УДК 574.3 +581.524.2

THE HISTORY OF AUSTRALIA'S FERAL CAMELS (SHORT COMMUNICATION)

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Received November 21, 2023; revised July 6, 2024; accepted August 24, 2024

It is well known that Australia has a significant population of feral camels. However, few people know that Australia is home to the largest number of wild camels in the world. As an introduced species, they pose a significant threat to the Australian ecosystems. But why do so many camels live in Australia? The purpose of this presentation is to provide a historical account of the Australian camel population, including the timing of introduction and origin of the Australian individuals, the population development history of the different species, suitable habitats, species harvesting, ecological and economic impacts, and strategic considerations for future management.

Keywords: Australia's Wildlife; Camels; Feral Animals; Mammals; Northern Territory; Sustainability
DOI:10.35885/1996-1499-17-3-240-242

Full text of the paper is published in Russian Journal of Biological Invasions. DOI: 10.31857/S207511172104XXXYYY

References

Aghakouchak, A., Feldman, D., Stewardson, M.J., Saphores, J.D., Grant, S., and Sanders, B., Australia´s drought: lessons for California, *Science*, 2014, vol. 343, no. 6178, pp. 1430–1431.

Almathen, F., Charruau, P., Mohandesan, E., Mwacharo, J.M., Orozco-terWengel, P., Pitt, D., Abdussamad, A.M., Uerpmann, M., Uerpmann, H.P., Cupere, B.D., Magree, P., Alnageeb, M.A., Salim, B., Raziq, A., Dessie, T., Abdelhadi, O.M., Banabazi, M.H., Al-Eknah, M., Walzer, C., Faye, B., Hofreiter, M., Peters, J., Hanotte, O., and Burger, P.A., Ancient and modern DNA reveal dynamic of domestication and cross-continental dispersal of the dromedary, Proc. Natl. Acad. Sci. U. S. A., 2016, vol. 113, no. 24, pp. 6707–6712.

Azhar, E.I., Hui, D.S.C., Memish, Z.A., Drosten, C., and Zumla, A., The Middle East Respiratory Syndrome (MERS), Infect. Dis. Clin. N. Am., 2019, vol. 33, no. 4, pp. 891–905.

BBC, Australia to cull thousands of camels. BBC. 2020. https://www.bbc.com/news/newsbeat-51032145. Accessed April 01, 2022.

Biancolini, D., Vascellari, V., Melone B., Blackburn, T.M., Cassey, P., Scrivens, S.L., and Rondinini, C., DAMA: the global Distribution of Alien Mammals database, *Ecology*, 2021, vol. 102, no. 11, pp. e03474.

Box, J.B., McBurnie, G., Strehlow, K., Guest, T., Campbell, M., Bubb, A., McConnel, K., Willy, S., Uluru, R., Kulitja, R., Bell, B., Burke, S., James, R., Kunoth, R., and Stockman, B., The impact of feral camels (*Camelus dromedarius*) on remote waterholes in central Australia, Rangel. J., 2016a, vol. 38, no. 2, pp. 191–200.

Box, J.B., Nano, C.E.M., McBurnie, G., Waller, D.M., McConnell, K., Brock, C., Paltridge, R., McGilvray, A., Bubb, A., and Edwards, G.P., The impact of feral camels (*Camelus dromedarius*) on woody vegetation in arid Australia, *Rangel. J.*, 2016b, vol. 38, no. 2, pp. 181–190.

Bradby, K., Fitzsimons, J.A., Del Marco, A., Driscoll, D.A., Ritchie, E.G., Lau, J., Bradshaw, C.J.A., and Hobbs, R.J., Ecological connectivity or Barrier Fence? Critical choices on the agricultural margins of Western Australia, Ecol. Manag. Restor., 2014, vol. 15, no. 3, pp. 180–190.

Brasher, S., Camels, New Statesman, 2014, vol. 143, no. 5205, p. 67.

