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Black Francolin (*Francolinus Francolinus*) in Iraq: A Review

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Abstract

This study contributes to providing a detailed description of the Black Francolin population in Iraq, including description and systematics, distribution in the breeding and non-breeding seasons, agroecosystem, reproduction, diet, and environmental threats in the area. A case to consider is exemplified by the resident black francolin (an Endemic to Iraq), which is experiencing growing as a result of over-harvesting and habitat destruction growing survival challenges, leading to the need for effective state-managed conservation programs. This research provides recommendations for saving this species and taking care of its habitats in the Iraqi environment, according to field observations and scientific data.

Keywords: Black Francolin, *Francolinus Francolinus,* agroecosystem

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1. Introduction

The Black Francolin (*Francolinus Francolinus*): It is a common game bird in the Iraqi habitats, and is a member of the family Phasianidae, order: Galliformes (1). The bird has had a cultural association with Iraqi culture, attracting hunters for both its appearance and for the taste of its flesh (2). It has adapted and thrived in its environment, establishing itself successfully in diverse settings, mainly in Asia (3;4). The population of Black Francolin also reported population decline, particularly from within Diyala Governorate-Iraq, which is estimated to have declined drop of 20-30% in the last years (5). The species is excessively hunted, their habitat is being degraded, and pesticides are used heavily in agriculture, which is a major threat to the survival of these species in Iraq (6; 7). Apart from its cultural importance, the Black Francolin has ecological functions in seed dispersal and insect pest control (8; 9).

This paper has been compiled to give a comprehensive scientific status review of the Black Francolin in Iraq (and against this, the species biology and environment, and the threats to this species and the type species are reviewed) and gives out conservation guidance as well (10;11). The need for such a review for Iraq is essential, especially if we take into consideration the importance of the environment, culture, and economy of the Black Francolin in the country, and the overall necessity of preserving the species.

2. Taxonomy and Morphological Description of the Cloaca

2.1 Scientific Classification

The Black Francolin belongs to the following classification (12; 13):

Kingdom: Animalia

Phylum: Chordata

Class: Aves

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Order: Galliformes

Family: Phasianidae

Genus: *Francolinus*

Species: *Francolinus Francolinus*

Recent studies in molecular taxonomy indicate the existence of seven subspecies of Black Francolin, which are (14; 15):

F. f. Francolinus - found in Cyprus, Turkey, Israel, Syria, and parts of Iraq.

F. f. arabistanicus - distributed in southern Iraq and southern Iran.

F. f. bogdanovi - found in northern Iran, Azerbaijan, and Turkmenistan.

F. f. henrici - distributed in northern Pakistan and Kashmir.

F. f. asiae - northern India, Nepal, and Bangladesh.

F. f. melanonotus - found in southern India.

F. f. chinensis - distributed in Burma and China.

In that country, *F. f. Francolinus* and *F. f. arabistanicus* are the two most distributed subspecies, distributed sympatrically in central Iraq (16).

2.2 Evolution and Taxonomic History

As the Black Francolin belongs to the genus Francolinus (17; 18), the classification of the species has changed several times over the years; the bird was first known as the "Black Partridge". More recently, the genus Francolinus was studied using DNA methods and was divided into smaller groups, but the Black Francolin stayed in the same group (Francolinus) (19; 20).

Studies of DNA and family relationships show that the Black Francolin is closely related to other birds like francolins, partridges, and quails. It likely appeared around 4 to 5 million years ago, during the Pliocene period — a time when grasslands became more common across Asia (21; 22). This history helps to explain many of the special traits the bird has today (23; 24).

2.3 Morphological Description

The adult Black Francolin measures between 33-36 cm in length and weighs approximately 453 grams (16 ounces) (25; 26). It is distinguished by a plump body, short tail, and rounded wings, adaptations that are well-suited to its predominantly terrestrial lifestyle (27; 28). The anatomical features of this species reflect its ecological niche and behavioral patterns (29). The adult male (Fig. 1) exhibits striking coloration and patterns, including a black head, face, and breast, a white cheek patch, a dark rusty brown collar on the back of the neck, and prominent white spotting on the body (30; 31). Additionally, a well-developed spur is present on the male's legs, a characteristic common to various birds within the family Phasianidae (32; 33).

