A REVIEW OF POULTRY PRODUCTION IN NIGERIA AND FERTILITY ISSUES: THE ROLE OF GINGER (*Zingiber officinale*) AND BLACK SEEDS (*Nigella saiva L.)* AS NATURAL FERTILITY BOOSTERS

[1]*Torhemen, M., [2]Torhemen, L.N.,[3]Poloma, A.B., [4]Ahmed, A.S., [5]Onuche, J., [5]Enefola, I.M., [6]Andrew, F., [7]Suleman, Z. and [8]Adegbe, J.Y.

[1]Department of Animal Husbandry, Akperan Orshi Polytechnic, Yandev, Nigeria
[2]Depertment of Animal Nutrition, Joseph Sarwuan Tarka University, Makurdi, Nigeria
[3]Department of Animal Science, Federal University, Kashere, Nigeria
[4]Department of Animal Science, Federal University, Dutsin Ma, Nigeria
[5]Department of Animal Health and Production Technology, Kogi State Polytechnic, Itakpe Campus, Nigeria
[6]Department of Animal Health and Production Technology, Federal College of Horticulture, Dadin Kowa, Nigeria
[7]Department of Animal Science, Saadu Zungur University, Gadau, Bauchi State, Nigeria
[8]Department of Agricultural Technology, Federal Polytechnic, Oko, Anambra State, Nigeria
*Corresponding author: mikeubi@yahoo.com; +2348034426227

ABSTRACT
The Nigerian poultry industry stands as a cornerstone of the nation's agricultural landscape, serving as a linchpin for food security, employment opportunities, and income generation for a vast number of Nigerians. Fertility can be affected by the quality of brood stock, male: female ratio, environmental temperature, storage time and housing system. fertility depends on the ability of females to ovulate. store sperm and provide an appropriate environment for the formation and development of the egg. The quality and quantity of semen deposited by the male were important to obtain good fertility. The use of photogenic feed additives (PFAs) is an object of increasing interest due to its food safety. In Nigeria several plants such as ginger, black seed cinnamon, cloves, celey, onion, cardamom and garlic have been identified to have medicinal and nutritional potency and have been use to enhance fertility in male and female animals (Ahmed etal 2020) and the female. Photogenic feed additives improving body weight, feed efficiency ratio, and increased viability of chickens It was concluded that the poultry industry occupies an important place in the Nigerian Agricultural systems, fertility is an important issue that needs to be addressed, Ginger and black seeds helps in boosting fertility in poultry It was recommended that the use of natural products like ginger and black seeds should be encouraged I n boosting fertility in poultry.
Keywords: Black Seeds, Boosters, Ginger, Fertility, Poultry, Review

INTRODUCTION

Poultry production has been suggested as one of the ways of massively producing animal protein food sources such as meat and eggs because of their relatively shorter generational interval , high growth rates and the fact that its production capacity is quite profitable (Andam *et a*l., 2020)Globally , poultry production provides high quality affordable animal protein , a high chance for investment, job opportunities and a source of income for small holders worldwide (Attia, 2020) The demand for livestock production such as poultry is increasing in Nigeria due to population growth and urbanization (Sonaiya, *et a*l 2020)

The Nigerian poultry industry stands as a cornerstone of the nation's agricultural landscape, serving as a linchpin for food security, employment opportunities, and income generation for a vast number of Nigerians. This sector, as underscored by Oladimeji *et a*l. (2017), plays a pivotal role in sustaining the nutritional needs of the population while also serving as a key driver of economic activity. The intricate web of interconnected benefits that the poultry industry underscores its critical importance within the broader context of Nigeria's agricultural economy.

In recent years, the Nigerian poultry industry has witnessed a remarkable trajectory of growth and development, propelled by a surge in demand for a diverse array of poultry products. The burgeoning appetite for chicken, duck, turkey, and guinea fowl, as noted by Adebayo *et al*. (2018), has fueled the expansion of this sector, reshaping its dynamics and reinforcing its significance within the national economy. This surge in demand not only reflects changing consumer preferences but also underscores the industry's capacity to adapt and evolve in response to shifting market forces.

At the heart of the Nigerian poultry industry's growth lies a complex interplay of factors that have converged to create a fertile environment for expansion. The industry's ability to meet the evolving needs of consumers, coupled with advancements in production techniques and technology, has enabled it to scale up operations and enhance

efficiency. Moreover, the sector's role in job creation and income generation cannot be overstated, as it serves as a vital source of livelihood for millions of Nigerians across the country.

Beyond its economic contributions, the Nigerian poultry industry plays a crucial role in bolstering food security and ensuring access to nutritious food for a significant portion of the population. By providing a steady supply of high-quality poultry products, the industry helps bridge the gap between demand and supply, thereby reducing reliance on imports and strengthening the nation's food self-sufficiency. This, in turn, has far-reaching implications for public health, poverty alleviation, and overall economic development.

