DEVELOPMENT OF GRASS-CUTTER FEEDING TASK PERFORMANCE MODULE FOR TEACHING ANIMAL HUSBANDRY IN SECONDARY SCHOOLS

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Abstract

The study developed the grass-cutter feeding task performance modules for teaching Animal Husbandry in secondary schools in Delta State using the research and development design. The study was guided by two research questions. The population of the study comprised of 1,144 Agricultural Science teachers in public secondary schools, and 22 grass-cutter farmers in Delta State. The sample size was 342 respondents, made up of 320 Agricultural Science teachers selected through Multi-staged stratified random sampling, and 22 grass-cutter farmers. A structured questionnaire titled "Grass-cutter Feeding Task Performance Module Questionnaire (GFTPMQ)" was used to collect data from respondents. The instrument was face validated by five experts. Split-half reliability method was used to determine the reliability of the instrument, which yielded a Spearman-Brown coefficient of 0.86, showing that the instrument is reliable. Mean ($\bar{x}$)and standard deviation were used to analyze the data collected from respondents. The results showed that both Agricultural Science teachers and grass-cutter farmers rated all the feeding tasks important and appropriate for inclusion into the grass-cutter feeding task performance module. It was therefore recommended amongst others that the grass-cutter feeding task performance module developed by the study should be adopted by schools, as well as skill acquisition centres for training students in grass-cutter production.

Keywords: Development, Grass-cutter Feeding, Task Performance Module, Animal Husbandry

Introduction

Grass-cutter (*Thryonomys spp.*), otherwise of cutting-grass or cane rat originated from Africa. According to Marani (2018), it is a non-ruminant wild herbivores rodent which belongs to the Class, *Mammalia* and Order, *Rodentia*. Grass-cutter are the biggest African rodent after the crested porcupine, measuring up to 60cm, and weighing between 2kg and 6kg (Jori, *et al.*, cited in Salau, *et al.*, 2017). Their meat has excellent taste and higher nutritional value when compared to other species of livestock (Opara, 2010). Anon (2013) added that grass-cutter meat is one of the most preferred meats in Africa, and it is also very expensive. Salau, *et al.* (2017) opined that the meat of grass-cutter is socially and culturally acceptable with no religious taboos against its consumption, and it is in high demand.

The value associated with grass-cutter has made it a viable venture with lots of opportunities that individuals can tap into. As such, the Animal Husbandry trade curriculum recommended that a minimum of 10 grass-cutter should be available in all school farms to aid the teaching of practical Animal Husbandry in secondary schools. Unfortunately, this policy has not been effectively implemented, as most secondary schools in Delta State do not have grass-cutters in their school farms (Iyeke, 2022). The only available option according to Iyeke, *et al.* (2021), is for Agricultural Science teachers to liaise with grass-cutter farmers to enable students get access to their farms and learn from them. This assertion was supported by Prosser's theorem number 1, 2, 3 and 7 that emphasized the need for learners to be trained by experienced instructors in the industry using the same tools and environment required in the occupation. But

the population of grass-cutter farmers in Delta State are still very few to meet the needs of secondary schools in the State.

Researchers, such as Akinola, *et al.* (2014); Aluko, *et al.* (2015); Ahaotu, *et al.* (2017) have attributed the decreasing rate of grass-cutter farmers in Nigeria to the challenges faced in the grass-cutter production industry. The most remarkable of them is grass-cutter feeding, especially during dry seasons when there is scarcity of fresh grasses.

The relevance of feeding in grass-cutter production cannot be overemphasized as it determines the survival, as well as the meat quality of the livestock. According to Useni, *et al.* (2018), feeding determines the growth rate, health status, reduces the problem associated with pregnancy and makes management easier for the farmer. Opara (2010) confirmed that the litter size of grass-cutter can be increased with good feeds. Similarly, Karikari and Nyameasem (2009) opined that efficient captivity of grass-cutter with high productivity requires adequate nutrition. Opara (2010) suggested that highly nutritive feeds and medicinal plants should be given to grass-cutters to ensure maximum productivity all year round since much has not been known on the synthetic drugs for preventing and curing diseases of grass-cutter which had resulted in 80% mortality during domestication. It is therefore important that grass-cutter farmers possess the requisite feeding skills to perform the feeding tasks, which they should also pass on to students attached to them.

