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SCREENING POLE OF GREEN FOREST CHICKEN (*Gallus varius*) AND ITS POTENTIAL AS A TEACHING SOURCE OF BIOCULTURAL DIVERSITY: A CASE STUDY IN BUKIT DEMULIH BANGLI INDIGENOUS FOREST AREA

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Abstract

Green jungle fowl (Gallus varius) is widespread in nature and community forests. This study aims to identify distribution patterns, habitat profiles, and the potential of green jungle fowl (GJF) as a source of biological learning based on a biocultural approach (biodiversity, cultural diversity, and language diversity). The case study was used for extensive bird exploration in a customary forest, Hutan Adat Bukit Demulih Bangli (HABD), from February to June 2022. Data on distribution patterns were collected with a combination of free-range, line transect, and point-count techniques and habitat profiles with physiognomy methodology. Meanwhile, document analysis and the concept map were used to demonstrate the potential of the GJF in HABD as a source of learning. The results revealed that GJF was unequally distributed, with a population at each observation point ranging from 2 to 10. The bird prefers forested areas dominated by shrubs with several trees and, therefore, has an open canopy that allows sunlight to reach the forested floor. Local knowledge and practices in the preservation of GJF and HABD are excellent resources for learning various biological materials and concepts in the context of biodiversity, culture, and language.

Keywords: *Green jungle fowl, Distribution pattern, Habitat profile, Customary forest, And Biocultural-learning source.*

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1. Introduction

Green partridges (*Gallus varius*) are widespread wildlife and can live in habitats near human settlements. These interactions make the green forest chicken (AHH) a component of biocultural diversity, which is all the diversity of life, which includes biodiversity and cultural diversity, as well as the interaction between the two: biodiversity, cultural diversity, and the interaction between the two diversities through local language varieties (Vierikko et al., 2015).

Therefore, AHHs have the potential to be a source of biocultural learning, i.e., learning that connects nature and culture as a way to promote learning and respect for both, as well as the close relationship between nature and culture (Tauro *et al.*, 2021). These connections can be seen in knowledge, the environment, the diversity of local languages, paintings, food, music, songs, dances, architecture, art, belief systems, and local economies (Bürgi & Kizos, 2015). Thus, learning biology in the context of bioculture is not only done with the mind but also with the heart, providing meaningful experiences, learning by doing, and learning from ancestral heritage (Cocks et al., 2012; Cocks & Wiersum, 2014).

One of the AHH habitats is a customary forest located in Demulih Bangli Village, about 50 km northeast of Denpasar city. The government formally recognized the area's local community as a customary forest in 2021 under the name Hutan Adat Bukit Demulih Bangli (HABD) (KLHK, 2021). Previous research shows that the forest is rich in bird diversity, including AHH (Sulistyobudi, 2021). The presence of various birdlife in HABD has been the focus of collaborative research between students, lecturers, and village partners in promoting HABD as a bird conservation area (Surata et al., 2022). Both studies found AHH widespread in almost all areas due to favorable habitat factors and the community's belief that AHH are sacred animals protected by the community (Sulistyobudi, 2021; Surata dkk., 2022).

Thus, this study aims to explore the habitat profile of AHH and its potential as a source of bioculture learning. The study's results are expected to enrich biology learning through a contextual approach, integrating biological concepts or knowledge with real life in the community, primarily related to their local wisdom.

The study results also found that AHH was widespread throughout the HABD area, in addition to favorable habitat factors, due to mythological factors so that residents helped preserve these animals (Sulistyobudi, 2021).

2. Research Methods

This study used a qualitative design with a case study approach by exploring in depth and continuously the distribution of AHH and the habitat profile of these animals in HABD from February to June 2022 (Sugiyono, 2020). Initial AHH distribution data were collected through free exploration techniques and interviews with local ornithologists (ethno-ornithologists) using birdwatching guidebooks (MacKinnon, 1991) and semi-structured observation guidelines as instruments. Based on preliminary results, three trajectories (transect lines) were determined that extended east-west of the HABD (south side, north, and hilltop). Subsequently, based on the exploration results along the transect lines, three points for each transect line were determined as locations for more intensive observation of AHH and habitat profiles (Points 1-8).

Each point was visited at least three times within at least two weeks for each visit. The observation time at each point was about 10 minutes, including observation of AHH's direct presence, sound, or footprints. If AHH were not directly observed during the three visits, the AHH population size was used based on the results of an interview with Mul (male, 45 years old, Demulih Village resident), who regularly visits the HABD area and has knowledge and understanding of various bird species around HABD so that he is considered a local bird expert (ethno-ornithologist).

