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DAFTAR PUSTAKA

Al-aameli, M.H., Kadhim, K.K. (2017). Histomorphological Study of Syrinx of Black Francolin (*Francolinus francolinus*) in Iraq. *Advances in Animal and Veterinary Sciences, 5*, 92–99. https://doi.org/10.14737/journal.aavs/2017/5.2.92.99

Abinawanto, A., Effendi, P.S. (2018). The bioacoustics analysis and the morphometrics study of the gaga's chicken (Ayam Ketawa) from Pinrang and Kebayoran Lama. *Proceedings Of The 3rd International Symposium On Current Progress In Mathematics And Sciences 2017 (ISCPMS2017),* Bali, Indonesia. https://doi.org/10.1063/1.5064134

Araji, H.M., Mohammed, H.H. (2023). Comparative Anatomical Study Of The Trachea In Adult Male And Female Indigenous Peafowl (*Pavo Cristatus*). *Ann. For. Res*, *66*(1), 1149-1157.

Arlina, F., Rusfidra, R., Munafri, S., Tanjung, W.F., Ardiansyah, T., Rafian, T. (2025). Activity and crowing frequency of Ayam Kokok Balenggek from West Sumatra by using and without perch. *Journal of Advanced Veterinary Research*, *15*(6), 767-770.

Asmara, I.Y., Garnida, D. Hilmia, N. (2024). Korelasi intensitas cahaya dengan karakteristik suara ayam Pelung. *ZIRAA'AH MAJALAH ILMIAH PERTANIAN*, *49*(2), 376-381. https://doi.org/10.24198/jlt.v24i1.55804

Asmara, I.Y., Garnida, D., Partasasmita, R., (2020). Crowing characteristics of Pelung chickens at different age and body weight. *Biodiversitas*, *21*(9), 4339-4344. https://doi.org/10.13057/biodiv/d210953

Atalgin, Ş.H., Can, M., Bekmezci, S. (2021). Gross anatomy and mineralization of larynx, trachea and syrinx in gray heron (*Ardea cinerea*). *Turkish Journal of Veterinary & Animal Sciences*, *45*(1), 126-132. https://doi.org/10.3906/vet-2008-46

Baraka, O.H., Onjoro, P.A. (2026). Vocalization In Domestic Chickens (Gallus Gallus Domesticus): A Review. *IOSR Journal of Agriculture and Veterinary Science, 19*(4), 14-18. https://doi.org/10.9790/2380-1904011418

Bayram, G., Liman, N. (2000). A Morphological Investigation of the Postnatal Development of the Syrinx in the Quail. *Turkish Journal of Veterinary & Animal Sciences, 24*(4), 381-392.

Çevik-Demirkan, A., Haziroğlu, R.M., Kürtül, İ., (2007). Gross Morphological and Histological Features of Larynx, Trachea and Syrinx in Japanese Quail. *Anatomia, Histologia, Embryologia, 36*, 215–219. https://doi.org/10.1111/j.1439-0264.2007.00758.x

Dewi, C.M.S., Dhamayanti, Y., Fikri, F., Purnomo, A., Khairani, S., Chhetri, S., Purnama, M.T.E. (2024). An investigation of syrinx morphometry and sound frequency association in lovebirds (*Agapornis fischeri*) chirps. *F1000Research*, *11*(354). https://doi.org/10.12688/f1000research.108884.3

UNIVERSITAS GADJAH MADA
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Derégnaucourt, S., Saar, S., Gahr, M. (2009). Dynamics of crowing development in the domestic Japanese quail (*Coturnix coturnix japonica*). *Proceedings. Biological sciences*, *276*(1665), 2153–2162. https://doi.org/10.1098/rspb.2009.0016

Eda, M. (2021). Origin of the domestic chicken from modern biological and zooarchaeological approaches. *Animal Frontiers*, *11*(3), 52-61.

Efendi, A.A., Asmawati, A., Muchlis, A. (2023). Substitusi tepung daun ubi jalar fermentasi dengan jagung giling sebagai sumber energi terhadap bobot badan akhir dan persentase karkasi ayam kampung unggul balitnak. *Jurnal Ilmiah Ecosystem*, *23*(2), 405-413.

