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Ecological preferences of wild pigeons (*Columba guinea*) in the semi-urban environment of the Faranah ISAV

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Abstract:-Wild pigeons (*Columba guinea*), a synanthropic species, are highly adaptable to anthropized environments. At the *Institut Supérieur Agronomique* Valery Giscard d'Estaing of Faranah (ISAV), they are abundant and occupy diverse habitats. This study investigates their habitat preferences, behavior, and the ecological and health implications of their presence in a semi-urban setting.Over three months, spanning the dry-to-wet season transition, data were collected using fixed-point observations at six abandoned buildings and fifteen *Cassia siamea* trees. Behavioral observations focused on nesting, social interactions, and feeding, while semi-structured surveys gathered local perceptions. Climate data were also analyzed in relation to pigeon behavior.Findings indicate a preference for abandoned buildings (45 ± 8 pigeons per site) over *Cassia siamea* trees (28 ± 6). Pigeons favor accessible, low-traffic buildings for nesting (12 ± 3 nests per site), while trees serve mainly as resting and feeding areas. Nesting increases with high temperatures ($r = 0.78$, $p < 0.05$), while rain reduces outdoor activity.Despite contributing to nutrient cycling, pigeons pose infrastructure and health risks due to feces accumulation. Sustainable management strategies, such as securing uninhabited buildings and diversifying green spaces, are recommended to balance ecological and human interests.**Keywords:** Wild pigeons, *Cassia siamea*, habitats, ecology, Guinea.

Introduction

Avian wildlife plays a crucial role in maintaining ecological dynamics and balancing urban and semi-urban ecosystems. Pigeons (*Columba guinea*), known for their extraordinary adaptive capacity, occupy a special position as a synanthropic species, often cohabiting with humans in various anthropogenic environments (Sol et al., 2013). These birds colonize a variety of habitats, including abandoned buildings and high-nesting trees, such as *Cassia siamea*, in response to environmental and anthropogenic pressures (Kark et al. 2007).

The *Institut Superieur Agronomique* Valery Giscard d'Estaing of Faranah (ISAV) offers a unique case study of a semi-urban ecosystem where wild pigeons have found refuge in various habitats including abandoned buildings and large trees. This behavior raises critical questions about the ecological and anthropogenic factors that influence their nesting site choices, as well as the environmental and social impacts that result (Kark et al., 2007; Fernández-Juricic & Tellería, 2000).

Abandoned buildings are ideal microhabitats for pigeons, providing them with shelter from predators and extreme weather conditions, facilitating their reproduction and survival (Mainwaring 2015). At the same time, plant species such as *Cassia siamea*, with their dense foliage and robust structure, provide an ideal support for nesting and growth of young birds (García-Navas et al., 2012). These interactions deserve particular attention in order to understand the dynamics of bird populations in semi-natural areas.

However, wild pigeons can also have negative impacts, including through their feces that degrade infrastructure and can pose health risks by transporting pathogens (Haag-Wackernagel & Moch, 2004). These challenges are particularly relevant in semi-urban areas such as ISAV, where interactions between bird populations and human activities require appropriate management (Johnston & Janiga, 1995).

In West Africa, although pigeons are widely studied in urban environments, little research has explored their ecological dynamics in semi-natural environments, particularly in Guinea. Existing data often focuses on large urban areas, neglecting hybrid environments such as those represented by ISAV of Faranah (Sol et al., 2013).

Thus, this research aims to examine preferential habitats as well as factors favoring the establishment of wild pigeons within ISAV of Faranah. Using a multidisciplinary methodology,

the study also analyzed the ecological and socio-environmental implications of their presence, contributing to better management of avian populations in similar contexts.

Study environment

The *Institut Superieur Agronomique* Valery Giscard d'Estaing (ISAV), located in the Faranah Prefecture in southeastern Guinea, is a hybrid environment combining natural and anthropized areas. Located at about 10°02' north latitude and 10°45' west longitude, the site extends over a vast area of twenty hectares comprising academic, administrative buildings, student housing, as well as semi-wooded natural spaces. The climate of the region is tropical of Guinean type, marked by a rainy season from May to October and a dry season from November to April, with temperatures varying between 20 °C and 35 °C. This climatic configuration favors dense vegetation in the wet season and varied food resources for wildlife.

