

DAFTAR PUSTAKA

- Adepoju, D. 2022. Estimating the effective population size of Swedish native cattle. Thesis. Swedish University of Agricultural Sciences, Uppsala.
- Adinata, Y., R.R. Noor, R. Priyanto, L. Cyrilla, and P. Sudrajat. 2022. The relationship between frame score, calving interval, and body mass index in Indonesian beef cattle. *J. Hunan Univ. Nat. Sci.* 49(9): 142–149. doi: 10.55463/issn.1674-2974.49.9.16
- Adinata, Y., R.R. Noor, R. Priyanto, L. Cyrilla, and P. Sudrajat. 2023. Morphometric and physical characteristics of Indonesian beef cattle. *Arch. Anim. Breed.* 66: 153–161. doi: 10.5194/aab-66-153-2023
- Affandhy, L., Y. Adinata, dan Aryogi. 2013. Evaluasi kualitas semen pejantan sapi PO Kebumen di Kabupaten Kebumen Provinsi Jawa Tengah. *J. Sains Dasar.* 2(2): 49–55.
- Agung, P.P., F. Saputra, M.S.A. Zein, A.S. Wulandari, W.P.B. Putra, S. Said, and J. Jakaria. 2018. Genetic diversity of Indonesian cattle breeds based on microsatellite markers. *Asian-Australas. J. Anim. Sci.* 32(4): 467–476. doi: 10.5713/ajas.18.0283
- Agung, P.P., S. Anwar, A.S. Wulandari, A. Sudiro, S. Said, and B. Tappa. 2015. The potency of Sumba Ongole (SO) cattle: A study of genetic characterization and carcass productivity. *J. Indones. Trop. Anim. Agric.* 40(2): 71–78. doi: 10.14710/jitaa.40.2.71-78
- Agus, A., and T.S.M. Widi. 2018. Current situation and future prospects for beef cattle production in Indonesia — A review. *Asian-Australas. J. Anim. Sci.* 31(7): 976–983. doi: 10.5713/ajas.18.0233
- Agustine, R., S. Bintara, S. Andarwati, M.A.U. Muzayyanah, T.S.M. Widi, and A.R.S. Putra. 2019. Analysis in making making decision of farmer to select bull frozen semen in Indonesia. *J. Indones. Trop. Anim. Agric.* 44: 323–332. doi: 10.14710/jitaa.44.3.323-332
- Akinsola, O.M., A.A. Musa, L. Muansangi, S.P. Singh, S. Mukherjee, and A. Mukherjee. 2024. Genomic insights into adaptation and inbreeding among Sub-Saharan African cattle from pastoral and agropastoral systems. *Front. Genet.* 15: 1430291. doi: 10.3389/fgene.2024.1430291
- Aryogi, D. Pamungkas, and J. Efendy. 2020. Formation and phenotypic performance of the new breed POGASI Agrinak cattle. In: *IOP Conf. Series: Earth and Environmental Science.* 492: 012106. doi: 10.1088/1755-1315/492/1/012106
- Aryogi, D. Pamungkas, L. Affandhy, Mariyono, Hartati, Y.N. Anggraeny, M. Luthfi, D.M. Dikman, dan Y. Adinata. 2018. Proposal usulan pelepasan rumpun baru sapi Pogasi Agrinak. *Loka Penelitian Sapi Potong, Grati.*

- Astuti, M. 2004. Potensi dan keragaman sumberdaya genetik sapi Peranakan Ongole (PO). *Wartazoa*. 14(3): 98–106.
- Baliarti, E., B.A. Atmoko, F. Ariyanti, N. Ngadiono, I.G.S. Budisatria, Panjono, T.S.M. Widi, and M.D.E. Yulianto. 2017. Postpartum oestrus variation of local cows at a village breeding centre in Yogyakarta Indonesia. In: *Proc. the 1st Internat. Conf. Trop. Agric.* p. 377–381.
- Barbato, M., G. Gorjanc, H. Jianlin, J.A. Lenstra, K. Periasamy, B. Rosen, T. Smith, and Y.T. Utsunomiya. 2023. Genomic tools and methods. In: Ajmone-Marsan, P., P.J. Boettcher, L. Colli, C. Jinja, J. Kantanen, and J.A. Lenstra, eds. *Genomic characterization of animal genetic resources – Practical guide*. FAO Animal Production and Health Guidelines No. 32, Rome. doi: 10.4060/cc3079en
- Barwegen, M. 2005. *Gouden Hoorns: De geschiedenis van de veehouderij op Java, 1850-2000*. PhD Thesis. Wageningen University, The Netherlands.
- Berry, D.P., and M.L. Spangler. 2023. Animal board invited review: Practical applications of genomic information in livestock. *Anim.* 17(11): 100996. doi: 10.1016/j.animal.2023.100996
- Bintara, S., W. Asmarawati, and R.N. Aji. 2023. The comparison of Javanese bull and Ongole crossbreed bull semen quality diluted with different diluents. In: *Proc. the 4th Int. Conf. Anim. Sci. Technol. (ICAST 2021)*. AIP Publishing LLC. 2628(1): 070006. doi: 10.1063/5.0143983
- Blakely, J., dan D.H. Bade. 1998. *Ilmu Peternakan*. Edisi Keempat. Gadjah Mada University Press, Yogyakarta.
- Boligon, A.A., L.G. de Albuquerque, M.E.Z. Mercadante, and R.B. Lôbo. 2010. Study of relations among age at first calving, average weight gains and weights from weaning to maturity in Nellore cattle. *Rev. Bras. Zootec.* 39(4): 746–751. doi: 10.1590/S1516-35982010000400007
- BPS Kabupaten Kebumen. 2025. *Kabupaten Kebumen Dalam Angka 2025*. BPS Kabupaten Kebumen, Kebumen.
- BPS Provinsi Nusa Tenggara Timur. 2025. *Provinsi Nusa Tenggara Timur Dalam Angka 2025*. BPS Provinsi Nusa Tenggara Timur, Kupang.
- BPS Sumba Timur. 2025. *Sumba Timur Dalam Angka 2025*. BPS Sumba Timur, Waingapu.
- Budisatria, I.G.S. 2006. *Dynamics of small ruminant development in Central Java-Indonesia*. PhD Thesis. Animal Production Systems Group, Wageningen University, The Netherlands.
- Burrow, H., and M. Goddard. 2023. Application of genetics and genomics in livestock production. *Agric.* 13(2): 386. doi: 10.3390/agriculture13020386

