



## Productive performance and Nutritional of domesticated pigeons. Present status and future concerns

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### Abstract

Domesticated pigeons, known for their captivating beauty and unique behaviors, have been bred for centuries. This comprehensive review article delves into various aspects of pigeon farming, providing insights into raising, caring for, and feeding these birds. In the past, pigeon rearing was primarily a hobby, but in the present, it has evolved into a profitable economic activity due to the increasing value of pigeons. Nowadays, people are engaged in farming pigeons for economic gain. As a result, pigeon rearers now recognize the importance of understanding the proper markings of fancy pigeons to produce purebred birds. The literature hasn't gone into great detail about the performance of domesticated pigeons. Although the majority of the studies had somewhat needed nutrient, results were rare. Since there are nearly endless alternatives for nutrient requirements levels and period of feeding, more research is necessary. It is difficult to compare results when there is a lack of standardisation. Despite the fact that pigeons are used by humans as experimental animals, ornamental birds, sports birds, and for meat production, little is known about their nutritional needs. More research conducted in more controlled settings is still needed.

**Keywords :** Economic; Nutrition; Pigeons; Production.

### 1. Introduction

The Pigeon keeping has been a longstanding practice across the globe for approximately 10,000 years (Levi, 1977), making it possibly the earliest bird species to be domesticated by humans (Johnston and Janiga, 1995). Symbolizing peace, the white pigeon or dove holds significant cultural importance. Besides its symbolic value, the domestication of pigeons led to a steady supply of fresh meat during the winter months. The commercial production of squab, a term for young pigeon meat, gained popularity in various regions, including the USA, European countries, Australia, and the Indian subcontinent. In Chinese culture, pigeon meat is believed to possess medicinal properties (Hsiung *et al.*,

2005). Consequently, squab is sold at higher prices compared to other poultry products.

Pigeons have also proven to be valuable subjects for genetic and behavioral research in laboratory settings. Due to their flying nature, pigeons require ample flight for proper growth of flight muscles, which are the prime meat components. Squab meat allows villagers with limited resources to quickly entertain their guests, and pigeon farming requires less capital investment compared to other forms of poultry farming. Rearing heavier pigeon breeds can potentially yield higher profitability.

Owners usually feed their pigeons a mixed diet, consisting of Grain mixture and mineral powder, which adequately supports their reproduction. However, there is limited information available regarding the specific feed requirements of local pigeon breeds. To maximize productivity, it is essential to determine suitable feed for semi-

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intensive rearing. It is expected that pigeons lay an average of 2 eggs per breeding cycle (Levi, 1957), with the hatching time for hens being longer than for cocks. The first egg typically hatches 17-18 days after laying, followed by the second egg 48 hours later (Blakely and Bade, 1989). Both the cock and the hen participate in feeding their squabs, with the pigeon's diet consisting mainly of grains and a small amount of grit, along with access to clean water (Anggorodi, 1995). Pigeons exhibit a preference for certain grains such as corn, soybeans, peanuts, and wheat (Alwazzan, 2000). However, there are currently no commercially produced pigeon feeds available in poultry shops. Therefore, a combination of mixed feed and broiler diets can be provided to pigeons during different stages of production. These feeds should fulfill the nutrient requirements of pigeons in semi-intensive rearing systems. Additionally, incorporating alternative uses of corn and wheat in pigeon rearing during summer and winter seasons can be beneficial. Observing the pigeons' feed consumption patterns, parental productivity, and weekly squab growth is crucial for optimizing semi-intensive rearing practices.

Consequently, the objective of this study to provide valuable information to pigeon owners and enthusiasts involved in semi-intensive rearing, enhancing their understanding of pigeon nutrition and optimizing productivity.

More study under more standardised settings is still needed to determine the appropriate nutrient requirements dose and its implications on the sustainability of pigeon meat production. Therefore, the purpose of this study was to provide a general review of the productive performance, optimal nutrition, and hygienic practises in domestic pigeon meat.

## **2. Optimum nutrition and hygiene practices**

Pigeon physiology depends on meals that can be converted into energy and on internal chemical processes. It is essential for pigeon rearers to offer

sufficient feed and follow sound maintenance procedures in order to ensure their health and prevent infections. For seasoned rearers, scientific management of pigeon farms is crucial. Unfortunately, this entails dangers because rearers and other people frequently visit these stores wearing filthy clothing and using dirty hands, which contaminates the chicken feed.