Omole, *et al.* (2005) affirmed that the cost of feeding is a major factor in animal production as it constitutes about 70-80% of the cost of production. The feasibility of rearing grass-cutters in captivity with good litter size has been attributed by Adu, *et al.* (2005) to good feeding. Taiwo, *et al.* (2009) asserted that grass-cutters should be raised on feeds that are rich and balanced in nutrients. Olomu, *et al.* (2003) surmised that grass-cutters require the same 41 nutrients ordinarily required by other monogastric animals, which included thirteen (13) essential amino acids.

Grass-cutters are herbivorous animals that grow rapidly on compound feed (Gbolagada, 2008). Adu, *et al.* (2017) opined that grass-cutters are easy to rear as majority of their feed requirements can be sourced locally, as their feed composition contains leaves of plants, tubers, underground stems, food and grains. The conventional feeds fed to grass-cutter include cassava tubers, guinea grass, elephant grass, sugar cane stems, maize, pineapple tops, sweet potatoes, brewery by-products, among others (Ayodele in Etchu, *et al.*, 2012). Some grasses and plants that are highly utilized by grass-cutters during the dry and wet season have also been identified by Ebenebe (2005) as elephant grass (*Pennisetum purpureum*), sugar cane (*Saccharum officianarium*), maize (*Zea mays*), guinea corn (*Sorghum vulgare*), rice (*Oryza sativa*), gamba grass (*Andropogon gayanus*), herbaceous legumes like Stylo (*Stylosanthes spp*) and tropical kudzu (*Pueraria phaseoloides*), among others. However, Mensah and Okeyo (2005) reported that grass-cutters show high preference for elephant grass (*Pennisetum purpureum*) and guinea grass (*Panicum maximum*). Good carcass quality and highest live weight was reported by Henry and Njume (2008) when grass-cutters were fed 2000 KcalMEkg in combination with chopped elephant grass (*Pennisetum purpureum*). Wogar (2011) reported that forages and crop residues used in feeding grass-cutters in captives are nutritionally poor and not balanced for optimum growth of the animal which account for high wastage of the feed; thus, the need for feed supplementation with concentrate diet.

Mensah and Okeyo (2005) noted that irrespective of the kind of forage, grass-cutters first eat stalks, the bark of twigs and finally some leaves. This eating habit causes wearing of the animal's teeth, and unfortunately leads to high forage wastage (Adu, 2005). According to Schrage and Yewadan in Wogar and Ayara (2015), about 70-80% of the feed fed to grass-cutters goes to waste and only about 20% is utilized by the livestock. Awotwi, *et al.* (2007), Annor, *et al.* (2009) lamented that feeding grass-cutters remains a challenge during dry season since farmers apparently find it difficult to feed them due to the fact that forages are dry and usually of low nutritive value. This calls for the production of pellet feed to help curb the wastage and also

improve upon the nutritional composition of the grass-cutter feed (Scharage & Yewadan in Wogar & Ayara, 2015). Opara (2010) reported that the nutritional status of grass-cutters can be improved through the provision of pelleted concentrate for supplementary feeding using by-products like wheat bran, corn bran, groundnut, soya meal, oilseed, cotton seed cakes, brewer yeast, grain legume pods, brewers' grains, maize shucks and cobs. The aim of pelleting feed according to Behnke (2006), is to obtain feed with optimized physical and nutritional quality in order to meet the requirement for specific animal category (in terms of better feed intake and improved nutritional value). Pelleted feed for grass-cutters according to Annor, *et al.* (2009), therefore constitutes 70% forage, 20% concentrate, 1% oyster shells, 0.5% salt and 0.5% termite hill, with cereal flour or cassava dough (2.5%) as binders. However, Banjo, *et al.* (2012) showed that higher growth rate and feed utilization were recorded for grass-cutters fed multi-nutrient supplements, kitchen wastes and water hyacinth over pelleted diet.

