



MINILIVESTOCK - THE INVALUABLE UNDERUTILISED GENETIC SPECIES FOR ENHANCED PROTEIN AVAILABILITY

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ABSTRACT: *The need to expanding the narrow food base especially protein of animal origin in quality and quantity for human and livestock has made Animal Scientists, Foresters and academic Zoologists to continue to beam their search lights on possible alternative sources of high quality animal protein. This has led to the evolving area of animal agriculture known as minilivestock production system. The term minilivestock includes small indigenous vertebrates and invertebrates which can be profitably and sustainably produced as food, animal feed, research work, income generation and lots more. Minilivestock comprise but not limited to the following: grass cutters, giant rats, guinea pigs, frogs, giant snails, manure worms, economic and edible insects (bees, grasshoppers and termites) including other mini species of livestock that are probably obtainable from the wild. Reptiles and small birds such as quails can be considered as eligible for minilivestock production status. Advantages abound if this unconventional animal agricultural system (minilivestock production) is adequately explored. These may include suitability for family backyard farming, source of employment, increase global food security, and environmental friendliness in the rearing process, indigenous adaptability and other yet to be mentioned merits of these unique but underutilised species. Minilivestock production if adequately encouraged will not only reduce unemployment but will also enhance food security.*

KEYWORDS: Genetic, Minilivestock, Protein, Species, Underutilised, Nigeria

INTRODUCTION

The desire to expand food animal has brought minilivestock production into the field of animal agriculture. Hardouinet *al.* (2003) asserted that over the years many large scale/intensive government and donor – sponsored animal production projects in the tropics have proved to be unsustainable. Probably as result of exorbitant initial capital outlay, large expanse of land required, high cost of feeding and management as feeding is known to be a major item of cost in animal production systems. To avert or reduce this negative trend, alternative livestock production should be sought. Opara (2010) added that with ever increasing human population and obvious protein shortages in Africa, there is the need for an exploration of other means to provide readily available and acceptable animal protein sources. Globally, wildlife has great potentials for meat production and serves as important source of highly desired animal protein to the people (Fonweban and Njwe, 1990). To this end, in 1985, in part response to this situation a new approach, ‘minilivestock’ was initiated, instead of indigenous land animals that have been used for centuries in the tropics through gathering, hunting and sometimes poaching (Hardouin, 1995). Wildlife domestication has



been recognized as a way of achieving this objective (Opara, 2010). Before now, minilivestock has been referred to as micro-livestock or unconventional livestock until 1992 when experts in the field of animal agriculture exchanged views and decided that only the term minilivestock should be used when speaking of animals such as edible rodents, guinea pigs, snails, frogs, manure worms, insects and similar animals when used for food, animal feed or as a source of income and other beneficial purposes (Hardouin and Stiévenart, 1993). Minilivestock has now been globally accepted as part of animal production systems. Food and Agriculture Organisation, Animal Production and Health Division has now incorporated minilivestock among the animal systems that falls within its remit, thus showing the acceptability and validity of the approach (Branckaert *et al.*, 1992). This paper review is aimed at creating more awareness about these ancient and unusual species with avalanche of benefits though underutilised.

THE CONCEPT OF MINILIVESTOCK

Hardouin *et al.* (2003) opined that any species living permanently or temporarily on the ground can be considered as minilivestock provided that: 1. It has potential benefits for humans, nutritional and or economic importance 2. It is well known in its area of adaptation or dispersion 3. It is not usually obtained by controlled breeding, although this may be possible. In addition, they include unconventional small size livestock that are currently not utilized to their full potentials. Many of these small species have been hunted, gathered and used by man for thousands of years but the concept of minilivestock production system is enhancing their domestication. Over exploitation or destruction of the natural habitat is endangering minilivestock species. Minilivestock could be vertebrate or invertebrate usually short cycled that are adaptable to the feeds in their locality and can be used by man as food, provide employment/or income and several other benefits such as research and as bio-instructional materials in educational institutions.

