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Behavior of local chickens in Agats district, Asmat south Papua province Indonesia

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Abstract

Rural communities raise free-range chickens as a source of family food with the eggs and meat produced by the chickens. Native chickens carry out eating, drinking, creating, and reproducing. These activities are the behavior of native chickens to adapt to the environment. The study aims to investigate the behavior of the chickens daily in Agats. The study employs the scanning sampling method. We collected data by observing free-range chickens for 7 days in the morning (08.00–09.00 AM) and afternoon (03.00–04.00 PM). Ten chickens (5 males and 5 females) are used as sampling to investigate their behavior. The data related to the quantitative traits are measured: body length (cm), wing length (cm), chest circumference (cm), shank length (cm), and beak length (cm). Research showed that village chickens in Agats have the following quantitative traits: back length of 21.6 ± 3.31 cm; wing length of 16.2 ± 2.94 cm; chest circumference of 22.3 ± 3.20 cm; shin length of 8.7 ± 1.06 cm; and beak length of 2.8 ± 0.92 cm. Village chickens exhibit various behaviors in the morning, including feeding (21.8%), drinking (19.6%), perching (17.8%), locomotion (14.4%), mating (2.4%), resting (2.2%), and other unobserved behaviors such as grooming and agonistic behavior. During the day, the village chickens engage in various activities such as feeding (21.4%), drinking (20.2%), perching (13.8%), locomotion (12.8%), resting (2.2%), mating (1.6%), and other unobserved behaviors.

Keywords: Behavior; Local chicken; South Papua

1. Introduction

Free-range chicken, successfully domesticated from the red jungle in Indonesia, is a local breed. One of the advantages of free-range chickens is that they have good adaptability because they can quickly adjust to climatic and environmental conditions. Rural communities raise free-range chickens as a source of family food with the eggs and meat produced by the chickens. Village chickens have a distinguishing characteristic, namely the variety of patterns and colors of their feathers, both male and female [1]. Small farmers in rural areas can continue to operate the free-range chicken business, even though the maintenance scale is still low [2]. [3] asserts that free-range chickens in Indonesia exhibit strong environmental adaptability, leading to their semi-intensive community rearing.

Native chickens (a group of poultry) are living creatures that carry out eating, drinking, producing, and reproducing. These activities are the behavior of native chickens to adapt to the environment. When birds are in conditions similar to their natural habitat, they typically engage in their normal behavior, also known as their natural behavior [4]. We divide poultry behavior into two groups: primary and incidental behavior. The main behaviors include eating, standing, sitting, dozing, and sleeping. Incidental behavior includes walking, drinking, pecking at the floor or walls, flapping wings, and aggressive behavior [5]. Commonly observed behaviors in poultry include dust bathing, ingestion, sexual activity, aggression, fighting, imitation, sheltering, observation, elimination, feces throwing, nesting, perching, walking, and scratching [6].