However, Banjo, *et al.* (2012) reported that the use of synthetic growth promoters and feed additives in fattening operation, as well as the use of oxytocin and other synthetic hormones should be strictly avoided; instead, natural growth promoters like *Moringa oleifera* and non-synthetic drugs like extract from herbs which have been proved effective in the treatment of many diseases should be used. Opara (2010) asserted that the success of grass-cutter domestication as well as the availability of grass-cutter meat all through the year is presently dependent on nutritional and medicinal plants since much has not been known on the synthetic drugs for preventing and curing diseases of grass-cutter which results in 80% mortality during domestication. Olorun-Ni (2007) posited that there should be a constant provision of water for grass-cutters, especially before feeding them to normalize their health. Adu (2002) reported that the provision of water has been found to have positive effects on feed utilization, growth rate, health and reproductive performances, and lack of it partially responsible for digestive disorders leading to enterotoxaemia. Opara and Fagbemi (2009) had reported that the practice of not giving the animals water would be responsible for the high still birth weight.

It is therefore pertinent for Agricultural Science teachers to be skilled and have good understanding of how to perform the feeding tasks in grass-cutter production, which should be effectively taught to secondary school Animal Husbandry students to enable them develop functional skills in grass-cutter production, which is one of the objectives of the Animal Husbandry trade curriculum. The problem lies in the fact that Agricultural Science teachers available to teach Animal Husbandry in secondary schools were neither trained nor employed specifically to teach Animal Husbandry (Iyeke & Ikeoji, 2019). There is need to develop the feeding task performance module to enable teachers effectively teach feeding task to Animal Husbandry in secondary schools in Delta State.

Purpose of the Study

The purpose of the study was to develop the grass-cutter feeding task performance module for teaching Animal Husbandry in secondary schools in Delta State. Specific objectives included to:

i. determine teachers and farmers' importance ratings of the feeding grass-cutter task performance module for implementing Animal Husbandry in secondary schools; and
ii. outline the features of the grass-cutter feeding task performance module for teaching Animal Husbandry to secondary school students in Delta State;

Research Questions

The following questions guided the study:

1. What are the teachers and farmers' importance ratings of the feeding grass-cutter task performance module for implementing Animal Husbandry in secondary schools?
2. What are the features of the grass-cutter feeding task performance module for teaching Animal Husbandry to secondary school students in Delta State?

Methods

The study adopted the research and development design. The population of the study comprised of 1,144 Agricultural Science teachers in public secondary schools, and 22 grass-cutter farmers in Delta State. The sample size was 342 respondents; it was made up of 320 Agricultural Science teachers representing 28% of the population of Agricultural Science teachers in Delta State, selected through Multi-staged stratified random sampling from the three Senatorial Districts (137 from Delta North, 53 from Delta South and 130 from Delta Central); and 22 grass-cutter farmers.

A structured questionnaire titled "Grass-cutter Feeding Task Performance Module Questionnaire (GFTPMQ)" was used to collect data from respondents. The questionnaire which was made up of 18 items with regards to feeding task performance in grass-cutter production was designed on a rating scale of Very High Importance (VHI) = 5; High Importance (HI) = 4; Moderate Importance (MI) = 3; Low Importance (LI) = 2; Very Low Importance (VLI) = 1. It was face validated by three lecturers from the Department of Vocational Education (Agricultural Education Unit), and a lecturer from Measurement and Evaluation, Department of Guidance and Counselling, Delta State University, Abraka. Split-half reliability method was used to determine the reliability of the instrument, which yielded a Spearman-Brown coefficient of 0.86, showing that the instrument is reliable.