Chuluunbat, B., Charruau, P., Silbermayr, K., Khorloojav, T., and Burger, P.A., Genetic diversity and population structure of Mongolian domestic Bactrian camels (*Camelus bactrianus*), Anim. Genet., 2014, vol. 45, no. 4, pp. 550–558.

Corman, V.M., Muth, D., Niemeyer, D., and Drosten, C., Hosts and sources of endemic human coronaviruses, *Adv. Virus. Res.*, 2018, vol. 100, pp. 163–188.

Coventry, J., Edwards, G., and Zeng, B., The odyssey of managing feral camels and their impacts – is there an Achilles´ heel?, *Aust. Zool.*, 2010, vol. 35, no. 2, pp. 251–264.

Crameri, G., Durr, P.A., Barr, J., Yu, M., Graham, K., Williams, O.J., Kayali, G., Smith, D., Peiris, M., Mackenzie, J.S., and Wang, L.F., Absence of MERS-CoV antibodies in feral camels in Australia: implications for the pathogen´s origin and spread, One Health, 2015, vol. 1, pp. 76–82.

Dighe, A., Jombart, T., Van Kerkhove, M., and Ferguson, N., A systematic review of MERS-CoV seroprevalence and RNA prevalence in dromedary camels: Implications for animal vaccination. Epidemics, 2019, vol. 29, pp. 100350.

Dittmann, M.T., Runge, U., Lang, R.A., Moser, D., Galeffi, C., Kreuzer, M., and Clauss, M., Methane Emission by Camelids, PLoS One, 2014, vol. 9, no. 4, pp. e94363.

Dolev, E., The first recorded aeromedical evacuation in the British Army – The true story, *J. R. Army Med. Corps*., 1986, vol. 132, pp. 34–36.

Dr-Victor-von-Doom, Datei:Verbreitung von Kamelen in Australiien.png. Wikipedia. 2010. https://de.m.wikipedia.org/wiki/Datei:Verbreitung_von_Kamelen_in_Australiien.png. Accessed April 05, 2022.

Duke, M., Arabana and The Ghan, Master´s Thesis, Monash University, Melbourne, Australia, 2017.

Edwards, G.P., Saalfeld, K., and Clifford, B., Population trend of feral camels in the Northern Territory, Australia, *Wildl. Res*., 2004, vol. 31, no. 5, pp. 509–517.

Edwards, G.P., Zeng, B., Saalfeld, W.K., and Vaarzon-Morel, P., Evaluation of the impact of feral camels, *Rangel. J*., 2010, vol. 32, no. 1, pp. 43–54.

Edwards, G., Digby, D., O´Leary, P., Rafferty, D., Jensen, M., Woolnough, A., Secomb, N., Williams, M., Schwartzkopff, K., and Bryan, R., Planning and conducting aerial culling operations for feral camels, *Rangel. J*., 2016, vol. 38, no. 2, pp. 153–162.

Fitzpatrick, K., The Burke and Wills Expedition and the Royal Society of Victoria, *Historical Studies: Australia and New Zealand*, 1963, vol. 10, no. 40, pp. 470 – 478.

Hart, Q., Saunders, G., and Lane, C., The Australian Feral Camel Management Project – 15th Australasian Vertebrate Pest Conference. NINTIONLIMITED. 2011. https://www.nintione.com.au/resources/rao/the-australian-feral-camel-management-project/. Accessed March 25, 2022.

Hart Q, and Edwards, G., Outcomes of the Australian Feral Camel Management Project and the future of feral camel management in Australia, *Rangel. J*., 2016, vol. 38, no. 2, pp. 201–206.

Ji, R., Cui, P., Ding, F., Geng, J., Gao, H., Zhang, H., Yu, J., Hu, S., and Meng, H., Monophyletic origin of domestic Bactrian camel (*Camelus bactrianus*) and its evolutionary relationship with the extant wild camel (*Camelus bactrianus ferus*), *Anim. Genet*., 2009, vol. 40, no. 4, pp. 377–382.