Areas of Minilivestock Production

Vermicultural Technology

Vermiculture is a system of rearing earth worms for specific purposes which may include rapid decomposition of organic residues which could be further used as organic fertilizer in crop agriculture. Manure worm can be fed alive to animals such as poultry and fish. Processed (dried) worms can be incorporated into livestock feeds as protein source. Earth worm can be cultured by accumulating household and farm organic residues thereby converting waste to wealth.

Entomophagy

From Greek, *éntomon* “insect” and *phagein* “to eat” is the consumption of insects as food. The eggs, larvae, pupae and adults of certain insect species have been eaten by man since prehistoric time and continue to be an item of human nutrition in modern times. Edible insects such as termites, crickets and grasshoppers are taken as sources of protein by many people in the developing countries. The avalanche of nutritional benefits that can be derived from edible insects by human and livestock has engendered the incorporation of insect culture into minilivestock production system.



Rodenticulture

Rodents are adaptable, prolific and short cycle game animals. They are fast becoming endangered or extinct species in developing countries because they are well hunted for as a result of their nutritious carcasses that go for reasonable prices. Local hunters kill rodents from the wild for sales as means of livelihood. The advent of minilivestock production has encouraged the rearing of rodents in confinement for many human uses which include food, income, employment, foreign exchange and research. Rodents that are commonly raised in captivity include: Guinea pig (*Caviaporcellus*), Squirrel, Giant rat and Grass cutter (*Thryonomyspp*). Meat of rodents especially Grass cutter has higher protein value and lower fat content compare to some domesticated livestock meat. It is also appreciated for its tenderness, texture and palatability. Rodents are highly adaptable and can flourish with local feed materials.

Heliciculture (Snail Farming)

Snail originates from the wild; they are good source of food for man and livestock. In recent years, snail farming has been on the increase and research on snail and snail production has been aggressively intensified. Heliciculture is the scientific process of raising or farming edible terrestrial snail for human consumption. In Nigeria, snails are raised in small pens mainly as a backyard activity to supplement household income and nutrition or as large scale commercial business. Snails could be gathered from the wild for domestic or commercial purposes in addition to farming edible snails. As a result of alteration in the natural ecosystem through various human activities, obtaining snails from the wild is becoming intensively difficult, hence, snail production as a component of minilivestock technology is highly rewarding. Snail farming has a lot of benefits which include but not limited to the following:

1. Source of protein to man and livestock.
2. A good source of employment for the producers and marketers.
3. The shell can be used in the production of livestock feeds and.
4. It can be used as an educational and resource material among others.

Apiculture (Beekeeping)

Honey is nutritious and medicinal product obtained from bees. Traditionally, honey is harvested from the wild bees but it is noticeable that gathering this important product (honey) from the wild could be dangerous and unsustainable. However, beekeeping has formed a major component of minilivestock production and much is being done in Africa to improve beekeeping and to de-emphasis dependence on wild bees for honey production and consumption. This practice has been found to improve beekeeping and has shown to improve farmers' income under favourable conditions. Apiculture has relatively reduced honey hunting in Ondo State, Nigeria as the government is viewing it as an alternative enterprise for employment and revenue generation. Honey and wax are both widely used as medicine, health food and traditional crafts such as candle making.

Quail Production

This is raising of quails like other poultry birds for meat and egg production. More recently, birds like quails have been considered as eligible for the status of minilivestock (Ogunniyet *al.*, 2015). Quails are among the smallest species of poultry birds that hold quantum of



benefits for man and farming them has proved to be lucrative and enterprising. Today, farming quails for meat and egg production has spread throughout the world. The meat and egg of quails are very tasty and nutritious. Quail eggs are more nutritious than other poultry eggs because they contain relatively more protein, phosphorus, iron, vitamins A, B₁ and B₂. Increasing the production of these small sized birds can play a very vital role in curbing global food inadequacies and protein deficiency. Quail farming business requires low capital, less labour and can be raised alongside other larger poultry birds for their high quality meat and egg which are low in fat but high in other nutrients.

