

## References

### Afrika

CHIRIKURE 2014

Shadreck Chirikure, Munyaradzi Manyanga, A. Mark Pollard, Foreman Bandama, Godfrey Mahachi & Innocent Pikirayi, *Zimbabwe Culture before Mapungubwe, New Evidence from Mapela Hill, South-Western Zimbabwe*. [PLoS ONE 9 \(2014\), e111224](#). DOI:10.1371/journal.pone.0111224.

Across the globe, the emergence of complex societies excites intense academic debate in archaeology and allied disciplines. Not surprisingly, in southern Africa the traditional assumption that the evolution of socio-political complexity began with ideological transformations from K2 to Mapungubwe between CE 1200 and 1220 is clouded in controversy. It is believed that the K2-Mapungubwe transitions crystallised class distinction and sacred leadership, thought to be the key elements of the Zimbabwe culture on Mapungubwe Hill long before they emerged anywhere else. From Mapungubwe (CE1220–1290), the Zimbabwe culture was expressed at Great Zimbabwe (CE1300–1450) and eventually Khami (CE1450–1820). However, new fieldwork at Mapela Hill, when coupled with a Bayesian chronology, offers tremendous fresh insights which refute this orthodoxy. Firstly, Mapela possesses enormous prestige stone-walled terraces whose initial construction date from the 11th century CE, almost two hundred years earlier than Mapungubwe. Secondly, the basal levels of the Mapela terraces and hilltop contain elite solid dhaka (adobe) floors associated with K2 pottery and glass beads. Thirdly, with a hilltop and flat area occupation since the 11th century CE, Mapela exhibits evidence of class distinction and sacred leadership earlier than K2 and Mapungubwe, the supposed propagators of the Zimbabwe culture. Fourthly, Mapungubwe material culture only appeared later in the Mapela sequence and therefore post-dates the earliest appearance of stone walling and dhaka floors at the site. Since stone walls, dhaka floors and class distinction are the essence of the Zimbabwe culture, their earlier appearance at Mapela suggests that Mapungubwe can no longer be regarded as the sole cradle of the Zimbabwe culture. This demands not just fresh ways of accounting for the rise of socio-political complexity in southern Africa, but also significant adjustments to existing models.

### Aktuell

DANCE 2021

Amber Dance, *The truth about gain-of-function research*. [nature 598 \(2021\), 554–557](#).

Granting new abilities to pathogenic microbes sounds dangerous, but what has the research told us?

At its most innocuous, GOF is a classic genetics term to describe mutations that give a gene, RNA or protein new abilities or expression patterns. Gain of function might result in bacteria that are extra sensitive to potassium ions<sup>5</sup>, for example, or an Arabidopsis plant with short stems and curly leaves<sup>6</sup>. A complementary

“People do all of these experiments all the time,” says Juliet Morrison. If only mice are at risk, should it be deemed GOF?

## Bibel

CLINES 1974

David J. A. Clines, *The tree of knowledge and the law of Yahweh (psalm 19)*. *Vetus Testamentum* **24** (1974), 8–14.

The terminology used to describe the law of Yahweh in the second half of Psalm 19 is reminiscent of the description of the tree of knowledge of good and evil (Gen. 2.9, 17; 3.5-7). It is here suggested that the author of Ps. 19.7-14 intended by his allusions to Gen. 2–3 to assert the superiority of the law to the tree of knowledge as a means of obtaining wisdom.

LUTHER 1534

Martin Luther, *Biblia, das ist die gantze Heilige Schrift Deudsch, Martin Luther Wittenberg, Als Faksimile herausgegeben und kommentiert von Stephan Füssel*. (Köln 2016).

