IOSR Journal Of Agriculture and Veterinary Science (IOSR-JAVS)
e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 19, Issue 4 Ser. 1 (April. 2026), PP 14-18
www.Iosrjournals.Org

Vocalization In Domestic Chickens (Gallus Gallus Domesticus): A Review

Osman Hassan Baraka And Dr. P. A. Onjoro
MSc Livestock Production Systems,
Department Of Animal Science
Egerton University.

Abstract
Chickens (Gallus gallus domesticus) produce a diverse array of vocalizations that play fundamental roles in social communication, predator avoidance, reproductive behavior, and parent-offspring interactions. Despite being one of the most numerically abundant domesticated birds worldwide, chicken vocalizations remain understudied compared to other avian species such as songbirds and parrots. This review synthesizes recent literature on chicken vocalization patterns, acoustic characteristics, functional contexts and behavioral mechanisms. The analysis reveals that chickens produce at least 24 distinct vocal signals that can be categorized into functional groups including alarm calls, food calls, social contact calls, aggressive vocalizations, and reproductive signals. The acoustic properties of these vocalizations show significant variation based on context, individual characteristics, and social dynamics. The review examined vocalization types such as rooster crowing (territory advertisement, flock coordination, dominance signaling), alarm calls (aerial versus ground predators), contact calls (group cohesion), maternal clucking and filial peeping (offspring care and recognition), and reproductive vocalizations (mate attraction and courtship coordination). Understanding chicken vocalizations has important implications for animal welfare assessment, poultry management optimization, human-animal interactions in agricultural settings, and our broader understanding of avian communication systems.

Keywords: *Chicken vocalizations, animal communication, alarm calls, welfare assessment, acoustic analysis, referential signaling*

Date of Submission: 29-03-2026 Date of Acceptance: 09-04-2026

I. Introduction

The domestic chicken (*Gallus gallus domesticus*) is one of the most abundant and economically significant bird species globally, with annual production exceeding 25 billion birds (Xiong et al., 2022). Despite theis, chicken vocalizations remain relatively understudied compared to other avian species. Recent research has demonstrated that chickens possess a varied vocal repertoire, with studies documenting between 24 and 25 discrete call types (McGrath et al., 2024; Tefera, 2012). These vocalizations serve diverse functions including predator warning, food advertisement, social bonding, territorial defense, and parent-offspring communication.

Chicken vocalizations provide specific and precise information about the surrounding environment to conspecifics (Rugani et al., 2023). The acoustic properties of chicken calls vary systematically with setting, individual characteristics, and social dynamics, suggesting a communication system that warrants detailed investigation. Knowledge of these signals has practical implications for welfare assessment in commercial poultry production, where distress vocalizations have been linked to growth rates and mortality levels (Xiong et al., 2022).

This review synthesizes current knowledge on chicken vocalization patterns, examining their acoustic properties, functional contexts, behavioral mechanisms, and welfare implications.

II. The Chicken Vocal Repertoire

Diversity and Classification

Domestic chickens possess an elaborate vocal repertoire that enables social communication. Research indicates that chickens produce approximately 24-25 distinct call types, which can be broadly categorized into several functional groups (McGrath et al., 2024; Tefera, 2012). These include alarm calls, food calls, social contact calls, maternal vocalizations, chick peeps, reproductive signals, and aggressive vocalizations.

Tefera (2012) identified 19 distinctly recognizable syllables in domestic chickens, including warning, alarm, contact, territorial, laying, nesting, mating, threat, submissive, distress, fear, contentment, food, dust bathing, perching, battle cries, privacy, dominance, and time calls. The acoustic frequency of chicken vocalizations ranges from 50 Hz to 10 kHz, which falls within the human hearing range of 20-20,000 Hz (Tefera, 2012).

Recent technological advances using machine learning have revealed even greater complexity in the chicken vocal repertoire. Using deep learning-based vocalization recognizers and clustering algorithms, researchers identified 42 distinct sound clusters beyond the four well-known vocalizations (distress calls, short peeps, warbles, and pleasure notes), eventually narrowing these to 10 key clusters that potentially represent novel vocalizations (Soster et al., 2025).