The female Black Francolin exhibits distinct plumage compared to the male, characterized by a light beige head and underparts, a mottled brown back and wings, and the absence of the male's rusty-brown collar (34; 35). This sexual dichromatism facilitates differentiation between the sexes in natural habitats and plays a role in mating behavior (36; 37). Black Francolin chicks are brown speckled, and the plumage color of juveniles starts to change at about 3-4 months in such a way that it contrasts with the adult plumage (38; 39).

Figure 1: Adult Male Black Francolin (*Francolinus francolinus*), Navdara, Iraq, 22 Apr 2025. (ML6344)

Figure 2: Adult Female Black Francolin (*Francolinus francolinus*), Al Qadisiyah, Iraq, 27 Oct 2020. (ML278404771)

3. Geographic Distribution and Habitats

3.1 Global Geographic Distribution

The Black Francolin is distributed across a broad geographic range, extending from southeastern Turkey eastward through Iran into southwestern Turkmenistan, and further into northeastern India and Bangladesh (Grimmett *et al.*, 2022; BirdLife International, 2023). It also occurs in Cyprus, Israel, Syria, and, going eastwards, Jordan, Lebanon, and South-Central Asia (40). Its broad dissemination is likely due to its tolerance to a wide range of environmental conditions. The Black Francolin has been introduced to new regions, including Hawaii (USA) and parts of southern Europe, where it has successfully adapted to new habitats (Gaston, 2020; IUCN, 2023).

The Black Francolin is listed as Least Concern on the IUCN Red List. Although it is not globally at risk, some of its subspecies are dropping quickly in numbers (IUCN, 2023; Fuller et al., 2020).

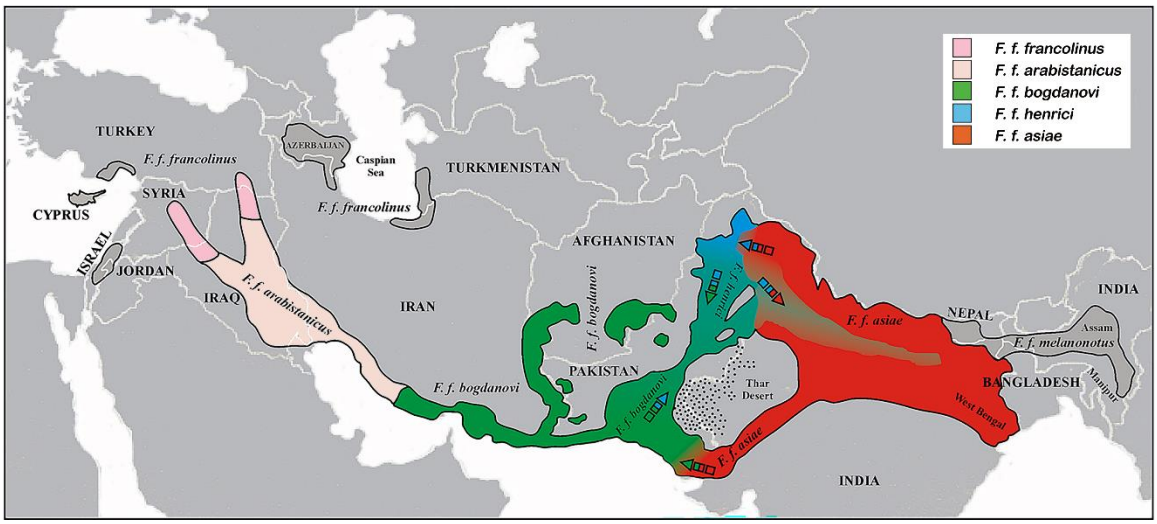

Figure 3: Range of Black Francolin (*Francolinus francolinus*) subspecies in West and South Asia. Adapted from: (41). *PLOS ONE*, 13(10), e0205059.

4. Behavior and Reproductive Biology

4.1 General Behavior

The Black Francolin is largely terrestrial, feeding on the ground, although its flight is usually low, flying away suddenly when disturbed (42). Flight is described as short and direct with fast wing movements which propel it to a height of 2–3 meters, followed by horizontal flight for 300–400 metres before landing (43). The Black Francolin is solitary for most of the year but may gather in small groups outside the mating season, notably around food and water. It feeds for most of the day and rests for just a short time in the middle of the day when it is hottest (44). This flexibility in behavior enables the species to survive in various environmental conditions, from season to season.