## Biologie

LIBRADO 2021

Pablo Librado & Ludovic Orlando et al., *The origins and spread of domestic horses from the Western Eurasian steppes*. *nature* **598** (2021), 634–640.

n598-0634-Supplement1.pdf, n598-0634-Supplement2.jpg, n598-0634-Supplement3.xlsx

Domestication of horses fundamentally transformed long-range mobility and warfare<sup>1</sup>. However, modern domesticated breeds do not descend from the earliest domestic horse lineage associated with archaeological evidence of bridling, milking and corralling<sup>2–4</sup> at Botai, Central Asia around 3500 bc<sup>3</sup>. Other longstanding candidate regions for horse domestication, such as Iberia<sup>5</sup> and Anatolia<sup>6</sup>, have also recently been challenged. Thus, the genetic, geographic and temporal origins of modern domestic horses have remained unknown. Here we pinpoint the Western Eurasian steppes, especially the lower Volga-Don region, as the homeland of modern domestic horses. Furthermore, we map the population changes accompanying domestication from 273 ancient horse genomes. This reveals that modern domestic horses ultimately replaced almost all other local populations as they expanded rapidly across Eurasia from about 2000 bc, synchronously with equestrian material culture, including Sintashta spoke-wheeled chariots. We find that equestrianism involved strong selection for critical locomotor and behavioural adaptations at the GSDMC and ZFPM1 genes. Our results reject the commonly held association<sup>7</sup> between horseback riding and the massive expansion of Yamnaya steppe pastoralists into Europe around 3000 bc<sup>8,9</sup> driving the spread of Indo-European languages<sup>10</sup>. This contrasts with the scenario in Asia where Indo-Iranian languages, chariots and horses spread together, following the early second millennium bc Sintashta culture<sup>11,12</sup>.

Pablo Librado, Naveed Khan, Antoine Fages, Mariya A. Kusliy, Tomasz Suchan, Laure Tonasso-Calviere, Stephanie Schiavinato, Duha Alioglu, Aurore Fromentier, Aude Perdereau, Jean-Marc Aury, Charleen Gaunitz, Lorelei Chauvey, Andaine

Seguin-Orlando, Clio Der Sarkissian, John Southon, Beth Shapiro, Alexey A. Tishkin, Alexey A. Kovalev, Saleh Alquraishi, Ahmed H. Alfarhan, Khaled A. S. Al-Rasheid, Timo Seregely, Lutz Klassen, Rune Iversen, Olivier Bignon-Lau, Pierre Bodu, Monique Olive, Jean-Christophe Castel, Myriam Boudadi-Maligne, Nadir Alvarez, Mietje Germonpre, Magdalena Moskal-del Hoyo, Jarosaw Wilczynski, Sylwia Pospua, Anna Lasota-Ku, Krzysztof Tunia, Marek Nowak, Eve Rannamae, Urmas Saarma, Gennady Boeskorov, Lembi Lugas, Rene Kysely, Lubomir Peke, Adrian Blescu, Valentin Dumitracu, Roxana Dobrescu, Daniel Gerber, Viktoria Kiss, Anna Szecsényi-Nagy, Balazs G. Mende, Zsolt Gallina, Krisztina Somogyi, Gabriella Kulcsar, Erika Gal, Robin Bendrey, Morten E. Allentoft, Ghenadie Sirbu, Valentin Dergachev, Henry Shephard, Noemie Tomadini, Sandrine Grouard, Aleksei Kasparov, Alexander E. Basylyan, Mikhail A. Anisimov, Pavel A. Nikolskiy, Elena Y. Pavlova, Vladimir Pitulko, Gottfried Brem, Barbara Wallner, Christoph Schwall, Marcel Keller, Keiko Kitagawa, Alexander N. Bessudnov, Alexander Bessudnov, William Taylor, Jérôme Magail, Jamiyan-Ombo Gantulga, Jamsranjav Bayarsaikhan, Diimaajav Erdenebaatar, Kubatbek Tabaldiev, Enkhbayar Mijiddorj, Bazartseren Boldgiv, Turbat Tsagaan, Mélanie Pruvost, Sandra Olsen, Cheryl A. Makarewicz, Silvia Valenzuela Lamas, Silvia Albizuri Canadell, Ariadna Nieto Espinet, Ma Pilar Iborra, Jaime Lira Garrido, Esther Rodríguez González, Sebastián Celestino, Carmen Olària, Juan Luis Arsuaga, Nadiia Kotova, Alexander Pryor, Pam Crabtree, Rinat Zhumatayev, Abdesh Toleubaev, Nina L. Morgunova, Tatiana Kuznetsova, David Lordkipanize, Matilde Marzullo, Ornella Prato, Giovanna Bagnasco Gianni, Umberto Tecchiati, Benoit Clavel, Sébastien Lepetz, Hossein Davoudi, Marjan Mashkour, Natalia Ya. Berezina, Philipp W. Stockhammer, Johannes Krause, Wolfgang Haak, Arturo Morales-Muñiz, Norbert Benecke, Michael Hofreiter, Arne Ludwig, Alexander S. Graphodatsky, Joris Peters, Kirill Yu. Kiryushin, Tumor-Ochir Iderkhangai, Nikolay A. Bokovenko, Sergey K. Vasiliev, Nikolai N. Seregin, Konstantin V. Chugunov, Natalya A. Plasteeva, Gennady F. Baryshnikov, Ekaterina Petrova, Mikhail Sablin, Elina Ananyevskaya, Andrey Logvin, Irina Shevnina, Victor Logvin, Saule Kalieva, Valeriy Loman, Igor Kukushkin, Ilya Merz, Victor Merz, Sergazy Sakenov, Victor Varfolomeyev, Emma Usmanova, Viktor Zaibert, Benjamin Arbuckle, Andrey B. Belinskiy, Alexej Kalmykov, Sabine Reinhold, Svend Hansen, Aleksandr I. Yudin, Alekandr A. Vybornov, Andrey Epimakhov, Natalia S. Berezina, Natalia Roslyakova, Pavel A. Kosintsev, Pavel F. Kuznetsov, David Anthony, Guus J. Kroonen, Kristian Kristiansen, Patrick Wincker, Alan Outram & Ludovic Orlando