Kabir, N.A., The economic plight of the Afghans in Australia, 1860 – 2000, *Islam Stud*., 2005, vol. 44, no. 2, pp. 229–250.

Kaethner, B., See, P., and Pennington, A., Talking camels: a consultation strategy for consent to conduct feral camel management on Aboriginal-owned land in Australia, *Rangel. J*., 2016, vol. 38, no. 2, pp. 125–133.

Kang, H., Zsoldos, R.R., Sole-Guitart, A., Narayan, E., Cawdell-Smith, A.J., and Gaughan, J.B., Heat stress in horses: a literature review, *Int. J. Biometeorol*., 2023, vol. 67, no. 6, pp. 957–973.

Kearney, S.G., Carwardine, J., Reside, A.E., Fisher, D.O., Maron, M., Doherty, T.S., Legge, S., Silcock, J., Woinarski, J.C.Z., Garnett, S.T., Wintle, B.A., and Watson, J.E.M., Ten threats to Australia´s imperilled species and implications for a national conservation response, *Pac. Conserv. Biol*., 2018, vol. 25, no. 3, pp. 231–244.

Lethbridge, M., Saalfeld, K.W., and Edwards, G.P., Measured reductions in the density of camels under the Australian Feral Camel Management Project, *Rangel. J*., 2016, vol. 38, no. 2, pp. 173–179.

Lundgren, E.J., Ramp, D., Ripple, W.J., and Wallach, A.D., Introduced megafauna are rewilding the Anthropocene, *Ecography*, 2017, vol. 41, no. 6, pp. 857–866.

McCarthy, P.H., The importation of the one-humped camel (*Camelus dromedarius*) into Australia during 1840–1841, *Aust. Vet. J*., 1980, vol. 56, no. 11, pp. 547–551.

McGregor, M., and Edwards, G., Guest Editorial: Managing the impacts of feral camels, *Rangel. J*., 2010, vol. 32, no. 2, pp. I–III.

Ming, L., Yuan, L., Yi, L., Ding, G., Hasi, S., Chen, G., Jambi, T., Hedayat-Evright, N., Batmunkh, M., Khongr Badmaevna, G., Gan-Erdene, T., Ts, B., Zhang, W., Zulipikaer, A., Hosblig, Erdemt, Natyrov, A., Mamay, P., Narenbatu, Meng, G., Narangerel, C., Khongorzul, O., He, J., Hai, L., Lin, W., Sirendalai, Sarentuya, Aiyisi, Li, Y., Wang, Z., and Jirimutu, Whole-genome sequencing of 128 camels across Asia reveals origin and migration of domestic Bactrian camels, *Commun. Biol*., 2020, vol. 3, pp. 1.

Modrow, S., Falke, D., Truyen, U., and Schätzl, H., 2009. Coronaviren, In *Molekulare Virologie*, Modrow, S., Falke, D., Truyen, U., and Schätzl, H., Eds., Heidelberg: Spektrum Akademischer Verlag, 2009, pp. 246 – 262.

Northern Territory Government, Feral Camel. Northern Territory Government. 2015. https://nt.gov.au/environment/animals/feral-animals/feral-camel. Accessed March 24, 2022.

Parks and Wildlife Service, Camels in Western Australia. Department of Biodiversity, Conservation and Attractions. 2014. https://www.dpaw.wa.gov.au/management/pests-diseases/202-camels-in-western-australia?showall=1. Accessed March 24, 2022.

Peiris, J.S., Guan, Y., and Yuen, K.Y., Severe acute respiratory syndrome, *Nat. Med*., 2004, vol. 10, pp. 88–97.

Pollock, D., Managing the unmanageable: reinstating the dingo for pastoral sustainability in Australian rangelands, *Proc. R. Soc. Vic*., 2021, vol. 133, no. 1, pp. 27–31.

