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Elusive traces: Baobabs and the African diaspora in South Asia

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ABSTRACT

The history of botanical exchanges between Africa and the Indian subcontinent reaches back in time over 5000 years. Recent advances in archaeobotany have revealed these connections through evidence of food crops of African origin found at various archaeological sites in the subcontinent. However, little is known about the people that brought the crops to these places and other parts of the Indian Ocean world. This is also the case with other plants from Africa such as the charismatic baobab tree (*Adansonia digitata L.*) that appears to have had a longstanding presence in South Asia. Most scholarly accounts assume that 'Arab traders' were responsible for introducing baobabs to this region but do not offer any reasons for their doing so. Few scholars, if any, have sought to relate the dispersal of baobabs with the history of African migrations to the region. This paper reveals the elusive traces of their entwined environmental histories by linking baobab genetics with historical accounts and cultural evidence of the presence of African diasporic communities in South Asia.

INTRODUCTION

The role of Africa and Africans in the making of the Atlantic World is now a well-recognised dimension of global history. There is a vast and rich body of literature on the diverse work and cultural contributions of enslaved and bonded Africans who laboured in the plantation economies established by European commercial and colonial interests in North and South America and the Caribbean from the 16th to the 19th centuries. Within this *oeuvre*, an important strand of historical geographic research has looked beyond the work performed by enslaved Africans in plantations to identify their agency in the introductions of African plants, cultivation technologies, and food processing practices that reshaped the physical and social landscapes of

the New World.[1] In comparison, the literature on the role of Africans in the making of the Indian Ocean World is minuscule. Most well-known histories of the Indian Ocean trade and commercial networks centre on the activities of Arab, Indian, Chinese, and European traders but rarely refer to Africans as agents within these circuits.[2] Even the few collections of historical studies of African diaspora in the Indian Ocean provide no insights about how their movements may have shaped landscapes in other parts of this oceanic world through the introduction of plants and associated cultural knowledges and practices.[3]

Recent advances in archaeobotany have revealed that human movements and biotic exchanges between Africa and the Indian subcontinent extend far back into prehistory. Evidence for these movements has been found at sites in the Indus valley, western and peninsular India, where food crops originating from Africa such as sorghum (*Sorghum bicolor*), pearl millet (*Pennisetum glaucum*), finger millet (*Eleusine coracana*), hyacinth bean (*Lablab purpureus*), and cowpea (*Vigna unguiculata*) appear in the archaeological records between 3500 and 4500 years ago.[4] The tamarind tree (*Tamarindus indica*), which is said to originate from the Sudan, is estimated to have been introduced even earlier and dispersed across the subcontinent into Southeast Asia.[5] In addition to these widely cultivated food plants, there are other plants of African origin such as the *doûm* palm (*Hyphaene thebaica*),[6] and the baobab (*Adansonia digitata*) which have limited or disjunct geographical distribution in this region and do not appear to be cultivated in any significant way. Although there are no archaeological records or archival accounts that establish when and from which regions of Africa these plants were brought to various places in the Indian Ocean world, it is possible to trace the historical connections and role of African migrants by combining genetic and cultural evidence associated with the plants between places of origin and introduction.

In this paper, we attempt to reveal the elusive traces of the African diaspora in South Asia by investigating the history of introduction of the African baobab (*Adansonia digitata*) to this region. We conducted genetic analysis to determine source populations of *A. digitata* by examining genetic variation and relationships within and between African and South Asian samples. We used the evidence of inferred ancestry and phylogeography to link source populations with dispersal pathways based on available historical information on trade routes and networks between Africa and southern Asia. We then examined specific baobab clusters and individuals in relation to available cultural evidence to infer agency of African migrants and possible time periods when they may have introduced the baobabs to South Asia.

THE AFRICAN BAOBAB AND ITS GEOGRAPHICAL DISTRIBUTION

Adansonia digitata, or the African baobab, is a charismatic tree species originating from and widely distributed across continental Africa. Its range extends from west to east Africa and from the northern Sahel to the Limpopo province of South Africa, excluding the rainforest areas of central Africa and high altitude areas above 1000 m (Figure 2).[7] It is highly valued for a variety of human purposes: the fruit, bark, leaves and roots are used for food, medicine and artisanal

[1] Carney 2001; Carney and Rosomoff 2009
[2] Chaudhuri 1985; McPherson 1993; Hourani 1995; Pearson 2003
[3] de Silva Jayasuriya & Pankhurst 2003; Catlin-Jairazbhoy and Alpers 2004; Zimba, Alpers, and Isaacman 2005; Alpers 2014
[4] Harlan 1971; Hilu & De Wet 1976; de Wet *et al.* 1984; Weber 1998; Marshall & Hildebrand 2002; Blench 2003, Fuller & Harvey 2006; Fuller & Boivin 2009; Manning *et al.* 2011; Rangan *et al.* 2012; Hoogervorst 2013
[5] Achaya 1994; Blench 2003; Burkill 1985-2004
[6] Cooke 1907
[7] Wickens & Lowe 2008

products, while the tree often serves as a rainwater store, shelter, and sacred site.[8] Since the tree can grow to enormous size and live for hundreds, even thousands of years,[9] it is held in great veneration by many African communities as a symbol and dwelling-place of ancestors and magical spirits.[10] The baobab fruit contains nutritious pith with a powdery texture and sweetish-sour flavour, along with plentiful seeds which are a source of protein; both pith and seeds preserve well in the fruit pod and can be consumed over long time-periods. The hardy shell of the fruit pod becomes lightweight as it loses its moisture content and is thus easily carried over long distances as part of food provisions. The fruit and leaves are widely used as supplementary and emergency food by people in rural and coastal areas of western and eastern Africa;[11] they are also used, along with the bark and root of the tree, in traditional medicine and healing practices.[12] Biogeographic studies of baobabs in Africa show that there is close association between past human settlements and the presence of the species.[13] Genetic studies of baobabs also suggest that humans have been the prime agents responsible for distributing the tree species across the African continent.[14]



Figure 1: Baobab trees and bags of baobab fruit pith for sale along the road between Beira and Tete, Mozambique.
Source: C. Kull

African baobabs are also found in various parts of the Indian Ocean region, in India, Sri Lanka, and coastal Pakistan; the southern Arabian Peninsula and southern Iran; the Comoros islands, northwest Madagascar and the Mascarene islands of Mauritius and Réunion; Malaysia and Indonesia; and across the Atlantic Ocean in the Caribbean islands and parts of sub-tropical South America.[15] The diverse values and cultural importance of baobabs for African communities have been identified as reasons for their presence in the Caribbean and South America, where large numbers of enslaved people from West Africa were transported between the 16th and 19th centuries to work in plantations.[16] However, no such reasons have been given to link the presence of baobabs with African migrations in the Indian Ocean region.

