A NOTE ON THE POSSIBILITIES OF ARTIFICIAL INSEMINATION IN DROMEDARY (*Camelus dromedarius*) IN SEMI ARID ZONE OF NIGERIA

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ABSTRACT

The objective of this study was to identify the possibilities of Artificial Insemination (AI) in dromedary camel and also to come up with the challenges of the production system in the semi-arid zone of Nigeria. The potentialities of camels to sustain the lives of the pastoralists living in the marginal lands of the study area cannot be allowed to be neglected. In some parts of the world, despite the AI associated problems, it was reported to be practicable. Several technical components such as training of the bull, provision of underground room for semen collection, provision of suitable Artificial Vagina (AV), adequate semen storage facilities among others shall be provided. In conclusion, the practice of AI in dromedary camel in the study area is possible if researchers devoted more time and funding agencies deployed more resources with intensive agro-livestock extension services.

Key words: Dromedary, AI, semi-arid zone, possibilities, semen collection

INTRODUCTION

Camel is a potential animal which is serving millions of people especially in arid, semi arid, mountainous and desert areas of the world. It provides milk, meat, hides, hairs, wool and transportation. Camel is also considered as status symbol in many of the areas in the tropical countries (Johnson, 1988). Although, camel cow is considered to be a seasonal breeder with a marked peak in sexual activities throughout the season (Wilson, 1984), in some tropical environments, it is possible that camels kept under high levels of nutrition and management would show oestrus throughout the year. However, despite the camel's considerable contribution to food security in semi dry and dry zones and its being a major component of the agro-pastoral systems in vast pastoral areas in Africa and Asia, little is known about its reproductive potential compared to other domestic livestock (Simenew *et al.*, 2012). Researchers and government funding agencies in the study area have been very reluctant to act on camel research for reproductive improvement. Data on camel reproduction potential obtained with respect to the study area is very scanty or not available. Although, some research work has been done in nutrition and health, but the area of reproduction and Artificial Insemination (AI) in camel has been scanty. Therefore, this paper is aimed at addressing the potentials, challenges and possibilities of AI in the study area.

CAMEL PRODUCTION SYSTEM IN SEMI-ARID ZONE, NIGERIA

Almost all the camels are kept by rural dwellers in a very extensive system that use few inputs and have relatively low outputs Musa (1990). Some form of migration, transhumance or nomadism, over

shorter or longer distances, is usually a basic feature of this production Wilson (1998). Camel production in most parts of the tropics is under extensive system of management where there is inadequate feeding and poor nutrition, poor or unavailability of housing, poor veterinary medication and veterinary extension services, environmental hazard, diseases and poor marketing system Allen *et al.*, (1992). The most important constraint to camel production and management in Nigeria is nutrition Rathroe (1986). The feed resources available meant for camel are the natural browse plant species with limited crop–residues Phoenix (1995). Farmers in northern Nigeria could be described as exploiters of camels rather than producers. However, camel is gradually being integrated as an essential part of the pastoral daily life in the region Musa (1990). The degree of increase in human population pressure and the declining of per capital production of food in Africa resulted in an urgent need to develop some neglected marginal resources, such as the semi-arid and arid rangelands and to optimize their utilization through appropriate livestock production systems among which camel production is certainly the most suitable (Mehari *et al*., 2007).

CHALLENGES OF CAMEL PRODUCTION IN SEMI-ARID ZONE, NIGERIA

Camel farming systems are changing over time, sedentary camel farming system is dominating transhumant and nomadic camel farming systems in some parts of Asia (Aujla *et al.,* 2012) while in the semi-arid regions of West African sub-region, camel herders maintain migratory system to switch-off between rainy and dry seasons. Under transhumant and nomadic camel farming systems with consideration of its feeding habit, camel has almost no competition for feed with other animals as it is a hardy animal, selective and comparatively eats less (Ahmad *et al.,* 2010). Due to gestation length and seasonality of breeding, calving practice occurs every two years. The long calving interval is attributed to lengthy gestation, limited breeding season and late post-partum oestrus which is frequently one year after parturition (Mukasa-Mugerwa, 1991).