- Bush, W.S., and J.H. Moore. 2012. Chapter 11: genome-wide association studies. *PLoS Comput. Biol.* 8: e1002822. doi: 10.1371/journal.pcbi.1002822
- Canario, L., S. Mignon-Grasteau, M. Dupont-Nivet, and F. Phocas. 2013. Genetics of behavioural adaptation of livestock to farming conditions. *Anim.* 7(3): 357–377. doi: 10.1017/S1751731112001978
- Cassar-Malek, I., B. Picard, C. Bernard, and J.F. Hocquette. 2008. Application of gene expression studies in livestock production systems: a European perspective. *Aust. J. Exp. Agric.* 48: 701–710. doi: 10.1071/EA08018
- Cavani, L., C.U. Braz, R. Giglioti, C.H. Okino, C.C. Gulas-Gomes, A.R. Caetano, M.C.S. Oliveira, F.F. Cardoso, and H.N. Oliveira. 2020. Genomic study of *Babesia bovis* infection level and its association with tick count in Hereford and Braford cattle. *Front. Immunol.* 11: 1905. doi: 10.3389/fimmu.2020.01905
- Chan, E.K.F., S.H. Nagaraj, and A. Reverter. 2010. The evolution of tropical adaptation: comparing taurine and zebu cattle. *Anim. Genet.* 41: 467–477. doi: 10.1111/j.1365-2052.2010.02053.x
- Chandaka, D., V. Regula, S. Krovvidi, N. Dhulipalla, and A.K. Kamisetty. 2024. MAP3K1, SPEF2 and PLCZ1 genes association with fertility and semen quality traits of AI bulls in Andhra Pradesh. *Indian J. Anim. Sci.* 94(7): 610–619. doi: 10.56093/ijans.v94i7.149620
- Chen, Q., B. Huang, J. Zhan, J. Wang, K. Qu, F. Zhang, J. Shen, P. Jia, Q. Ning, J. Zhang, N. Chen, H. Chen, and C. Lei. 2020. Whole-genome analyses identify loci and selective signals associated with body size in cattle. *J. Anim. Sci.* 98(3): skaa068. doi: 10.1093/jas/skaa068
- Cheruiyot, E.K., M. Haile-Mariam, B.G. Cocks, I.M. MacLeod, R. Xiang, and J.E. Pryce. 2021. New loci and neuronal pathways for resilience to heat stress in cattle. *Sci. Rep.* 11: 16619. doi: 10.1038/s41598-021-95816-8
- Cochran, S.D., J.B. Cole, D.J. Null, and P.J. Hansen. 2013. Discovery of single nucleotide polymorphisms in candidate genes associated with fertility and production traits in Holstein cattle. *BMC Genet.* 14: 49. doi: 10.1186/1471-2156-14-49
- Corbin, L.J., A.Y.H. Liu, S.C. Bishop, and J.A. Woolliams. 2012. Estimation of historical effective population size using linkage disequilibria with marker data. *J. Anim. Breed. Genet.* 129(4): 257–270. doi: 10.1111/j.1439-0388.2012.01003.x
- Coyne, J.M., R.D. Evans, and D.P. Berry. 2019. Dressing percentage and the differential between live weight and carcass weight in cattle are influenced by both genetic and non-genetic factors. *J. Anim. Sci.* 97(4): 1501–1512. doi: 10.1093/jas/skz056
- Decker, J.E., S.D. McKay, M.M. Rolf, J. Kim, A. Molina Alcala, T.S. Sonstegard, O. Hanotte, A. Götherström, C.M. Seabury, L. Praharani, M.E. Babar, L.C. de

- Almeida Regitano, M.A. Yildiz, M.P. Heaton, W-S. Liu, C-Z. Lei, J.M. Reecy, M. Saif-Ur-Rehman, R.D. Schnabel, and J.F. Taylor. 2014. Worldwide patterns of ancestry, divergence, and admixture in domesticated cattle. *PLoS Genet.* 10(3): e1004254. doi: 10.1371/journal.pgen.1004254
- Devendra, C. 2007. Perspectives on animal production systems in Asia. *Livest. Sci.* 106(1): 1–18.
- Dewi, R.S., R.D. Soejoedono, A.H. Wardhana, and S. Mulatsih. 2018. Analyses of environment factors influencing Surra outbreak in Sumba Timur Nusa Tenggara Timur - Indonesia. In: *Proc. the 20th FAVA Congress & the 15th KIVNAS PDHI*, Bali, pp. 362–366.
- Diwyanto, K. 2008. Pemanfaatan sumber daya lokal dan inovasi teknologi dalam mendukung pengembangan sapi potong di Indonesia. *Pengembangan Inovasi Pertanian.* 1(3): 173–188.
- Diwyanto, K., dan I. Inounu. 2009. Dampak crossbreeding dalam program inseminasi buatan terhadap kinerja reproduksi dan budidaya sapi potong. *Wartazoa.* 19(2): 93–102.
- Dixit, S.P., S. Singh, I. Ganguly, A.K. Bhatia, A. Sharma, N.A. Kumar, A.K. Dang, and S. Jayakumar. 2020. Genome-wide Runs of Homozygosity revealed selection signatures in *Bos indicus*. *Front. Genet.* 11: 92. doi: 10.3389/fgene.2020.00092
- Djama, R.E.T., J. Almet, A. Winarso, and D. Djungu. 2023. Keragaman jenis lalat penghisap darah pada kuda Sumba (*Equus caballus*) di Kabupaten Sumba Timur. *J. Veteriner Nusantara.* 6(2): 327–335. doi: 10.35508/jvn.v6i2.9076
- Edea, Z., H. Dadi, T. Dessie, M.R. Uzzaman, M.F. Rothschild, E.-S. Kim, T.S. Sonstegard, and K.-S. Kim. 2018. Genome-wide scan reveals divergent selection among taurine and zebu cattle populations from different regions. *Anim. Genet.* 49(6): 550–563. doi: 10.1111/age.12724
- EFSA. 2014. Scientific opinion on the welfare risks related to the farming of sheep for wool, meat and milk production. *EFSA J.* 12(12): 3933, doi: 10.2903/j.efsa.2014.3933
- Estill, C.T. 2021. Initiation of puberty in heifers. *Bov. Reprod.* 258–268. doi: 10.1002/9781119602484.ch23
- Falconer, D.S., and T.F.C. Mackay. 1996. *Introduction to Quantitative Genetics*. Fourth ed. Longman, England.
- Farias, G.D., L. Cerdótes, J. Restle, L.L. Pascoal, P.T. Costa, O.G.L. Ferreira, R.Z. Vaz. 2018. Body size and its effects on productive efficiency of cows with predominant Nellore genetic composition. *Acta Scientiarum Anim. Sci.* 40(1): e42532. doi: 10.4025/actascianimsci.v40i1.42532