As the Nigerian poultry industry continues to chart a path of growth and expansion, it is poised to assume an even greater role in shaping the country's agricultural landscape. By leveraging its strengths, addressing key challenges, and embracing innovation, the industry holds the potential to not only meet the growing demand for poultry products but also drive sustainable development and prosperity for the nation as a whole.
Torhemen *et al,* (2022) called for a more efficient poultry production system, considering its importance in animal protein supply.

The use of photogenic feed additives (PFAs) is an object of increasing interest due to its food safety. In Nigeria several plants such as ginger, black seed cinnamon, cloves, celey, onion, cardamom and garlic have been identified to have medicinal and nutritional potency and have been used to enhance fertility in male and female animals (Ahmed *et a*l 2020) and the female. Photogenic feed additives improving body weight, feed efficiency ratio, and increased viability of chickens (javandel *et al,* 2008).

Infertility is a major concern in the poultry industry, leading to significant economic losses. To avoid the residual or/ and cumulative effect of antibiotics or synthetic drugs in final poultry products, which have an adverse effect on human health, researches have recently directed to use herbs, seeds, and edible plants as natural feed additives. Herbs have some medical properties and pharmacological activities that could help in improving productivity, physiological and immunological performance or plasma biochemical parameters of poultry (Abaza, 2001). Black seed (*Nigella saiva L.)* which is an herbaceous plant, grows.

In poultry industry, fertility of broiler breeders is of major concern to ensure maximum economic returns from the number of chicks produced per hen housed (Bramwell*et al*, 1995). Fertility (F) problems are often associated with broiler breeder males (Hocking, 1990). It is known that the F declines markedly pronounced cocks spermatozoa in a given ejaculate (Lake, 1989; Sexton *et al*., 1989). In addition, there was a reduction in libido and in successful copulation of aging males (Wilson *et al*., 1979).

Fertility can be affected by the quality of brood stock, male: female ratio, environmental temperature, storage time and housing systems, Brillard (2003) reported that fertility depends on the ability of females to ovulate. store sperm and provide an appropriate environment for the formation and development of the egg. It has also been reported that the quality and quantity of semen deposited by the male were important to obtain good fertility. (Brillard 2003; and Mohan *et al.* 2018).

Brillard (2003) stated that fertility depends on the ability of females to ovulate, store sperm and provide an appropriate environment for the formation and development of the egg. Infertility caused by male management problems is common. Problems may be caused by an inadequate number of healthy males or because males have reduced sperm production resulting from chronic diseases, inadequate feed intake, or starvation (harsh feed restriction). However, obese females may be less efficient in transporting sperm to the infundibulum, resulting in reduced fertilization of the ovum as it is released from the ovary. The male must be dominant to the females, or mating will not occur.

According to (Chowdhury*et al,* 2004), heat street causes a decrease in the number or germ cells, ovular release, fertilization and several capacity of the embryo and abnormalities in sperm of the Northern Pintail duck (Penfold*et al.,* 2000). The latter decreases deposition of sperm in the host gland in the reproductive system of female (Brillard, 2003; Abd El-Hack *et al.,* 2018). Male poultry require Vit E to maintain normal testis development (Hooda *et al.,* 2007), and thus spermatogenesis, which could explain the increases in the semen volume and sperm concentration.

This review highlights the importance of the poultry industry in Nigeria, fertility/reproductive issues and the effects of ginger and black seeds Understanding this interaction is essentials for optimizing poultry breeding practices and improving reproductive performance and hence increased poultry production

REVIEW AND DISCUSSION

Fertility Issues in Poultry

One of the important factors that affect reproductive age, semen quality, and the rooster reproductive potential, is nutrition (Jorsaraei *et al*., 2008). It appears that the administration of natural or artificial antioxidants in the diet can reduce the amount of oxidative stress in sperm and improve semen quality and increase sperm fertility (El-Shahat *et al*., 2009). Oxidative stress in semen leads to the lipid peroxidation of the cytoplasmic membrane of the sperm, the damage of the acrosomal membrane, the oxidation and breakdown of the DNA and eventually chromosomal abnormalities in the sperm (Sikka, 1996). On the other hand, increased oxidative stress by lowering testosterone production, degeneration of Sertoli cells, and rupture of the blood-testicular barrier disrupts the process of spermogenesis and ultimately leads to a decrease in epidermal sperm counts and fertility (El-Shahat *et al*., 2009). Therefore, in order to reduce oxidative stress, improvement in spermatogenesis and an increase in sperm fertility potential, the use of natural or artificial antioxidant compounds is necessary (Khaki *et al*., 2014). Herbal medicines with antioxidant properties such as ginger, remove the intermediate free radicals, end the oxidation chain reactions and ultimately lead to the improvement of specific sperm fertility indicators and increase the fertility potential of sperm in roosters (Khaki *et al.* 2014)