CAMELS' PRODUCTION AND REPRODUCTION CYCLE

The repetitive form of reproductive cycle in camels is related to the season and climate under which they survive. The favorable conditions out of which camels breeds is between November and January and or February Ali *et al.,* (2009). Male and female camels reach puberty between the age ranges of 3 to 4 years respectively. After conception, if the pregnant camel cow is beaten on her neck or she is made to run fast, the fetus may be aborted. Since there is no organized breeding strategy in camels under traditional / nomadic production system, all breeds are getting mixed-up due to lack of proper selective breeding Mukasa-Mugerwa, (1991). The young females are randomly exposed to the breeding male at the age of 3 and 4 years. However, gestation period is about twelve and a half month. Usually the calving interval is 24 months but if the female is well managed, then the calving interval may be reduced to 18–20 months. The female also has the ability to produce twins but in rare occasions and the survivability of the twins is scientifically challenged. A female with a life span of 35 years would produce between 6 and 8 calves and above in her life time depending upon the breeding pattern and management Ghude, (2017).

POSSIBILITIES OF ARTIFICIAL INSEMINATION IN CAMELS IN SEMI-ARID ZONE, NIGERIA

As Artificial Insemination is obtainable in cattle production systems as well as small ruminants, an attempt of practicing AI in camel production is yet to be a successful one. Presently, there is no established farm majored in camel production in commercial perspective located in the Nigeria's Semi-Arid Zone. Most of the farms in the semi-arid zones are concentrated either in poultry, sheep, goat and or cattle production. The few number of camels kept on these farms are not in any way operating commercially. Nomads of sedentary extraction and migratory herders own the camels and operate at subsistence level (Ghude, 2017). There are many questions that remains open concerning the possibilities of AI. According to Yagil, (1985) who reported that the selection of camels for milk production is rather difficult due to the fact that they are later maturers. Selecting the best male would mean that camel bull would be at least 14 years old before an adequate data on his daughters' performance could be ascertained.

Possibilities: Although, less attention has been given to camel production improvements for many years when planning national development, the potential of Dromedary is generally underestimated for different reasons. With adequate research program and agro-livestock extension services in camel area of production, herders will embrace the potentialities of AI (Ghude *et al.,* 2010).

ASSOCIATED PROBLEMS OF ARTIFICIAL INSEMINATION IN CAMELS

One of the most important factors affecting productivity of the camel is the low reproductive performance. The efficiency in semen collection as guaranteed a quality semen preservation for AI is very important. Maintenance of high levels of reproduction is essential not only for profitable production but also to provide ample opportunity for selection and genetic improvement for optimum production, growth and reproduction efficiency. However, the collection process itself may in fact be the cause of poor fertility or inferior semen quality, Hurtgen (2000). Other problems of scientific concern was the copulation position of camels that takes place on a sitting (couch) position with longer duration and slow process of ejaculation. Therefore, collection of semen from camel using electro–ejaculation technique requires tranquility of the animal with special restraint. Also, the ejaculate has lower volume and poor quality in addition to the possibility of contamination with urine and some cellular debris (Tibari and Memon 1999).

Semen collection: It was believed that semen collection in camel bulls are very difficult, tasky and laborious compared to other species of livestock. Camel bull meant for semen collection must be well trained. The positional presentation during copulation is unique. To achieve that, an underground room need to be constructed with entrance and exit to allow the collector have access to the ejaculate with minimum interruption. A new AV was designed and developed for camel bull after a trial with that of cattle bull, ram and boar. The modified AV is measured 30cm in length. The AV was designed to make the guidance of penis easier (Hemeida *et al.,* 2001).

RECOMMENDATION

Accordingly, research to develop a system of AI is necessary in order to improve on the breeding program of camels. The possibilities of semen collection methods, handling of the semen, development of suitable extenders, deep freezing among other technical approach should be adopted and be made available. However, the Camel and Equine Research Program and AI Unit of National Animal Production Research Institute (NAPRI), Ahmadu Bello University, Shika – Zaria shall be well funded to carry–on with the research and implementation. Adequate agro-livestock extension services by NAERLS, ABU, Zaria should be encouraged and funded.