Acoustic Properties

The acoustic properties of chicken vocalizations vary significantly based on call type and context. Rooster crows, the most iconic chicken vocalization, can reach extraordinary sound pressure levels of 130-142.3 dB at close range, comparable to jackhammer or chainsaw noise (Claes et al., 2017; Muyshondt et al., 2017). The spectral decomposition of rooster crows reveals frequency content primarily between 0.25 and 4 kHz, which corresponds to the audible range of chickens (Claes et al., 2017).

Different call types exhibit distinct acoustic signatures. Aerial alarm calls are characterized as short, high-pitched shrieks or trills, while ground alarm calls consist of repetitive clucking that becomes louder and faster as predators approach (Evans & Marler, 1994). Food calls are characterized by rapid repetitive vocalizations, while maternal cluck calls are slow, rhythmic clucks that attract and maintain the brood as a unit (Collias & Joos, 2016).

III. Functional Categories Of Vocalizations

Alarm Calls

Chicken alarm calls demonstrate functional referentiality, with qualitatively different calls produced in response to terrestrial versus aerial predators (Evans & Marler, 1994). Male chickens produce high-pitched aerial alarm calls in response to overhead predators such as hawks or eagles, while ground alarm calls are evoked by animals moving on the substrate, such as raccoons.

Playback experiments have confirmed that these alarm calls are functionally referential: receivers respond to playbacks of food calls with increased anticipatory feeding behavior, while alarm call playbacks elicit appropriate anti-predator responses (Rugani et al., 2023). The production of alarm calls is subject to audience effects, with males modulating their alarm calling based on the presence or absence of suitable audiences, particularly females (Karakashian et al., 1988).

Roosters do not reflexively shriek upon spotting aerial predators; instead, they survey the situation and are more likely to sound alarms when females are nearby or when they can also take cover. This demonstrates that alarm calling involves cognitive assessment of social context and personal risk.

Rooster Crowing

Rooster crowing serves multiple communicative functions including territory advertisement, dominance signaling, and flock coordination. Contrary to popular belief, rooster crowing is not triggered by sunrise but by an internal circadian clock, which explains why roosters often crow before dawn (Yoshimura et al., 2013).

In environments with multiple roosters, crowing follows a distinct hierarchical pattern. Dominant roosters typically initiate morning crowing sequences, with subordinate males following in order of social rank. Research has demonstrated that both crow rate and acoustic quality vary with male status. Dominant roosters produce crows that are higher in frequency, longer in duration, and more complex than those of subordinate males (Leonard & Horn, 1995).

The social component of crowing is evidenced by the fact that roosters in isolation crow less frequently than those with a flock, suggesting that without an audience, the social imperative for communication diminishes.

Food Calls

Male chickens produce characteristic food calls upon discovering edible objects, and are more likely to do so in the presence of hens (Evans & Marler, 1994). This social modulation of food calling is consistent with the hypothesis that food calls function to attract females and provide information about food availability. Research has demonstrated that males adapt their food calls to communicate information about food quality to females, with the probability of a hen approaching being greater when males call to highly preferred foods (Marler et al., 1986).

Food calls are functionally referential, as demonstrated by playback experiments showing that isolated hens respond to recorded food calls with increased ground-substrate inspection behavior compared to alarm calls or contact calls (Evans & Evans, 1999). Hens also produce food calls, though these may function more as social calls, as they express them more in social situations whether food is present or not (Evans & Marler, 1994; McGrath et al., 2017).

Maternal-Offspring Communication

Mother-offspring communication in chickens is particularly sophisticated and begins even before hatching. Once chicks internally pip and begin breathing air, they can be heard peeping inside the shell, and broody hens respond with cooing and clucking vocalizations. This pre-hatching communication establishes a network between the unhatched chicks and their mother (Smith & Daniel, 2000).