Issues can also arise from ignorance of the food that pigeons consume. Pigeon productivity may suffer if improperly mixed poultry feed results in excessive weight gain in the birds. Additionally, the dissolution of poultry feed with regular feed encourages the development of dangerous fungus. Pigeons' digestion depends on proper nutrition, and oyster dust larger than 6 mm is needed. Pigeons are given sand and brick dust that are devoid of germs for their health. Pigeons need a variety of diet ratios for things like flying and breeding. It's crucial to maintain the proper room temperature, humidity, ventilation, and number of pigeons and feed intake. It might be necessary to dry feed out in the sun to control fungal growth. For growing, moulting, and breeding birds, several feeding techniques are used as well. The proper feed ratio also depends on the age-based pigeon groups. Unlike current fancy pigeons, which have evolved to polished feed, prehistoric pigeons survived on mustard, paddy, and paddy rice. Unfortunately, some rearers improperly gather neighbourhood or fancy pigeons, which compromise their general well-being and output. A timely feed supply is essential for output, however excessive vitamin supplementation should be avoided because it can temporarily increase productivity but may not have long-term benefits. Maintaining cleanliness in pigeon farms is a widespread issue in the country, which can affect the well-being of the birds. Pigeons tend to eat more during the colder months, and it is essential to monitor and adjust the feed according to their needs. food consumption is about one-tenth of a pigeon's body weight.to sustain their health and productivity.

### 3. The diets of pigeons

Corn is a good food option for pigeons, especially when they are feeding their chicks, as the fine-netted corn gives more of the fine granules that are required for the chicks' sustenance. Corn has a lot of carbohydrates, but not enough protein (Teurlings, 1923). Additionally, you can give them balanced chicken feed. 15–16% protein should be present in pigeon meal. Each pigeon eats 35–50 grammes of grainy food each day. Large pigeons in Egypt benefit from beans and entire peas, which hasten crop fullness. Peas and beans, however, are not suggested for young pigeons. According to The Pigeon Racing Formula, peas have a global crude protein content of 22–23% (Sales *et al.*, 2003; Anjulo *et al.*, 2020). Mustard is an oil-based seed that pigeons strongly appreciate. In addition, a daily dose of rapeseed, a plant related to mustard, is sufficient for pigeons, and there is no need to provide mustard seed if rapeseed is given (The Pigeon Racing Formula). While pigeon pea is liked by pigeons, it contains a neurotoxin that can cause paralysis in pigeons. Sorghum and broken rice are great pigeon food options because they are chemical-free and contain wholesome protein. Pigeons need seashell powder dust to get the vital minerals they need, especially calcium. When giving this out, you must exercise caution because it can be contaminated with germs and substantial amounts of dust.

Based on offspring production, feeding adult pigeons is advised to have a dietary crude protein level of between 12 and 18% and a metabolizable energy (ME) content of about 12 MJ/kg. For maize (14.76 MJ/kg), barley (12.36 MJ/kg), sorghum (13.87 MJ/kg), and peas (14.01 MJ/kg) (Sales *et al.*, 2003), apparent metabolizable energy, corrected for nitrogen retention (AMEn), did not significantly deviate from values derived for chickens. Pigeons could use lipids as an alternative to carbohydrates for energy. Feed additives are examined, along with ideas for additional research.

### 4. Pigeon Squab Feeding

Baby pigeons (squab) don't need extra feed for 27 days. They take crop milk from their parents. This is known as pigeon milk. Male and female pigeon feed their baby in this way for 10 days. After that, they become able to fly and feed themselves by their own. Keep fresh feed and clean water near their house.

Milk proteins are crucial for young children's health since they nourish and promote their growth and development. According to studies by Goudswaard *et al.* (1979), Engberg *et al.* (1992), Kocianov *et al.* (1993) and Bharathi *et al.* (1997), pigeon crop milk includes a significant number of immunoglobulins and physiologically active enzymes. Squab (Pigeon) Meat Only Raw has 356 calories, of which 51% come from protein, 0% from carbohydrates, 49% from fat, and 0% from alcohol. The macronutrient components of Squab (Pigeon) Meat Only Raw are depicted in a pie chart. 74.44% of this food is water, 17.89% is protein, 0% is carbohydrates, 7.67% is fat, and 0% is alcohol (Fisher *et al.*, 2013).