The site has a relatively flat topography and vegetation composed of native and introduced species. Among the dominant trees is *Cassia siamea*, a species introduced for its soil stabilization capabilities and shade. This species, coupled with natural lawns and wooded areas, provides favorable habitat for bird fauna, notably pigeons (*Columba guinea*), a synanthropic species that takes advantage of human infrastructure to reproduce. The uninhabited ISAV buildings, combined with limited human activity in some areas, provide favorable microhabitats for pigeons and other animal species such as rodents and insects.

This diversity of habitats and the cohabitation between natural and anthropogenic elements make ISAV a unique semi-natural ecosystem, conducive to the study of interactions between wildlife and its environment. Anthropogenic structures, including abandoned buildings, play a key role in providing safe havens for pigeons and other species. This study environment thus represents an ideal framework for analyzing the ecological and behavioral dynamics of avian populations in a semi-urban environment in West Africa.

For this study, a multidisciplinary approach was adopted to collect quantitative and qualitative data on the factors favoring pigeon (*Columba guinea*) settlement within ISAV of Faranah . The main methods of data collection are detailed below.

Data collection

For this study, a multidisciplinary approach was used to collect comprehensive data on wild pigeon (*Columba guinea*) populations at ISAV.

1. **Census of pigeon populations**

The population census was carried out using the fixed observation point method. The observation sites included six abandoned buildings and 15 trees from *Cassia siamea* spread across the campus. The observations were made early in the morning (6-9 am) and late in the afternoon (16-18 pm), periods of maximum pigeon activity. The individuals were counted with the naked eye using binoculars (10x42).

2. **Identification of nesting sites**

Nesting habitat characteristics were documented by inspecting selected buildings and trees. For buildings, the parameters studied included structure type, abandonment level and accessibility. For trees, variables such as height, foliage density, and nest presence were noted. Each site has been geolocated and photographed.

3. **Behavioral Observation**

Pigeon behaviors were recorded, including nesting (nest construction and maintenance), social interactions (mating and territorial disputes), and feeding behaviors. These behavioral data were collected from standardized ethology protocols.

4. **Local perceptions on pigeon presence at ISAV**

Semi structured surveys were conducted towards students, academic staff and ISAV maintenance officers in order to gather information on their perception on the presence of wild pigeons. The questions addressed the perceptions of residents on the presence of pigeons, the perceived impacts (positive or negative), and their suggestions for better management of their presence in the institute.

5. **Climate data**

Local climate data, including daily temperatures, precipitation, and humidity, were obtained from the Faranah weather station. These data were used to establish correlations with observed pigeon behavior.

The data collection took place over three months (October to December 2014), covering transitions between the dry and wet seasons, to capture seasonal variations in pigeon behavior.

Data Analysis Method

The data collected were analyzed using quantitative and qualitative methods to meet the objectives of the study on factors favoring the establishment of wild pigeons at ISAV of Faranah. Data from pigeon population censuses, behavioral observations and habitat characteristics were processed using descriptive statistics. The frequencies, means and standard deviations were calculated to characterize the observed trends. These analyzes were performed using R 4.2.2 software and Microsoft Excel.

Habitat characteristics, such as building and tree parameters (*Cassia siamea*), were compared to determine their respective influences on pigeon settlement. Statistical tests, including analysis of the variance (ANOVA), were used to identify significant differences between nesting sites. When significant differences were detected, the post-hoc Tukey test was applied to clarify comparisons between groups.

Qualitative data from semi-structured surveys were analyzed using the thematic analysis method. Participants' responses were grouped into recurring themes to identify residents' perceptions of pigeon presence, perceived impacts, and management suggestions. The results were interpreted by cross-referencing information from observations and surveys to provide a global view of the ecological and social dynamics associated with pigeon presence.