- Fauzyah, A., Panjono, A. Agus, I.G.S. Budisatria, and B.P. Widyobroto. 2017. Pengaruh tingkat rumen undegradable protein pada konsentrat dengan pakan basal jerami padi terhadap kinerja pertumbuhan sapi Sumba Ongole. *Buletin Peternakan*. 41(2): 142–149. doi: 10.21059/buletinpeternak.v41i2.11990
- Feradis. 2010. *Bioteknologi Reproduksi Pada Ternak*. Alfabeta, Bandung.
- Ferdous, R.N., S.S. Nebir, P.K. Das, A.H. Prova, M. Moniruzzaman, M.S.H. Khan, B. Rokeya, and S.M.Z.H. Asna. 2022. Antimicrobial activity of *lannea coromandelica* bark extracts against methicillin-resistant *staphylococcus aureus*. *BIRDEM Med. J.* 12(3): 201–206. doi: 10.3329/birdem.v12i3.61690
- Gading, B.M.W.T., Panjono, and A. Agus. 2019. The effect of high quality feed supplement on growth performance post-weaning calves. *Buletin Peternakan*. 43(2): 97–102. doi: 10.21059/buletinpeternak.v43i2.38905
- Gao, Y., M. Gautier, X. Ding, H. Zhang, Y. Wang, X. Wang, M.D.O. Faruque, J. Li, S. Ye, X. Gou, J. Han, J.A. Lenstra, and Y. Zhang. 2017. Species composition and environmental adaptation of indigenous Chinese cattle. *Sci. Rep.* 7: 16196. doi: 10.1038/s41598-017-16438-7
- Gao, Y., S. Li, Z. Lai, Z. Zhou, F. Wu, Y. Huang, X. Lan, C. Lei, H. Chen, and R. Dang. 2019. Analysis of long non-coding RNA and mRNA expression profiling in immature and mature bovine (*Bos taurus*) testes. *Front. Genet.* 10: 646. doi: 10.3389/fgene.2019.00646
- Gaur, G.K., S.N. Kaushik, and R.C. Garg. 2002. Ongole cattle status in India. *Anim. Genet. Resour. Inf.* 32: 27–34. doi: 10.1017/S1014233900001528
- Gerstenblith, M.R., J. Shi, and M.T. Landi. 2010. Genome-wide association studies of pigmentation and skin cancer: a review and meta-analysis. *Pigm. Cell Melanoma Res.* 23: 587–606. doi: 10.1111/j.1755-148X.2010.00730.x
- Ghoreishifar, S.M., S. Eriksson, A.M. Johansson, M. Khansefid, S. Moghaddaszadeh-Ahrabi, N. Parna, P. Davoudi, A. Javanmard. 2020. Signatures of selection reveal candidate genes involved in economic traits and cold acclimation in five Swedish cattle breeds. *Genet. Sel. Evol.* 52: 52. doi: 10.1186/s12711-020-00571-5
- Gouveia, J.J.D.S., M.V.G.B.D. Silva, S.R. Paiva, and S.M.P.D. Oliveira. 2014. Identification of selection signatures in livestock species. *Genet. Mol. Biol.* 37: 330–342. doi: 10.1590/S1415-47572014000300004
- Graffelman, J., I.G. Femenía, R. de Cid., and C. Barceló-i-Vidal. 2018. Multidimensional Scaling and Relatedness Research. *bioRxiv*. 297879. doi: 10.1101/297879
- Hadi, U.K., and S. Soviana. 2010. *Ektoparasit pengenalan, identifikasi, dan pengendaliannya*. IPB Press, Bogor.

- Hall, S.J.G. 2022. Genetic differentiation among livestock breeds—values for Fst. *Animals*. 12(9): 1115. doi: 10.3390/ani12091115
- Hambakodu, M., J.P. Pawulung, M.C. Nara, U.A.R. Amah, E.P. Ranja, and A.H. Tarapanjang. 2021. Identifikasi hijauan makanan ternak di lahan pertanian dan padang penggembalaan Kecamatan Haharu Kabupaten Sumba Timur. *JITRO*. 8(1): 43–50. doi: 10.33772/jitro.v8i1.14601
- Han, J., P. Kraft, H. Nan, Q. Guo, C. Chen, A. Qureshi, S.E. Hankinson, F.B. Hu, D.L. Duffy, Z.Z. Zhao, N.G. Martin, G.W. Montgomery, N.K. Hayward, G. Thomas, R.N. Hoover, S. Chanock, and D.J. Hunter. 2008. A genome-wide association study identifies novel alleles associated with hair color and skin pigmentation. *PLoS Genet*. 4(5): e1000074. doi: 10.1371/journal.pgen.1000074
- Han, Y., and F. Peñagaricano. 2016. Unravelling the genomic architecture of bull fertility in Holstein cattle. *BMC Genet*. 17(1): 143. doi: 10.1186/s12863-016-0454-6
- Hapsari, T.A., M. Socheh, S.W. Purbojo, P. Yuwono, and T. Warsiti. 2018. Pendugaan bobot badan sapi Sumba Ongole dengan menggunakan ukuran linier tubuh. *Prosiding Seminar Teknologi dan Agribisnis Peternakan VI: Pengembangan Sumber Daya Genetik Ternak Lokal Menuju Swasembada Pangan Hewani ASUH*, Fakultas Peternakan Universitas Jenderal Soedirman, Purwokerto. pp. 316–320.
- Hardjosubroto, W. 1994. Aplikasi Pemuliabiakan Ternak di Lapangan. PT Gramedia Widiasarana. Jakarta.
- Hardjosubroto, W. 2004. Alternatif kebijakan pengelolaan berkelanjutan sumberdaya genetik sapi potong lokal dalam sistem perbibitan ternak nasional. *Wartazoa*. 14(3): 93–97.
- Hartati, R. Antari, L. Affandhy, Y.N. Anggraeny, R. Widiyawati, N.H. Krishna, Aryogi, D. Pamungkas, and J. Effendhy. 2021. Grati-Ongole-crossbred cattle (POGASI Agrinak) development on farm kept in diverse agroecological zones. In: *IOP Conf. Series: Earth and Environmental Science* 888: 012014. doi: 10.1088/1755-1315/888/1/012014
- Hartatik, T., D. Maharani, J.H.P. Sidadolog, A. Fathoni, and Sumadi. 2018. Haplotype diversity of partial cytochrome b gene in Kebumen Ongole Grade cattle. *Trop. Anim. Sci. J.* 41(1): 8–14. doi: 10.5398/tasj.2018.41.1.8
- Haryanto, B., and D. Pamungkas. 2010. Growth performance of Ongole Grade (Peranakan Ongole) cattle in Indonesia. In: *Proc. the 5th Internat. Sem. Trop. Anim. Prod.*, Universitas Gadjah Mada, Yogyakarta, pp. 446–451.
- Hayes, B.J., P.M. Visscher, H.C. McPartlan, and M.E. Goddard. 2003. Novel multilocus measure of linkage disequilibrium to estimate past effective population size. *Genome Res*. 13: 635-643. doi: 10.1101/gr.387103

- Hegde, N.G. 2019. Livestock development for sustainable livelihood of small farmers. *Asian J. Res. Anim. Vet. Sci.* 3(2): 1–17.
- Hemingway, R.G. 2003. The influences of dietary intakes and supplementation with selenium and vitamin E on reproduction diseases and reproductive efficiency in cattle and sheep. *Vet. Res. Comm.* 27: 159–174. doi: 10.1023/A:1022871406335
- Hirooka, H. 2010. Systems approaches to beef cattle production systems using modeling and simulation. *Anim. Sci. J.* 81: 411–424. doi: 10.1111/j.1740-0929.2010.00769.x
- Jia, P., C. Cai, K. Qu, N. Chen, Y. Jia, Q. Hanif, J. Liu, J. Zhang, H. Chen, B. Huang, and C. Lei. 2019. Four novel SNPs of MYO1A gene associated with heat-tolerance in Chinese cattle. *Animals.* 9(11): 964. doi: 10.3390/ani9110964
- Jiang, Z., J.J. Michal, X.L. Wu, Z. Pan, and M.D. MacNeil. 2011. The heparan and heparin metabolism pathway is involved in regulation of fatty acid composition. *Int. J. Biol. Sci.* 7(5): 659–663. doi: 10.7150/ijbs.7.659
- Kaka, A., and A.T. Ina. 2021. Kualitas spermatozoa Sumba Ongole dalam pengencer tris kuning telur dengan penambahan level nira lontar (*Borassus flabelifer* L) yang berbeda. *J. Peternakan Indonesia.* 23(3): 255–261. doi: 10.25077/jpi.23.3.255-261.2021
- Kaur, R., M.L. Jaiswal, and V. Jain. 2013. Protective effect of *Lannea coromandelica* Houtt. Merrill. against three common pathogens. *J. Ayurveda Integr. Med.* 4(4): 224–228. doi: 10.4103/0975-9476.123706
- Kementan dan BPS. 2011. Rilis akhir hasil Pendataan Sapi dan Kerbau (PSPK) 2011. Kerjasama antara Kementerian Pertanian dan Badan Pusat Statistik.
- Kusuma, S.B., N. Ngadiyono, and Sumadi. 2017. The estimation of population dynamic and reproduction performance of Ongole Crossbred cattle in Kebumen Regency, Central Java Province. *Buletin Peternakan.* 41(3): 230–242. doi: 10.21059/buletinpeternak.v41i3.13618
- Lenstra, J.A., L.F. Groeneveld, H. Eding, J. Kantanen, J.L. Williams, P. Taberlet, E.L. Nicolazzi, J. Solkner, H. Simianer, E. Ciani, J.F. Garcia, M.W. Bruford, P. Ajmone-Marsan, and S. Weigend. 2012. Molecular tools and analytical approaches for the characterization of farm animal genetic diversity. *Anim. Genet.* 43: 483–502. doi: 10.1111/j.1365-2052.2011.02309.x
- Liu, C-C., S. Shringapure, K. Lange., and J. Novembre. 2020. Exploring population structure with admixture models and principal components analysis. *Methods Mol. Biol.* 2090: 67–86. doi: 10.1007/978-1-0716-0199-0_4
- Lu, D., S. Miller, M. Sargolzaei, M. Kelly, G. Vander Voort, T. Caldwell, Z. Wang, G. Plastow, and S. Moore. 2013. Genome-wide association analyses for