Pople, A.R., and McLeod, S.R., Demography of feral camels in central Australia and its relevance to population control, *Rangel. J*., 2010, vol. 32, no. 1, pp. 11–19.

Potts, Camel hybridization and the role of *Camelus bactrianus* in the Ancient Near East, *J. Econ. Soc. Hist. Orient*., 2004, vol. 47, no. 2, pp. 143–165.

Radford, D., and Hetz, H., Aussies? Afghans? Hazara refugees and migrants negotiating multiple identities and belonging in Australia, *Soc. Identities*, 2020, vol. 27, no. 3, pp. 377 – 393.

Rawat, N., Astonishing story of Australian camels. Why thousands of them are shot dead routinely. India Today. 2020. https://www.indiatoday.in/world/story/astonishing-story-of-australian-camels-why-thousands-of-them-are-shot-dead-routinely-1635687-2020-01-11 . Accessed March 24, 2022.

Rockx, B., Kuiken, T., Herfst, S., Bestebroer, T., Lamers, M.M., Oude Munnink, B.B., de Meulder, D., van Amerongen, G., van den Brand, J., Okba, N.M.A., Schipper, D., van Run, P., Leijten, L., Sikkema, R., Verschoor, E., Verstrepen, B., Bogers, W., Langermans, J., Drosten, C., van Vlissingen, M.F., Fouchier, R., de Swart, R., Koopmans, M., and Haagmans, B.L., Comparative

pathogenesis of COVID-19, MERS, and SARS in a nonhuman primate model, *Science*, 2020, vol. 368, no. 6494, pp. 1012–1015.

Rybczynski, N., Gosse, J.C., Harington, C.R., Wogelius, R.A., Hidy, A.J., and Buckley, M., Mid-Pliocence warm-period deposits in the High Arctic yield insight into camel evolution, *Nat. Commun*., 2013, vol. 4, pp. 1550.

Turner, T., A story of coincidence: Norman Huon, Imperial Camel Corps, AIF, *Sabretache*, 1999, vol. 40, no. 2, pp. 26–29.

Twigg, L.E., Lowe, T.J., Martin, G.R., Wheeler, A.G., Gray, G.S., Griffin, S.L., O´Reilly, C.M., Butler, T.L., Robinson, D.J., and Hubach, P.H., The ecology of the European rabbit (*Oryctolagus cuniculus*) in coastal southern Western Australia, *Wildl. Res*. 1998, vol. 25, no. 2, pp. 97–111.

Underwood, J., The organisation of the Imperial Camel Brigade, 1916 – 1918, *Sabretache*, 2003, vol. 44, no. 4, pp. 5–14.

Visconti, M., The Afghans and their camels in Australia, *Antipodes*, 2000, vol. 14, no. 1, pp. 17–21.

Wieler, L.H., "One Health" – linking human, animal and environmental health, *Int. J. Med. Microbiol*., 2014, vol. 304, no. 7, pp. 775–776.

Wilson, R.T., Perceptions and problems of disease in the one-humped camel in southern Africa in the late 19th and early 20th century, *J. S. Afr. Vet. Assoc*., 2008, vol. 79, no. 2, pp. 58–61.

Zaki, A.M., van Boheemen, S., Bestebroer, T.M., Osterhaus, A.D.M.E., and Fouchier, R.A.M., Isolation of a novel coronavirus from a man with pneumonia in Saudi Arabia, *New Engl. J. Med*., 2012, vol. 367, no. 19, pp. 1814–1820.

Zohaib, A., Saqib, M., Athar M.A., Chen, J., Khan, S., Taj, Z., Sadia, H., Tahir, U., Tayyab, M.H., and Qureshi, M.A., Countrywide survey for MERS-Coronavirus antibodies in dromedaries and humans in Pakistan. *Virol. Sin*., 2018; vol. 33, no. 5, pp. 410–417.