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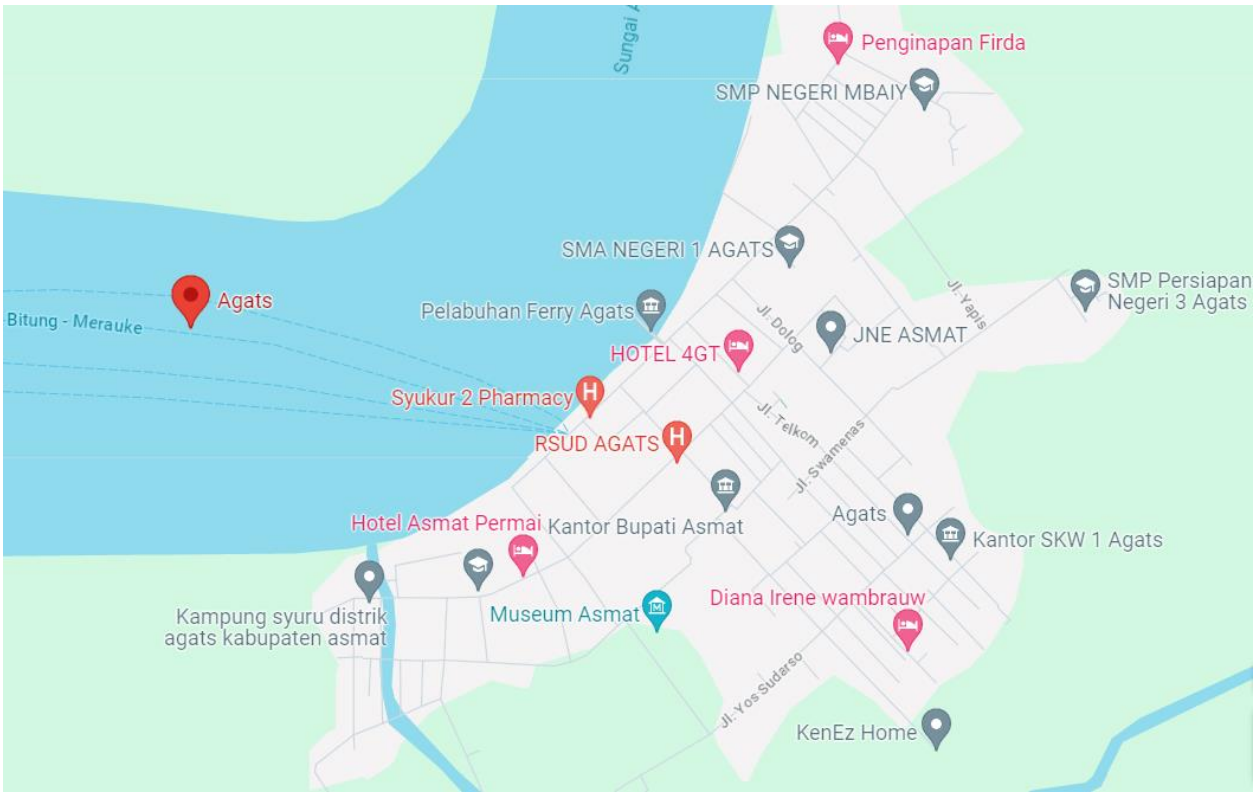
Asmat Regency is one of the expanding districts on Papua's southern coast. Asmat Regency's livestock development is very promising, with the potential to make the area very suitable for livestock, especially pigs and poultry. People in the Asmat Regency area cultivate a large number of local chickens, either through regional government activity programs run by the Food Crops and Agriculture Service or independently by the community. The development of the local chicken population in Asmat Regency is quite good, and there is an increase in the population every year. The free-range chicken population in Agats District in 2018 was 913; in 2019, there were 1063, or an increase of 16.43%. In 2020, there were 1563, or an increase of 47.50%. In 2021, there will be 1878 people, or a 19.77% increase. With the population increasing, it is necessary to research the behavior patterns of free-range chickens, especially in the Agats District, Asmat Regency, to answer the question: What are the main and incidental behavioral patterns of free-range chickens daily in the Agats District, Asmat Regency, South Papua Province, Indonesia? The study aims to investigate the behavior of the chickens daily in Agats.

2. Materials And Methods

The research is located in Agats City, Agats District, Asmat Regency (Research location is presented in Figure 1).

Agats is a district in Asmat Regency, South Papua Province, Indonesia. Agats is also the capital of Asmat district. This district is located on the southern coast of Papua, facing the Arafura Sea. The population of this district is 15,841 (2020), with an area of 701.99 km^2, with a population density of 22.57 people/km^2.



Source:https://www.google.com/maps/place/Agats,+Bis+Agats,+Agats,+Asmat+Regency,+Papua/@-5.5356258,138.121359,15z/data=!3m1!4b1!4m6!3m5!1s0x683a5e4a9f6c20f3:0xf1c37eeb196c76c9!8m2!3d-5.535626!4d138.121359!16s%2Fm%2F012nx_xg?entry=ttu

Figure 1 Research location

Purposive sampling determined the research location, provided it had a dominant population of free-range chickens. All free-range chickens that have reached maturity and are in the production period, with an age range of approximately 6 months, and extensively reared by breeders, constitute the population in this study. We chose Agats District as the research location due to its substantial population of free-range chickens. In the Agats District, Asmat Regency, there are 80 free-range chicken breeders. The study employs the scanning sampling method. We use the scan sampling method to calculate individual activity in a population, taking into account specific time intervals. We collected data by directly observing the research object, in this case, free-range chickens. The number of free-range chickens that made

up the research sample was 10, 5 males and 5 females. For seven days, we conducted observations in the morning (08.00–09.00 AM) and in the afternoon (03.00–04.00 PM). We directly measure the data related to the quantitative traits of free-range chickens. 1. Body Length (cm): This refers to the length measured from the neckbone to the backbone to the tailbone. We used a measuring tape to determine the body length. 2. Wing length (cm): Measure the distance between the base of the humerus bone and the tip. 3. Chest circumference (cm): Measure the chest circumference by circling a thread from the back to the chest, then use a measuring tape to record the measurement. 4. Shank length (cm): Measure along the tarsometatarsus bone to obtain the shank length (mm). 5. Beak length (cm): Measure with a measuring tape from the base of the maxilla to the tip of the maxilla.