Finally, climate data were correlated with observed changes in pigeon activity and behavior. Correlations were established using the Pearson correlation coefficient to determine the relationship between climatic parameters and nesting and feeding behavior of pigeons. This approach has revealed significant relationships between environmental conditions and pigeon habits at ISAV.

Results

The results obtained in this study revealed significant trends in the factors influencing the establishment of wild pigeons (*Columba guinea*) within ISAV of Faranah. Data are presented below according to the main objectives of the study.

1. Census of pigeon populations

The censuses revealed a heterogeneous distribution of pigeons at the ISAV site. Uninhabited buildings housed an average of **45 ± 8 individuals** per building, against **28 ± 6 individuals** per tree of *Cassia siamea*. Peak activity periods of pigeons were concentrated early in the morning

(6-9 am) and late in the afternoon (16-18 pm), with peak observations in areas of low human disturbance (Table 1).

Table 1: Distribution of pigeon populations by habitats

Type of habitat	Average number of pigeons ± Standard deviation	ANOVA	Post-hoc (Tukey)
Uninhabited buildings	45 ± 8	$F(1.19) = 25.43$, $p < 0.001$	Significant difference with *Cassia siamea* trees
***Cassia siamea* trees**	28 ± 6	-	-

2. Characteristics of nesting habitats

Analyzes showed that pigeons favored buildings with low human use, accessible structure and protected niches. Among the trees observed, *Cassia siamea* trees of more than 8 meters in height and with a high foliage density (cover index > 70%) were the busiest. Nests found in buildings were more numerous (mean 12 ± 3 nests per building) than those found in trees (8 ± 2 nests per tree) (Table 2).

Table 2: Characteristics of nesting habitats

Parameter	Uninhabited buildings	*Cassia siamea*
Mean number of nests ± SD	12 ± 3	8 ± 2
Minimum tree height	N/A	> 8 m
Foliage density	N/A	> 70%

3. Pigeon behavior

Behaviors showed high nesting activity in abandoned buildings, where 65% of activities were related to nest construction and maintenance. Under the trees of *Cassia siamea*, pigeons spent 40% of their time for feeding and 30% for resting. Social interactions, such as territorial disputes and mating, were also common, especially in the late afternoon (Table 3).

Table 3: Distribution of pigeon activity by habitat

Activity	**Uninhabited buildings (%)**	***Cassia siamea* trees (%)**	**ANOVA**
Nesting	65	20	$F(1.19) = 30.25, p < 0.001$
Rest	15	30	$F(1.19) = 12.87, p < 0.01$
Feeding	20	40	$F(1.19) = 10.45, p < 0.05$

Photo1: Couple of *Columba guinea* (ISAV-VGE Faranah, January 2025)

Photo 2: Preferred habitats for wild pigeons at ISAV (A: Abandoned building; B: Foot of *Cassia siamea*) (ISAV-VGE Faranah, January 2025)

4. Residents' perceptions

The semi-structured surveys revealed that 70% of residents perceive pigeons as a nuisance due to accumulation of their droppings, which affect buildings and green spaces. However, 30% of participants noted ecological benefits, including their role in seed dissemination and insect population regulation. Among the management suggestions, closure of access to uninhabited buildings and planting of alternative plant species were the most mentioned (Table 4).

Table 4: Residents' Perceptions of Pigeon Presence

Perception	Percentage of respondents
Nuisance (droppings)	70%
Environmental benefits	30%

5. Influence of climate conditions

Correlations between climate data and pigeon behavior showed that nesting activity was positively related to temperature ($r = 0.78$, $p < 0.05$). In contrast, increased rainfall significantly reduced pigeon sightings, with pigeons sheltering more in buildings during rainy days (Table 5).

Table 5: Influence of climatic conditions on pigeon behavior in Faranah

Climate condition	Climate parameter	Observed effect on behavior
High temperature	30-40°C	Increased nesting and activity ($r = 0.78$, $p < 0.05$)
Moderate daily precipitation	10-30 mm	Gradual reduction of external activities
Heavy Daily Precipitation	> 30 mm	Pigeons mainly take refuge in abandoned buildings

Discussion

This study highlights the factors influencing the settlement of wild pigeons (*Columba guinea*) at ISAV of Faranah, as well as the ecological and socio-environmental implications of their presence in this semi-natural environment.