[8] Wickens 1982; Blench 2007; Wickens & Lowe 2008
[9] Livingstone 1861; Swart 1963; Wilson 1988; Watson 2007
[10] Armstrong 1979; Wickens 1982
[11] Irvine 1952; Weiss 1979; Burkill 1985-2004; Gebauer *et al.* 2002; Gustad *et al.* 2004
[12] Watt & Breyer-Brandwijk 1962; De Caluwé *et al.* 2009; Kamatou *et al.* 2011
[13] Blench 2007; Duvall 2007; Wickens & Lowe 2008
[14] Leong Pock Tsy *et al.*, 2009
[15] Perrier de la Bâthie 1932; Parsa 1959; Maheshwari 1971; Armstrong 1979; Rashford 1987; Sidibe & Williams 2002; Vandercone *et al.* 2004
[16] Rashford 1987

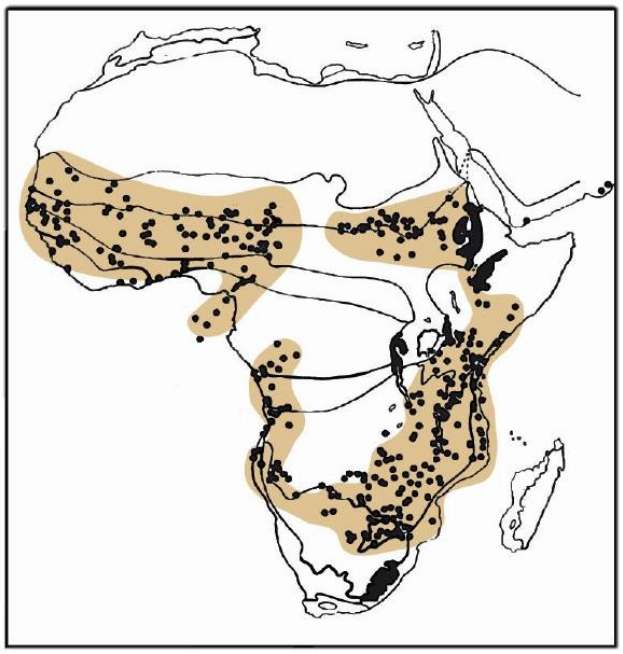


Figure 2: Broad distribution of *A. digitata* in the African continent
Source: Adapted from Wickens and Lowe 2008



Figure 3: A baobab on the Indian Ocean shore at Kilwa, Tanzania
Source: C. Kull

Within South Asia today, baobab clusters are largely found in the coastal areas of western India and pockets of central India. Smaller distributions occur in coastal areas of southeastern India, and scattered individuals are found in the Indo-Gangetic plains.[17] In western India, baobab clusters mainly occur in Kutch and the Kathiawar peninsula and southern coastal towns of Gujarat; in Mumbai and further south along the Konkan coast to its south, extending into Goa and northern Karnataka. Inland, in Central India, baobab clusters are found on the Malwa plateau in western Madhya Pradesh state, and the south central Deccan plateau of Andhra Pradesh. In southeastern India, baobabs occur in Chennai and the southernmost tip of the subcontinent close to the Palk Strait that separates mainland India from Sri Lanka. In Sri Lanka, baobab clusters occur mostly on Mannar and neighbouring areas in the northwest of the main island (see Figure 4).[18]

[17] Maheshwari 1971, Wickens & Lowe 2008
[18] Vandercone *et al.*2004

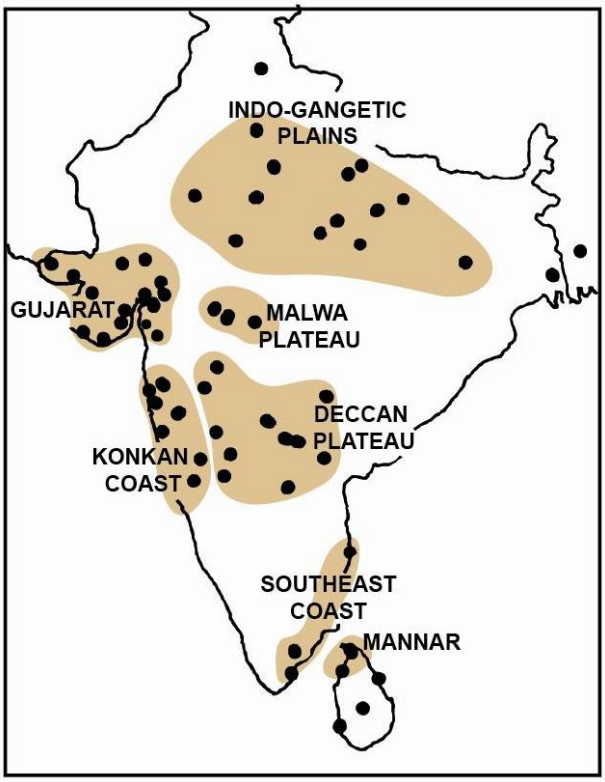


Figure 4: Broad presence of *A. digitata* in the Indian subcontinent
Source: Adapted from Wickens and Lowe 2008



Figure 5: A baobab in the coastal village of Ghogha, Bhavnagar district, Gujarat, India
Source: H. Rangan

Despite numerous observations by British colonial officials and naturalists about the presence of these trees,[19] there are few systematic or empirically-based studies of African baobabs in South Asia. Most published surveys of baobabs in India and Sri Lanka reproduce the assumptions of colonial officials in attributing their introduction to 'Arab traders'.[20] None of these accounts make the effort to explain the identity of the 'Arab' traders nor their reasons for introducing an African tree that had no formal commercial value in the Indian subcontinent. Were the traders 'Arab' because they originated from the Arabian peninsula, or because they spoke Arabic[21] in some form? Is there material evidence to show that the baobab tree and its products were as widely used by communities in the Arabian peninsula as in Africa? Or is there linguistic and cultural evidence that shows similarities in terminology, categorisation, or symbolic significance of baobabs among trading communities from Arabia and their counterparts in places where baobabs occur in South Asia? While a few authors attribute the introduction of baobabs in some parts of India to medieval Muslim rulers who maintained African army corps,[22] they do not provide any explanation of possible motives for introducing the tree. In short, apart from acknowledging the African origins of the tree, none of these surveys attempts to investigate the direct links between the geographical distribution of baobabs in the Indian subcontinent and the history of African migration, involvement in trade and cultural exchanges in South Asia and across the Indian Ocean.