Elemans, C.P.H., Rasmussen, J.H., Herbst, C.T., Düring, D.N., Zollinger, S.A., Brumm, H., Srivastava, K., Svane, N., Ding, M., Larsen, O.N., Sober, S.J. (2015). Universal mechanisms of sound production and control in birds and mammals. *Nature communications*, *6*(1). https://doi.org/10.1038/ncomms9978

Elemans, C.P.H., Spierts, I.L.Y., Hendriks, M., Schipper, H., Müller, U., Leeuwen, J.L. (2006). Syringeal muscles fit the trill in ring doves (*Streptopelia risoria* L.). *J Exp Biol*. *209*(5), 965–977. https://doi.org/10.1242/jeb.038885

Fagerlund, S. (2004). Acoustics and physical models of bird sounds. *Seminar in acoustics, HUT, Laboratory of Acoustics and Audio Signal Processing*.

Farid, M.F. (2020). Karakteristik Suara, Struktur Anatomi, dan Histologi Syrinx pada Ayam Ketawa, Ayam Pelung, dan Ayam Bangkok [Gallus gallus gallus (Linnaeus, 1758)]. *Skripsi*, Universitas Gadjah Mada.

Fitriani, S., Budiarto, T., Nurulhaq, M.I. (2023). Strategi Pengembangan Komoditas Ayam KUB di Desa Masingai II, Kabupaten Tabalong. *Jurnal Resolusi Konflik, CSR dan Pemberdayaan (CARE)*, *8*(2), 43-52.

Florencio-Silva, R., Sasso, G.R., Sasso-Cerri, E., Simões, M.J., Cerri, P.S. (2015). Biology of Bone Tissue: Structure, Function, and Factors That Influence Bone Cells. *BioMed research international*, *421746*. https://doi.org/10.1155/2015/421746

Frank, T., Walter, I., Probst, A., König, H.E. (2006). Histological aspects of the syrinx of the male mallard (*Anas platyrhynchos*). *Anatomia, Histologia, Embryologia*, *35*(6), 396-401. https://doi.org/10.1111/j.1439-0264.2006.00701.x

Fusani, L., Beani, L., Dessì-Fulgheri, F. (1994). Testosterone Affects the Acoustic Structure of the Male Call in the Grey Partridge (*Perdix perdix*). *Behaviour*, *128*(3/4). https://doi.org/10.1163/156853994x00307

Ginting, A.V., Hamdan, Wahyuni, T.H. (2015). Identifikasi Dan Karakterisasi Pola Kokok Pada Ayam Pelihara Berdasarkan Pendekatan Bioakustik. *Jurnal Peternakan Integratif, 3*, 142–155. https://doi.org/10.32734/jpi.v3i2.2751

Goller, F., (2022). The syrinx. *Current Biology*, *32*(20), 1095-1100. https://doi.org/10.1016/j.cub.2022.08.034

UNIVERSITAS
GADJAH MADA
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Universitas Gadjah Mada, 2026 | Diunduh dari http://etd.repository.ugm.ac.id/

Gordon, M.L., Gulati, A., Samlan, R.A., Miller, J.E. (2026). Voice changes in aging birdsong: A longitudinal study in adult male zebra finches. *Behavioral Neuroscience*. https://doi.org/10.1037/bne0000666

Hadi, R.F., Suprayogi, W.P.S., Handayanta, E., Sudiyono, S., Hanifa, A., Widyawati, S.D. (2021). Peningkatan Produktivitas Usaha Budidaya Ayam Kampung UKM Putra Budi Kecamatan Mojolaban Kabupaten Sukoharjo. *PRIMA: Journal of Community Empowering and Services, 5*(118).

Harris, C.L., Gross, W.B., Robeson, A. (1968). Vocal Acoustics of the Chicken. *Poultry Science, 47*, 107–112. https://doi.org/10.3382/ps.0470107

Hogg, D.A. (1982). Ossification of the laryngeal, tracheal and syringeal cartilages in the domestic fowl. *Journal of anatomy*, *134*(1), 57–71.

