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GROWTH DEVELOPMENT IN PRE-PUBERTAL FEMALE RABBITS FED CRUDE OIL (BONNY LIGHT) CONTAMINATED FORAGE

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ABSTRACT
This study was conducted to examine the effects of crude oil (Bonny Light Grade) on the growth potential of young female rabbits. Forty pre-pubertal female rabbits within the age bracket of 16-17 weeks were used for this study. These forty young rabbits were randomly allocated to five dietary treatment group (A-E) with the control group inclusive. All other conditions of management were similar. At the expiration of the experiment which lasted for 24 weeks, data collected were analyzed using the analysis of variance method and differences in means separated using the Duncan Multiple Range Test (DMRT) means. It was observed that growth was significantly depressed ($P \leq 0.05$) in the crude oil treated diets (B-E) with the lowest weight (1320.001 ± 10.00) (g) observed in rabbits fed the highest (0.20%) contaminated diet. Similar depressed observations were made in the animals fed contaminated forage on other parameters as feed intake and feed efficiency compared with animals in the control group.

Key words: Pre-pubertal, doe, crude oil, hydrocarbons, Niger Delta.

INTRODUCTION
The oil industry, due to its importance the world over has become a booming and lucrative business. But its exploration and exploitation is not without negative impacts on the immediate environment where these exploratory activities take place. Oil exploratory activity is usually characterized by periodic spills of varying magnitude. Infact, it has been known to always leave a devastating impact on the immediate environment where it spills and even leave far reaching effects when it spills in aquatic environment as water current carries it to far unimaginable areas (Da-silva *et al.*, 1997).

In the light of this, oil exploration has now been seen as a hazardous activity/business. Despite the hazardous nature of crude oil activities, it has continued to strife and nations depend on it for their livelihood. Nigeria is one of such nations. It is reported that oil exploratory activities started in Nigeria as far back in 1908 assuming a commercial dimension in 1956 when oil was first struck in Oloribiri town in present Bayelsa State (Ekweozor, 1989). Since then, production level has been increasing and Nigeria presently depends on it as her main source of economic life. The Niger Delta is the area where this main oil exploratory activity is domicile. Therefore a lot of these problems associated with oil exploratory activities are experienced in the Niger Delta area. Where oil spills, natural resources are usually contaminated and terrestrial and aquatic biota within the affected area suffer various degrees of devastated (Ovuru and Nodu 2005). Majority of the studies and data obtained on the consequences/effects of crude oil spillage on animal lives have been on marine lives (Geiger and Buikema 1982; Da-silva *et al*., 1997). However, few works available on terrestrial animals also indicated negative consequences of crude oil ingested on most parameters ascertained on them (Berepubo, *et al.*, 1994; Ovuru, 2002; Nodu, 2005).

This study therefore intends to add to the pool of data on similar subject. Rabbit is fast becoming a popular micro livestock that can easily solve the animal protein intake crisis in Nigeria since the rabbit is noted for its fast growth rate and high prolificacy. Yet because

rabbit depends mostly on forage, the animal becomes highly endangered in a situation of oil spillage contaminating vegetation in the affected area. It is against this background that this study is conducted to investigate the consequential effects of this hydrocarbon laden substance on the growth performance of young female rabbits.

MATERIALS AND METHODS

Forty (40) pre-pubertal female rabbits aged 16-17 weeks were used for this study. All the rabbits belonged to the medium breed of Chinchilla and New Zealand White procured from reputable farms in Port Harcourt. These farms are Kip-Link service livestock farm in Elibrada-Emohua and Rivers State Agricultural Development Programme (ADP) farm (livestock unit), Rumuodomaya-Port Harcourt. The initial mean weight of the rabbits was between 1.30 and 1.42kg. Prior to the commencement of the crude oil treatment, all the animals were acclimated for two weeks during which period they were subjected to same management. They were all administered prophylactic coccidiostat (25% embazin) and broad-spectrum antibiotics (terramycin soluble powder) with some vitamins like biovite during this pre-experimental stage. Their feed composed of uncontaminated grass/legume mixture of *centrosema pubescence* and *puereria phaseolides* (legumes), and, guinea grass *(panicum maximum)* and *brachiara mutica* as grasses.

Concentrate feed (growers mash) as recommended by Ibeanwuchi and Fajuyitan (1986) was also given as supplement feed while clean-cool water was provided *ad-libitum.* All the animals were housed in conventional single-tier wire hutches.

On commencement of the crude oil treatment, the forty rabbits were randomly allocated to 5 dietry group (A, B, C, D and E) using the simple Completely Randomized Design (CRD) method of experimental design. Each group comprised of 8 rabbits and each of these groups was further splited into 4 replicates of two animals' per-replicate. Animals in group A served as the control (Control group) while groups B-E served as the crude oil treatment groups. The treatment groups are as follows: Group A – no contamination (control).

Group B – 0.05% crude oil contamination;
Group C-0.10% crude oil contamination;
Group D-0.15% crude oil Contamination;
Group E-0.20% crude oil contamination level.

The concentrate feed was not however contamination. The graded contamination level of the forage using measured quantities of crude oil was done by simple mixing and homogenization. After the mixing, the contaminated feed (forage) was allowed sometime of 2-3hours of exposure and imbibitions to simulate actual spillage situation before being fed to the animals according to their treatment levels. Uncontaminated water was provided to the animals in all the groups' *ad-libitum.* The experiment lasted for 24 weeks during which period the initial weights and subsequent weights of the animals in each of the groups were taken on weekly basis including other needed data/ information. At the expiration of the experiment, the data collected were analysed using analysis of variance and Duncan Multiple Range Test (DMRT) (SAS, 1999) employed to separate means where differences existed. Mortality records were also taken. The mortality rates were however calculated in simple percentage as shown in the table.