Edible frog Production

Frog meat is considered a delicacy in some countries including Nigeria. Currently, frog culture is uncommon in Nigeria but most people obtain them from the water bodies in the wild for personal consumption or processed into dried meat and sold to lovers of the delicacy. In their natural habitat frogs live in streams, ponds, water canals, rice folds and fadamas (waterlogged land) where insects thrive. They feed on soft plants growing in water, insects, cooked flour products, boiled potatoes, visceral, earthworms etc. Frogs can be included in livestock feed if economically produced.

General Importance of Minilivestock Production

Minilivestock production could be a cheap source of protein to humans and animals if well harnessed. The conventional protein sources have become so competitive and inadequate to meeting the protein needs of man and livestock, hence the need to seek for alternative protein sources and minilivestock can serve as a credible reliable alternative. Minilivestock can have some foreign exchange benefits when exported to other countries. Live animals or processed products can be exported as foreign exchange. The production of minilivestock requires less space or land compare to large expanse of land required for the conventional livestock farming hence it is suitable for backyard or in-house production system which is practicable in urban setting. The cost of production in terms of feeding, land requirement, labour cost and housing is lower compare to what is required for larger animals. Minilivestock like cane rat, snail, guinea pig are good research materials in which the outcome of the research can be used to further food production and enhance human health. The fact that some individuals are engaging in minilivestock production either on a commercial or subsistence basis has reduced the problem of unemployment in developing countries. Because minilivestock requires less space, its production can be practiced in urban settings since urban areas are known with the problem of inadequacy of land. The commercialization of minilivestock production will help to reducing hunting and poaching especially in developing countries where wild animals are hunted for food and livelihood. Therefore, minilivestock production will help to preserve our bio-diversity that is near extinction. It can also be combined with many other activities or practiced on part time basis or as a hobby. Minilivestock can easily be incorporated to the already existing farming systems to promote economic diversification. Due to the small size and docility of some of these unique stocks, they can be raised by most people such as old, young, male or female. More so, no special skill is required in raising minilivestock. Minilivestock like snail has high reproductive capacity and are very prolific. The meat quality of minilivestock is also very high and is comparable to the meat quality of other conventional animals. The income generating capacity through minilivestock production will be maximized if adequate attention is given to its production.



MINILIVESTOCK IN NIGERIA EDUCATION SYSTEM

In order to further disseminate appropriate information on minilivestock and enable the teaming Nigeria students acquire basic knowledge in minilivestock production, minilivestock production as a component course in animal health and production technology has been integrated into the curriculum of the education system of Polytechnics and Colleges of agriculture. This course has eight (8) points' objectives which at the end of the course the students should be able to:

1. Know the history and development of minilivestock industry in Nigeria.
2. Understand the biology of minilivestock'
3. Know the distribution of minilivestock in Nigeria.
4. Know the methods of minilivestock farming.
5. Understand the nutrition of minilivestock.
6. Know the health problems of minilivestock, their prevention and control.
7. Know the different types of housing provided for minilivestock and.
8. Understand the various production records kept in minilivestock farming.

The course content also consists of practical activities alongside class work to equip students with minimum requirements for minilivestock production. It is also heartwarming to note that some Nigerian universities offer it as micolivestock as part of course content to further boost protein availability.

CONCLUSION

Minilivestock species are valuable and under underutilised genome which if given adequate attention can contribute substantially to the nutrition and economy of developing nations. There is need to further intensify the importance and usefulness of these invaluable genetic resources through organized extension services. Animal scientists should research more to improve on the existing minilivestock species to enhance high quality protein availability. More so, Lecturers, Technologists and Trainers need appropriate minilivestock training to widen their scope of knowledge in minilivestock production.

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