Ibrahim, I.A.A., Hussein, M.M., Hamdy, A., Abdel-Maksoud, F.M. (2020). Comparative Morphological Features of Syrinx in Male Domestic Fowl *Gallus gallus domesticus* and Male Domestic Pigeon *Columba livia domestica* : A Histochemical, Ultrastructural, Scanning Electron Microscopic and Morphometrical Study. *Microscopy and Microanalysis*, *26*, 326–347. https://doi.org/10.1017/S1431927620000021

Kabak, M., Orhan, I.O., Haziroglu, R.M. (2007). The Gross Anatomy of Larynx, Trachea and Syrinx in the Long-Legged Buzzard (*Buteo rufinus*). *Anatomia, Histologia, Embryologia*, *36*(3). https://doi.org/10.1111/j.1439-0264.2006.00708.x.

Karaavcı, F.A., Koçyiğit, A., Kanik, B. (2024). Morphological comparison of larynx, syrinx and trachea of some wild birds. *Harran University Journal of the Faculty of Veterinary Medicine*, *13*(1), 48-55. https://doi.org/10.31196/huvfd.1444521

Kelly, L., Alworth, L. (2013). Techniques for collecting blood from the domestic chicken. *Lab Anim, 42*, 359–361. https://doi.org/10.1038/laban.394

Kuwayama, T., Ogawa, H., Munechika, I., Kono, T., Ichinoe, K. (1996). Crowing characteristics of Jungle Fowls, Japanese native breeds and White Leghorn breed of chicken. *Japanese poultry science*, *33*(2), 89-95. https://doi.org/10.2141/jpsa.33.89

Lawal, R.A., Martin, S.H., Vanmechelen, K., Vereijken, A., Silva, P., Al-Atiyat, R.M. (2020). The wild species genome ancestry of domestic chickens. *BMC biology, 18*(13). https://doi.org/10.1186/s12915-020-0738-1

Li, Z., Zhang, T., Cuan, K., Fang, C., Zhao, H., Guan, C., Qu, H. (2022). Sex detection of chicks based on audio technology and deep learning methods. *Animals*, *12*(22).

Liu, Y.P., Wu, G.S., Yao, Y.G., Miao, Y.W., Luikart, G., Baig, M. (2006). Multiple maternal origins of chickens: out of the Asian jungles. *Molecular Phylogenetics and Evolution, 38*, 12–19. https://doi.org/10.1016/j.ympev.2005.09.014

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Maksoud, A., Ibrahim, A., Hussein, M. Hamdy, A. (2019). The Gross Anatomy of the Syrinx of Adult Male Domestic Fowl Gallus gallus domesticus. *OSP J Vet Res Med*, *1*(1).

Manikandan, V., Neethirajan, S. (2025). AI-Powered Vocalization Analysis in Poultry: Systematic Review of Health, Behavior, and Welfare Monitoring. *Sensors*, *25*(13). https://doi.org/10.3390/s25134058

Meidiwarsito, A.E.A. (2015). Studi Morfologi Anatomi Struktur Syrinx Ayam Ketawa Usia 1 Bulan Sampai 4 Bulan. *Skripsi*, Universitas Hasanuddin.

Miller, A.H. (1965). The syringeal structure of the Asiatic owl Phodilus. *Condor*, *67*(6). https://digitalcommons.usf.edu/condor/vol67/iss6/11

Mulyana, Royani, M., Kusmayadi, T. (2025). Identification of Crowing Sound Characteristics of Pelung Chickens at the UNIGA Rector Cup Contest through Bioacoustic and Morphometric Approaches. *JURNAL ILMIAH PETERNAKAN TERPADU*, *13*(3), 832–851. https://doi.org/10.23960/jipt.v13i3.p832-851

Nelson, B.S., Beckers, G.J., Suthers, R.A. (2005). Vocal tract filtering and sound radiation in a songbird. *The Journal of experimental biology*, *208*(2), 297–308. https://doi.org/10.1242/jeb.01378

Onuk, B.R.M.H., Kabak, M. (2010). The gross anatomy of larynx, trachae and syrinx in goose (*Anser anser domesticus*). *Kafkas Üniversitesi Veteriner Fakültesi Dergisi*, *16*(3).

