forage Type	CoP
First 3 hours after forage was presented			0.20±0.16
After 3hours till morning			0.20±0.14
All night long			0.20±0.15
P-value			0.24
	Dry forage		0.20±0.19
	Fresh forage		0.20±0.09
	P-value		0.24
		<i>Tridax procumbens</i>	0.14±0.04 ^c
		<i>Euphobia heterophylla</i>	0.44±0.15 ^a
		<i>Alternanthera brasiliana</i>	0.12±0.04 ^{cd}
		<i>Aspilia africana</i>	0.11±0.05 ^d
		<i>Tithonia diversifolia</i>	0.19±0.09 ^b
		P-value	0.00
First 3 hours after forage was presented	Dry forage	<i>Tridax procumbens</i>	0.14±0.05
		<i>Euphobia heterophylla</i>	0.39±0.09
		<i>Alternanthera brasiliana</i>	0.11±0.04
		<i>Aspilia africana</i>	0.11±0.04
		<i>Tithonia diversifolia</i>	0.25±0.04
	Fresh forage	<i>Tridax procumbens</i>	0.13±0.09
		<i>Euphobia heterophylla</i>	0.53±0.18
		<i>Alternanthera brasiliana</i>	0.12±0.06
		<i>Aspilia africana</i>	0.08±0.03
		<i>Tithonia diversifolia</i>	0.14±0.10
		P-value	0.54

Mean ± SD. a,b,c means on same column with different superscripts are significantly different ($p \leq 0.05$)

Table 1b: Coefficient of Preference (CoP) of Weaner Rabbits Presented with Five Selected Forages in a Cafeteria Experiment (Continue)

Duration Of Access	Nature	Forage Type	CoP
After 3hours till morning	Dry forage	<i>Tridax procumbens</i>	0.15±0.04
		<i>Euphobia heterophylla</i>	0.33±0.04
		<i>Alternanthera brasiliana</i>	0.12±0.02
		<i>Aspilia africana</i>	0.14±0.05
		<i>Tithonia diversifolia</i>	0.26±0.04
	Fresh forage	<i>Tridax procumbens</i>	0.13±0.04
		<i>Euphobia heterophylla</i>	0.53±0.04
		<i>Alternanthera brasiliana</i>	0.13±0.05
		<i>Aspilia africana</i>	0.09±0.04
		<i>Tithonia diversifolia</i>	0.12±0.07
		P-value	0.54
All night long	Dry forage	<i>Tridax procumbens</i>	0.15±0.04
		<i>Euphobia heterophylla</i>	0.36±0.08
		<i>Alternanthera brasiliana</i>	0.12±0.03
		<i>Aspilia africana</i>	0.13±0.04
		<i>Tithonia diversifolia</i>	0.24±0.04
	Fresh forage	<i>Tridax procumbens</i>	0.13±0.07
		<i>Euphobia heterophylla</i>	0.53±0.15
		<i>Alternanthera brasiliana</i>	0.12±0.52
		<i>Aspilia africana</i>	0.09±0.04
		<i>Tithonia diversifolia</i>	0.13±0.09
		P-value	0.54

Mean ± SD. a,b,c means on same column with different superscripts are significantly different ($p \leq 0.05$)

Table 2a: Coefficient of Preference (CoP) of Post- weaned Rabbits Presented with Five Selected Forages in a Cafeteria Experiment

Duration Of Access	Nature	Forage Type	CoP
First 3 hours after feed was presented			1.00±0.17
After 3hours till morning			0.96±0.24
All night long			0.98±0.22
P-value			0.24
	Dry forage		1.00±0.24
	Fresh forage		0.96±0.21
	P-value		0.24
		<i>Tridax procumbens</i>	0.98±0.20
		<i>Euphobia heterophylla</i>	1.00±0.17
		<i>Alternanthera brasiliana</i>	0.94±0.30
		<i>Aspilia africana</i>	0.99±0.22
		<i>Tithonia diversifolia</i>	0.99±0.17
		P-value	0.76
First 3 hours after feed was presented	Dry forage	<i>Tridax procumbens</i>	1.00±0.24
		<i>Euphobia heterophylla</i>	1.00±0.15
		<i>Alternanthera brasiliana</i>	1.00±0.30
		<i>Aspilia africana</i>	1.00±0.12
		<i>Tithonia diversifolia</i>	1.00±0.20
	Fresh forage	<i>Tridax procumbens</i>	1.00±0.14
		<i>Euphobia heterophylla</i>	1.00±0.18
		<i>Alternanthera brasiliana</i>	1.00±0.12
		<i>Aspilia africana</i>	1.00±0.14
		<i>Tithonia diversifolia</i>	1.00±0.08
		P-value	0.76