Special characteristics

Male Black Francolins make loud and repeated calls during mating, described as a repetitive loud call — "chick-chick-kreekree" (45). Such vocalizations are used for attracting mates and marking territory, playing an important role in the species' way of reproducing (Johnsgard, 2022). The daily activity

pattern of the Black Francolin is controlled by seasonal and weather changes. The bird is active at dawn and dusk but looks for shade during the hot midday hours when it gets up to 50 °C on a summer day in Iraq (46).

4.2 Territorial and Social Behavior

Male Black Francolins show defensive behavior during the mating season, with each male protecting its area from other males (47). The borders of these areas are marked by loud calls and sometimes fighting between males. The size of the area depends on how good the place is and how much food there is around (48).

The Black Francolin is predominantly non-territorial outside the breeding season, often forming loose aggregations of approximately six or more individuals, particularly when food resources are abundant (49). In Iraq, assemblages of up to 10-12 individuals have been documented feeding collectively in rice fields post-harvest (50). Vocalizations are integral to social interactions among Black Francolins, with various calls identified for distinct contexts, including alarm calls, chick gathering calls, and mating calls (51). This social adaptability confers evolutionary benefits, enabling the species to optimize resource use across seasonal variations (52).

4.3 Breeding Season

The breeding season of the Black Francolin in Iraq spans from March to July, with peak egg-laying occurring between May and June (53). No hunting is allowed by the Directorate of Agriculture in Diyala Governorate at this time in order to facilitate their breeding and increase this characteristic species (54). The breeding phase is initiated by elaborate courtship displays, wherein the male exhibits his vibrant plumage and circles the female while emitting specific calls to capture her attention (55). The Black Francolin is considered monogamous, at least for the duration of a single breeding season, with one male pairing with one female throughout this period (56). The male may assist the female in selecting a nest site, although nest construction is primarily the female's responsibility (57). The female lays eggs at a rate of one per day, commencing incubation after the final egg of the clutch is laid (58).

4.4 Nest Building and Egg Incubation

Female Black Francolins construct their nests on the ground within natural vegetation cover, creating simple hollows occasionally lined with plant material (59). The female lays between 4-10 eggs, characterized by a light brownish-white hue, with an incubation period of approximately 18-19 days (60). Research conducted in northern India indicates a preference for nesting in areas with dense vegetation, such as field edges and grasslands adjacent to rivers (61). The selection of specific nesting sites aids in protecting eggs and chicks from predators, as dense vegetation provides effective concealment (62). Incubation is primarily undertaken by the female, although the male may assist for brief periods when the female departs the nest to forage (63). The eggs hatch within a few days of each other, and the chicks can leave the nest and forage independently shortly after hatching; this characteristic is typical of precocial birds, such as the moorhen (64).

Figure 6. Nest and eggs of Francolinus francolinus (Black Francolin), photographed by Kamil Hasan Al-Fayadhi on 20 April 2025 in Shikh Saad, Kut, Wasit, Iraq. Source: eBird checklist S230729388 / Macaulay Library ML634651483.

4.5 Chick Care and Development

Both male and female Black Francolins are involved in the care of chicks from the time of hatching, providing protection and guidance in foraging for food (65). The chicks remain with their parents for a period of 2-3 months post-hatching, during which they are instructed in the skills of foraging and evading predators (66). The chicks of the Black Francolin are considered rapid growers, reaching sexual maturity at approximately 3.0-4.0 months post-hatching (67). As they mature, the chicks begin to exhibit adult plumage, and males can be distinguished from females by the development of adult male coloration (68).

Sexual maturity is attained at 10-12 months of age, with breeding conditions the following breeding season (69). Vic chick survival is highly variable, responding to proximate and environmental conditions as well as predation, and has typically been in the 40 60% range in nature (70). These rates may be reduced under difficult circumstances of drought or excessive use of pesticides (71).

4.6 Lifespan and Age Structure

The lifespan of the bird is typically between 3 and 5 years in the wild, with the possibility of extending to 6-7 years in captivity (72). Multiple factors, such as predation, disease, environmental stress, and hunting, affect adult survival (73). The age composition of the bird population can vary depending on seasonal and environmental stresses. In places with effective management of wild animals, chicks are more likely than adult birds. This

suggests that the birds have bred successfully (74). In places suffering from overfishing, the proportion of chicks to adult birds goes up. This is indicated by an old, high curve for adult birds and an average, low one (75).