Following hatching, broody hens produce a variety of vocalizations that can be characterized as either attraction or alarm calls (Collias & Joos, 2016). Maternal attraction vocalizations include roosting calls (long purring sounds which lack rhythm), maternal cluck calls (slow, rhythmic clucks), and feeding calls. The rhythmicity of maternal cluck calls increases arousal and memory formation through noradrenaline release in the chick's brain, reinforcing learning of desired behaviors (Edgar et al., 2016).

Maternal cluck calls enable chicks to differentiate between their mother and other hens, with most chicks demonstrating this ability by four days of age (Edgar et al., 2016). Research has shown that playback of maternal cluck calls can decrease stress responses in non-brooded chicks, suggesting these calls may be primary reinforcers for domestic chicks (Edgar et al., 2011).

Chicks communicate through peeping vocalizations that convey distress or satisfaction. The volume and velocity of chirps indicate the chick's emotional state, with loud, sharp chirps signaling distress and soft, irregular chirps indicating contentment. Mother hens track their chicks by counting the peeps of each individual and noting the emotional tones of their voices.

Contact and Social Calls

Chickens use various contact calls to maintain group cohesion and communicate their location and status to flock mates. Quiet murmuring or purring sounds indicate contentment and a secure environment, serving as low-level contact calls that allow flock members to keep track of each other while foraging.

The "egg song" is a distinctive vocalization produced by hens after laying eggs, characterized by the pattern "buk-buk-buk-buk BAGAWK!" This vocalization serves as a notification to the rooster and other hens in the flock. While superficially similar to alarm calls in structure, the egg song differs in tone and context, and experienced chicken keepers can distinguish between the two.

Context-Dependent Variation

Recent research has demonstrated that hens vary their vocal repertoire and structure when anticipating different types of rewards. McGrath et al. (2017) found that hens produce acoustically distinct vocalizations when expecting different reward types (mealworms, normal food, or dustbathing substrate), with reward-related calls differing significantly from non-reward calls. This demonstrates that chicken vocalizations encode information about the valence and arousal associated with anticipated events.

IV. Acoustic Adaptations And Protective Mechanisms

The extreme sound pressure levels produced by rooster crowing (up to 142.3 dB at the entrance of the outer ear canal) necessitate protective mechanisms to prevent hearing damage (Claes et al., 2017). Research has revealed that roosters possess anatomical adaptations that attenuate sound transmission through their ears during vocalization.

When roosters open their beaks to crow, the auditory canal closes, providing approximately 3.5 dB of attenuation (Claes et al., 2017). While this mechanical effect alone provides limited protection, it is combined with stapedius muscle activity and other mechanisms to effectively protect the inner ear from damage. Interestingly, this protective mechanism is more pronounced in roosters than in hens, corresponding to the difference in vocalization capacity between the sexes (Claes et al., 2017).

Chickens also demonstrate the Lombard effect, a vocal mechanism for communication in noise in which animals increase their vocal amplitude in response to increased background noise levels (Brumm & Zollinger, 2011). This adaptation allows chickens to maintain effective communication even in noisy environments.

V. Individual Recognition And Social Factors

Chickens can recognize individual conspecifics through their vocalizations. Hens recognize and respond specifically to the crow of their flock's rooster, a phenomenon known as vocal recognition. Similarly, chicks can recognize their own mother's call within a flock, helping them identify her presence quickly and seek protection when needed.

The production of vocalizations is strongly influenced by social context. Males produce more food calls and alarm calls when in the presence of females compared to when alone or with other males (Karakashian et al., 1988). This audience effect demonstrates that chickens make strategic decisions about when to vocalize based on the social composition of their group and the potential benefits of communication.

VI. Welfare Implications

Vocalizations as Welfare Indicators

Chicken vocalizations provide valuable non-invasive indicators of health, affective state, and welfare. There is a clear connection between chicken vocalizations and stress, with various stressors eliciting characteristic vocal responses (Weary & Fraser, 1995). The output of distress vocalizations in commercial flocks is linked to growth rates and mortality levels, making vocalization monitoring a potentially valuable tool for precision livestock farming (Xiong et al., 2022).