growth and feed efficiency traits in beef cattle. *J. Anim. Sci.* 91(8): 3612–3633. doi: 10.2527/jas.2012-5716

Maharani, D., A. Fathoni, Sumadi, T. Hartatik, and M. Khusnudin. 2018. Identification of MC4R gene and its association with body weight and body size in Kebumen Ongole Grade cattle. *J. Indones. Trop. Anim. Agric.* 43(2): 87–93. doi: 10.14710/jitaa.43.2.87-93

Manik, M.K., M.A. Wahid, S.M.A. Islam, A. Pal, and K.T. Ahmed. 2013. A comparative study of the antioxidant, antimicrobial and thrombolytic activity of the bark and leaves of *lannea coromandelica* (anacardiaceae). *Int. J. Pharm. Sci. Res.* 4(7): 2609–2614. doi: 10.13040/IJPSR.0975-8232.4(7).2609-14

Marawali, H.H. 2015. Perbaikan manajemen pemeliharaan anak sapi Ongole prasapih di Kabupaten Sumba Timur, Provinsi Nusa Tenggara Timur. Prosiding Seminar Nasional Teknologi Peternakan dan Veteriner. Pusat Penelitian dan Pengembangan Peternakan, Bogor.

Mastrangelo, S., S.B. Jemaa, E. Ciani, G. Sottile, A. Moscarelli, M. Boussaha, M. Montedoro, F. Pilla, and M. Cassandro. 2020. Genome-wide detection of signatures of selection in three Valdostana cattle populations. *J. Anim. Breed. Genet.* 137(6): 609–621. doi: 10.1111/jbg.12476

Maulana, T., P.P. Agung, M. Gunawan, and S. Said. 2022. Computer aided semen analysis (CASA) to determine the quality and fertility of frozen thawed Sumba Ongole sperm supplemented with amino acids. *Livest. Anim. Res.* 20(2): 194–201. doi: 10.20961/lar.v20i2.58754

Mirkena, T., G. Duguma, A. Haile, M. Tibbo, A.M. Okeyo, M. Wurzinger, and J. Solkner. 2010. Genetics of adaptation in domestic farm animals: A review. *Livest. Sci.* 132: 1–12. doi: 10.1016/j.livsci.2010.05.003

Mohammadi, H., A. Najafi, and A. Javanmard. 2022. Genome-wide association study related to semen traits based on gene-set enrichment analysis in Holstein bulls. *Res. Anim. Prod.* 13(35): 168–175. doi: 10.52547/rap.13.35.168

Movahedin, M.R., C. Amirinia, A. Noshary, and S.A. Mirhadi. 2010. Detection of genetic variation in sample of Iranian proofed Holstein cattle by using microsatellite marker. *Afr. J. Biotechnol.* 9: 9042–9045. doi: 10.5897/AJB10.428

Msalya, G., E-S. Kim, E.L.K. Laisser, M.J. Kipanyula, E.D. Karimuribo, L.J.M. Kusiluka, S.W. Chenyambuga, and M.F. Rothschild. 2017. Determination of genetic structure and signatures of selection in three strains of Tanzania Shorthorn zebu, Boran and Friesian cattle by genome-wide SNP analyses. *PLoS ONE.* 12(1): e0171088. doi: 10.1371/journal.pone.0171088

Naserkheil, M., A. Bahrami, D. Lee, and H. Mehrban. 2020. Integrating single-step GWAS and bipartite networks reconstruction provides novel insights into

- yearling weight and carcass traits in Hanwoo beef cattle. *Animals*. 10(10): 1836. doi: 10.3390/ani10101836
- Naskar, S., G.R. Gowane, A. Chopra, C. Paswan, and L.L.L. Prince. 2012. Genetic adaptability of livestock to environmental stresses. In: Sejian, V., S. Naqvi, T. Ezeji, J. Lakritz, and R. Lal eds. *Environmental Stress and Amelioration in Livestock Production*. pp. 317–378. Springer, Berlin, Heidelberg. doi: 10.1007/978-3-642-29205-7_13
- Nazari-Ghadikolaie, A., M-Y. Hassan, R.M-A. Seyed., E.A. Staiger, A. Rashidi, H.j. Huson. 2018. Genome-wide association studies identify candidate genes for coat color and mohair traits in the Iranian Markhoz goat. *Front. Genet.* 9. doi: 10.3389/fgene.2018.00105
- Nei, M. 1978. Estimation of average heterozygosity and genetic distance from a small number of individuals. *Genet.* 89: 583–590. doi: 10.1093/genetics/89.3.583
- Ngadiyono, N., Panjono, S.P.S. Budhi, and A.E. Susanti. 2017. Characteristics of Ongole Grade cows in the Kebumen Regency, Central Java Province. In: *Proc. the 7th Internat. Sem. Trop. Anim. Prod.*, Universitas Gadjah Mada, Yogyakarta, pp. 835–839.
- Nugraha, C.D., R.F. Putri, A. Furqon, W.A. Septian, and Suyadi. 2021. Hubungan antara umur, bobot badan, lingkaran skrotum dengan produksi spermatozoa sapi Peranakan Ongole. *J. Ternak Tropika*. 22(1): 20–26. doi: 10.21776/ub.jtapro.2021.022.01.3
- Nugroho, E., S.J. Oosting, R. Ihle, and W.J.M. Heijman. 2020. Smallholders' perceptions of policies for preserving the traditional Ongole cattle breed of Indonesia. *Outlook Agric.* 50(2): 188–195. doi: 10.1177/0030727020983588
- Numata, S., J.P. McDermott, G. Sanchez, A. Mitra, and G. Blanco. 2022. The sodium-glucose cotransporter isoform 1 (SGLT-1) is important for sperm energetics, motility, and fertility. *Biol. Reprod.* 106(6): 1206–1217. doi: 10.1093/biolre/ioac052
- Nurchahyo, W. 2017. *Penyakit Surra Pada Hewan dan Ternak*. Penerbit Samudra Biru, Yogyakarta.
- Odeh, H., K.L. Hunker, I.A. Belyantseva, H. Azaiez, M.R. Avenarius, L. Zheng, L.M. Peters, L.H. Gagnon, N. Hagiwara, M.J. Skynner, M.H. Brilliant, N.D. Allen, S. Riazuddin, K.R. Johnson, Y. Raphael, H. Najmabadi, T.B. Friedman, J.R. Bartles, R.J.H. Smith, and D.C. Kohrman. 2010. Mutations in *Grxcr1* are the basis for inner ear dysfunction in the pirouette mouse. *Am. J. Hum. Genet.* 86: 148–160. doi: 10.1016/j.ajhg.2010.01.016
- Olivieri, B.F., M.E.Z. Mercadante, J.N.dS.G. Cyrillo, R.H. Branco, S.F.M. Bonilha, L.G. de Albuquerque, R.M.dO. Silva, and F. Baldi. 2016. Genomic regions associated with feed efficiency indicator traits in an experimental Nellore cattle population. *PLoS One*. 11(10): e0164390. doi: 10.1371/journal.pone.0164390