#### THOMPSON 2021

Tosin Thompson, *Ancient DNA points to origins of modern domestic horses*. [nature](#) **598** (2021), 550.

Genetic analysis shows ancestors of modern horses lived in the Western Eurasian steppes 4,000 years ago.

## Klima

#### LIU 2021

Chengying Liu, Junsheng Nie, Zaijun Li, Qingqing Qiao, Jordan T. Abell, Fei Wang & Wenjiao Xiao, *Eccentricity forcing of East Asian monsoonal systems over the past 3 million years*. [PNAS](#) **118** (2021), e2107055118.

[pnas118-e2107055118-Supplement.pdf](#)

The East Asian summer monsoon and the precipitation it brings are relevant for millions of people. Because of the monsoon’s importance, there has been a substantial amount of work attempting to describe the driving mechanisms behind its past variability. However, discrepancies exist, with speleothem-based East Asian monsoon reconstructions differing from those based on loess records from the Chinese Loess Plateau during the late Quaternary. The periodicity of wet and dry phases experienced by desert areas that lie on the periphery of the East Asian monsoon’s influence offer another independent view of monsoonal variability. Here, we provide environmental records based on magnetic parameters for the last 3 million years from the Tengger Desert, China, one such marginal arid region. Our results reveal wet–dry cycles at a dominant frequency of 405 kiloyears, with drier intervals corresponding to eccentricity minima. These findings are consistent with previous reconstructions of East Asian summer and North African summer monsoon precipitation variability. Our records emphasize the dominant role of eccentricity in forcing East Asian monsoonal precipitation as well as monsoonal-derived environmental fluctuations experienced in peripheral desert areas. These results challenge the traditional view that high-latitude ice sheets are the primary driver of East Asian monsoon precipitation during the Quaternary based on Chinese loess records.

**Keywords:** monsoon | environmental magnetism | eccentricity | Tengger Desert

**Significance:** Desert regions were not always dry, and in the geological past, they experienced periods of wetter and drier conditions. Understanding these wet–dry cycles in arid regions is an important scientific endeavor that could provide information related to their future variations. Environmental variability of deserts in monsoonal regions are controlled by monsoon-derived precipitation. Here, we show that the Tengger Desert of northern China experienced drying every 400 thousand years, corresponding to the Earth orbital eccentricity minimum, forced by variations in the East Asian monsoon. This finding requires a revision of the traditional view of Northern Hemisphere ice sheet forcing of the East Asian monsoon based on Chinese Loess Plateau records.