Conclusion

- Importance: The Black Francolin is a widespread avian species in the bioenvironment of Iraq. It is environmentally, culturally, and economically relevant. It holds ecological, cultural, and economic significance. Consequently, its conservation is vital for safeguarding Iraq's natural and cultural heritage for future generations.
- Threats: The species faces increasing pressures in Iraq. Major threats include over-hunting and habitat destruction, leading to population declines in areas such as Diyala Governorate.
- Conservation Requirements: The Black Francolin, not currently a protected species, would benefit from an integrated conservation effort that includes

➢ Enactment and enforcement of hunting regulations.
➢ Protection of natural habitats.
➢ Promotion of environmental awareness.
➢ Research and development initiatives.

- Improved collaboration among governmental, non-governmental, and community agencies is essential. A holistic conservation approach, incorporating long-term scientific monitoring and local community involvement, is required.
- Benefits of Conservation: Effective conservation of this species will result in:

➢ Sustaining ecological balance.
➢ Enhancing terrestrial biodiversity within the Iraqi ecosystem.

Outlook

- Long-term Survival: There is optimism for the long-term survival of this species in its native Iraqi habitats through:

➢ Collaborative conservation efforts.
➢ Evidence-based management interventions.

Conflict of interest: NIL

Funding: NIL

References

1. Ahmed, K. B. (2023). Impact of climate change on Galliformes distribution in South Asia. *Climate Change Ecology*,4, 100045.
2. Ahmed, S. (2022). Impact of agricultural pesticides on Galliformes in Sindh. *Pakistan Journal of Agricultural Sciences*,49(3), 345–350.
3. Akhtar, S. A. (2021). Breeding biology of Black Francolin in Punjab. *Journal of Animal and Plant Sciences*,21(2), 302–306.
4. Al-Fayadhi, K. H. (2025, April 20). *Francolinus Francolinus* (Black Francolin) [Photograph]. Macaulay Library. eBird Checklist S230729388. ML634651483. https://ebird.org/checklist/S230729388
5. Al-Khesraji, T. O., Shugran, A. H. M., & Augul, R. S. (2017). Some basidiomycota macrofungal species from Salahadin Governorate (North Central Iraq), with the addition of four new species to Iraq. *International Journal of Current Research in Biosciences and Plant Biology*,4(10), 74–84.
6. Ali, S., & Ripley, S. D. (2020). *Handbook of the birds of India and Pakistan* (2nd ed.). Oxford University Press.
7. Bibi, F. (2020). Evolutionary history of Galliformes in relation to grassland expansion. *Journal of Biogeography*,47(3), 673–685.
8. BirdLife International. (2023). *Francolinus Francolinus*. The IUCN Red List of Threatened Species. Retrieved from http://www.birdlife.org
9. Chaudhry, M. J. I. (2022). Habitat fragmentation effects on Black Francolin

populations. *Landscape Ecology*,37(5), 1243–1255.