The use of Ginger and Black Seeds in Boosting Fertility in Poultry

Ginger (*Zingiber officinale*) contains gingerol, gingerdiol and gingerdione, which may promote the functioning of the antioxidant defense system (Baliga *et al.,* 2011). The antioxidant capacity was enhanced in chickens and laying hens when their diet was supplemented with ginger (Zhang et al., 2009; Zhao et al., 2011). These findings suggest that ginger might enhance the fertility of male poultry. Indeed, adding 15 g of ginger root powder/kg diet increased the fertility of aged Cobb male breeders because of the increased number of live sperm, total antioxidant capacity of the seminal plasma, sperm membrane integrity, forward motility and sperm penetration (Akhlaghi *et al.,* 2014), while consuming 100 µl of ginger essential oil/kg body weight maximized the fertility of male quails (Herve *et al*., 2018). Ginger increased sperm production because of improved testes growth by enhancing development of the seminiferous tubules and germ cells and semen quality by suppressing the oxidative damage induced in the testes via the activation of antioxidant enzymes, such as superoxide dismutase and catalase (Herve *et al*., 2018; Saeid *et al*., 2011; Shanoon, 2011). Saeid *et a*l. reported that *Zingiberoffcinale* had useful effects on spermatogenesis and sperm parameters in broiler breeder males (Saeid *et al.,* 2011). The 24-week-old broiler breeders were administered aqueous extract of *Zingiberoffcinale* in drinking water at 5% and 10% daily for 20 weeks. It increased FSH, testosterone and LH levels, but decreased MDA and TAC levels. There were increases in testes weight, ejaculated volume, sperm concentration and motility but decreases in dead sperm and abnormal sperm. These findings showed that *Zingiberoffcinale* could enhance spermatogenesis.

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CONCLUSION AND RECOMMENDATIONS

Conclusion

The poultry industry occupies an important place in the Nigerian Agricultural systems, fertility is an important issue that needs to be addressed, Ginger and black seeds helps in boosting fertility in poultry

Recommendations

The use of natural products like ginger and black seeds should be encouraged in boosting fertility in poultry

REFERENCES

Adebayo, A. A., Ojo, O. O., &Oluwafemi, R. A. (2018). Poultry production in Nigeria: An overview. *Journal of Agricultural Science and Technology,* 18(3), 537-546.

Adeoye, A. A., Adedeji, T. A., &Ojo, O. O. (2017). Egg production and marketing I n Nigeria: A review. *Journal of Poultry Science*, 54(2), 147-155.

Andam, K,Edeh, H, Oboh, V, Paow, K, and Thurlow, I (2021)Impacts of COVID-19 on Food Systems and Poverty in Nigeria. In Advances in Food Security and Sustainability 5: 145 – 173 Elselvia

Attia, Y.A, Rahman, M.T, Hossain, M.I, Baiouni, S, Khafada, Khafada, A.F, Shehata, A. and Hafez, A.M (2020) Poultry Production and Sustainability, in Developing Countries Under COVID-19 Crises , Lessons Learnt Animals,12(5) 664

Eko, P.M, Afolabi, k.d, and Enyenihi, (2020). Grwth Performance, Carcass Quality , Organ Weights and Haematlogy in Broilers fed Graded Levels of Tumeric(*Curcuma longa*) Powder as Feed Additive *Animal and Veterinary Science, Special Issue : Promoting Animal and Veterinary Research* 6(5): 65 – 70

Food and Agriculture Organization (FAO) of the United Nations. (2020). Poultry production in Africa. Retrieved from (link unavailable)

Ibrahim, A. D., Mohammed, A., &Abdullahi, J. (2015). Poultry meat and egg production in Nigeria: A review. *Journal of Veterinary Science and Technology*, 6(2), 1-9.

Oladimeji, T. E., Adedeji, T. A., &Ojo, O. O. (2017). Poultry industry in Nigeria: An overview. *Journal of Agricultural Extension,* 21(1), 123-132.

Kursid , A.M, Farooq, F..R, Durrani, K, Sarbiland, ,K, and Chand , M (2003) Predicting egg weight , shell weight of Japanese Quial Using various Egg Traits as Regressors Int,. *Jounal of Poultry Science*2(2):164 -

Sun, C., Liu, J., Yang, N., and Xu, G. (2019). Egg quality and egg albumen property of domestic chicken, duck, goose, turkey, quail, and pigeon. Poultry science, 98(10), 4516-4521

Smith, J.A (2001) Poultry the Tropical Agriculturalist Series. , General Livestock Volumes, Rene Coste (Editor,), Center for Tropical Veterinary Medicine, University of Edinburg, UK. CTA/Macmillan. 70 - 73

Torhemen, M, Ocheja, J.O, Torhemen, L.N, Eboh, S, Adegbe, J.Y, and Apeh, J.U (2022) Protein- Energy Relationships in Poultry Nutrition, : A Review, In: Securing Animal Agriculture Amidst Global Challenges Proceedings of the Nigerian Society for Animal Production, College of Forewsry Jo, 18TH – 22ND March, 2022. 1167 – 1169