- Otto, P.I., S.E.F. Guimarães, L.L. Verardo, A.L.S. Azevedo, J. Vandenplas, C.A. Sevillano, D.B.D. Marques, M.F.A. Pires, C. de Freitas, R.S. Verneque, M.F. Martins, J.C.C. Panetto, W.A. Carvalho, D.O.R. Gobo, M.V.G.B. da Silva, M.A. Machado. 2019. Genome-wide association studies for heat stress response in *Bos taurus* × *Bos indicus* crossbred cattle. *J. Dairy Sci.* 102(9): 8148–8158. doi: 10.3168/jds.2018-15305
- Ouédraogo, D., A. Soudré, S. Ouédraogo-Koné, B.L. Zoma, B. Yougbaré, N. Khayatadeh, P.A. Burger, G. Mészáros, A. Traoré, O.A. Mwai, M. Wurzinger, and J. Sölkner. 2020. Breeding objectives and practices in three local cattle breed production systems in Burkina Faso with implication for the design of breeding programs. *Livest. Sci.* 232: 103910. doi: 10.1016/j.livsci.2019.103910
- Pickrell, J.K., and J.K. Pritchard. 2012. Inference of population splits and mixtures from genome-wide allele frequency data. *PLoS Genet.* 8: e1002967. doi: 10.1038/npre.2012.6956.1
- Piper, E.K., N.N. Jonsson, C. Gondro, A.E. Lew-Tabor, P. Moolhuijzen, M.E. Vance, and L.A. Jackson. 2009. Immunological profiles of *Bos taurus* and *Bos indicus* cattle infested with the cattle tick, *Rhipicephalus* (*Boophilus*) *microplus*. *Clin. Vaccine Immunol.* 16: 1074–1086. doi: 10.1128/CI.00157-09
- Pundir, R.K., P.K. Malik, P.K. Singh, B. Prakesh, S.M.K. Karthickeyan, P. Thangaraju, K.K. Reddy, R. Vinoo, G. Singh, and S.P.S. Ahlawat. 2006. Ongole. National Bureau of Animal Genetic Resources, Haryana.
- Raj, A., M. Stephens, J.K. Pritchard. 2014. fastSTRUCTURE: Variational inference of population structure in large SNP data sets. *Genet.* 197(2): 573–589. doi: 10.1534/genetics.114.164350
- Rao, T.T. 2005. Studies on scrotal biometry and semen characteristics and their relationship with fertility in Ongole bulls (*Bos indicus*). Thesis. Acharya N.G. Ranga Agricultural University, Hyderabad.
- Reich, D., K. Thangaraj, N. Patterson, A.L. Price, and L. Singh. 2009. Reconstructing Indian population history. *Nature.* 461: 489–494. doi: 10.1038/nature08365
- Reshma, R.S., and D.N. Das. 2021. Molecular markers and its application in animal breeding. In: Mondal, S., and R.L. Singh eds. *Advances in Animal Genomics*. Elsevier Inc., United Kingdom. pp. 123–140.
- Rezende, F.M., E. Rodriguez, J.D. Leal-Gutiérrez, M.A. Elzo, D.D. Johnson, C. Carr, and R.G. Mateescu. 2021. Genomic approaches reveal pleiotropic effects in crossbred beef cattle. *Front. Genet.* 12: 627055. doi: 10.3389/fgene.2021.627055
- Ribeiro, V.M.P., G.C. Gouveia, M.M. de Moraes, A.E.M. de Araújo, F.S.S. Raidan, P.A. de S. Fonseca, E.P. Cardoso, M.V.G.B da Silva, F.L.B. Toral. 2020.

Genes underlying genetic correlation between growth, reproductive and parasite burden traits in beef cattle. *Livest. Sci.* 104332. doi: 10.1016/j.livsci.2020.104332

Robinson, T.P., P.K. Thornton, G. Franceschini, R.L. Kruska, F. Chiozza, A. Notenbaert, G. Cecchi, M. Herrero, M. Epprecht, S. Fritz, L. You, G. Conchedda, and L. See. 2011. Global livestock production systems. Food and Agriculture Organization of the United Nations (FAO) and International Livestock Research Institute (ILRI), Rome. pp. 152.

Rohyan, J., Sutopo, and E. Kurnianto. 2016. Population dynamics on Ongole Grade cattle in Kebumen Regency - Central Java. *J. Indones. Trop. Anim. Agric.* 41(4): 224–232. doi: 10.14710/jitaa.41.4.224-232

Rubio Gomez, M.A., and M. Ibba. 2020. Aminoacyl-tRNA synthetases. *RNA.* 26(8): 910–936. doi: 10.1261/rna.071720.119

Sabeti, P.C., S.F. Schaffner, B. Fry, J. Lohmueller, P. Varilly, O. Shamovsky, A. Palma, T.S. Mikkelsen, D. Altshuler, and E.S. Lander. 2006. Positive natural selection in the human lineage. *Science.* 312: 1614–1620. doi: 10.1126/science.112430

Said, S., P.P. Agung, W.P.B. Putra, S. Anwar, A.S. Wulandari, and A. Sudiro. 2016. Estimation of Most Probable Producing Ability value for calf birth's performance in Sumba Ongole cows. *J. Indones. Trop. Anim. Agric.* 41(2): 53–60. doi: 10.14710/jitaa.41.2.53-60

Saitou, N., and M. Nei. 1987. The neighbor-joining method: A new method for reconstructing phylogenetic trees. *Mol. Biol. Evol.* 4(4): 406–425.

Sanders, J.O. 1980. History and development of zebu cattle in the United States. *J. Anim. Sci.* 50(6): 1188–1200.

Sandor, C., W. Li, W. Coppieters, T. Druet, C. Charlier, and M. Georges. 2012. Genetic variants in REC8, RNF212, and PRDM9 influence male recombination in cattle. *PLoS Genet.* 8(7): e1002854. doi: 10.1371/journal.pgen.1002854

Santana, M.H.A., H.N. Kadarmideen, S.D. Pant, P.A. Alexandre, G.A. Oliveira Junior, R.C. Gomes, Y.T. Utsunomiya, H.H.F. Neves, J.F. Garcia, H. Fukumasu, and J.B.S. Ferraz. 2014. Systems genetics investigations for feed intake, feed efficiency and performance in Nellore (*Bos indicus*) cattle. In: *Proc. 10th World Congress of Genetics Applied to Livestock Production, Canada.*

Saputri, S. 2020. Evaluasi pertambahan bobot badan sapi Sumba Ongole dengan sistem pemeliharaan feedlot. Diploma thesis. Politeknik Negeri Jember, Jember.