RESULTS AND DISCUSSION

The result indicate significant differences ($P<0.05$) in the growth performance among the various groups especially when compared with the control group (A). The final weight (1320.00±10.00) (g) and weight gain (20.00±10.00) (g) were lowest in the animals fed the highest level of contaminated forage (0.20%). Rabbits in groups B, C, and D also fed the

graded levels of crude oil contaminated forage equally showed poor weight gains as 110.00±30.00(g), 50.00±20.00(g), and 30.00±20.00(g), respectively. However animals in the control group were not affected by this poor growth in weight gain (123.00±40.00) as shown in the table below.

The growth rate or body size of an animal is one major parameter of consideration in selecting animals on the farm and its one of the most important indices in mammalian toxicity studies (Heywood, 1981). The results in this study revealed a severe depression in growth response as the level of crude oil contamination in feed increased. This significant difference ($P<0.05$) in body weight gain as well as final body weight between the control animals and those fed crude oil contaminated forage is a conformation that crude oil is toxic and its ingestion is counter productive in livestock production (Berepubo *et al.,* 1994; Ngodigha *et al.,* 1998). The highest weight gain was observed among does in the control group, while the least mean weight gain was recorded among rabbit exposed to the highest level of crude oil contaminated feed. The final weights indicated growth depression among the treatment groups relative to the control group which lends credence to the general observation of suppressed growth or body weight gain in animals fed crude oil contaminated diets or other related toxic chemical substance (Heywood, 1981; Nwokolo *et al.,* 1984). Nwokolo *et al.,* (1984) had earlier reported a corresponding decline in the growth rate of poultry (chicken) exposed to feeds similarly treated with crude oil. Ngodigha *et al.,* (1998) similarly observed same in young West African Dwarf.

A corresponding decline in feed intake was also observed among the treated rabbits in groups B-E as compared to does in the control group (A). This result is in agreements with the reports of Berepubo *et al.,* (1984) and Yahaya, (2001). It was observed in this study that not only was there depression in feed intake, but there was outright rejection of feed by some rabbits, especially those in treatments D and E. This rejection of feed in some circumstance may not be unconnected with the pungent and repulsive smell of the crude oil as well as the unpalatability of the feed as a result of the contamination effect. In like manner, feed efficiency results showed great depression with increasing levels of percentage of crude oil contamination. The observed general suppression of body weight/growth rate in the animals (rabbits) fed crude oil contaminated forage is believed to be due to the toxic components of the crude petroleum, which also affected tissues, organs and consequently the general well being of the affected animals. Crude oil contains majorly the hydrocarbons like the alkanes (olefins), cycloalkanes (nephthenes) and alkanes-aromatics which have low boiling points and are associated with toxicity (Baker *et al.,* 1983; Da-silva *et al.,* 1997). These hydrocarbons interfere with the process of glucocorticoid production in the system which eventually suppresses energy production and utilization in the body of the animals (Ovuru, 2002). This, by implication therefore result in general weakness of the affected animal and eventual death in severe cases as revealed in the table. This may be a pointer to the observed mortality recorded in this study among the rabbits exposed to crude oil contaminated forage.

Mortality records indicate that animals in the crude oil treated groups (B-E) suffered casualties while no mortality was recorded among animals in the control group (A). It was observed that treatment E had the highest mortality of 4 (50%), followed by treatment C and D with 3 mortalities representing 37.50% in each group while treatment B had the least mortality of 25% among the treatment groups.

CONCLUSION

Growth rate is a major parameter in assessing the well-being of an animal. Therefore, maximum growth with corresponding body size is desirable in an animal for the profitability of a livestock venture, hence, good and proper feeding is required. This study however revealed that animals exposed to contaminated feeds especially crude oil contaminated diets

are subject to depressed growth which will eventually affect the overall performance of the animals. Again it confirms the fact crude oil is hazardous and not fit for consumption by animals.

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Table 1: Effect of crude oil contaminated forage on growth performance of young female rabbits.

	Treatment groups and levels of contamination (%)				
Parameter	**A (control)**	**B (0.05)**	**C (0.10)**	**D (0.15)**	**E (0.20)**
Initial Weight (g)	1320.00±10.00[b]	1420.00±10.00[a]	1400.00±10.00 [a]	1320.00±10.00 [b]	1300.00±10.00 [b]
Final Weight(g)	2540.00±30.00 [a]	1530.00±10.00 [b]	1450.00±10.00c	1350.00±20. 00d	1320.00±10.00 [d]
Weight gain (g)	1230.00±40.00 [a]	110.00±30.00 [b]	50.00±20.00 [c]	30.00±20.00 [c]	20.00±10.00 [c]
Total feed intake (g)	76.74±0.22a	16.13±0.07 [b]	14.55±0.25 [c]	13.05±0.12 [d]	10.29±0.36 [e]
Feed efficiency	0.016±0.00 [a]	0.0065 0.01±0.00 [b]	0.00360.00±0.01[b c]	0.00230.02±0.00[c]	0.00190.00±0.00[d]
Mortality rate (%)	0(0%)	2(25.00)	3(37.50)	3(37.50)	4(50.00)

Within row, mean ± SEM with different subscripts are significantly different (P<0.05). Figures in parenthesis are in percentage (%).