Mean±SD. a, b, c means on same column with different superscripts are significantly different (p≤0.05)

Table 2b: Coefficient of Preference (CoP) of Post-weaned Rabbits Presented with Five Selected Forages in a Cafeteria Experiment (continue)

Duration Of Access	Nature	Forage Type	CoP
After 3hours till morning	Dry forage	<i>Tridax procumbens</i>	1.00±0.18
		<i>Euphobia heterophylla</i>	1.00±0.20
		<i>Alternanthera brasiliana</i>	1.00±0.39
		<i>Aspilia africana</i>	1.00±0.26
		<i>Helianthus annuus</i>	1.00±0.21
	Fresh forage	<i>Tridax procumbens</i>	0.91±0.22
		<i>Euphobia heterophylla</i>	1.02±0.18
		<i>Alternanthera brasiliana</i>	0.76±0.31
		<i>Aspilia africana</i>	0.96±0.32
		<i>Tithonia diversifolia</i>	0.98±0.21
		P-value	0.76
All night long	Dry forage	<i>Tridax procumbens</i>	1.00±0.21
		<i>Euphobia heterophylla</i>	1.00±0.17
		<i>Alternanthera brasiliana</i>	1.00±0.34
		<i>Aspilia africana</i>	1.00±0.20
		<i>Tithonia diversifolia</i>	1.00±0.20
	Fresh forage	<i>Tridax procumbens</i>	0.95±0.91
		<i>Euphobia heterophylla</i>	1.01±0.17
		<i>Alternanthera brasiliana</i>	0.87±0.26
		<i>Aspilia africana</i>	0.98±0.23
		<i>Tithonia diversifolia</i>	0.99±0.15
		P-value	0.76

Mean ± SD. a,b,c means on same column with different superscripts are significantly different (p≤0.05)

DISCUSSION

The nature of forage and duration of access of the forage had non-significant effect ($p \geq 0.05$) on the preferences in the rabbits. *Euphrobia heterophylla* was significantly ($p \leq 0.05$) the most preferred of all the forages presented during the experiment. At the post-weaned phase of the experiment, no significant ($p \geq 0.05$) difference was recorded for all the forages considered but *Euphrobia heterophylla* recorded the highest value of 1.00 ± 0.17 which was not significantly ($p \leq 0.05$) different from that of all other forages considered. Abu and Turner (2016) described that most preferred forage as those with CoP greater or equal to unity (1.00).

Euphrobia heterophylla is an annual plant often found as weed on cultivated and waste lands. The plant has milky latex present in both its stem and leaves. Kouakou et al. (2017) reported that *Euphrobia heterophylla* diet has a significant beneficial effect on the nutritional quality of animal products with the enrichment in polyunsaturated fatty acids, however high consumption of these plant by animals could have negative effect on the productivity animals. The roots and latex of the plant has also been reported by other authors (Nalule et al., 2017; Burkil, 1985) to be toxic when consumed. Ali et al. (2020) reported that leaves of *Euphrobia hirta* a member of the *Euphobia* family has laxative properties and fluid extracts from the leaves exhibited strong purgative effects when administered orally to rabbits and an *in-vitro* experiments with guinea-pig ileum suggest that the purgative effect is caused by an increase in intestinal motility (Mamillapalli et al. 2017). Nalule et al. (2017) reported that high dose of *E. heterophylla* extract can cause fatal vital organs damage, the researcher further reported that exposure of animals to these plants over a long period may lead to morbidity and/or mortality, caution should therefore be exercised in the use of *E. heterophylla* as feed. To reduce likely effect of the milky latex present in *E. heterophylla* the plant could be subjected to further processing like drying as this could reduce the milky latex present within the plant and its likely effect.

The high preference for *Euphobia heterophylla* could be as a result of the tender and succulent nature of the plant which could encourage rabbits to consume more of the plant (Beaulieu, 2021).

CONCLUSION AND RECOMMENDATION

From the result obtained in this study, it was therefore concluded that the rabbits preferred *E. heterophylla* over all other forages presented and the preferences of the rabbits did not change with age. The preference of rabbits in this experiment was not affected by nature of the forage nor by how long the forages remained with them in the pen. It is recommended that feeding trail should be carried out to study the effect of *E. heterophylla* on the performance characteristics of rabbits when used as feed either solely or in combination with concentrate.

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