Penar, W., Magiera, A., Klocek, C. (2020). Applications of bioacoustics in animal ecology. *Ecological Complexity, 43.* https://doi.org/10.1016/j.ecocom.2020.100847

Picasso, M.B.J., Carril, J. (2013). The peculiar syrinx of *Rhea americana* (greater rhea, Palaeognathae). *Vertebrate Zoology*, *63.*

Prawira, A.Y., (2014). STRUKTUR ANATOMI SYRINX PADA AYAM KETAWA, *Skripsi*, Universitas Hassanudin.

Riede, T., Goller, F., (2010a). Peripheral mechanisms for vocal production in birds – differences and similarities to human speech and singing. *Brain and Language, 115*, 69–80. https://doi.org/10.1016/j.bandl.2009.11.003

Riede, T., Goller, F., (2010b). Functional morphology of the sound-generating labia in the syrinx of two songbird species. *Journal of Anatomy, 216*, 23–36. https://doi.org/10.1111/j.1469-7580.2009.01161.x

Rosadi, B., Darmawan, Hoesni, R., (2020). RESPON BIOAKUSTIK AYAM JANTAN SERAMA MUDA TERHADAP INJEKSI TESTOSTERON, *Prosiding Seminar Teknologi dan Agribisnis Peternakan (STAP)*, *7*, 289–295.

Rusfidra, R., Tumatra, Y.Y., Abbas, M.H., Heryandi, Y., Arlina, F. (2012). Identifikasi Marka Bioakustik Suara Kokok Ayam Kokok Balenggek di Kandang Penangkaran "Agutalok", Kabupaten Solok. *Jurnal Peternakan*

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GADJAH MADA
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Indonesia (Indonesian Journal of Animal Science), 14(303). https://doi.org/10.25077/jpi.14.1.303-307.2012

Shimmura, T., Tamura, M., Ohashi, S. (2019). Cholecystokinin induces crowing in chickens. *Sci Rep*, *9*(3978). https://doi.org/10.1038/s41598-019-40746-9

Stoeger, A.S., Zeppelzauer, M., Baotic, A. (2014). Age-group estimation in free-ranging African elephants based on acoustic cues of low-frequency rumbles. *Bioacoustics, 23*, 231–246. https://doi.org/10.1080/09524622.2014.888375

Stone, N.D. (1983). Acoustical analyses of chicken vocalizations. *Disertasi*, Virginia Polytechnic Institute and State University.

Taşbaş, M., Hazıroğlu, R.M., Çakır, A., Özer, M. (1994). Denizli horozunun solunum sisteminin morfolojisi. II. Larynx, trachea, syrinx. *Ankara Üniv Vet Fak Derg*, *41*, 135¬153.

Uchida, A.M., Meyers, R.A., Cooper, B.G., Goller, F. (2010). Fibre architecture and song activation rates of syringeal muscles are not lateralized in the European starling. *The Journal of experimental biology*, *213*(7), 1069–1078. https://doi.org/10.1242/jeb.038885

Vaytina, T.M., Shitikov, D.A. (2019). Age-related changes in song *repertoire* size and song type sharing in the Whinchat *Saxicola rubetra*. *Bioacoustics, 28*, 140–154. https://doi.org/10.1080/09524622.2017.1408495

Warner, R.W. (1972). The anatomy of the syrinx in passerine birds. *Journal of Zoology*, *168*(3), 381-393. https://doi.org/10.1111/j.1469-7998.1972.tb01353.x

Yavari, M., Banakar, A., Sharafi, M. (2020). Sound signals processing of roosters for sexual maturity and puberty diagnosis. *Journal of Agricultural Machinery (JAM)*, *10*(2), 265-271. https://doi.org/10.22067/jam.v10i2.75264