The instrument was administered to Agricultural Science teachers and grass-cutter farmers with the help of six (6) research assistants; out of 320 copies of questionnaire that were administered to Agricultural Science teachers, only 300 copies were completely filled and retrieved, indicating 93.75% return rate, 20 copies were retrieved from grass-cutter farmers, indicating 90.91% return rate.

Data collected were collated and inputted into SPSS Version 23 spreadsheet and analyzed with Means ($\bar{x}$) and Standard Deviations (SD). A cut off mean ($\bar{x}$) of 3.00 was used as the benchmark for accepting or rejecting each of the items. Any item with mean ($\bar{x}$) score greater than 3.00 indicated that they were rated important by Agricultural Science teachers and grass-cutter farmers for inclusion into the grass-cutter feeding task performance module, while those with mean less than 3.00, showed that they were not rated important by Agricultural Science teachers and grass-cutter farmers, and should not be included into the grass-cutter feeding task performance module. The items that were rated important by Agricultural Science teachers and grass-cutter farmers were further used to develop a training module on grass-cutter feeding that can be adopted by Agricultural Science teachers, as well as grass-cutter farmers to teach students for effective implementation of the Animal Husbandry trade curriculum in secondary schools in Delta State.

Results

Table 1

Mean ($\bar{x}$) and Standard Deviation Values of Feeding Task Performance Module Rated Important by Respondents for Grass-cutter Production (Agricultural Science Teachers, n=300; Grass-cutter Farmers, n=20)

		Agricultural Science Teachers			Grass-cutter Farmers		
S/N	Feeding Task Performance Module	Mean ($\bar{x}$)	SD	Decision	Mean ($\bar{x}$)	SD	Decision
	Ability to:						
1.	formulate feeds for grass-cutters	4.77	.429	Important	4.90	.308	Important
2.	purchase already prepared feed (concentrates) from the relevant market	4.50	.501	Important	4.25	.851	Important
3.	obtain appropriate fodder within the environment	4.66	.483	Important	4.65	.587	Important
4.	wash fodders to avoid pest infestations	4.67	.485	Important	4.60	.598	Important
5.	supply appropriate amount of fodder at regular intervals to grass-cutters	4.49	.501	Important	4.50	.513	Important
6.	supply correct quantity of concentrate feed to grass-cutters between 2-3pm	4.51	.501	Important	4.35	.489	Important
7.	supply water always to grass-cutters	4.45	.550	Important	4.75	.444	Important
8.	dry grassy fodder in the sun for 1-2 days before feeding them to grass-cutters	4.39	.547	Important	4.60	.503	Important
9.	combine concentrate with fodders fed to grass-cutters	4.62	.494	Important	4.70	.470	Important
10.	feed grass-cutters with multi-nutrient supplements	4.66	.481	Important	4.65	.587	Important
11.	feed grass-cutters with plant debris collected after clearing and harvesting, especially the leaves/stems of crops like maize, sugarcane, cassava	4.52	.500	Important	4.60	.503	Important
12.	feed grass-cutters with kitchen wastes	4.42	.587	Important	4.45	.605	Important
13.	feed grass-cutters with pellets that contains 70% forage, 20% concentrate, 1% oyster shells, 0.5% salt and 0.5% termite hill, with cereal flour or cassava dough (2.5%) as binders	4.74	.453	Important	4.75	.550	Important
14.	detect medicinal plants that can be fed to grass-cutters	4.68	.476	Important	4.55	.686	Important
15.	avoid the use of synthetic growth promoters/feed additives in fattening operation	4.52	.501	Important	4.40	.681	Important
16.	feed grass-cutters with feeds containing the 41 nutrients required by them	4.61	.496	Important	4.75	.444	Important
17.	feed gestating grass-cutters with 14% Crude Protein included in their diet	4.52	.500	Important	4.80	.410	Important
18.	feed weaning grass-cutters to provide enough breast-milk for their young	4.69	.472	Important	4.65	.587	Important
	Grand Mean ($\bar{x}$)	**4.58**	**.498**		**4.61**	**.545**	