CONCLUSION

Dromedary are extremely important livestock specie in the arid and semiarid zones in Asia and Africa. They contribute significantly to the livelihood of the pastoralists and agro-pastoralists living in the fragile environments. However, camel shall not be considered as an animal that provided essential needs to pastoralists and reproduce naturally. Therefore, the study concluded that AI in dromedary camel from the study area is possible if the researchers will pay more attention and funding agencies deploy more resources along with the sensitization of the camel herders through adequate agro-livestock extension services.

REFERENCE

Ali, I., Shafiq Chaudhry, M. and Farooq, U. (2009). Camel (*Camelus dromedarius*) Rearing in Cholistan Desert of Pakistan. *Pakistan Vet. J., 29(2): 85-92.*

Aganga, A. A. and Tshwenyane, S. O. (2003). Feeding value and anti-nutritive factors of forage tree legumes. *Pakistani Journal of Nutrition*, 12(2): 170–177.

Ahmad S., M. Yaqoob, N. Hashmi, S. Ahmad, M. A. Zaman, and Tariq, M. (2010). Economic importance of camel. Pakistan Vet. J. 30 (4): 191-197.

Ahmad, K. (2012). Frequency of milking dromedary cow and quantity produce. *Journal of Dairy Technology and Research*, 4(2): 61–65.

Aujla K. M., Husssain, M. and Hassan, S. (2012). Marketing of live camels and camel products in Pakistan. An unpublished report of Social Sciences Division, Pakistan Agricultural Research Council, Islamabad.

Ghude, M. I., Maigandi, S. A. and Garba, Y. (2010). Study on the Reproductive Performance of one Humped Camel (*Camelus dromedarius*) in a Fragile Ecosystem of Nigeria. Proceedings of the 35th Annual Conference of NSAP held at University of Ibadan, Ibadan, Oyo State. March 14th – 17th 2010. Pages 143–146.

Ghude, M. I., (2017). Dromedary camel milk yield, composition and diet selectivity in selected locations in North–Western Nigeria. A PhD Thesis submitted to the Department of Animal Science, Bayero University, Kano–Nigeria. Pp 196.

Hemeida, N. A., El–Eknah, M. M., Ismail, S. T. and Haider, A. K. H. (2001). A New Technique for Collection of Semen from Dromedary Camels. *Emir. J. Agric. Sci. (13): 18–22.* *http://www.cfs.uaeu.ac.ae/research/ejas.html*

Hurtgen, J. P. (2000). Semen Collection in Stallion in Equine Breeding Management and AI. Eds J. C. Samper. W. B. Saunder Corporation, Philadelphia. Pp 81 – 90

Johnson, T. (1988). Camel Production in the Arid Zones. Macmillan publication, London, U.K. Page 112-114

Mehari, Y., Mekuriawb, Z. and Gebru, G. (2007). Potentials of camel production in Babilie and Kebribeyah woredas of the Jijiga Zone, Somali Region, Ethiopia. *Livest. Res. Rural Dev., 19: 4-7.*

Mukasa-Mugerwa, E. (1991). The camel (Camelus dromedarius). A bibliographical review. ILCA Monograph, Internat. Livestock Centre for Africa, Addis Ababa, Ethiopia.

Simenew, K., Dejen, T., Tesfaye, S., Fekadu, R., Tesfu, K. and Fufa, D. (2013). Characterization of Camel Production System in Afar Pastoralists, North East Ethiopia. *Asian Journal of Agricultural Sciences 5(2): 16-24.* ISSN: 2041-3882; e-ISSN: 2041-3890. Tibary, A. and Nemon, M. A. (1999). Reproduction in the Male *Camelidae*. *Journal of camel Practice and Research.* 6:235–245Pp

Wilson, R. T. (1994). The Camel. Longman Publishing Company Limited. London, New York, 83-101.

Yagil, R. (1985). The Desert Camel (*Camelus dromedarius*). Verlag Karger, Basel, München.