Saravanan, K.A., M. Panigrahi, H. Kumar, B. Bhushan, T. Dutt, and B.P. Mishra. 2020. Selection signatures in livestock genome: A review of concepts,

approaches and applications. *Livest. Sci.* 241: 104257. doi: 10.1016/j.livsci.2020.104257

Saravanan, K.A., M. Panigrahi, H. Kumar, S. Parida, B. Bhushan, G.K. Gaur, T. Dutt, B.P. Mishra, and R.K. Singh. 2021. Genomic scans for selection signatures revealed candidate genes for adaptation and production traits in a variety of cattle breeds. *Genomics*. 113(3): 955–963. doi: 10.1016/j.ygeno.2021.02.009

Satriani, N., A. Farajallah, dan Muladno. 2002. Keragaman genetik sapi Peranakan Ongole (PO) berdasarkan uji DNA Mikrosatelit. *Med. Pet.* 25(3): 84–91.

Sawitri, D.H., and A.H. Wardhana. 2024. Detection of *Trypanosoma evansi* in healthy horses, cattle and buffaloes in East Sumba: eight years after outbreak. In: IOP Conf. Series: Earth and Environmental Science. 1292: 012039. doi: 10.1088/1755-1315/1292/1/012039

Schettini, G.P., E. Peripolli, P.A. Alexandre, W.B. dos Santos, A.S.C. Pereira, L.G. de Albuquerque, F. Baldi, and R.A. Curi. 2022. Transcriptome profile reveals genetic and metabolic mechanisms related to essential fatty acid content of intramuscular longissimus thoracis in Nellore cattle. *Metabolites*. 12(5): 471. doi: 10.3390/metabo12050471

Selionova, M., M. Aibazov, T. Mamontova, V. Malorodov, A. Semyagin, N. Zinovyeveva, and A.A. Easa. 2022. Genome-wide association study of live body weight and body conformation traits in young Karachai goats. *Small Rumin. Res.* 216: 106836. doi: 10.1016/j.smallrumres.2022.106836

Sendow, I., N.S. Assadah, A. Ratnawati, N.L.P.I. Dharmayanti, dan M. Saepulloh. 2021. Lumpy Skin Disease: Ancaman penyakit emerging bagi status kesehatan hewan nasional. *Wartazoa*. 31(2): 85–96. doi: 10.14334/wartazoa.v31i2.2739

Sere, C., H. Steinfeld, and J. Groenewold. 1995. *World Livestock Production Systems*. Food and Agriculture Organization of the United Nations.

Setianto, N.A., A. Sodik, J. Sumarmono, W.Y. Kii, R. Widiyanti, dan I. Haryoko. 2024. An exploratory study of beef cattle farming systems: A comparative analysis of cut and carry in Java vs. the pastoral system in Sumba island, Indonesia. *J. Agripet*. 24(1): 57–64.

Sherman, E.L., J.D. Nkrumah, B.M. Murdoch, C. Li, Z. Wang, A. Fu, and S.S. Moore. 2008. Polymorphisms and haplotypes in the bovine neuropeptide Y, growth hormone receptor, ghrelin, insulin-like growth factor 2, and uncoupling proteins 2 and 3 genes and their associations with measures of growth, performance, feed efficiency, and carcass merit in beef cattle. *J. Anim. Sci.* 86: 11–16. doi: 10.2527/jas.2006-799

Siliwolu. 2005. *Peran Sumba Kontrak Pola Bantuan Langsung Masyarakat Dalam Pengembangan Sapi Sumba Ongole*. Satya Wacana University Press, Salatiga.

- Silva, L.H.P., P.V.R. Paulino, G.J.F. Assis, D.E.F. Assis, M.M. Estrada, M.C. Silva, J.C. Silva, T.S. Martins, S.C.V. Filho, M.F. Paulino, and M.L. Chizzotti. 2017. Effect of post-weaning growth rate on carcass traits and meat quality of Nellore cattle. *Meat Sci.* 123: 192–197. doi: 10.1016/j.meatsci.2016.10.005
- Silva, L.H.P., P.V.R. Paulino, P.D.B. Benedeti, M.M. Estrada, L.C. Alves, D.E.F. Assis, G.J.F. Assis, F.P. Leonel, S.C.V. Filho, M.F. Paulino, and M.L. Chizzotti. 2020. Post-weaning growth rate effects on body composition of Nellore bulls. *Anim. Prod. Sci.* 60(6): 852–862. doi: 10.1071/AN19032
- Sio, S., I.G. Mahardika, I.B.G. Partama, and N.N. Suryani. 2017. Rumen metabolite of Balinese cows that being given stewed water of *lannea coromandelica* peel as feed additive. *IRJEIS.* 3(5): 24. doi: 10.21744/irjeis.v3i5.531
- Sizova, O., L.S. John, Q. Ma, and J.J. Molldrem. 2023. Multi-faceted role of LRP1 in the immune system. *Front. Immunol.* 14: 1166189. doi: 10.3389/fimmu.2023.1166189
- Slatkin, M. 2008. Linkage disequilibrium – understanding the evolutionary past and mapping the medical future. *Nat. Rev. Genet.* 9: 477–485. doi: 10.1038/nrg2361
- Smith, L.P., and M.K. Kuhner. 2009. The limits of fine-scale mapping. *Genet. Epidemiol.* 33: 344–356. doi: 10.1002/gepi.20387
- Soelarto, B. 1980. Budaya Sumba. Proyek Pengembangan Media Kebudayaan Ditjen Kebudayaan Departemen P & K Republik Indonesia, Jakarta.
- Sofia Ortega, M., A.C. Denicol, J.B. Cole, D.J. Null, J.F. Taylor, R.D. Schnabel, and P.J. Hansen. 2017. Association of single nucleotide polymorphisms in candidate genes previously related to genetic variation in fertility with phenotypic measurements of reproductive function in Holstein cows. *J. Dairy Sci.* 100(5): 3725–3734. doi: 10.3168/jds.2016-12260
- Steinfeld, H., T. Wassenaar, and S. Jutzi. 2006. Livestock production systems in developing countries: status, drivers, trends. *Rev. sci. tech. Off. int. Epiz.* 25(2): 505–516. doi: 10.20506/rst.25.2.1677
- Stier, W. 1989. Basic concepts and new methods of time series analysis in historical social research. *Hist. Soc. Res.* 14(1): 3–24.
- Strandén, I., J. Kantanen, M.H. Lidauer, T. Mehtiö, and E. Negussie. 2022. Animal board invited review: Genomic-based improvement of cattle in response to climate change. *Animal.* 16: 100673. doi: 10.1016/j.animal.2022.100673
- Subiharta dan P. Sudrajad. 2013. Keragaan bobot lahir pedet sapi lokal (Peranakan Ongole/PO) Kebumen dan potensinya sebagai sumber bibit sapi PO yang berkualitas. *Prosiding Seminar Nasional: Menggagas Kebangkitan Komoditas Unggulan Lokal Pertanian dan Kelautan.* Fakultas Pertanian, Universitas Trunojoyo, Madura, pp. 292–299.