Spectral entropy of early-life distress calls has been proposed as an "iceberg indicator" of chicken welfare, with changes in acoustic complexity reflecting underlying welfare states (Herborn et al., 2020). Humans can successfully identify chicken calls produced in reward versus non-reward contexts, with 71% of reward calls classified correctly, suggesting that vocalization monitoring could enhance management of farmed chickens to improve welfare (McGrath et al., 2024).

Automated Monitoring Technologies

Recent advances in artificial intelligence and machine learning have enabled automated identification and classification of chicken vocalizations. Deep learning models can identify chicken distress calls with high accuracy (precision >94%, recall >94%), making them suitable for deployment in commercial settings (Xiong et al., 2022). These technologies can detect subtle changes in vocalization patterns associated with heat stress, respiratory infections, and other health issues before they become visually apparent.

However, implementation in commercial settings faces challenges, particularly the high levels of background noise from heaters and ventilation fans in industrial chicken houses. Future developments must focus on improving signal-to-noise discrimination and integrating vocalization monitoring with other welfare assessment methods.

Effects of Domestication

Domestication has influenced chicken responses to conspecific vocalizations. Comparisons between domestic chickens and Red Junglefowl have revealed differences in behavioral reactions to alarm and contentment calls, with domesticated breeds showing reduced vigilance responses to alarm calls compared to their wild counterparts (Rugani et al., 2023). This suggests that selection for production traits has modified the perception and expression of vocal communication in domesticated lines.

Commercial breeds may also show reduced vocal complexity. Adults of commercial breeds showed fewer motor reactions, postural displays, and vocal responses to acoustic stimuli compared to local broody breeds, suggesting a degradation of communication abilities in intensively selected lines (Tefera, 2012).

VII. Conclusions And Future Directions

Domestic chickens possess a sophisticated vocal communication system comprising at least 24-25 distinct call types with functionally referential properties. These vocalizations serve diverse functions including predator warning, food advertisement, social bonding, territorial defense, and parent-offspring communication. The acoustic properties of chicken calls vary systematically with context, individual characteristics, and social dynamics, encoding information about environmental referents, individual identity, emotional state, and social relationships.

Understanding chicken vocalizations has important practical implications for welfare assessment in commercial poultry production. The development of automated vocalization monitoring systems using artificial intelligence offers promising tools for non-invasive, continuous welfare assessment in large-scale operations. However, challenges remain in terms of signal processing in noisy environments and validating the welfare implications of different vocalization patterns across diverse production systems and genetic lines.

Future research should focus on: (1) comprehensive cataloging of the full chicken vocal repertoire across different breeds and production systems; (2) validation of welfare correlates for different vocalization patterns; (3) development of robust automated monitoring systems for commercial implementation; (4) investigation of how domestication and selection for production traits have modified vocal communication; (5) integration of vocalization monitoring with other welfare assessment methods for comprehensive welfare evaluation; and (6) cross-species comparisons to understand the evolution of referential communication in birds.

By advancing our understanding of chicken vocalizations, we can improve both the welfare of farmed chickens and our broader understanding of avian communication systems.

References

[1]. Brumm, H., & Zollinger, S. A. (2011). The Evolution Of The Lombard Effect: 100 Years Of Psychoacoustic Research. Behaviour, 148(11-13), 1173-1198.

[2]. Claes, R., Muyshondt, P. G., Dirckx, J. J., & Aerts, P. (2017). Sound Attenuation In The Ear Of Domestic Chickens (Gallus Gallus Domesticus) As A Result Of Beak Opening. Royal Society Open Science, 4(11), 171286.