In this paper, we argue that the presence and geographical distribution of baobabs in South Asia reflect the direct links and migration histories of African agents. Given the deep prehistory of biotic exchanges between Africa and the Indian subcontinent, the baobab may have been an ancient arrival in South Asia, perhaps introduced along with the tamarind tree or food crops from the semi-arid regions of northeast Africa. However, the intensity and regularity of the monsoonal trade linking East Africa with circuits of exchange in the western and eastern Indian Ocean is likely to have resulted in many more introductions of baobabs by African sailors and migrants who may have carried the fruit pods as part of their personal food provisions on voyages to the Indian subcontinent and beyond.[23] The coastal and deep ocean trade networks between eastern Africa and southern Asia, both ancient and recent, extended from present-day northern Mozambique, Tanzania, Kenya and the Horn of Africa across to western and peninsular India, Sri Lanka and beyond into southeast Asia. All these regions of eastern and southern Africa may have been the source of baobab introductions to South Asia and other parts of the Indian Ocean World.

MATERIALS AND METHODS

In order to carry out the genetic analysis, we collected plant material, usually leaf but occasionally bark, from baobabs in Africa and India. Baobabs in Africa have been identified as comprising two genetic groups, one representing a West African lineage and the other an East African lineage.[24] Our sampling in Africa focussed mainly on the eastern lineage, based on the assumption that this was the most likely source for dispersal of baobabs across the Indian

[19] See Armstrong 1979 and Wickens 1982 for a comprehensive summary of these accounts.
[20] Maheshwari 1971; Vandercone *et al.* 2004
[21] This is the definition used by Hourani 1995, see p. 3.
[22] Burton-Page 1969; Armstrong 1979; Wickens & Lowe 2008
[23] Villiers 1952.
[24] Leong Pock-Tsy *et al.* 2009.

Ocean. We collected samples from inland and coastal Mozambique and Tanzania, and further drew on samples collected by Pettigrew in Kenya, South Africa, Botswana, and eastern Namibia.[25] We also included a single sample from Senegal to ensure that the West African lineage was represented in the genetic analysis. Outside Africa, we collected baobab samples from introduced populations in western, central, and southeast India; from trees in the islands of Mauritius and Réunion (the Mascarenes) in the western Indian Ocean; and obtained a single sample from Penang in Malaysia.[26] We could not obtain samples from other potential source populations such as Sudan, Ethiopia and Eritrea in northeast Africa, or from other locations in South Asia where baobabs were introduced, such as Sri Lanka and Pakistan.

Genetic analysis can provide some indication of variation or differentiation of baobabs between biogeographic regions at source and in the introduced locations, but cannot provide estimates for the time of introduction, particularly if these have taken place in historical time frames of a few centuries or a few thousand years. However, it is possible to determine through genetic analysis whether a plant's presence outside its source of origin is the result of a single or multiple introductions over a period of time. In the case of multiple introductions, the genetic structure of the plant in its new location may differ from that at the place of origin, and the extent to which the genetic structures differ can provide some indication of whether the presence of the plant in its introduced location is recent or ancient.[27] If there is little difference in structure, then the introductions are likely to be fairly recent. But significant difference between the source and introduced populations may suggest that the latter was introduced further back in time and has evolved *in situ* in its new location.

There are other methods for assessing the age of trees such as tree ring analysis and carbon dating that could provide better estimates of the duration of their presence in the places of introduction. But these are not easily applied to baobabs. Many large baobabs have trunks that have been hollowed out due to damage by natural or human causes, making it difficult to assess age through tree ring analysis.[28] Measurements of tree girth at breast height (GBH) are sometimes used to estimate age based on a combination of growth rates of younger trees of known age and evidence from annual rings. However, using GBH measurements to estimate the age of baobabs can be misleading because the growth rates are not uniform over time and vary in relation to local ecological conditions. Younger baobab trees grow at a faster rate than older ones, while trees in areas with two distinct annual rainfall seasons rapidly increase in girth compared to those in areas with a single rainfall season.[29] Also, due to the high moisture content of the tree, it is difficult to find baobab remains in archaeobotanical records that can be carbon dated. Only one study has, so far, been able to use radiocarbon analysis on samples obtained from the cross-section of a 4.5m diameter baobab tree felled in 1960, during the construction of the Kariba dam in Zambia. The analysis estimated the age of the heartwood as roughly 1010 years and showed that the tree grew more slowly over the outer half of its diameter, suggesting that the very large baobabs could be several thousand years old.[30]

Taking these factors into account, we decided that the most effective approach for assessing the sources and times of introduction of baobabs from Africa to South Asia and other parts of the Indian Ocean world would be to use genetic analysis to identify the geographic

[25] Pettigrew *et al.* 2012
[26] Details of the collection and storage are provided in Bell *et al.* 2014 (under review).
[27] Williams *et al.* 2005; Hawkins *et al.* 2007
[28] Swart 1963
[29] Wilson 1988
[30] Swart 1963, p. 709.

patterns of differences and connections between African and South Asian samples,[31] and link these to available historical accounts of trade routes and networks between the sampled locations. We also used cultural information (stories, names, symbolic and practical uses of baobabs) obtained during fieldwork in the sampled locations to trace the movement of African migrants and when they might have arrived in these places.

GENETIC RELATIONSHIPS BETWEEN AFRICAN AND SOUTH ASIAN BAOBABS

The genetic analyses provided three important insights regarding the relationships between the African and South Asian baobab populations. First, the South Asian baobabs showed lower genetic diversity than those from Africa, thereby confirming the common assumption that they had been introduced from that continent. But, although they shared substantial similarities with the African samples, they also contained private (*i.e.*, different) alleles not found in the latter. The existence of private alleles in the Indian samples could point to ancient introduction of baobabs from Africa that produced *in situ* mutations over several generations; this suggests that many of the large trees sampled in India, which had girths exceeding 14 metres, may not have been founding individuals (the first introductions) despite possibly being over a thousand years in age.[32] Alternatively, the private alleles found in the Indian baobab populations could be similar to those from places in northeast Africa for which we did not have samples, such as Sudan, Ethiopia or Eritrea and might represent recent introductions from these places. Yet another possibility could be that the private alleles represent both, origins from northeast Africa and ancient introduction to the subcontinent.

Second, the analysis of genetic structure revealed that both East and West Africa have been sources of baobabs for South Asia and other parts of the western and eastern Indian Ocean, such as the Mascarenes islands and Malaysia. The baobab clusters in the East African coastal areas between Mombasa (southern Kenya) and Sofala (northern Mozambique) were closely related to the western and central Indian clusters, and probably the main source for baobabs brought to these areas. The baobab samples from West Africa, the Mascarenes, southeast India and Malaysia shared genetic structure and formed a single cluster, and the phylogenetic analysis also showed that West African populations were the likely source for introductions to these places.

