



Whole-genome sequencing reveals population structure and demographic history of Nigerian indigenous pigs



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INTRODUCTION

- ✓ Origin of African indigenous pig is highly controversial (Amills *et al.*, 2013)
- ✓ Its population structure and evolutionary history is essential and fundamental for its genetic diversity
- ✓ Previous genetic analyses of West African pigs revealed possibility of western ancestry (Ramirez *et al.*, 2009; Adeola & Omitogun, 2012)
- ✓ Further studies based on mitochondrial DNA, Y-chromosome and the melanocortin receptor 1 showed European and East/Southeast Asian ancestry for Nigerian indigenous pigs (NIP) (Adeola *et al.* 2017)
- ✓ To determine the population structure and demographic history of NIP and its relationship with European and Asian pigs, we performed whole genome analysis on 261 global wild and domestic pigs together with NIP

METHODS

Collection of 51 NIP & background data

Genomic data

Estimate genetic diversity

210 wild & domestic pigs from Far East, Near East & Europe

Analyses of population structure & relatedness

Demographic history



Fig 1: 51 NIP (three sub populations) + 210 wild & domestic pigs from Far East, Near East & Europe

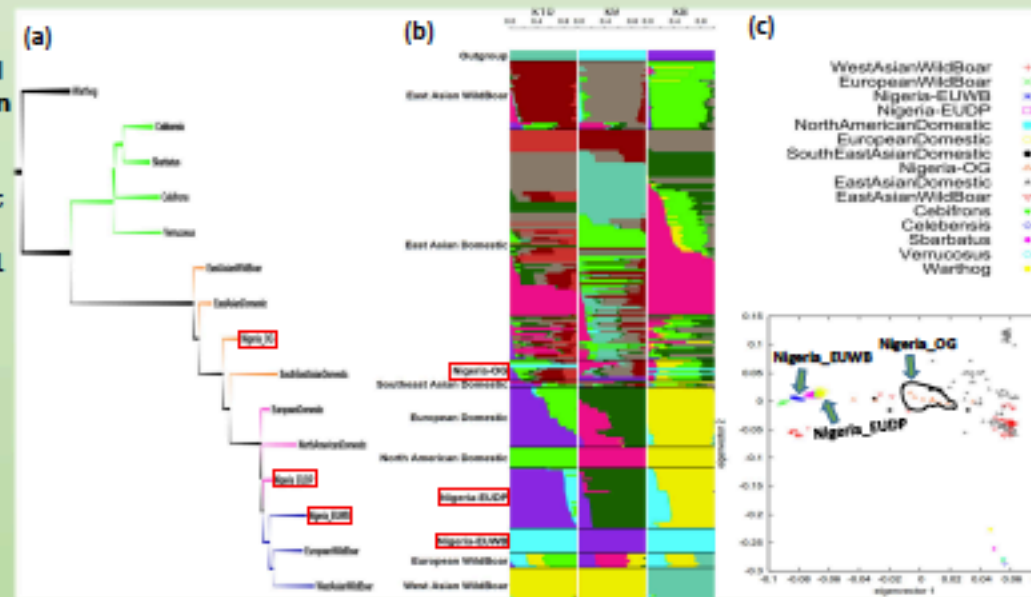


Fig 2: Phylogenetic relationships (a) Phylogenetic tree (b) Admixture (c) PCA

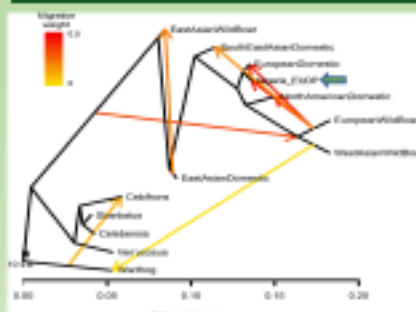


Fig 3: TreeMix showing Gene flow

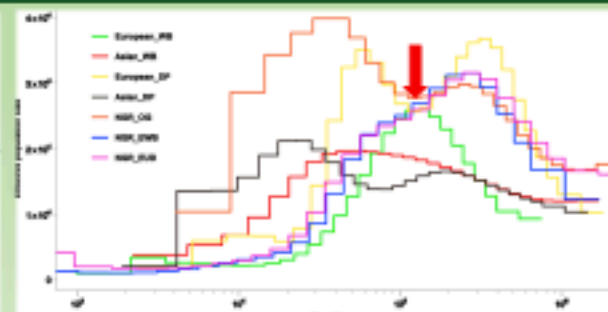


Fig 4: Demographic History of three NIP subpopulations

RESULTS

- ✓ NIPs grouped into three different sub populations: (a) Nigeria_EUWB (NIP clustering with European wild boar) (b) Nigeria_EUDP (NIP clustering with European domestic pigs) (c) Nigeria_OG (NIP clustering with East Asian wild boar & domestic pigs) (Fig. 1)
- ✓ Majority of NIPs clustered with wild and domestic pigs from Europe, while some individuals clustered with Chinese wild boars and domestic pigs (Fig. 2).
- ✓ Further, TreeMix analysis showed similar patterns without migrations. However, with migration we detected strong gene flow from European wild boar into NIP (Fig. 3)
- ✓ Multiple Sequentially Markovian Coalescent (MSMC) of the three NIP subpopulations showed that Nigerian_OG diverged from Nigerian Nigeria_EUDP & Nigeria_EUWB around 200K years ago (Fig. 4).

CONCLUSION/ FURTHER STUDIES

- ✓ NIP can be grouped into three subpopulations with strong gene flow between Nigeria_EUDP & European Wildboar;
- ✓ Nigeria_OG is possibly from another *sus* specie, incorporation of other ancient DNA will help to unravel its origin
- ✓ Future studies on detection of candidate genes for adaptation to African conditions are ongoing to aid in understanding the evolution of African pigs.

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