- Subiharta, Muryanto, B. Utomo, Ernawati, R.N. Hayati, P. Sudrajad, I. Musawati, dan Suharno. 2011. Pendampingan PSDS melalui inovasi teknologi dan kelembagaan. Laporan Penelitian. Balai Pengkajian Teknologi Pertanian Jawa Tengah, Ungaran.
- Subiharta, P. Sudrajad, dan A. Malik. 2018. Kinerja kelompok perbibitan sapi PO Kebumen sebagai penghasil bibit sapi potong yang berkualitas di Kabupaten Kebumen. Prosiding Temu Nasional Inovasi Pengelolaan, Pemanfaatan, dan Festival Sumberdaya Genetik Lokal. Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor.
- Subiharta, S., P. Sudrajad, Y. Adinata, E.S. Rohaeni, R.N. Hayati, A. Prabowo, S.N. Ahmad, S. Asmarasari, and R.P. Hantoro. 2024. Unveiling the origin, characters, and breeding system of Kebumen Ongole Grade cattle in Indonesia — A review. *J. Anim. Sci. Technol.* doi: 10.5187/jast.2024.e121
- Sudardjat, S., dan R. Pambudy. 2003. Menjelang Dua Abad Sejarah Peternakan dan Kesehatan Hewan Indonesia: Peduli Peternak Rakyat. Yayasan Agrindo Mandiri, Jakarta.
- Sudaryanto, B., K. Subagyo, Subiharta, Ernawati, B. Utomo, R.N. Hayati, A. Rifai, dan A.S. Romdon. 2009. Pemetaan Wilayah Sapi Kembar dan Identifikasi Pakan yang Berpengaruh Terhadap Kelahiran Kembar di Jawa Tengah. Laporan Penelitian. Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor.
- Sudrajad, P., dan Subiharta. 2014. Phenotypic characteristics of Ongole Grade cows in Kebumen. *Widyaiset.* 17: 283–290.
- Sudrajad, P., S. Subiharta, Y. Adinata, A. Lathifah, J.H. Lee, J.A. Lenstra, and S.H. Lee. 2020. An insight into the evolutionary history of Indonesian cattle assessed by whole genome data analysis. *PLoS One.* 15(11): e0241038. doi: 10.1371/journal.pone.0241038
- Sudrajad, P., S.D. Volkandari, M. Cahyadi, A. Prasetyo, K. Komalawati, S. Wibowo, dan S. Subiharta. 2021. Pemanfaatan informasi genom untuk eksplorasi struktur genetik dan asosiasinya dengan performan ternak di Indonesia. *Livest. Anim. Res.* 19(1): 1–12. doi: 10.20961/lar.v19i1.47658
- Sudrajad, P., Subiharta, dan A. Malik. 2018. Persepsi Peternak Terhadap Upaya Peningkatan Mutu Genetik Sapi Potong Melalui Introduksi Sapi PO Kebumen. Prosiding Seminar Nasional Percepatan Alih Teknologi Pertanian Mendukung Revitalisasi Pertanian dan Pembangunan Wilayah. Balai Besar Pengkajian dan Pengembangan Teknologi Pertanian, Bogor.
- Sumadi dan Siliwolu. 2004. Penelitian mutu genetik sapi Ongole dan Brahman di Kabupaten Sumba Timur, Nusa Tenggara Timur. Prosiding Lokakarya Nasional Sapi Potong. Pusat Penelitian dan Pengembangan Peternakan, Bogor.

- Sumadi, N. Ngadiyono, D.T. Widayati, C.T. Noviandi, A. Fathoni, and M. Khusnudin. 2016. MPPA (Most Probable Producing Ability) estimation of Kebumen Ongole Crossbred cattle based on offsprings weaning weight. *J Sain Veteriner*. 34(2): 220–224. doi: 10.22146/jsv.27561
- Susilawati, T., N. Sholikhah, S. Wahjuningsih, E. Herwiyanti, Kuswati, and A.P.A. Yekti. 2020. Relationship of scrotal circumference with spermatozoa production in various breed of Indonesian local bulls. *Am. J. Anim. Vet. Sci*. 15(2): 102–107.
- Susilawati, T., Yekti, S. Wahyuningsih, dan M.N. Ihsan. 2017. *Fisiologi Reproduksi Ternak*. UB Press, Malang.
- Sutarno, dan A.D. Setyawan. 2016. Review: The diversity of local cattle in Indonesia and the efforts to develop superior indigenous cattle breeds. *Biodiversitas*. 17(1): 275–295. doi: 10.13057/biodiv/d170139
- Sutresniwati, F.A. Steenstra, and H.M.J. Udo. 2006. The invasion of crossbred cattle: Stakeholders' perspectives in Central Java, Indonesia. In: *Proc. the 4th Internat. Sem. Trop. Anim. Prod.*, Universitas Gadjah Mada, Yogyakarta, pp. 461–466.
- Suyadi, S., B. Purwantara, A. Furqon, W.A. Septian, I. Novianti, I.W. Nursita, C.D. Nugraha, R.F. Putri, H. Pratiwi, and E. Herwiyati. 2020. Influences of bull age and season on sperm motility, sperm concentration, and ejaculate volume of Ongole Grade cattle in Singosari National Artificial Insemination Center. *J. Indones. Trop. Anim. Agric*. 45(4): 261–267. doi: 10.14710/jitaa.45.4.261-267
- Sved, J.A., and W.G. Hill. 2018. One hundred years of linkage disequilibrium. *Genet*. 209: 629–636. doi: 10.1534/genetics.118.300642
- Sweett, H., P.A.S. Fonseca, A. Suárez-Vega, A. Livernois, F. Miglior, and A. Cánovas. 2020. Genome-wide association study to identify genomic regions and positional candidate genes associated with male fertility in beef cattle. *Sci. Rep*. 10: 20102. doi: 10.1038/s41598-020-75758-3
- Taye, M., J. Kim, S.H. Yoon, W. Lee, O. Hanotte, T. Dessie, S. Kemp, O.A. Mwai, K. Caetano-Anolles, S. Cho, S.J. Oh, H-K. Lee, and H. Kim. 2017. Whole genome scan reveals the genetic signature of African Ankole cattle breed and potential for higher quality beef. *BMC Genet*. 18: 11. doi: 10.1186/s12863-016-0467-1
- Thornton, P. K. 2010. Livestock production: recent trends, future prospects. *Philos. Trans. R. Soc. B*. 365: 2853–2867. doi: 10.1098/rstb.2010.0134
- Utsunomiya, Y.T., A.M. Pérez O'Brien, T.S. Sonstegard, J. Sölkner, and J.F. Garcia. 2015. Genomic data as the "hitchhiker's guide" to cattle adaptation: tracking the milestones of past selection in the bovine genome. *Front. Genet*. 6: 36. doi: 10.3389/fgene.2015.00036