Third, there was evidence of genetic admixture within the western and central Indian populations as well as those from East Africa, indicating that these populations experienced repeated introductions over time from the represented cluster source regions (see Figures 6A & B). For example, baobab samples from western India between Mumbai-Dharwad (Konkan coast) and Gujarat showed the presence of genetic clusters from inland Tanzania, the Kilimanjaro area, inland Mozambique and southern Africa. Likewise, the samples from Central India around Dhar district (Malwa plateau) and Hyderabad (Deccan plateau) showed admixtures of the same African genetic clusters but differing proportions. Within East Africa, similar admixtures of genetic clusters in varying proportions were found in samples from Kilwa and Mombasa-Dar es Salaam on the Swahili coast, and from the Tete area in inland Mozambique,

[31] The genetic analysis is described in detail in Bell *et al.* 2014 (under review). Briefly, it involved: 1) investigating whether baobab introductions from Africa to new locations were ancient or recent by examining allele (one of several versions of a gene) frequencies and genetic diversity to identify admixtures of lineages, bottlenecks, and *in situ* evolution in introduced locations; and 2) inferring ancestry of baobab populations in South Asia and other areas of the Indian Ocean world by examining genetic structure and phylogenetic relationships with African source populations.

[32] The baobab tree which Swart (1963) estimated as roughly 1010 years of age, had a girth of 14.4 metres.

indicating significant long-distance gene-flow, most likely by fruit dispersal, through these places. The patterns of divergence and overlap between the East African and western and central Indian clusters show that fruit from the different African source regions were repeatedly borne across the Indian Ocean to these regions.

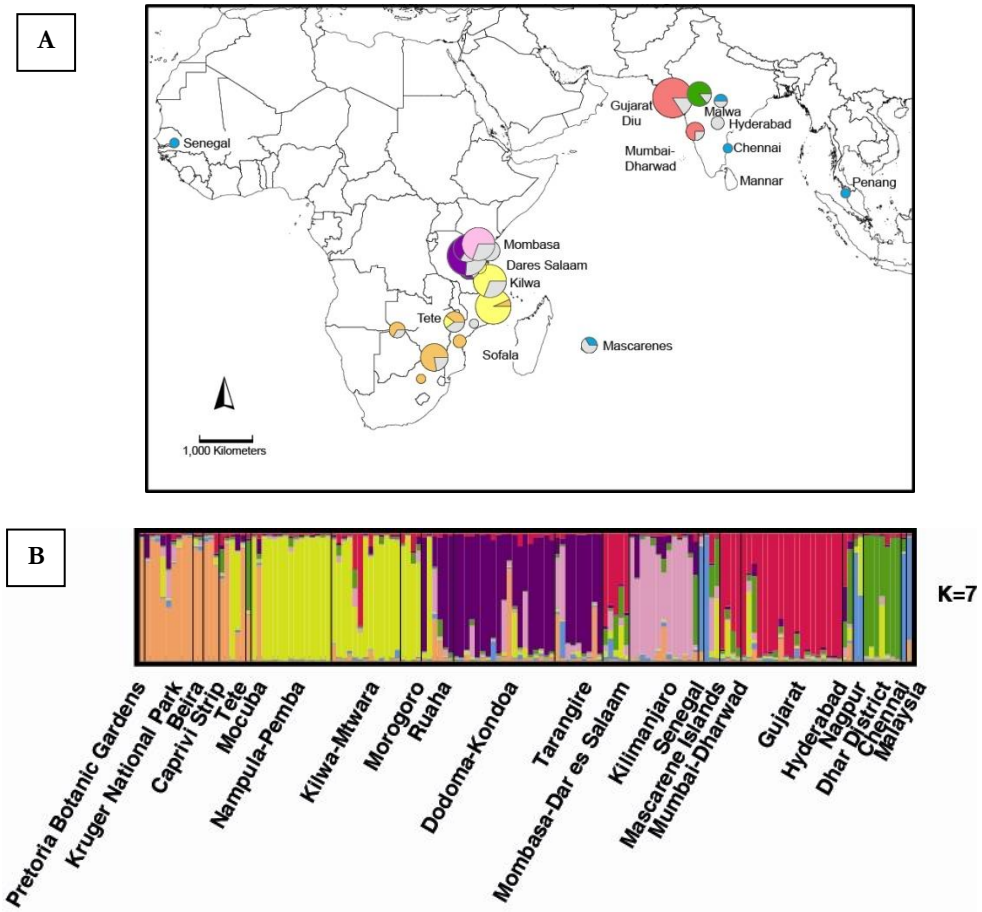


Figure 6: **A.** Proportion of *Adansonia digitata* samples within populations belonging to one of seven genetic clusters (K=7) inferred through STRUCTURE analysis, mapped by major localities. The sizes of the pie charts are proportional to the number of samples. **B**: Proportional assignment of *Adansonia digitata* samples to seven genetic clusters (K=7) identified by STRUCTURE analysis. Bell *et al.* 2014.

BAOBAB GENETICS AND AFRICAN MIGRATIONS TO SOUTH ASIA

The findings from the genetic analyses of baobabs provide a useful frame of reference for tracing pathways of movements of people from different regions of Africa to South Asia and other parts of the Indian Ocean world. Based on the available historical information, the movement of Africans in this region is best understood in relation to four broad periods of dominant oceanic trade networks: before the rise of Islam (pre-8th century CE), Islamic dominance (10th to 16th centuries CE); Portuguese dominance (16th and 17th centuries CE), and the combined influence of Dutch, French, and English colonialisms (18th to mid-20th centuries CE). Although there is limited written evidence available for the pre-Islamic period, Hourani mentions the active role of people from the land of Punt (roughly between present-day Ethiopia and Somalia) in the sea trade between ancient Egypt and India extending back to the second millennium BCE.[33] When Greek traders entered the Indian Ocean via Egypt and the Red Sea

[33] Hourani 1995, p. 7

during the 3rd century BCE, they encountered merchants from India, Africa, Arabia, and Persia mingling in the markets of Socotra, an island off the Horn of Africa.[34] The rise of Roman power in the Mediterranean during the 1st century BCE brought its traders in contact with merchants from Adulis in the Abyssinian kingdom of Axum (in present-day Ethiopia) and ports along the Somali coast to Socotra before they set course for Indian ports.[35] The *Periplus of the Erythraean Sea*, written by a Greek merchant during the 1st century CE,[36] describes a busy maritime world of coastal and oceanic trade between small and large ports in northeast and eastern Africa as far down as Rhapta (a port on the Rufiji River delta in present-day Tanzania, near Kilwa), Arabia, Gujarat and peninsular India, and island Southeast Asia, in which African traders from present-day Ethiopia, Eritrea, Sudan, and Somalia were actively involved.[37]