Physiognomic analysis was used to describe AHH's external appearance and habitat stratification (Wijana, 2014), while concept maps were used to visualize the potential of AHH in HABD as a bioculture learning resource based on the analysis of various documents.

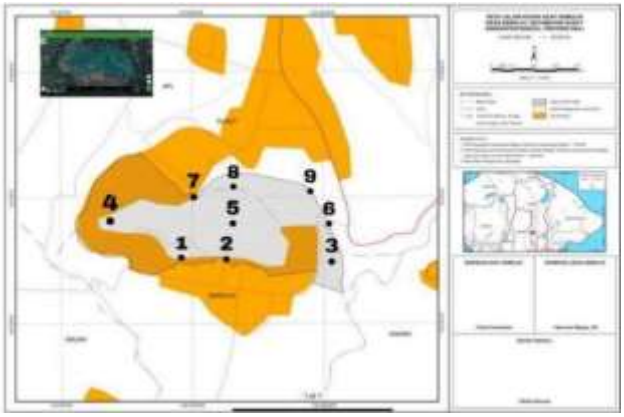

Figure 1. Green forest chicken observation points 1-9 in the Bukit Demulih Bangli Customary Forest (KLHK, 2021).

3. Results and Discussion

3.1 Distribution Pattern of Green Forest Chicken

Green forest chickens (AHH) were found at nine observation points based on direct observation, sound, and tracks left by the animals (Table 1). Based on direct observation, sound, and tracks left by the animals (Table 1), these partridges tend to be found in groups of 2-10 members, primarily females. The distribution of AHH was highest at Point 8, near Pucak Demulih Temple, while the least was at Point 1, near Gunung Sari Temple.

The presence of AHH, spread almost throughout with a relatively large population, indicates that indigenous forest areas suit these animals' habitats. This is due to the forest vegetation structure formed from a combination of tree plants and shrubs, which provides a good source of food, nesting, and shelter for AHH. In addition, the attitude and behavior of the surrounding community, which does not hunt or disturb the life of partridges, allows these animals to live and breed in the Bukit Demulih customary forest area. Local people, especially residents of the Demulih Customary Village, view the partridge as a sacred animal, so they dare not disturb or capture it. Furthermore, an informant stated, "In the past, people from outside the village captured AHH from the customary forest area to keep in their homes. However, a few days later, the captured animal was re-released. It turned out that the person was sick after catching the jungle chicken and could not recover despite trying to do a medical treatment. Surprisingly, after the AHH was released, the person was healthy again".

Table 1. Distribution of green partridges (*Gallus varius*) in the Bukit Demulih Indigenous Forest of Bangli

Point	Point Coordinates	Altitude	Number of individuals
Point 1	LS 8º48’54,76” S BT 115º34’3,45” T	±275	1-3 individuals: alone & in groups.
Point 2	LS 8°48’53,72” S BT 115°34’3,44” T	±295	2-4 ekor: in groups.
Point 3	LS 8°48’52,71” S BT 115°34’3,43” T	±310	2-4 individuals: alone & in groups.
Point 4	LS 8°48’52,71” S BT 115°34’3,43 T	±345	3-5 individuals: alone & in groups.
Point 5	LS 8°48’52,70” S BT 115°34’3,41” T	±355	3-6 individuals: alone & in groups.
Point 6	LS 8°48’51,71” S BT 115°34’3,40” T	±365	5-8 individuals: alone & in groups.
Point 7	LS 8°48’50,70” S BT 115°34’3,39” T	±395	4-6 individuals: alone & in groups.
Point 8	LS 8°48’49,70” S BT 115°34’3,38” T	±400	8-12 individuals: alone & in groups., tracks were also found, and the sound of AHH was heard.
Point 9	LS 8°48’52,72” S BT 115°34’3,44” T	±397	3-4 individuals: alone & in groups., tracks were also found, and the sound of AHH was heard.

The incident further strengthened the local people's belief that AHH is a sacred animal as an unen-unen (pet animal) of Ida Bethara-Bethari (manifestation of God Almighty), who resides in various temples in Demulih Hill. The community increasingly believes AHH is a sacred animal because AHH is often found around the temple area.

Figure 2 shows a male AHH sunbathing on the steps before Taman Temple (Point 2). The temple area is close to residential areas and often receives visits, especially from villagers, for various purposes, such as praying, gardening, or conducting paruman (formal meetings). However, the presence of three springs at the top of the temple means that Taman Temple is visited by many bird species, especially in search of water sources.