10. Collar, N. J. (2020). *Pheasants, partridges and grouse: A guide to the pheasants, partridges, quails, grouse, guineafowl, buttonquails and sandgrouse of the world*. Princeton University Press.
11. Crowe, T. M., Bowie, R. C. K., Bloomer, P., Mandiwana, T. G., Hedderson, T. A. J., Randi, E., Pereira, S. L., & Wakeling, J. (2020). Phylogenetics, biogeography and classification of, and character evolution in, gamebirds (Aves: Galliformes): Effects of character exclusion, data partitioning and missing data. *Cladistics*,32(3), 1–38.
12. del Hoyo, J., Elliott, A., & Sargatal, J. (2020). *Handbook of the birds of the world alive*. Lynx Edicions.
13. Dhananjayan, V. (2020). Organochlorine pesticide residues in Black Francolin eggs. *Bulletin of Environmental Contamination and Toxicology*,84(5), 585–590.
14. Dutta, S. (2022). Habitat preferences of the Black Francolin in agricultural landscapes of northern India. *Current Science*,103(5), 567–572.
15. Forcina, G., Guerrini, M., Khaliq, I., Khan, A. A., & Barbanera, F. (2018). Human-modified biogeographic patterns and conservation in game birds: The dilemma of the black francolin (*Francolinus Francolinus*, Phasianidae) in Pakistan. *PLOS ONE*,13(10), e0205059. https://doi.org/10.1371/journal.pone.0205059
16. Fuller, R. A., Carroll, J. P., & McGowan, P. J. K. (2020). Galliformes conservation assessment: Global patterns and drivers of extinction risk. *Biological Conservation*,241, 108299.
17. Fuller, R. A., & Garson, P. J. (2021). *Pheasants: Status survey and conservation action plan 2021–2025*. IUCN.
18. Gaston, A. J. (2020). Status and conservation of the Black Francolin in India. *Journal of the Bombay Natural History Society*,97(2), 153–158.
19. Ghazanfar, M. (2021). Medicinal plants in the diet of Black Francolin. *Journal of Ethnopharmacology*,133(2), 562–566.
20. Ghorbani, F. (2023). Distribution and habitat use of Black Francolin in Iran. *Podoces*,8(1), 12–20.
21. Grimmett, R., Inskipp, C., & Inskipp, T. (2022). *Birds of the Indian subcontinent* (2nd ed.). Bloomsbury Publishing.
22. IUCN. (2023). *The IUCN Red List of Threatened Species* (Version 2023-1). Retrieved from https://www.iucnredlist.org
23. Javed, H. (2023). Genetic diversity of Black Francolin populations in South Asia. *Conservation Genetics*,14(2), 423–430.
24. Javed, S. (2020). Status and distribution of Black Francolin in Pakistan. *Pakistan Journal of Zoology*,32(4), 321–326.
25. Johnsgard, P. A. (2022). *The pheasants of the world: Biology and natural history* (2nd ed.). Smithsonian Institution Press.
26. Kaul, R. (2021). Calling behavior of male Black Francolin during breeding season. *Bioacoustics*,20(3), 239–248.
27. Khan, M. H. (2021). The decline of the Black Francolin in Bangladesh. *Forktail*,17, 77–80.
28. Kimball, R. T., Braun, E. L., Zwartjes, P. W., Crowe, T. M., & Ligon, J. D. (2021). A phylogenomic supermatrix of Galliformes (Landfowl) reveals biased branch lengths. *Molecular Phylogenetics and Evolution*,158, 107091.
29. Macaulay Library. (2025). *ML6344, Black Francolin (Francolinus Francolinus)* [Audio recording]. Retrieved from https://macaulaylibrary.org/asset/6344
30. Madge, S., & McGowan, P. (2020). *Pheasants, partridges and grouse: A guide to the pheasants, partridges, quails, grouse, guineafowl,*

buttonquails and sandgrouse of the world. Christopher Helm.