From the 3rd to the 5th centuries CE, the Sassanid rulers of Persia encouraged seaborne trade among their native merchants and extended commerce with both the kingdoms of Axum and Zang (in eastern Somalia). During this period, Chinese traders met their counterparts from Persia, India, Syria and East Africa in the ports of Ceylon (present-day Sri Lanka) to transact business.[38] Hourani comments that although it is not common to regard Abyssinians as a seafaring people, Cosmas Indicopleustes and other sources reveal the presence of merchants and sailors from Adulis in Sri Lankan ports and their prominence in the Indian Ocean trade during the 6th century CE. The emergence of Islam in the 7th century brought early followers from Arabia in close relations with Abyssinians and, as Hourani observes, they relied on these connections to enter the world of oceanic navigation and long-distance seafaring in the western Indian Ocean.[39] Alpers notes that while there is no doubt that there was a diaspora of African sailors and merchants around the Indian Ocean during the pre-Islamic period, it is unlikely they would have established a sizeable presence in any of these regions due to the transient nature of their occupations or by their assimilation if they settled in the ports and married locally.[40]

Given this deep history of involvement of people from northeast and eastern Africa in the Indian Ocean trade, the evidence of private alleles in the Indian baobab clusters points to the strong possibility that they represent introductions from northeast Africa and that these introductions could have occurred well beyond a few thousand years. The pre-Islamic introduction of baobabs is also compatible with archaeobotanical evidence of the arrival of African food crops in South Asia roughly 4000 years ago. Baobabs are distributed across the Sudanian-Sahelian biogeographical transition zone where sorghum, pearl and finger millets, cowpea, hyacinth bean, and the tamarind tree originated.[41] It is quite probable that mariners from this biogeographical zone, which includes much of northeast Africa, were familiar with the valuable qualities of the baobab and benefits of its fruit, and would have carried it with them on their sea journeys to India.

The expanding influence of Islam on the Indian Ocean trade between the 10th and 16th centuries CE led to an extension of commercial networks inland and along the East African coast, bringing greater integration between these regional trading circuits and ports in western

[34] *Ibid.*, p. 22
[35] *Ibid.*, p. 29
[36] Schoff 1912
[37] Datoo 1970; Chami 2007
[38] Hourani 1995, p. 38
[39] *Ibid.*, pp. 42-46
[40] Alpers 2004, p. 27-28
[41] See footnotes 4 and 5 for references.

and central India.[42] The Arab conquest of Kordofan and Nubia (in present-day Sudan) during the 14th century CE drew merchants and slaves from these inland regions into the Indian Ocean trade. Direct voyages across the ocean from ports such as Mombasa, Malindi, Zanzibar and Kilwa,[43] brought many more African mariners from the Swahili coast to the ports and coastal towns in Gujarat and the west coast of peninsular India. The increasing interaction between these regions was also reflected in the rising trend among Muslim sultanates in the subcontinent for maintaining African troops in their armies. Although many of the African soldiers recruited by Muslim sultanates in northern India and Gujarat during the early medieval era (13th to15th centuries CE) were from Abyssinia and the Sudan,[44] the growth in direct voyaging between the Swahili coast and peninsular India over the 16th and 17th centuries CE allowed inland sultanates of Malwa and the Deccan to obtain enslaved Africans from the hinterlands of Kilwa, Zanzibar and Mombasa for their armies.[45] The strong presence of genetic clusters between Mombasa (Kenya) and Dar es Salaam (Tanzania) in the western and central Indian clusters (see Figure 6B) is likely an expression of this historical trend. The overlap and admixtures in the genetic structure of the East African, western and central Indian clusters are the likely reflection of the movements of African migrants between these places.

The entrance of the Portuguese into the Indian Ocean in the late 15th century CE and their assertion of control over the seaborne trade led to a further extension of direct connections between East African and Indian ports. The opening of a passage via the Cape of Good Hope to the Indian Ocean and Portuguese control of major East African ports such as Sofala, Kilwa, and Mombasa meant that more of southern and southeastern Africa was being drawn into the oceanic trading circuits. With Goa on the western coast of India secured as the base for the Estado da India, the Portuguese attempted to channel as much of the Indian Ocean trade through the ports and territories under their control. Sofala and Ilha do Moçambique in present-day Mozambique which had previously been connected to Swahili coastal trading circuits via Kilwa were now directly connected to Goa and other key ports along the Konkan and Gujarat coast such as Chaul, Dabhol, and Bombay, Bassein, Daman, and Diu, as well as Colombo (Sri Lanka) and Saõ Tomé (near present-day Chennai) and Malacca (Malaysia).[46] The establishment and protection of forts and factories and consolidation of the Estado da India through the Viceroyalty of Goa over the course of the 16th and 17th centuries required substantial labour, and a significant number of enslaved African men and women captured from inland Mozambique, Malawi, and southern Tanzania were brought to work in these places.[47] The establishment of colonial sugar plantations by the French in the Mascarene Islands (Mauritius and Réunion) during the 18th and 19th centuries led to an increasing supply of African slaves from southern Tanzania and regions of inland Mozambique which were under Portuguese control.[48] The presence of genetic clusters from the areas between Kilwa and Beira in the Indian and Mascarene samples (see Fig. 6B) indicates that the slaves may have carried baobab fruit on their passage to these destinations.

The admixture of genetic clusters in the baobab samples from Tete, Kilwa, and Dar es Salaam (Fig. 6B) reflects the importance of these places in the East African trade corridors and slaving networks. Tete, a town in Mozambique located on the banks of the Zambezi River, was

[42] This is evidenced in Ibn Batúta's (1929) accounts of his travels along the East African coast and India in the early 14th century. He journeyed to Mogadishu, Mombasa, and Kilwa on his way to the Indian subcontinent. See Ibn Batúta 1929, pp. 110-113.
[43] Tibbetts 1971
[44] Sadiq Ali 1996; Pankhurst 2003; Obeng 2007
[45] Sheriff 2005
[46] Chaudhuri 1985; de Silva Jayasuriya 2007
[47] Cardoso 2010
[48] Alpers 2005; Cardoso 2010

the farthest inland trading centre that could be reached by boat from the coast; beyond Tete, the rapids of the Zambezi made it impossible for larger boats to navigate upriver. Tete thus functioned as the centre for trading slaves captured from surrounding inland regions and sold to Portuguese and Swahili agents.[49] The slaves were then moved along the river by land and boat to Quelimane, Cabo Delgado, Ilha do Moçambique and Kilwa where they were put on ships and transported to destinations across the Indian and Atlantic Oceans.[50] The evidence of genetic admixture of southern and east African clusters in baobab samples from these trading centres serves as a manifestation of the slave journeys and their diaspora.