Source: Field Work (2021)

Table 1 shows the grass-cutter feeding task rated important by Agricultural Science teachers and grass-cutter farmers for implementing Animal Husbandry trade curriculum. For item 1 to 18, a grand mean ($\bar{x}$) of 4.58 and standard deviation of .498 were recorded for Agricultural Science teachers, while that of grass-cutter farmers were 4.61 and .545, which were above the cut-off mean ($\bar{x}$) score of 3.00. However, each item recorded mean ($\bar{x}$) scores higher than the 3.00 cut-off mark, from the two groups of respondents. This implies that both Agricultural Science teachers and grass-cutter farmers rated all the feeding tasks important and appropriate for inclusion into the grass-cutter feeding task performance module for

implementing Animal Husbandry trade curriculum in secondary schools in Delta State. The feeding task with the highest mean ($\bar{x}$) scores was item 1 (ability to formulate feeds for grass-cutters) with mean ($\bar{x}$) scores of 4.77 from Agricultural Science teachers and 4.90 from grass-cutter farmers.

Table 2
The Grass-cutter Feeding Task Performance Module

Method (Co-operative Learning): Learners are shared in a group of 5, and advised to contribute meaningfully to the success of their groups as they complete the various tasks. A practical manual on grass-cutter production containing feeding tasks will be given before the commencement of the training.

Evaluation Guide: Evaluation should be done individually to ascertain if individual members of the groups contributed to the success of a particular task, and also if they understood how each task was achieved.

S/N	Feeding Tasks	Objectives	Task Contents	Tools and Equipment	Evaluation Guide	Time Allocation	
						Days	Hours
1.	Feed Purchase	Students should be able to purchase highly nutritive grass-cutter feeds from the market	Students are asked to go to the market to purchase pelleted grass-cutter feeds that contains the 41 nutrients	Training manual on feeding containing the nutrients and ingredients to look out for	Purchase highly nutritive feeds from the market using the feeding manual	1	2
2.	Feed Formulation I	Students should be able to list out the ingredients for formulating grass-cutter feeds	Looking at ingredients from the pack of the purchased feeds and the practical manual, Students are asked to list out the ingredients that can be used for formulating grass-cutter feed	Purchased feeds, training manual	Enumerate the ingredients for formulating grass-cutter feeds	1	2
3.	Feed Formulation II	Students should be able to select appropriate ingredients and measure the appropriate proportion needed	Students are asked to select from the ingredients provided and measure the appropriate proportion needed for formulating a grass-cutter field	Measuring scale, training manual, ingredients such as wheat bran, corn bran, groundnut, soya bean, oil seed, cotton seed cakes, brewer yeast, grain legume pods, brewers' grains, maize shucks and cobs, salt, oyster shells, forage, vitamins, bone meal	Using the presented materials, select appropriate ingredients for formulating grass-cutter feed, and measure the required proportion needed	1	3

4.	Feed Formulation III	Students should be able to grind the ingredients, pellet them and dry them afterwards	Students are asked to grind the ingredients with the grinding machine, pellet them with the pelleting machine, and dry them with the sun	Grinding machine and pelleting machine	Using the equipment provided, grind the ingredients, pellet and dry them	4	8
5.	Feeding Process I	Students should be able to feed grass-cutter with the right quantity of feed and water	Students are mandated to feed grass-cutters with the formulated feed and water, at least 2 times a day	Training manual on feeding, feeding troughs, drinkers	Use the provided materials to feed grass-cutter with the right quantity of feed and water	2	4
6.	Feeding Process II	Students should be able to pick kitchen wastes, plant debris and medicinal plants from their environment to feed grass-cutters	Students are asked to go round their environment and collect kitchen waste, plant debris and medicinal plants that can be used to feed grass-cutters	Training manual on supplementary feeds for grass-cutters	With the aid of your manual, pick kitchen wastes, plant debris and medicinal plants around you that can be fed to grass-cutters	3	6