- Utsunomiya, Y.T., M. Milanese, M.R.S. Fortes, L.R. Porto-Neto, A.T.H. Utsunomiya, M.V.G.B. Silva, J.F. Garcia, and P. Ajmone-Marsan. 2019. Genomic clues of the evolutionary history of *Bos indicus* cattle. *Anim. Genet.* 50: 557–568. doi: 10.1111/age.12836
- van der Nest, M.A., N. Hlongwane, K. Hadebe, W-Y. Chan, N.A. van der Merwe, L. De Vos, B. Greyling, B.B. Koooverjee, P. Soma, E.F. Dzomba, M. Bradfield, and F.C. Muchadeyi. 2021. Breed ancestry, divergence, admixture, and selection patterns of the Simbra Crossbreed. *Front. Genet.* 11: 608650. doi: 10.3389/fgene.2020.608650
- Vandooren, J., and Y. Itoh. 2021. Alpha-2-Macroglobulin in Inflammation, Immunity and Infections. *Front. Immunol.* 12: 803244. doi: 10.3389/fimmu.2021.803244
- Vara, C.C., M.F. Silveira, R.Z. Vaz, J. Restle, D.S. Machado, and S. Macari. 2020. Body size in beef cows and its influence on calf production. *Semin. Ciênc. Agrár.* 41(6, Supl.2): 3299–3310. doi: 10.5433/1679-0359.2020v41n6Supl2p3299
- Velayudhan, S.M., S. Alam, T. Yin, K. Brügemann, A. Buerkert, V. Sejian, R. Bhatta, E. Schlecht, and S. König. 2023. Selective sweeps in cattle genomes in response to the influence of urbanization and environmental contamination. *Genes.* 14(11): 2083. doi: 10.3390/genes14112083
- Verheijen, J.A.J. 1990. Dictionary of plant names in the lesser Sunda islands. The Australian National University, Australia.
- Vignal, A., D. Milan, M. SanCristobal, and A. Eggen. 2002. A review on SNP and other types of molecular markers and their use in animal genetics. *Genet. Sel. Evol.* 34: 275–305. doi: 10.1051/gse:2002009
- Vinoo, R. 2003. Genetic Studies on Economic Traits of Ongole Cattle. Dissertation. Acharya N.G. Ranga Agricultural University, Hyderabad.
- Vinoo, R., G.N. Rao, B.R. Gupta, and K.B. Rao. 2005. Genetic study on productive and reproductive traits of Ongole cattle. *Indian J. Anim. Sci.* 75(4): 438–441.
- Vinoo, R., G.N. Rao, B.R. Gupta, and K.B. Rao. 2007. A study on coat colour in Ongole calves. *Indian J. Anim. Res.* 41(1): 77–78.
- Voight, B.F., S. Kudaravalli, X. Wen, and J.K. Pritchard. 2006. A map of recent positive selection in the human genome. *PLoS Biol.* 4(3): e72. doi: 10.1371/journal.pbio.0040072
- Volkandari, S.D., I. Rahmawati, M. Cahyadi, Y. Adinata, R. Kusumaningrum, D. Maharani, B. Purwantara, Subiharta, and P. Sudrajad. 2021. Admixture study of Ongole grade cattle based on genome-wide SNP data. In: *IOP Conf. Series: Earth and Environmental Science.* 762: 012047. doi: 10.1088/1755-1315/762/1/012047

- Volkandari, S.D., S. Anwar, A.S. Wulandari, P. Sudrajad, Indriawati, M.F. Nasrulloh, I. Rahmawati, E.T. Margawati, and M. Cahyadi. 2021. Effect of polymorphism of Insulin-induced gene 1 (INSIG1) (A4366G) on slaughter characteristics in unproductive Kebumen Ongole Grade cows. *Livest. Anim. Res.* 19(2): 238–246. doi: 10.20961/lar.v19i2.48557
- Wahyuningsih. 2022. Kinerja induk sapi Peranakan Ongole Kebumen di Kabupaten Kebumen, Jawa Tengah. Undergraduate Thesis. Faculty of Animal Science, Universitas Gadjah Mada, Yogyakarta.
- Walker, P.J., and E. Klement. 2015. Epidemiology and control of bovine ephemeral fever. *Vet. Res.*, 46: 124. doi: 10.1186/s13567-015-0262-4
- Watuwaya, B.K., and J.A. Syamsu. 2021. Potensi pengembangan sapi Sumba Ongole berdasarkan pemanfaatan limbah pertanian: Studi kasus Kabupaten Sumba Timur. *JITRO*. 8(3): 328–336. doi: 10.33772/jitro.v8i3.15167
- Watuwaya, B.K., J.A. Syamsu, Budiman, dan D. Useng. 2020. Analysis of the potential development of beef cattle in East Sumba Regency, East Nusa Tenggara Province, Indonesia. In: IOP Conf. Series: Earth and Environmental Science. 492: 012153. doi: 10.1088/1755-1315/492/1/012153
- Weir, B.S., C.C. Cockerham. 1984. Estimating F-statistics for the analysis of population structure. *Evolution*. 38: 1358–1370. doi: 10.2307/2408641
- Widada, H. 2013. Analisis kandungan vitamin E pada buah *Borassus flabellifer* Linn. menggunakan High Performance Liquid Chromatography (HPLC). *Mutiara Medika*. 13(3): 143–150. doi: 10.18196/mmjkk.v13i3.2478
- Widi, T.S.M. 2015. Mapping the impact of crossbreeding in smallholder cattle systems in Indonesia. PhD Thesis. Wageningen University, The Netherlands.
- Widi, T.S.M., H.M.J. Udo, K. Oldenbroek, I.G.S. Budisatria, E. Baliarti, and A.J. van der Zijpp. 2015. Is crossbreeding of cattle beneficial for mixed farming systems in Central Java?. *Anim. Genet.* 56: 127–144. doi: 10.1017/S2078633615000028
- Widyaningrum, Y., D. Ratnawati, S.Y. Hayanti, and L. Affandhy. 2023. Morphological and biochemical characterization of new cattle breeding PO Grati (POGASI) Sperm. In: Proc. the 4th Int. Conf. Anim. Sci. Technol. (ICAST 2021). AIP Publishing LLC. 2628(1): 070001. doi: 10.1063/5.0151570
- Wilkinson, S., and P. Wiener. 2019. Population genomics of animal domestication and breed development. In: Rajora, O.P. eds. *Population genomics: concepts, approaches and applications*. Springer Nature, Switzerland, pp. 709–753. doi: 10.1007/13836_2017_8
- Wulandari, A. 2019. Keragaman genetik DNA Mitokondria (mtDNA) pada beberapa sapi lokal Indonesia. Thesis. Universitas Brawijaya, Malang.

- Yan, J., J.E. Lawson, and L.J. Reed. 1996. Role of the regulatory subunit of bovine pyruvate dehydrogenase phosphatase. *Proc. Natl. Acad. Sci. USA*, 93, pp. 4953–4956. doi: 10.1073/pnas.93.10.4953
- Yang, C., Y. Zhu, Y. Ding, Z. Huang, X. Dan, Y. Shi, and X. Kang. 2022. Identifying the key genes and functional enrichment pathways associated with feed efficiency in cattle. *Gene*. 807: 145934. doi: 10.1016/j.gene.2021.145934
- Zamorano-Algandar, R., J.F. Medrano, M.G. Thomas, R.M. Enns, S.E. Speidel, M.A. Sánchez-Castro, G. Luna-Nevárez, J.C. Leyva-Corona, and P. Luna-Nevárez. 2023. Genetic markers associated with milk production and thermotolerance in Holstein dairy cows managed in a heat-stressed environment. *Biol.* 12(5): 679. doi: 10.3390/biology12050679