Finally, the genetic cluster formed by baobab individuals from West Africa, Mascarene Islands, Chennai and Malaysia can be explained by the history of Dutch, English, and French colonial activities in the Indian Ocean region. Dutch, English, and French mercantile interests followed the Portuguese in using the Atlantic route rounding the Cape to the Indian Ocean and competed with each other to gain control over different segments of the Indian Ocean trade. The 18th and 19th centuries were a critical period in which each of these European interests sought to establish colonial control over territories and derive revenue from monopolising profitable commerce.[51] The French established sugar plantations in the Mascarene Islands that relied on slave labour obtained in large part from Mozambique, the Comoros and Madagascar, and also from Senegal and Guinea in West Africa during the 18th and early 19th centuries.[52] The British East India Company recruited slaves from the Gold Coast and Guinea in West Africa to serve as ship crew, mercenaries and labour for their forts and factories on the southeast coast of India (including present-day Chennai) and Penang.[53] The Dutch VOC, and later the colonial government, also recruited soldiers from West Africa for their trading forts and colonial settlements in Colombo and the East Indies.[54] While some of the baobabs in these colonies, particularly those in botanical gardens, were planted by botanists, it is possible that these migrants, too, may have been among the agents that carried the baobab fruit on their voyage from West Africa to these places.

CULTURAL SYMBOLISM OF AFRICAN BAOBABS IN INDIA

The surveys of baobabs in India have often sought evidence of their history and introduction to the subcontinent by examining the uses and cultural symbolism associated with the tree.[55] However, the ethnographic information they provide to support the possible introduction of the baobab by Arab traders is weak; in most cases, the relation between the two is assumed, as in the case of Baden-Powell's statement, "The tree was introduced to India from tropical Africa by Arab traders",[56] or in the implicit equation of 'Muslim' with 'Arab' in the context of the Indian Ocean trade.[57] There is little evidence by way of culinary, medicinal, or artisanal uses or names for baobabs in India that can be directly attributed to Arabic traditions. Most ethno-medicinal

[49] Livingstone 1861; Alpers 2005

[50] In addition to those shipped to the Mascarenes, Madagascar and Portuguese enclaves in the Indian subcontinent, a large number of slaves from Mozambique were also transported to South Africa, Brazil, and various parts of the Americas and Caribbean. See Alpers 2005 and Allen 2010 for estimates of slave exports from Mozambique. Slaves from southern and central Tanzania were also transported to work on clove plantations in Zanzibar and date palm (*Phoenix sylvestris*) plantations in Oman. See Sheriff 2005 for details.

[51] Alpers 2014

[52] Allen 2010

[53] Ewald 2000; de Silva Jayasuriya 2009

[54] Vink 2003; de Silva Jayasuriya 2007; van Kessel 2007

[55] Maheshwari1971; Armstrong 1979

[56] Quoted in Armstrong 1979, p. 12

[57] Maheshwari 1971; Armstrong 1979, Vandercone *et al.* 2004

studies of the properties and uses of baobab fruit in areas where the species occur in India generally refer to their application for digestive disorders that would be commonly treated with the fruit of the tamarind tree, which is far more widespread and extensively used for food and medicinal purposes in the subcontinent.[58] Indeed, the majority of the names given to the baobab in the languages of the regions where it occurs relate it to the tamarind (with the suffix *amli or imli* in northern Indian languages, and *puli* in southern Indian languages, *e.g.*, *gorakh imli, chor amli, bondam puli*, etc.), followed by names that allude to its voluminous girth (*e.g.*, elephant-tree, elephant-tamarind tree, fat-tamarind tree) and, in several places, to its foreign origins (with the prefix *vilayati* [foreign land in Hindi/Urdu], *seema* or *seemai* [frontier in southern Indian languages]).[59] None of the Arabic vernacular names identified by Wickens and Lowe correspond with, or appear to be proto-forms for, any of the Indian vernacular names.[60]

The only source that acknowledges the possibility of Africans introducing baobabs to India is Sir George Birdwood, an eminent Anglo-Indian physician and naturalist who worked on compiling a catalogue of economic vegetable products of Bombay Presidency. He described the baobab as "a fantastic-looking tree with immense elephantine stem and small twisted branches laden in the rains with large white flowers; found all along the coast of Western India, but whether introduced by the Mahommedans from Africa, or by ocean-currents wafting its large light fruit, full of seed, across from shore to shore is a nice speculation."[61] Burton-Page takes up this observation and discusses the possibility that *Habshis* (literally, Abyssinians) may have introduced the tree to India. He notes that while in early Islam, *Habshi* referred to slaves of Abyssinian origin, in India it "is applied to African slaves of other races, Bantu and Somali, imported from the Horn of Africa."[62] Observing that *Habshis* were settled in considerable numbers in Malwa, Khandesh, the Deccan and western ports of India where the baobab was to be found, he points out that the tree was not present in many other *Habshi*-colonised areas of central and eastern India. He comments,

> If, as seems possible, there is a connection between the baobab and the Habshis, the African tree and the African people, a powerful reason for the tree's introduction is still wanting. A slave people would hardly introduce it as a specimen to remind them of home; the craving for a "refreshing sherbet" is hardly convincing, as India is well provided with other natural resources for such purposes…. It does seem possible, however, that its importation for a cult purpose might have been permitted. What such a cult purpose might have been does not seem possible to say; colleagues… have not yet been able to throw any light on possible baobab cults in east Africa or along the coast.[63]

Burton-Page's observations are important on several counts, first of which is the recognition that the term *Habshi* has been used more generally in Indian (particularly northern Indian) vernaculars to refer to a wider range of East Africans, rather than solely to migrants from Ethiopia. Second, while he questions the idea of African slaves craving 'refreshing sherbet', he seems to overlook the nutritive qualities of the baobab pith and seeds and the lightness and long-

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[58] Wickens and Lowe 2008 note that the attributes and uses of baobab fruit mentioned in recent Indian literature need to be viewed with caution, because they are likely to have drawn on information from African sources regarding the numerous remedies and treatments for disorders for which the baobab is used across the continent. See p.86.

[59] See Wickens and Lowe 2008, Appendix I-Vernacular names, 1.3 Indian names, pp. 352-355.

[60] *Ibid.* pp. 351-352; the Egyptian Arabic name *ba-hobab* and its variants listed under Indian Arabic are uncommon and not found in Indian languages. The name 'baobab' is mainly used by Indian English speakers.

[61] Note to Henry Yule, quoted in Yule and Burnell 1903, p. 577. The glossary entry for the baobab is under the heading 'monkey-bread' tree. This name is used in the West Indies (see Rashford 1987), but not in India.

[62] Burton-Page 1969, p. 333. The Arabic name for Abyssinia is *Habash*, hence the term *habashi* or *habshi* for Abyssinian.

[63] Burton Page, *ibid.* p. 334.

term viability of the fruit, all of which would have made it worthwhile for African mariners, migrants, and slaves to carry them on their voyages across the Indian Ocean. Finally, his observation that the baobabs might be associated with some kind of cults in East Africa is an aspect that has never been investigated so far only because Arab agency, rather than African, is assumed to have introduced baobabs to the Indian subcontinent.