### 5. Pigeons Housing

Pigeons should be housed in cosy, dry spaces, preferably facing north east, for maximum production and minimal disease risk. The house will stay dry with sufficient ventilation and lots of sunlight.

Breeders may be kept under totally intensive circumstances or in a building with a flight area. If wire flooring is utilised, the mesh size should be at least 18 gauge and 25 millimetres, or its equivalent. A pigeon enclosure should hold 25–30 pairs of breeders and have a total floor size of roughly 0.6 m<sup>2</sup>, including 0.4 m<sup>2</sup> for the nest. Based on Kabir's research (2018a; 2019b), we examine the crucial processes and factors for setting up and running a productive pigeon farm in this post. This manual offers helpful tips for aspiring pigeon rearers on everything from choosing the right pigeon breeds with the right markings, buying from reliable sources, and

quarantine procedures to figuring out how to foster parents, identify key indicators of pigeon fitness, and improve breeding conditions using artificial light. It also discusses how crucial it is to keep the pigeons healthy and happy by keeping an effective ventilation system and a designated hospital cage inside the main loft. Finally, taking into account the size of the space and the quantity of pigeons in the loft, we consider the need of maintaining good temperature regulation, particularly in regard to employing electric bulbs for heating.

There are a few crucial factors to take into account when housing pigeons in order to maintain their comfort and well-being. There are certain broad rules to follow, even if the precise layout and size of the pigeon house can vary based on the number of birds and available space. Here are some pointers for housing pigeons:

1- Loft Design: Pigeon lofts need to be secure, well-ventilated, and protective. The loft should be large enough to accommodate all the pigeons you plan to keep there. To maintain a comfortable environment for the birds, take into account elements like insulation, loft orientation, and natural illumination.

2. Perches and Nesting Areas: Pigeons need perches to rest and nesting areas to reproduce. Install stable perches at various heights to provide pigeons a place to exercise and interact. Pigeon pairs should be accommodated for breeding purposes on nesting boxes or shelves.

3- Ventilation: A healthy loft environment requires adequate ventilation. Adequate ventilation reduces the danger of respiratory illnesses, prevents the buildup of ammonia from animal waste, and controls humidity. Include opening and closing windows and vents as needed.

4- Flooring and Cleaning: The floor of the loft should be simple to disinfect and clean. Think about employing trays or grates that can be easily removed for garbage disposal. The pigeons' comfort and the spread of disease are both improved by routine loft cleaning.

5- Security: Keep the pigeons safe from predators like hawks, cats, and raccoons. Make sure the loft has solid, burglar-resistant doors, windows with mesh or wire, and a roof.

6- Feeding and Watering Stations: Set apart spaces for the pigeons to be fed and given water. Use waterers and feeders that are simple to refill and clean. To keep the pigeons hydrated and in good health, regularly provide them with fresh food and water.

7- Lighting: Exposure to natural light is beneficial for pigeons. To offer daylight, include windows or skylights in the loft design. Consider installing artificial lighting as well for prolonged daylight hours during the winter. It's crucial to remember that local rules and laws may differ with relation to housing pigeons.

## **6. Pigeon production Knowledge and Considerations**

When embarking on the journey of setting up a pigeon farm, aspiring rearers should ensure the acquisition of their chosen pigeon breeds with appropriate markings from reputable shops or well-known sources. It is crucial to select healthy pigeons, and thus, potential farmers need to observe key identifying points such as bright feathers, normal breathing, clear eyes, normal movements, and healthy fecal appearances to assess the fitness of the birds.

Upon purchasing the pigeons, a quarantine period of 40 days is recommended to keep them isolated and monitor their health status (Magnino *et al.*, 2009). For fostering parents, local breeds, mixed breeds, homers, and tumblers are excellent choices. Opting for young adults is advisable to initiate the first-time pigeon farm, as pigeons are typically sexually active up to 4-5 years old. Breeders will eventually need to make other pairings from the offspring within this timeframe. To maintain a conducive environment for the pigeons, a well-ventilated loft is essential, and it is advisable to have a hospital cage within the main loft. Adequate lighting is crucial for

enhancing the production of pigeon gametes, especially during winter when lower temperatures can impact the birds' ability to produce sex hormones. In such cases, artificial lighting in the form of bulbs becomes important, particularly for rare and valuable pigeon breeds. However, it is essential to note that excessive artificial light may deprive the birds of proper rest and can contribute to certain flyborne diseases.