Figure 2. A male green partridge sunbathing on the stairs in front of Taman Demulih Temple (Documentation by the researcher, 2022).

3.2 Habitat Profile of Green Partridge

The vegetation profile of Point 1 tended to be dominated by shrubs and some trees with an open canopy structure so that sunlight penetration tended to reach the ground surface (Figure 3). At Point 2, the vegetation is dominated by one sizeable towering tree with shrubs and bushes at the bottom of the forest. This profile causes sunlight penetration to be unable to reach the forest floor around the giant tree, but in other areas with more open canopy, sunlight can reach the bottom of the forest. In contrast to Point 3, with empty spaces between canopies, which underneath contains plants with herbaceous strata that are not recorded because they have minimal crown cover and are dominated by tree plants with open canopy structures so that sunlight penetration tends to reach the ground level. While the vegetation structure at Point 4 is similar to Point 1, which is dominated by shrubs and some tree plants with a closed canopy structure that causes sunlight penetration to not reach the ground surface.

Although tall and large trees tend to dominate Point 5, these trees have open canopies so sunlight can easily reach the ground surface. While the vegetation profile at Point 6 is similar to Point 7 and Point 9, which are dominated by shrubs and some tree plants with a closed canopy structure that causes sunlight penetration to be unable to enter the ground surface. Point 8 is also dominated by shrubs and tall and large trees but has an open canopy structure, so sunlight penetration tends to reach the ground surface.

Figure 3 presents profile images of Point 1 (most minor AHH population) and Point 8 (most AHH population). The vegetation structure of both habitats is almost similar, dominated by shrubs with a few large and tall trees but with an open canopy so that sunlight penetration can reach the ground level. However, Point 1 was close to human settlements, while Point 8 was further away (see Figure 1). As a wildlife species, AHH may avoid human encounters, which may be one of the factors why the bird was rarely found at Point 1.

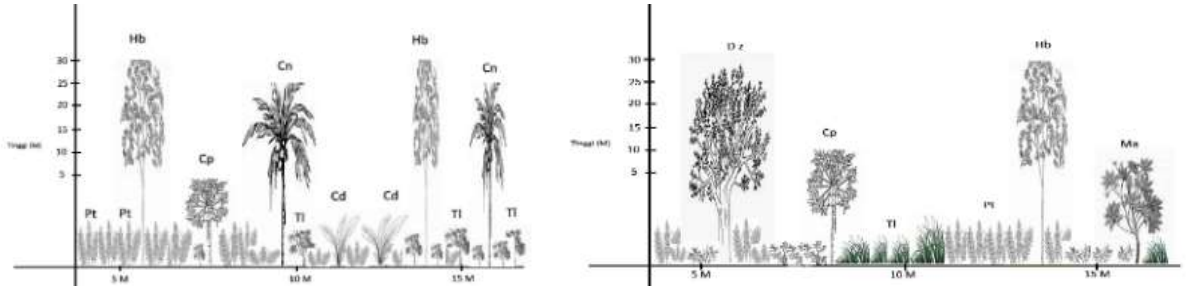

Figure 3. Vegetation profiles at Points 1 (top) and 8 (bottom). Cp (*Carica papaya*); Cn (*Cocos nucifera*), Hb (*Hevea braziliensis*), Cd (*Curcuma domestica*), Dz (*Durio zibethinus*), Ma (*Michelia alba*), Pt (*Pteridophyta*), and Tl (*Wild Plants*).