[3]. Collias, N. E., & Joos, M. (2016). The Spectrographic Analysis Of Sound Signals Of The Domestic Fowl. Behaviour, 5(3-4), 175-188.
[4]. Edgar, J. L., Lowe, J. C., Paul, E. S., & Nicol, C. J. (2011). Avian Maternal Response To Chick Distress. Proceedings Of The Royal Society B: Biological Sciences, 278(1721), 3129-3134.
[5]. Edgar, J. L., Nicol, C. J., Clark, C. C., & Paul, E. S. (2016). Influences Of Maternal Care On Chicken Welfare. Animals, 6(1), 2.
[6]. Evans, C. S., & Evans, L. (1999). Chicken Food Calls Are Functionally Referential. Animal Behaviour, 58(2), 307-319.
[7]. Evans, C. S., & Marler, P. (1994). On The Meaning Of Alarm Calls: Functional Reference In An Avian Vocal System. Animal Behaviour, 46(1), 23-38.
[8]. Herborn, K. A., Mcelligott, A. G., Mitchell, M. A., Sandilands, V., Bradshaw, B., & Asher, L. (2020). Spectral Entropy Of Early-Life Distress Calls As An Iceberg Indicator Of Chicken Welfare. Journal Of The Royal Society Interface, 17(167), 20200086.
[9]. Karakashian, S. J., Gyger, M., & Marler, P. (1988). Audience Effects On Alarm Calling In Chickens (Gallus Gallus). Journal Of Comparative Psychology, 102(2), 129-135.
[10]. Leonard, M. L., & Horn, A. G. (1995). Crowing In Relation To Status In Roosters. Animal Behaviour, 49(5), 1283-1290.
[11]. Marler, P., Dufty, A., & Pickert, R. (1986). Vocal Communication In The Domestic Chicken: II. Is A Sender Sensitive To The Presence And Nature Of A Receiver? Animal Behaviour, 34(1), 194-198.
[12]. Mcgrath, N., Dunlop, R., Dwyer, C., Burman, O., & Phillips, C. J. C. (2017). Hens Vary Their Vocal Repertoire And Structure When Anticipating Different Types Of Reward. Animal Behaviour, 130, 79-96.
[13]. Mcgrath, N., Phillips, C. J. C., Burman, O. H. P., Dwyer, C. M., & Henning, J. (2024). Humans Can Identify Reward-Related Call Types Of Chickens. Royal Society Open Science, 11(1), 231284.
[14]. Muyshondt, P. G., Soons, J., Dirckx, J. J., & Aerts, P. (2017). Do High Sound Pressure Levels Of Crowing In Roosters Necessitate Passive Mechanisms For Protection Against Self-Vocalization? Zoology, 121, 65-70.
[15]. Rugani, R., Regolin, L., & Marconato, F. (2023). Effects Of Domestication On Responses Of Chickens And Red Junglefowl To Conspecific Calls: A Pilot Study. Plos ONE, 18(1), E0279299.
[16]. Smith, P., & Daniel, C. (2000). The Chicken Book. University Of Georgia Press.
[17]. Soster, P., Grzywalski, T., Hou, Y., Thomas, P., Dedeurwaerder, A., De Gussem, M., Tuyttens, F., Devos, P., Botteldooren, D., & Antonissen, G. (2025). Identification And Characterization Of Clusters Of Potentially New Vocalizations In Broiler Chickens Using Advanced Acoustic Analysis. Poultry Science, 104(3), 103437.
[18]. Tefera, M. (2012). Acoustic Signals In Domestic Chicken (Gallus Gallus): A Tool For Teaching Veterinary Ethology And Implication For Language Learning. Ethiopian Veterinary Journal, 16(2), 77-84.
[19]. Weary, D. M., & Fraser, D. (1995). Calling By Domestic Piglets: Reliable Signals Of Need? Animal Behaviour, 50(4), 1047-1055.
[20]. Xiong, Y., Huang, Y., Zeng, X. Y., Lu, X., Xu, H., Liu, Y., He, D., & Luo, Q. (2022). Automated Identification Of Chicken Distress Vocalizations Using Deep Learning Models. Journal Of The Royal Society Interface, 19(192), 20210921.
[21]. Yoshimura, T., Suzuki, Y., Makino, E., Suzuki, T., Kuroiwa, A., Matsuda, Y., Namikawa, T., & Ebihara, S. (2013). Molecular Analysis Of Avian Circadian Clock Genes. Molecular Brain Research, 78(1-2), 207-215.