Temperature control is another critical aspect, as the body temperature of pigeons is 107°F (Sossidou *et al.*, 2014). The use of room heaters may lead to moisture absorption, which can be harmful to the birds. Instead, employing 100 to 200 watt electric bulbs is a suitable alternative, with the number of bulbs depending on the room size and the number of pigeons being kept. In practice, medium-sized rooms in Egypt, typically equipped with one or two 100-200 watt bulbs, are commonly used for rearing most fancy pigeons. By adhering to these fundamental guidelines and acquiring the necessary knowledge, prospective pigeon rearers can lay a solid foundation for their first time pigeon farm and ensure the well-being and productivity of their avian companions (Kabir, 2018a; 2019b).

## 7. Life cycle

pigeons are typically raised in pairs, where a male and female pigeon form a lifelong bond. Their lifespan can range from 12 to 15 years. During the breeding process, both male and female pigeons work together to collect straw and construct a small nest for their habitation. Female pigeons start laying eggs at approximately 56 months of age, laying two eggs at a time, and their breeding capability usually spans around 5 years. The incubation period, during which both parents take turns to hatch the eggs, typically lasts about 17 to 18 days (Blakely and Bade, 1989).

In terms of productivity, a pair of breeding pigeons is expected to yield 12 marketable squabs per year, with each squab weighing around 450-700 grams (Jiliy *et al.*, 2018). Breeders that fail to

meet this standard should be culled. Pigeons can be bred from as early as 6 months of age, and some females can continue their productive breeding life for up to 10 years, while males can be used successfully for up to 5 years.

Distinguishing the age and sex of pigeons can be challenging, so it is advisable to acquire pigeons from reputable breeding organizations to ensure accuracy. In general, the female pigeon is smaller and has a more refined head compared to the male. She may waddle rather than walk and carries her tail higher than the male. Additionally, the pelvic bones of the female are spaced further apart.

On the other hand, the male pigeon is larger, more aggressive, and emits a louder cooing noise, especially during the mating season. He tends to strut around the female as part of his mating behaviour.

Breeding pairs of pigeons may be left to choose their own mates, or they can be force-mated when necessary. When using natural mating methods, male and female pairs can be identified based on their behavior and interactions.

## 8. Egg Production and Hatching in Pigeons

During the egg-laying period, male and female pigeons form pairs and construct small nests using straw. Female pigeons begin laying eggs when they reach 5 to 6 months of age (Rahman, 1999), usually producing a pair of eggs approximately once a month. Both the male and female pigeons take turns incubating the eggs, a process that takes about 17 to 18 days. In cases where an artificial nest is required, it can be provided.

## 9. Hatching and rearing

Pigeon eggs have an incubation period of 17 days, with a period 1 or 2-day gap between the laying of the first and second egg (Kumar *et al.*, 2018). Consequently, the first squab may not hatch until the 18th or 19th day (Bolla, 2007). The responsibility of building the nest and incubating

the eggs is shared by both parents, but as the squabs reach two weeks of age, the female may begin laying new eggs.

To avoid disrupting the squabs and egg incubation, a double nest should be provided since the female starts laying before the squabs have left the nest. During this time, the male parent primarily takes over the task of feeding the squabs. It is essential not to disturb the birds during feeding to ensure their well-being. If one of the squabs dies within the first couple of weeks, appropriate care and attention should be given to the surviving squab to ensure healthy development. Due to the small size of the eggs, breeding squabs can be more profitable than consuming the eggs.

## 10. Conclusion

In conclusion, taking care of domesticated pigeons nutritionally and economically is an exciting endeavour. These amazing birds have long coexisted with humans, offering a variety of functions, including communication, entertainment, and racing. Pigeon breeding can be profitable as a pastime or as a business endeavour if it is done with commitment, expertise, and ethical standards. The economic opportunities and potential advantages of pigeon management are likely to increase as we continue to learn more about these amazing creatures, providing a promising future for both pigeon aficionados and the business. More study under more standardised settings is still needed to determine the appropriate nutrient requirements dose and its implications on the sustainability of pigeon meat production

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Data presented in this study are available on fair request from the respective author.

### Ethics Approval and Consent to Participate

Not applicable

### Consent for Publication

Not applicable.

### Conflicts of Interest

The authors disclosed no conflict of interest.

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