To determine the behavior of free-range chickens, researchers used observation sheets, observation notes, and documentation tools. The number of times the chicken engages in eating behavior after performing other activities like drinking, resting, panting, sitting, and walking serves as a measure of its eating behavior. We observed the same chicken for 2 hours daily for 7 days, both in the morning (08.00–09.00 AM) and in the afternoon (03.00–04.00 PM). Pecking and cocking is one of the common behaviors used by birds in selecting and obtaining food. Under normal conditions, intensively kept birds can dedicate 70% of their day to eating. Naturally, birds can select food and cease eating once their energy requirements are satisfied. Chickens' drinking behavior is influenced by their activities, temperature, thirst, and eating behavior. Excessive activity causes chickens to become thirsty quickly and increases drinking water consumption [7].

Naturally, chickens engage in unique behaviors, mimicking the movements and behavior of both male and female chickens during lustful reproduction. 1. Male a. Waltz Dance. The male will perform a waltz dance, which involves lowering his wings, approaching the female, and stepping alongside her until they are nearby. There are three types of waltz dances that males perform for females: the courtship dance, the mate-ready dance, and the post-mating dance. b. Substitute. Activities Diverts sexual urges. If the female doesn't respond to the proposal, the male will continue pecking at rocks or paws until he summons her. Should the female fail to respond, the male will pursue her. c. Neck hair straightening. Before and after mating, the male lifts his feathers, erects them, and takes photos of his entire body shaking. d. Tail Movement. The male's tail moves quickly in a horizontal direction. e. Head Movement. The male tilts his head and then moves it in a circular motion. f. Fur Combing. The animal rubs its head against its wings. g. Foot Stomp. The male typically bends his legs, lowers his wings to the ground, and shortens his neck before pursuing the female. h. Abnormal Movement. The male circles the female, carefully observing her, then approaches her from behind, pecking her head or neck while rapidly flapping his wings. 2. Female. a. Females who refuse to mate tend to avoid situations and run away. b. When a hen accepts mating, she presses her chest and tail to the ground, spreading her wings for stability. c. Nesting. When the chicken is about to lay eggs, it feels restless. The laying process affects the chicken's soul; it tends to be calm when there are eggs. e. Parenting. Mother hens that have great mating abilities will generally be more aggressive. The mother will care for and protect her offspring. f. Communication. Vision for recognition and memory, which includes the shape and color of the head (comb and wattles), as well as the color of the wings and body feathers. g. Hearing. Crowing sounds serve as a means of communication between mother and child, or between female and male. h. Protect. Mother hens often cover their young with their wings to ward off predators and shield them from potential physical harm. i. Nesting. The mother hen nests in a safe and comfortable place for brooding and sleeping activities for the mother and chicks. j. Brooding Behavior. Village chickens possess a natural and inherited brooding characteristic, a maternal trait that greatly benefits rural communities in their efforts to incubate eggs and raise young chicks [8].

We group the collected data based on the observed variables. We carried out data analysis by displaying frequencies, means, and standard deviations of the characteristic variables and qualitative properties of free-range chickens. We analyze behavioral variables using descriptive analysis techniques, which involve describing the observed behavior.

3. Results and Discussion

3.1. General Condition of Asmat

Agats is a district in Asmat Regency, South Papua Province, Indonesia. Agats is also the capital of the Asmat district. This district is located on the southern coast of Papua, facing the Arafura Sea. This district has a population of 15,841 (2020), an area of 701.99 km2, and a population density of 22.57 people per km2. Agats is situated in the Asewets River delta, in a tidal lowland area. Because of this, at high tide, the water can rise to 5 meters (16 feet) above sea level, resulting in a unique construction of the city where all the buildings and roads are elevated with wooden structures and concrete. Administratively, the urban settlement is located within the Bis Bis 'village'. In 2021, the population of Agats district will be 23,991 people, consisting of 12,428 men and 11,563 women with a sex ratio of 113.02 and divided into 6,787 households. Meanwhile, religious and cultural diversity is part of Asmat district society, especially in Agats district. The

Ministry of Home Affairs data from 2021 notes that 78.32% of the Agats population practices Christianity, with 51.19% being Catholic and 27.13% being Protestant. Some others embrace Islam as much as 21.58%, and Hindus 0.10%.