Table 2 presented a fully developed grass-cutter feeding task performance modules for training Animal Husbandry students in grass-cutter production for implementing the Animal Husbandry trade curriculum in secondary schools in Delta State. Sub-tasks under the feeding task are feed purchase, feed formulation I, feed formulation II, feed formulation III, feeding process I, and feeding process II. Each of these sub-tasks were designed in such a way that the objectives, task content, tools and equipment, evaluation guide and time allocated for the task are clearly specified. Teachers/instructors are expected to guide students through these processes to accomplish each task.

Discussion of Findings

Table 1 showed that both Agricultural Science teachers and grass-cutter farmers rated all the feeding tasks as important and appropriate for inclusion into the grass-cutter feeding task performance module for implementing Animal Husbandry trade curriculum in secondary schools in Delta State. The feeding tasks are: ability to formulate feeds for grass-cutters, feed grass-cutters with feeds containing the 41 nutrients required by them, detect medicinal plants that can be fed to grass-cutters, obtain appropriate fodder within the environment, among others. The findings agreed with Adu, *et al.* (2005), Karikari and Nyameasem (2009) who stated that feeding task is very important in grass-cutter production because the feasibility of rearing grass-cutters in captivity with good litter size is connected to good feeding. Similarly, Useni, Muller and Cruywagen (2018) asserted that nutrition is vital in early attainment of puberty, ovulation and conception rates as well as survival of foetus, pregnancy and improved lactation.

The findings are also in line with Taiwo, et al. (2009), who reported that feeding tasks are very important because grass-cutters needs to be raised on feeds rich and balanced in nutrients. Supporting this view, Olomu, *et al.* (2003) stated that grass-cutters requires the same 41 nutrients ordinarily required by other monogastric animals, which include thirteen (13) essential amino acids. Opara and Fagbemi (2009) stated that grass-cutter farming requires

rations that include forage and concentrate diets, which should be formulated to satisfy the requirements for health and productive activity. Banjo, *et al.* (2012) posited that grass-cutters also thrives well when they are fed with kitchen wastes, plant debris collected after clearing and harvesting, especially the leaves and stems of crops like maize, sugarcane and cassava.

Table 2 presented a fully developed grass-cutter feeding task performance modules for training Animal Husbandry students in grass-cutter production for implementing the Animal Husbandry trade curriculum in secondary schools in Delta State. The grass-cutter feeding task performance modules developed by the study is in harmony with the one developed by Wombo and Oko (2018) on palm oil processing for youths in Bekwara Local Government Area of Cross River State. The task performance modules are also in line with that of Dumbiri (2011) on fish industry in selected Niger Delta States in Nigeria.

Conclusion

From the findings, it was concluded that the tasks and sub-tasks in grass-cutter feeding are important and appropriate for inclusion into the grass-cutter feeding task performance module, which were further used to develop the grass-cutter task performance modules. It is expected that the adoption of the grass-cutter feeding task performance module by Agricultural Science teachers and grass-cutter farmers in teaching Animal Husbandry to students will lead to the effective implementation of the Animal Husbandry trade curriculum in secondary schools in Delta State.

Recommendations

The following recommendations were made:

1. The grass-cutter feeding task performance module developed by the study should be adopted by schools, as well as skill acquisition centres for training students in grass-cutter production.
2. Seminars should be organized for Agricultural Science teachers, as well as grass-cutter farmers on how to use the use the grass-cutter feeding task performance module to train students.
3. Policy makers and curriculum planners should distribute this training modules to all schools to enable teachers get access to it.

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