VAN DER LUBBE 2021

H. J. L. van der Lubbe, I. R. Hall, A. Starr & J. C. A. Joordens et al., *Indo-Pacific Walker circulation drove Pleistocene African aridification*. *nature* **598** (2021), 618–623.

Today, the eastern African hydroclimate is tightly linked to fluctuations in the zonal atmospheric Walker circulation<sup>1,2</sup>. A growing body of evidence indicates that this circulation shaped hydroclimatic conditions in the Indian Ocean region also on much longer, glacial–interglacial timescales<sup>3–5</sup>, following the development of Pacific Walker circulation around 2.2–2.0 million years ago (Ma)<sup>6,7</sup>. However, continuous long-term records to determine the timing and mechanisms of Pacific-influenced climate transitions in the Indian Ocean have been unavailable. Here we present a seven-million-year-long record of wind-driven circulation of the tropical Indian Ocean, as recorded in Mozambique Channel Throughflow (MCT) flow-speed variations. We show that the MCT flow speed was relatively weak and steady until  $2.1 \pm 0.1$  Ma, when it began to increase, coincident with the intensification of the Pacific Walker circulation<sup>6,7</sup>. Strong increases during glacial periods, which reached maxima after the Mid-Pleistocene Transition (0.9–0.64 Ma; ref. 8), were punctuated by weak flow speeds during interglacial periods. We provide a mechanism explaining that increasing MCT flow speeds reflect synchronous development of the Indo-Pacific Walker cells that promote aridification in Africa. Our results suggest that after about 2.1 Ma, the increasing aridification is punctuated

by pronounced humid interglacial periods. This record will facilitate testing of hypotheses of climate–environmental drivers for hominin evolution and dispersal.

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## Kultur

### WILKIN 2021

Shevan Wilkin & Nicole Boivin et al., *Dairying enabled Early Bronze Age Yamnaya steppe expansions*. [nature 598 \(2021\), 629–633](#).

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During the Early Bronze Age, populations of the western Eurasian steppe expanded across an immense area of northern Eurasia. Combined archaeological and genetic evidence supports widespread Early Bronze Age population movements out of the Pontic–Caspian steppe that resulted in gene flow across vast distances, linking populations of Yamnaya pastoralists in Scandinavia with pastoral populations (known as the Afanasievo) far to the east in the Altai Mountains<sup>1,2</sup> and Mongolia<sup>3</sup>. Although some models hold that this expansion was the outcome of a newly mobile pastoral economy characterized by horse traction, bulk wagon transport<sup>4–6</sup> and regular dietary dependence on meat and milk<sup>5</sup>, hard evidence for these economic features has not been found. Here we draw on proteomic analysis of dental calculus from individuals from the western Eurasian steppe to demonstrate a major transition in dairying at the start of the Bronze Age. The rapid onset of ubiquitous dairying at a point in time when steppe populations are known to have begun dispersing offers critical insight into a key catalyst of steppe mobility. The identification of horse milk proteins also indicates horse domestication by the Early Bronze Age, which provides support for its role in steppe dispersals. Our results point to a potential epicentre for horse domestication in the Pontic–Caspian steppe by the third millennium bc, and offer strong support for the notion that the novel exploitation of secondary animal products was a key driver of the expansions of Eurasian steppe pastoralists by the Early Bronze Age.

Shevan Wilkin, Alicia Ventresca Miller, Ricardo Fernandes, Robert Spengler, William T.-T. Taylor, Dorcas R. Brown, David Reich, Douglas J. Kennett, Brendan J. Culleton, Laura Kunz, Claudia Fortes, Aleksandra Kitova, Pavel Kuznetsov, Andrey Epimakhov, Victor F. Zaubert, Alan K. Outram, Egor Kitov, Aleksandr Khokhlov, David Anthony & Nicole Boivin