3.2. Quantitative Traits

The quantitative traits of native chickens included body length, wing length, chest circumference, shank length, and beak length. Table 1 presents the measurement data.

Table 1 Quantitative traits of native chickens in Agats district

Quantitative traits	Average ± SD (cm)	Maximum (cm)	Minimum (cm)
Back length	21.6 ± 3.31	26	18
Wing length	16.2 ± 2.94	21	14
Chest circumference	22.3 ± 3.20	27	18
Shank length	8.7 ± 1.06	10	7
Beak length	2.8 ± 0.92	4	2

According to this study, adult village chickens in Agats had an average back length of 21.6 ± 3.31 cm. The back length of native chickens in Agats is better than that of adult male Merawang chickens; the back length is 19.68 ± 2.52 cm, and the back length of the parent is 16.92 ± 1.78 cm [9]. Likewise, compared with the back length of Wareng chickens, it is 19.68 ± 2.52 cm and 16.92 ± 1.78 cm for adult male and female Wareng chickens, respectively [10]. According to research by [11], the back length of Buras Super chickens averaged 17.15 ± 1.28 cm and 16.05 ± 1.46 cm for males and females, respectively. The results of this research were also lower than those of the chickens in Agats.

The average wing length measurement seen in Table 1 is 16.2 ± 2.94 cm. [8] reported that Kampung chickens had an average wing length of 35.74 cm/head, so the results of this study were lower, whereas [12] research showed that Kampung chickens had an average wing length of 38.04 cm/head. Another type of village chicken, namely Burgo, shows a wing length of 34.40 ± 1.58 cm [13]; 30.31 cm [14]; and 30.44 cm [15]. The variation in wing length in native chickens is due to genetic differences between the chickens. This is consistent with [16], who wrote that the diversity of animal body size is caused by genetic and environmental factors. The average of adult female kampung chicken was 30.72 cm.

The chest circumference of native chickens in Agats is 22.3 ± 3.20 cm. The importance of measuring chest circumference stems from the fact that the chest houses the majority of muscles. The morphological trait that has the greatest correlation with body weight is chest circumference in both males and females [17]. Native chickens in Agats have a lower chest circumference than other types in Bengkulu, such as Burgo chickens (26.25 cm), Ketarras chickens (30.10 cm), and Kampung chickens (36.30 cm) [13].

The data in Table 1 shows that the shank size of Kampung chickens in Agats is 8.7 ± 1.06 cm. Other research [18] indicates that the shank length of male and female village chickens at The Mother breeding farm is 9.61 ± 0.89 cm and 8.025 ± 0.53 cm. This shows that the shank length of native chickens in Agats is still lower. The results of research on village chickens that were reared extensively [19] showed that the shank length for males and females was 8.58 cm and 7.06 cm, respectively. This indicates that the data from this study are 0.012 cm longer.

The average beak length of native chickens in Agats in Table 1 is 2.8 ± 0.92 cm. The research results obtained by [20] show that the average beak length of two-month-old Super Javanese chickens is 3 cm. This indicates that the obedience length of chickens in Agats is similar to chickens kept in other places.

Table 2. The behavior of free-range chickens in Agats District, Asmat Regency, was observed in the morning and evening.

Pecking and squawking are common behaviors that birds carry out to select and obtain food. Birds kept in an extensive system (outdoors) freely engage in this behavior, and under normal conditions, they can dedicate 90% of their day to this activity [5]. Genetic factors, environmental temperature, the type of food available, and habitat influence eating behavior [21]. Table 1 illustrates that the most prominent behavioral activity of chickens in Agats is eating, accounting for 21.6% of their total activity. [22] stated that activities that directly impact feeding activities dominate the morning

activity behavior, bolstering their productivity levels. Based on [23] report, chickens will eat when cold and not when hot because of their higher energy requirements.

Chickens drink by sinking their beaks into the drinking bowl, and after a few seconds, they raise their heads and open their beaks to drink water [24]. In Agats, free-range chickens drink 19.6% in the morning and 20.2% in the afternoon. Extensive-reared Agats chickens exhibit higher morning drinking activity than intensively-reared KUB chickens, with a difference of 9.9% [22]. According to [25], fluctuations in solar radiation cause air temperatures to be higher than optimal requirements, which causes livestock to experience heat stress. To overcome this condition, chickens drink to reduce heat stress.