Preference of pigeons for uninhabited buildings and *Cassia siamea*

Uninhabited buildings have been found to be preferred nesting sites for pigeons, probably because of their low use by human and their ability to provide protection from bad weather conditions and predators. This finding is consistent with the findings of Mainwaring (2015), which emphasized that anthropogenic structures provide ideal niches for nesting synanthropogenic birds. In addition, the trees of *Cassia siamea*, thanks to their density of foliage and their height, serve as secondary refuges and resting sites, which is consistent with the work of García-Navas et al., (2012) on the use of trees as habitats for birds.

Pigeon behavior and nesting activity

Pigeon behaviors at ISAV showed strong nesting activity in abandoned buildings, confirming the findings of Sol et al. (2013), according to which synanthropic species intensively exploit urban habitats to maximize their reproduction. The trees of *Cassia siamea* have also served as supports for feeding and rest, reflecting their importance in maintaining bird populations in semi-urban environments (Fernández-Juricic & Tellería, 2000).

Influence of climatic conditions

Climatic variations have influenced pigeon behavior, in particular their nesting activity. The results show a positive correlation between temperature and nesting activity, consistent with the work of Sol et al. (2013) which demonstrated that high temperatures promote the reproduction of urban species. In contrast, rainfall has reduced outdoor activity, with pigeons seeking more shelter in buildings, as observed by Kark et al. (2007).

Resident perceptions and population management

Residents' perceptions reveal ambivalent coexistence with pigeons. While some recognize their ecological role, the majority consider their presence a nuisance, in particular because of the impacts on infrastructure. This reflects the observations of Haag-Wackernagel and Moch

(2004), who noted that pigeons, although ecologically important, are often perceived negatively in urban areas.

Conclusion

Wild pigeons from the Faranah ISAV show a strong preference for habitats providing protection against human disturbance and adverse climatic conditions. Abandoned buildings are their main nesting sites, while *Cassia siamea* trees serve as secondary shelters and food sources. Although their presence is perceived as a nuisance by the majority of residents, the results also highlight their potential ecological role. This data provides a basis for developing sustainable management strategies adapted to the local context.

Contributions and perspectives

This study contributes to the understanding of the ecological dynamics of wild pigeons in semi-urban environments in West Africa, a subject that has not yet been explored. The findings support the recommendations of Mainwaring (2015) and Johnston and Janiga (1995) on the importance of integrated bird population management, combining habitat management strategies with actions to minimize nuisance. Better management of abandoned buildings and planting of alternative plant species could reduce negative interactions between pigeons and humans while promoting their ecological role.

Bibliographic References

Fernández-Juricic, E., and Tellería, J. L. (2000). Effects of human disturbance on spatial and temporal feeding patterns of blackbirds *Turdus merula* in urban parks in Madrid, Spain. *Bird Study*, 47(1), 13-21.

García-Navas, V., Arroyo, L., Sanz, J. J., and Díaz, M. (2012). The effect of nest site selection on bird reproduction in Mediterranean forests. *Acta Oecologica*, 43, 39-45.

Haag-Wackernagel, D., and Moch, H. (2004). Health hazards posed by feral pigeons. *Journal of Infection*, 48(4), 307-313.

Johnston, R. F., and Janiga, M. (1995). *Feral Pigeons*. Oxford University Press.

Mark, S., Iwaniuk, A., Schalimtzek, A., and Banker, E. (2007). Living in the city: Can anyone become an 'urban explorer'? *Journal of Biogeography*, 34(4), 638-651.

Mainwaring, M. C. (2015). The use of man-made structures as nesting sites by birds: A review of the costs and benefits. *Journal of Nature Conservation*, 25, 17-22.

Sol, D., Bartomeus, I., and Griffin, A. S. (2013). The paradox of invasion in birds: Competitive superiority or ecological opportunism? *Oecologia*, 172(3), 583-592.