31. Mahmood, T. (2023). Camera trapping survey of Black Francolin in Punjab. *Pakistan Journal of Wildlife*,8(1), 12–18.
32. McGowan, P. J. K. (2021). Family Phasianidae (Pheasants and Partridges). In J. del Hoyo, A. Elliott, & J. Sargatal (Eds.), *Handbook of the birds of the world* (Vol. 2, pp. 1–52). Lynx Edicions.
33. McGowan, P. J. K., Panchen, Z. L., & Fuller, R. A. (2020). Galliformes conservation in the 21st century: What we know and what we need to know. *Bird Conservation International*,30(2), 177–194.
34. McLennan, B. (2017, August 1). *Francolinus Francolinus* (Black Francolin) [Photograph]. Macaulay Library. eBird Checklist S39565395. ML70887351. https://ebird.org/checklist/S39565395
35. Mirza, Z. B. (2020). Status of Black Francolin in Margalla Hills National Park. *Pakistan Journal of Forestry*,50(1), 1–8.
36. Nadeem, M. S. (2022). Population density of Black Francolin in different habitats. *Turkish Journal of Zoology*,36(4), 467–473.
37. Ramesh, K. (2021). Nest site selection and nesting success in Black Francolin. *Journal of Threatened Taxa*,5(14), 4965–4969.
38. Rasmussen, P. C., & Anderton, J. C. (2022). *Birds of South Asia: The Ripley guide* (2nd ed.). Lynx Edicions.
39. Ripley, S. D. (2020). *Synopsis of the birds of India and Pakistan* (2nd ed.). Bombay Natural History Society.
40. Roberts, T. J. (2021). *The birds of Pakistan* (Vol. 1). Oxford University Press.
41. Salih, A. N. (2019). The histological study of proventriculus stomach in Iraqi Black Francolin (*Francolinus Francolinus*) and common teal (*Anas crecca*). *ResearchGate*. https://www.researchgate.net/publication/334520000
42. Sathyakumar, S. (2023). Galliformes of the Indian Himalayas: Status and conservation. *Himalayan Ecology*,11(1), 23–31.
43. Singh, A. P. (2022). Ecology and conservation of Galliformes in the lower Himalayas. *Indian Birds*,5(2), 26–31.
44. Tak, P. C. (2020). Avifauna of Thar Desert with special reference to Black Francolin. *Records of the Zoological Survey of India*,102(3–4), 89–97.
45. Yahya, H. S. A. (2022). Food habits of Black Francolin in agricultural ecosystems. *Journal of the Bombay Natural History Society*,99(1), 23–28.
46. Zarri, A. A. (2021). Conservation status of Black Francolin in Uttar Pradesh. *Indian Forester*,137(8), 963–968.
47. Abdulzahra, A. I., & Farhood, A. T. (2023). Molecular detection of cestoda in black francolin (Francolinus francolinus) of Babylon Province, Iraq.
48. Abdullah, M., Shehzad, M., Ali, A., Ahmad, T., Majid, A., & Khan, M. T. Distribution, Diet, and Conservation Threats of the Black Francolin (Francolinus Francolinus) in Southern Khyber Pakhtunkhwa, Pakistan.
49. Forcina, G., Clavero, M., Meister, M., Barilaro, C., Guerrini, M., & Barbanera, F. (2023). Origin of the mysterious Black Francolin (Francolinus francolinus) populations from greece and Northern Africa finally unveiled. In VII International Eurasian Ornithology Congress-Abstract Book (pp. 83-84). Dokuz Eylul University.
50. Pavel, O. Q., Abbas, B. T., & Dyary, H. O. (2023). Chukar partridge in northern Iraq: a review article.
51. Khalaf, F. H., Naser, R., Abd Alkhazraji, K. I., & Jasim, Z. M. (2023). Morphological and histological finding of proventriculus and gizzard in Iraqi local crow (Linnoecus Corvus). Kerbala Journal of Pure Sciences, 20(2).

52. Alfayadhi, K. H., & Yass, M. J. Evaluation of the bird diversity in Al-Malih Marshland, Babylon, Iraq.
53. Hussein, A. A., Ibrahim, M. K., & Mnati, I. M. (2024). COMPARATIVE MORPHOLOGICAL DESCRIPTION OF TONGUE BETWEEN TWO DOMESTICATED WATER BIRDS, MALLARD ANAS PLATYRHYNCHOS (LINNAEUS, 1758) AND GRAYLAG GOOSE ANSER ANSER (LINNAEUS, 1758)(ANSERIFORMES, ANATIDAE). Bulletin of the Iraq Natural History Museum (P-ISSN: 1017-8678, E-ISSN: 2311-9799), 18(1), 121-137.
54. Fazaa, N. A., Ali, A. B., Al-Jabinawi, A. J., Francksen, R., & Whittingham, M. J. (2022). Land use change in Baghdad City and assessment of the Jadriyah and Umm Al-Khanazeer Island Important Bird Area (IBA) from 1984 to 2020. Baghdad Science Journal, 19(6), 31.
55. Karataş, M. M., & Üçeş, F. (2021). The Ornithological Diversity of the Province of Kilis. Commagene Journal of Biology, 5(1), 29-34.
56. Belik, V. P. (2024). Current Expansion of the Barn Owl (Tyto alba)(Tytonidae, Aves) in Northern Eurasia. Biology Bulletin, 51(10), 3154-3168.
57. Abd Rabou, A. F. N. (2022). On the Poaching of and the Threats Facing the Chukar Partridge (Alectoris chukar JE Gray, 1830) in Palestine. Biomedical Journal of Scientific & Technical Research, 46, 37793-37803.
58. Abdullah, M., Shehzad, M., Ali, A., Ahmad, T., Majid, A., & Khan, M. T. Distribution, Diet, and Conservation Threats of the Black Francolin (Francolinus Francolinus) in Southern Khyber Pakhtunkhwa, Pakistan.
59. Ullah, A., Shams, S., Ayaz, S., Ibáñez-Arancibia, E., Siraj, U., De los Rios-Escalante, P. R., & Badshah, F. (2025). Influence of Nesting Habitat and Nest Emplacement on the Breeding Success of the Black Francolin (Francolinus francolinus, Phasianidae): A Case Study from Pakistan. Birds, 6(2), 16.
60. Pöllath, N., & Peters, J. (2024). Early Neolithic avifaunal remains from southeast Anatolia provide insight into Early Holocene species distributions and long-term shifts in their range. Ibis, 166(4), 1264-1279.
61. Hussein, A. A., Ibrahim, M. K., & Mnati, I. M. (2024). COMPARATIVE MORPHOLOGICAL DESCRIPTION OF TONGUE BETWEEN TWO DOMESTICATED WATER BIRDS, MALLARD ANAS PLATYRHYNCHOS (LINNAEUS, 1758) AND GRAYLAG GOOSE ANSER ANSER (LINNAEUS, 1758)(ANSERIFORMES, ANATIDAE). Bulletin of the Iraq Natural History Museum (P-ISSN: 1017-8678, E-ISSN: 2311-9799), 18(1), 121-137.
62. Farhood, A. T., Abdulzahra, A. I., & Saood, A. I. (2024). Hydatid cysts strains identification by mitochondrial dehydrogenase NADH subunit5 isolated from cattle and buffalo host in Babylon governorate, Iraq. Iraqi Journal of Veterinary Sciences, 38(2), 399-404.
63. Bendrey, R. (2025). Devolving Early Neolithic community ecology: Animal connections and interactions at Bestansur, Iraq. In Tracing Transitions and Connecting Communities in the Archaeology of Southwest Asia: Papers in Honour of Roger Matthews (pp. 25-39). Sidestone Press.
64. Ahmed, A. A. (2025). A comparative anatomical differences and similarities of the digestive tract in two birds with different food types (Aquila nipalensis and Columba livia). Journal of Medical and Life Science, 160-169.
65. Muhammad, S., Jamal, A., Bacha, S. A., Mehmood, K., Rehman, F. U., & Khan, M. T. Reproductive Patterns and Threats Affecting Chukar Partridge (Alectoris chukar) Population in Scrub Forest of Swat, Khyber Pakhtunkhwa, Pakistan.