Table 2 Behavioral Observation Results

No.	Behavioral	Morning (08.00–09.00 AM)	Afternoon (03.00–04.00 PM)
1.	Feeding (%)	21.8	21.4
2.	Drinking (%)	19.6	20.2
3.	Perching (%)	17.8	13.8
4.	Mating (%)	2.4	1.6
5.	Locomotion (%)	14.4	12.8
6.	Resting (%)	2.2	2.2
7.	Other (%)	21.8	28

Shelter behavior includes perching activity. In general, chickens will seek shelter when they feel disturbances coming from outside (the environment), such as sunlight, wind, rain, and predators such as insects. Chickens will climb to higher places to roost. Generally, chickens like to sit and stand near their perches. Therefore, providing perching places is necessary for intensively kept chickens. According to [26], providing perches leads to welfare benefits, reduced fear and aggression, and better body condition. The relationship between performance and perching behavior usually does not influence each other [24]. The roosting activity of village chickens in Agats is 17.8% in the morning and 13.8% in the afternoon. Before dusk, chickens are still carrying out activities.

Village chickens in Agats showed mating behavior in the morning at 2.4% and in the afternoon at 1.6%. The mating behavior of chickens begins with the male cock flapping its wings and crowing. Typically, male cocks accompany this movement by stomping their feet, tilting their heads, and then turning them in a circle. The next stage involves the males dancing in a waltz pattern. If the female responds positively, she will bend her body. However, if the female does not respond positively, the male will peck and paw at rocks or objects around him while calling the female [5]. Numerous studies have explored the sexual behavior of poultry. [27] conducted a study that described the sexual behavior of adult Burgo chicken males as courtship, mating, and dismounting. The mating behavior of chickens is different every day due to internal and external influences. [28] states that internal factors are responsible for the LH hormone's work in spermatogenesis. External factors include feed intake with adequate quality and nutritional balance. Aside from that, the age factor of the bird can influence its reproductive behavior [5].

Moving from one point to another is known as locomotion. This activity is 14.4% in the morning and 12.8% in the afternoon. The chicken typically engages in this activity during its mealtime. This picture shows that livestock really like large areas. Chickens use locomotion activities to explore their surrounding environment and adapt accordingly. [29] asserts that chickens often exhibit walking behavior when they sense human disturbance and become alert.

The percentage of rest in the morning and afternoon is 2.2%. [24] reported that chickens typically engage in this behavior in quiet situations, resting for more than 2 minutes. The ambient air temperature may contribute to the low percentage of rest activity. According to [30], high environmental temperatures and increased ammonia concentrations were associated with more frequent aggressive actions and lower amounts of eating, laying eggs, cleaning feathers, and dust bathing.

Other behaviors include grooming, agonistic behavior, and other unobserved behaviors. The other pattern was 21.8% in the morning and 28% in the afternoon. Birds engage in agonistic behavior to protect themselves during social

conflicts. In general, agonistic behavior in birds involves threats, aggression, subjugation, attempts to avoid, and passivity (apathy). Compared to female birds, male birds tend to show more agonistic behavior, particularly in efforts to fight over female birds to mate. However, female birds also show agonistic behavior in certain conditions, for example, related to efforts to protect their young and fight for food [5]. Grooming is the act of cleaning or taking care of oneself, such as pecking one's body, bathing in sand, or littering the cage's bedding. Sand or dirt baths dominate grooming activities. Chickens carry out grooming activities in the morning and evening.

4. Conclusion

Based on the research results, it was concluded that:

Village chickens in Agats have the following quantitative traits: back length of 21.6 ± 3.31 cm; wing length of 16.2 ± 2.94 cm; chest circumference of 22.3 ± 3.20 cm; shin length of 8.7 ± 1.06 cm; and beak length of 2.8 ± 0.92 cm.

Village chickens exhibit various behaviors in the morning, including feeding (21.8%), drinking (19.6%), perching (17.8%), locomotion (14.4%), mating (2.4%), resting (2.2%), and other unobserved behaviors such as grooming and agonistic behavior. During the day, the village chickens engage in various activities such as feeding (21.4%), drinking (20.2%), perching (13.8%), locomotion (12.8%), resting (2.2%), mating (1.6%), and other unobserved behaviors.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no conflict of interest regarding the publication of this paper.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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