As our genetic analysis of baobabs shows, there were multiple introductions of the plant to the Indian subcontinent, with strong representation of genetic clusters from the Swahili coast extending from Mombasa to Dar es Salaam and Kilwa to Sofala. African migrants arriving from these areas from the 13th century onwards were likely to be predominantly Muslim (or if enslaved, were likely to have converted to Islam before being freed) and would have assimilated into the existing African and Indian Muslim communities in western and central India. These resident Africans were most likely a cosmopolitan community made up of people whose origins lay in Abyssinia, Sudan, Egypt, Somalia and regions of East Africa that were referred to as *Zanj*.[64] The generic appellation of *Habshi* for African Indians was gradually accompanied by, or, as in most parts of western India, replaced by the name *Sidi*, which referred more specifically to Africans of Bantu origin.[65] The patron saint of the Sidis of Gujarat, Bava Gor,[66] is said to have been an African Muslim merchant who came to southern Gujarat in the 14th century to extend the trade in agate beads to Africa.[67] Agate was mined near Ratanpur, a small settlement located inland from the busy port of Bharuch, and was exported through a network of traders along the western coast to Kutch and Sind (in present-day Pakistan).[68] Some sources link the saint's roots to Abyssinia, calling him Bava Gor *Habash*, while others trace his origins to Nubia and refer to him as Sheedi Mubarak *Nobi* (see Figure 7).[69] Bava Gor is said to have vanquished some female demons that were terrorising the populace in the vicinity of the agate mountain with the help of his sister, Mai Misra, and brother, Bava Habash.[70] All three are venerated as holy personages by Sidi Muslim communities in western India. The main shrine for Bava Gor is in Ratanpur, and there are small shrines from Sind in Pakistan through Kutch, Kathiawar, and Gujarat to Maharashtra and northern Karnataka, marking various sites where the three are said to have visited, preached or stayed.[71]

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[64] *Zanj* in Arabic and *Zang* or *Zand*, in Persian. Some groups within these communities retain names that refer to their ancestral origins, such as *Zangbari* (from Zanzibar), *Makuwa* (from the Makua tribe in Mozambique), *Sagara* (the Sagara tribe in Tanzania), *Nobi or Nubi* (from Nubia in Sudan) and *Habash or Abbasi* (from Ethiopia); see Sheriff 2005, Catlin-Jairazbhoy and Alpers 2004.

[65] Campbell 1883; the name is usually spelled Sidi (and occasionally as Sheedi) in Gujarat, but pronounced more like Siddi. African Indians are commonly referred to as Shidi in Sind, Pakistan, and as Siddi in northern Karnataka and Goa. Although the majority of Sidis are Muslims, particularly in Gujarat and Maharashtra, there are also Hindu and Christian Siddi communities in northern Karnataka; see Catlin-Jairazbhoy and Alpers 2004; Camara 2004; Karmwar 2010.

[66] *Bava/baba* is an honorific term which can mean 'father', 'teacher', 'saint'. He is also referred to as Gori Pir. *Pir* is a term for a Muslim 'holy man' or saint. See Francis 1986; Basu 2004.

[67] Francis 1986; Kenoyer and Bhan 2004

[68] The English referred to Bharuch as Broach; the port was called Barygaza in the *Periplus of the Erythraean Sea*.

[69] Francis 1986; one of the Bava Gor shrines we visited during fieldwork in Ahmedabad, Gujarat referred to him as '*Hazrat Sheedi Mubarak Nobi Bava Gor*'. Given the Arab conquest of the Nubian lowlands in the 14th century and extension of Islamic trading networks between inland Africa and India, it is likely that Bava Gor was from Nubia in Sudan, rather than Abyssinia.

[70] *Mai* means 'mother', and *Misr* is the Indian term for Egypt (Arabic *Al-Masr*). Since Mai Misra's name indicates she was from Egypt and Bava Habash's name points to origins in Abyssinia, Bava Gor was most probably from Nubia.

[71] Alpers 2004; Kenoyer and Bhan 2004. These small shrines are often called *chila* (base) or *takia* (seat).



Figure 7: Shrine for Bava Gor in Ahmedabad, Gujarat
Source: H. Rangan

An interesting feature that we encountered during fieldwork in Gujarat was the presence of such shrines built at the base of baobab trees in settlements that had sizeable Sidi Muslim communities or which had once been predominantly African-Indian. As we mentioned earlier, baobabs are venerated by many African communities as symbols and dwelling places for ancestors and magical spirits. During our fieldwork in northern Mozambique,[72] we came across baobab trees with small shrines built underneath for the ancestors of families living in their vicinity (see Figure 8). In what seems to be a similar tradition, we found baobabs that had shrines commemorating the Sidi saints. One baobab in Ghogha village near the city of Bhavnagar had a small monument called *Mai Misra no takio* or Mai Misra's seat (see Figure 9), while another baobab at Navabandar village on the mainland across from Diu island had a small shrine built around it called *Bava Gor na chila*, or the place where Bava Gor is said to have given a sermon. Other coastal villages that were once predominantly Sidi Muslim but are now a mix of Hindu and Muslim communities had Hindu shrines at the base of baobab trees. Jafrabad, a town in Amreli district, had a baobab shrine dedicated to Khodiyar, a female deity venerated by the largely Hindu Koli (fishermen) community living in its vicinity. In some instances in coastal Gujarat, the baobab tree itself has been deified as *Rukhda dada* and worshipped by local Hindu communities (see Figure 10). In these areas, the baobab often goes by the name of *rukhda* or *rukhdo*, where the word *rukh* is a modification of the Sanskrit word *vriksh*, or tree, and *dada* means (paternal) 'grandfather'. *Rukhda dada* thus stands for 'grandfather tree', and could represent a kind of Hindu syncretisation of ancestor worship associated with baobabs that we encountered in our fieldwork in northern Mozambique.[73] We found this kind of syncretisation in northern

[72] Fieldwork in Mozambique and Tanzania was carried out by H. Rangan and C. Kull; fieldwork in India was carried out by H. Rangan.
[73] It is fairly common to find shrines built underneath trees or for particular tree species to the object of worship in India. The *pipal* tree (*Ficus religiosa*) is associated with a great deal of religious symbolism as well as magical, wish-

Karnataka where, according to local folklore, the large baobabs in Savanur town near Dharwad are believed to have been brought from Africa many thousands of years ago by the Hindu god, Krishna.[74]



Figure 8: Baobab ancestor shrine, Anchilo village, Nampula Province, Mozambique
Source: C. Kull



Figure 9: *Mai Misra no takio*, Ghogha Village
Source: H. Rangan

In some places, similar to the healing rituals associated with baobabs in Africa,[75] both Muslim and Hindu communities perform rituals at baobab trees for relief from illness, healing of limbs, and wish fulfilment; we found one such example in the city of Junagadh, where people

fulfilling and healing properties for Hindus, Buddhists, and followers of various animist traditions. The banyan tree (*Ficus bengalensis*) is also regarded in India as a grand old tree that harbours ghosts and ancestor spirits that can be appealed to for fulfilling wishes. It can be argued that the baobab, being similarly grand in size and having a charismatic dominating presence in the landscape, is treated by communities in the same way as these *Ficus* species, and that such rituals do not represent a uniquely African tradition. While accepting this argument in principle for Hindu shrines, we would point out that it is not common to find *Muslim* shrines at the base of either *pipal* or *banyan* trees in this region.