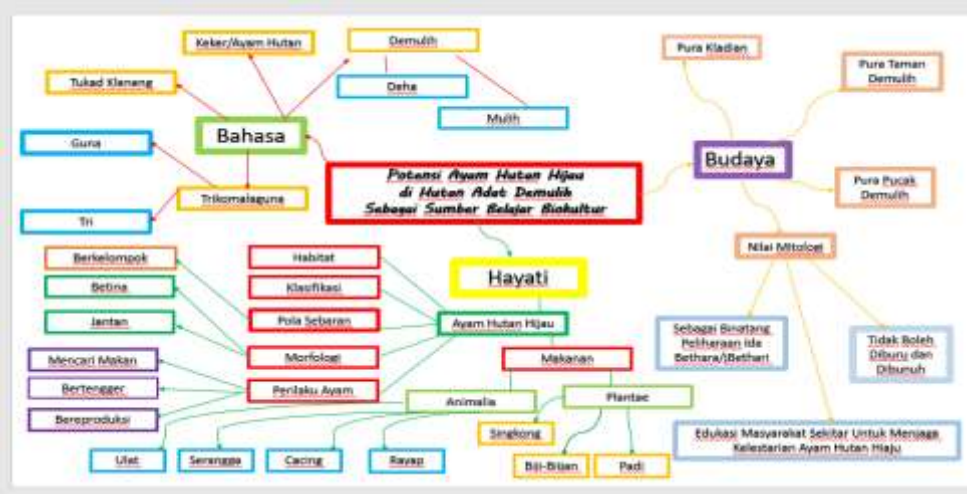

Figure 4. Concept Map of Jungle Chicken as a Bioculture Learning Resource

3.3 Bioculture Learning Resources

Forest chickens in Demulih Hill can be a source of bioculture learning in aspects of biodiversity, cultural diversity, and linguistic diversity (Figure 4). Regarding biodiversity, AHH can be a source of learning various biology topics such as behavior, distribution patterns, living habitat, and food sources. Regarding cultural diversity, AHH can be a source of learning biology topics, such as analyzing the mythological values of sacred animals that are a source of sacred beliefs. Moreover, regarding language diversity, AHH can be a source of learning biologies, such as the regional/local name of the partridge, usually called keker, and the Latin name of the green partridge called *Gallus varius*.

3.4 Discussion

Green partridges in HABD tend to be unevenly distributed. They tend to favor a less dense shrub habitat profile with a few trees that have open canopies. Dense shrubs provide food through seeds, leaves, and insects (Arifinsjah, 1988; KSDAE, 2020). Meanwhile, tree plants with open canopies allow animals to perch to rest, observe and simultaneously avoid enemies. Previous studies found that AHH favors open habitats dominated by grass and shrubs (Yuda et al., 2012). The factor of human presence also affects the distribution of AHH because wildlife AHH tends to avoid encounters with humans by hiding in the bushes.

However, the finding that AHH is widespread with a reasonably dense population in HABD cannot be separated from local wisdom. This wisdom is a mythology that sacralizes AHH as animals under the protection of the gods who reside in various temples around HABD. Another local wisdom is that the HABD area is very sacred, and if local residents die, then for 12 days, they are prohibited from entering the hill area (Sulistyobudi, 2021). Local wisdom like this is a biocultural diversity that needs to be integrated into biology learning so that biological concepts or materials are in real-life contexts (Bürgi & Kizos, 2015; Deveci & Karteri, 2022). This research indicates that the distribution and mythology of AHH around HABD provide a perspective on the urgency of an ecological-social approach in biology learning, which can not only support learning targets but also potentially provide benefits to society, especially related to community-based wildlife conservation efforts (Cocks et al., 2012; McRuer & Zethelius, 2017; Surata et al., 2022).

Further research still needs to be done related to the limitations of this study. Observations of AHH in HABD need to be conducted more in-depth, including ecological, morphological, behavioral, and genetic aspects. The last aspect

needs priority attention, considering that there are indications of a decrease in genetic diversity due to domestication efforts. Studies on distribution patterns need to be expanded outside the HABD area, considering that some people claim that the animal often visits rice fields, moorlands, and even people's yards. Studying the possibility of changes in AHH behavior due to intense interaction with humans is fascinating.

Related to bio-culture learning, studies are needed to integrate local wisdom-based environmental conservation in biology learning through transformative learning, such as problem-based, project-based, or experiential learning, to increase students' capacity to care more and better understand and realize the vital role of community-based conservation.

4. Conclusions and Suggestions

4.1 Conclusions

1. Green partridges are widely distributed in the HABD area with an uneven distribution pattern with populations between 2-10 birds at each observation point.
2. The habitat profile of AHH in HABD consists of two types. First, areas are dominated by large and tall tree plants with closed canopies so that only a little sunlight penetrates the floor. Second, areas are dominated by shrubs with some tall trees that have open canopies so that sunlight can penetrate the forest floor. The first type of habitat profile tends to be more favored by AHH than the second type.
3. The existence of local wisdom in the conservation of HABD and the preservation of AHH populations through mythology has the potential to become a source of learning biology to connect biological material with real life in society through various aspects of bioculture (biodiversity, culture, and language) of HABD and AHH.

4.2 Suggestions

1. It is recommended to conduct further research covering aspects of biology and biology learning contextual approach to various aspects of local wisdom bio culture in environmental conservation.
2. Learning about various aspects of local wisdom bioculture is expected to use a transformative approach to increase students' awareness, attitudes, skills, and understanding that bioculture is an actual implementation of a sustainable form of life carried out across generations.

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