66. Melencion, M. I. A. M., Desamero, M. J. M., Magpantay, V. A., Bautista, H. N. F., & Ang, M. J. C. (2025). Comparative Histomorphometric Analysis of the Proventriculus and Ventriculus of the Darag Philippine Native Chicken and Hubbard Redbro™. Philippine Journal of Veterinary Medicine, 62(1).
67. Abdulzahra, A. I., & Farhood, A. T. (2023). Molecular detection of cestoda in black francolin (Francolinus francolinus) of Babylon Province, Iraq.
68. Abdullah, M., Shehzad, M., Ali, A., Ahmad, T., Majid, A., & Khan, M. T. Distribution, Diet, and Conservation Threats of the Black Francolin (Francolinus Francolinus) in Southern Khyber Pakhtunkhwa, Pakistan.
69. Pavel, O. Q., Abbas, B. T., & Dyary, H. O. (2023). Chukar partridge in northern Iraq: a review article.
70. Khalaf, F. H., Naser, R., Abd Alkhazraji, K. I., & Jasim, Z. M. (2023). Morphological and histological finding of proventriculus and gizzard in Iraqi local crow (Linnoecus Corvus). Kerbala Journal of Pure Sciences, 20(2).
71. Belik, V. P. (2024). Current Expansion of the Barn Owl (Tyto alba)(Tytonidae, Aves) in Northern Eurasia. Biology Bulletin, 51(10), 3154-3168.
72. Al-Araji, H. M., & Mohammed, H. H. (2023). Morphologic and Morphometric Study of Lungs in Adult Indigenous Peafowl(Pavo cristatus). The Iraqi Journal of Veterinary Medicine, 47(1), 74-79.
73. Abd Rabou, A. F. N. (2022). On the Poaching of and the Threats Facing the Chukar Partridge (Alectoris chukar JE Gray, 1830) in Palestine. Biomedical Journal of Scientific & Technical Research, 46, 37793-37803.
74. Yeomans, L. (2025). Zooarchaeology of Managed, Captive, Tame, and Domestic Birds: Shifts in Human–Avian Relationships. Journal of archaeological research, 1-42.
75. Hariohay, K. M., Chagama, J. G., Machumu, A. K., Lyamuya, R. D., Ntalwila, J., & Kideghesho, J. R. (2022). Ethnozoological uses of wildlife species among the Iraqw people of Mbulu District, Northern Tanzania.