[74] Savanur and Dharwad in northern Karnataka lie in the hinterland of Goa, in areas outside the territories under Portuguese control. It is likely that some African slaves brought over by the Portuguese to Goa may have escaped to settle in these areas. See Camara 2004. The baobab trees in Savanur have a protective fence built around them by a Hindu ascetic who has appointed himself as their guardian. There is board providing information about the trees in Kannada and Hindi, which contains this statement, roughly translated in English as: "Old people say and believe that these trees were brought by Lord Krishna to India from Africa".

[75] See Wickens and Lowe 2008, for numerous examples of rituals and folklore associated with baobabs in Africa.

suffering injury in their limbs bring small wooden likenesses of the ailing body-part to tie on the trunk of the baobab tree (see Figure 11). Another similarity, though somewhat weak, between African rituals and those found in coastal Gujarat is the association of the baobab with the health of children. In northern Mozambique, children are passed through the holes in baobab trunks to make them strong and protect them from various ailments, including coughs and respiratory problems. We found a similar kind of ritual associated with a baobab located in an erstwhile Sidi Muslim neighbourhood in the city of Bhuj in Gujarat, where infants and small children suffering from respiratory problems are taken to the tree by their parents to pray for cures.



Figure 10: Shrine for *Rukhda dada* (baobab), Jafrabad, Gujarat
Source: H. Rangan



Figure 11: Baobab as healer and wish-fulfiller, Junagadh, Gujarat
Source: H. Rangan

In addition to these cultural connections, there are other linguistic clues associated with baobabs that point to possible pathways of migrants from eastern Africa to India. During fieldwork in Gujarat, we found our way to a very large baobab in a village that had once been a predominantly African-Indian settlement. The name of the village was Mitiala, which sounded very similar to *mitali*, a word for the baobab tree in the Makua language that we noted down during our fieldwork in northern Mozambique. Among the diverse vernacular names for the baobab in northern Indian languages, the words '*gor*' and '*gorakh*' are most common, followed by the suffix reference to either tamarind (*amli*) or tree (*chinch*), as in *gor aml, gor-amli, gorakh amli, gorak-chinch*, and so on.[76] Burton-Page (1969) pondered over the use of the word *gorakh* for the baobab and could find no reason why this name was associated with the tree.[77] However, it is interesting to note that when we visited a baobab shrine at the coastal settlement of Gorakshmadhi in Junagadh district of Gujarat, we were told that the place was named after a Hindu ascetic called Gorakhnath who had planted the baobab tree at the site. The correspondence of the name *Gor* for the Muslim saint, and *Gorakh* for the Hindu ascetic (the suffix -*nath* is an honorific term in Sanskrit for 'lord') with the vernacular names for baobab was particularly striking, and pointed to the kind of syncretic evolution of folk beliefs and traditions that arise from repeated and intensive interactions between different communities. Finally, another linguistic connection that is worth investigating is the close correspondence between the western Indian vernacular name *gorakh* and '*kwora*', which is the name for baobab in the Nubian languages of Delami and Umm Brembeita of Eastern Sudan.[78] The closeness of the two word-forms for baobabs may well indicate the movements and connections between Nubia and western India in historic times and possibly even prove to be the source for early introductions of the tree to the subcontinent. Comparison of genetic structure of old baobab trees from Nubia and India may help explain the presence of private alleles in the Indian populations and offer a better sense of when the tree may have first arrived in the subcontinent.

CONCLUSION

By combining genetic analysis with historical and ethnographic data, our study shows that the oft-repeated assertion that 'Arab traders' introduced the baobab to South Asia is both incomplete and misleading. It draws attention to the deep and complex and still poorly explored histories of African migration, trade and influence on landscapes and cultures of South Asia. Most importantly, it challenges the implicit and persistent civilizational conceit that African agency in the Indian Ocean, if it existed at all, was always as enslaved subjects under the direction of 'Arabs', 'Indians', 'Chinese' or 'European' superiors. The presence of baobabs in South Asia provides the clues to uncover the elusive traces of African agency and force a fundamental rethinking of South Asian and Indian Ocean social and environmental history.

Our study of baobabs in the Indian subcontinent also raises a number of questions that still need to be explored to gain a better understanding of the history and pathways of plant exchanges between Africa and other parts of South and Southeast Asia. For instance, as Armstrong observes, many authors have noted the close ecological association between tamarinds and baobabs in Africa.[79] Given that the origins of the tamarind have been determined

[76] See Wickens and Lowe 2008, Appendix I-Vernacular names, 1.3.1 Indo-European phylum, Indo Iranian, Indo Aryan, pp. 352-353.
[77] Burton-Page (1969), p. 332.
[78] See Wickens and Lowe 2008, Appendix I-Vernacular names, 1.2.2 Nilo-Saharan phylum, Eastern Sudanic, Eastern, Nubian, p. 347, and compare with 1.3.1 Indo-European phylum, Indo Iranian, Indo Aryan, pp. 352-353.
[79] Armstrong 1979, p. 17.

in Sudan and their presence in India as more ancient than the food crops that arrived some four thousand years ago, could it be possible that early migrants from eastern Africa may have carried the fruit of both trees with them to the Indian subcontinent? If so, why is the distribution of the baobab in South Asia so limited compared to the tamarind, to the extent that the latter tree serves as the reference for vernacular names for the baobab? These questions and many more open up fertile spaces for developing innovative interdisciplinary collaborations and methods for reconstructing the environmental history of plant dispersals and exchanges between Africa and other regions of the Indian Ocean World.

Finally, we think it is likely that baobabs had a greater presence in towns and urban settlements of western and central India where African migrants settled, but the increasing density of settlement along with grazing has prevented the recruitment of younger populations in these places. In several cities and towns of western India, baobab trees have been cut down to make way for urban development. The old trees that stand today may continue to survive because of the charisma of their sheer size or their association with religious shrines or healing properties. Nevertheless, as long as they are present in the landscape, the baobabs will stand as magnificent living reminders of the African diaspora and its role in shaping the environmental and social history of South Asia.

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