

African Swine Fever: virus isolates

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Comparison of genomes of African swine fever virus isolates from Cameroon, other African countries and Europe

Determination of genetic relationship between ASF virus isolates from Cameroon, other African countries and Europe by restriction enzyme site mapping of their genomes.

Introduction

Materials and methods

Results

Restriction enzyme analysis of the genomes of European and Cameroon ASF virus isolates

Comparison of BamHI restriction enzyme site maps of genomes of European and Cameroon isolates of ASFV

Restriction enzyme analysis of the genomes of ASFV isolates from Cameroon and other African countries

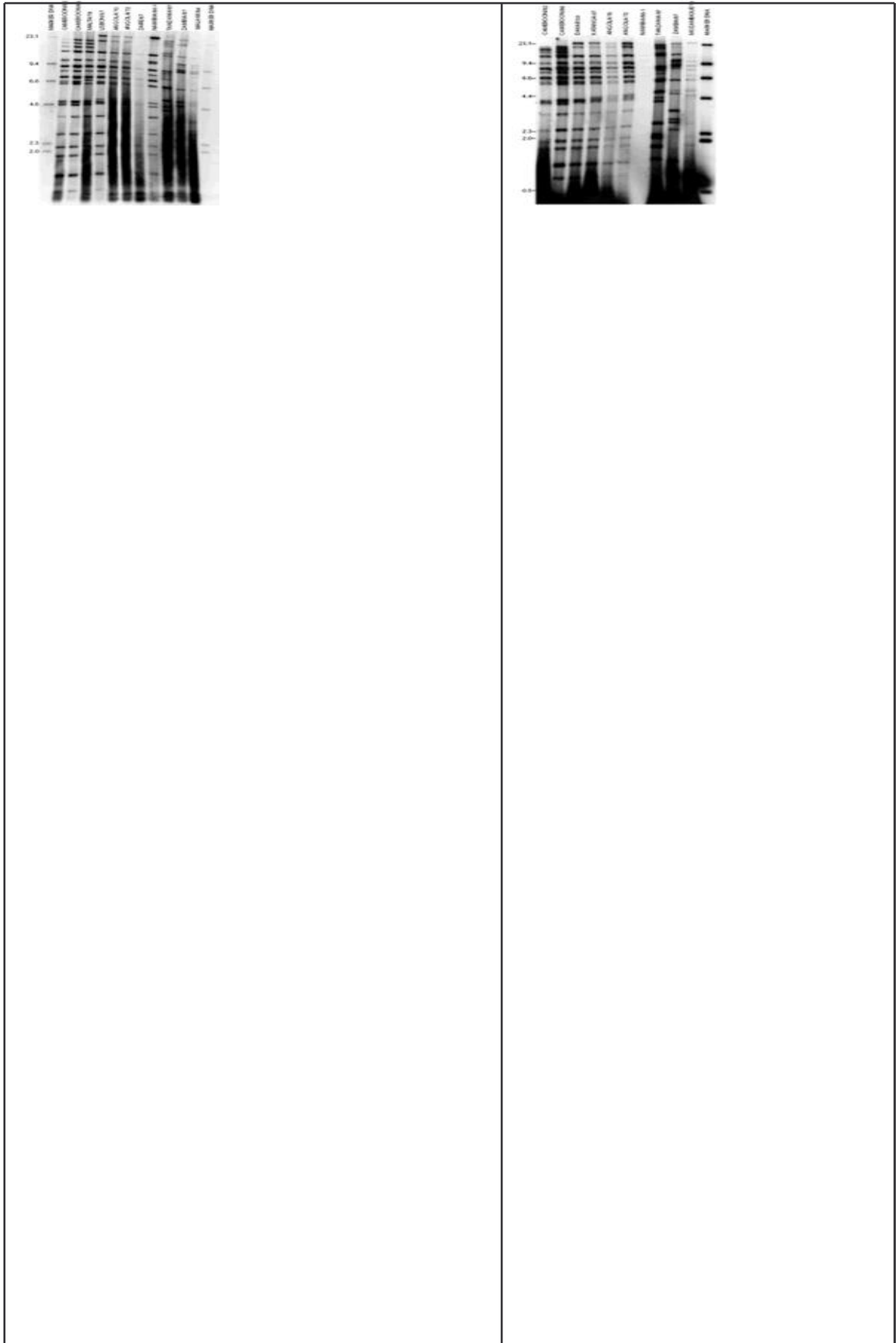


Figure 5: Restriction enzyme analysis of genomes of African swine fever virus isolates from Europe, Cameroon and other African countries with the restriction enzyme BamHI. The figure shows positions and sizes of the molecular weight markers in Kbp.

Figure 6: Restriction enzyme analysis of genomes of African swine fever virus isolates from Cameroon and other African countries with the enzyme BamHI. Molecular weight markers are indicated.

Comparison of BamHI restriction enzyme site maps of genomes of Cameroon and African isolates of ASFV

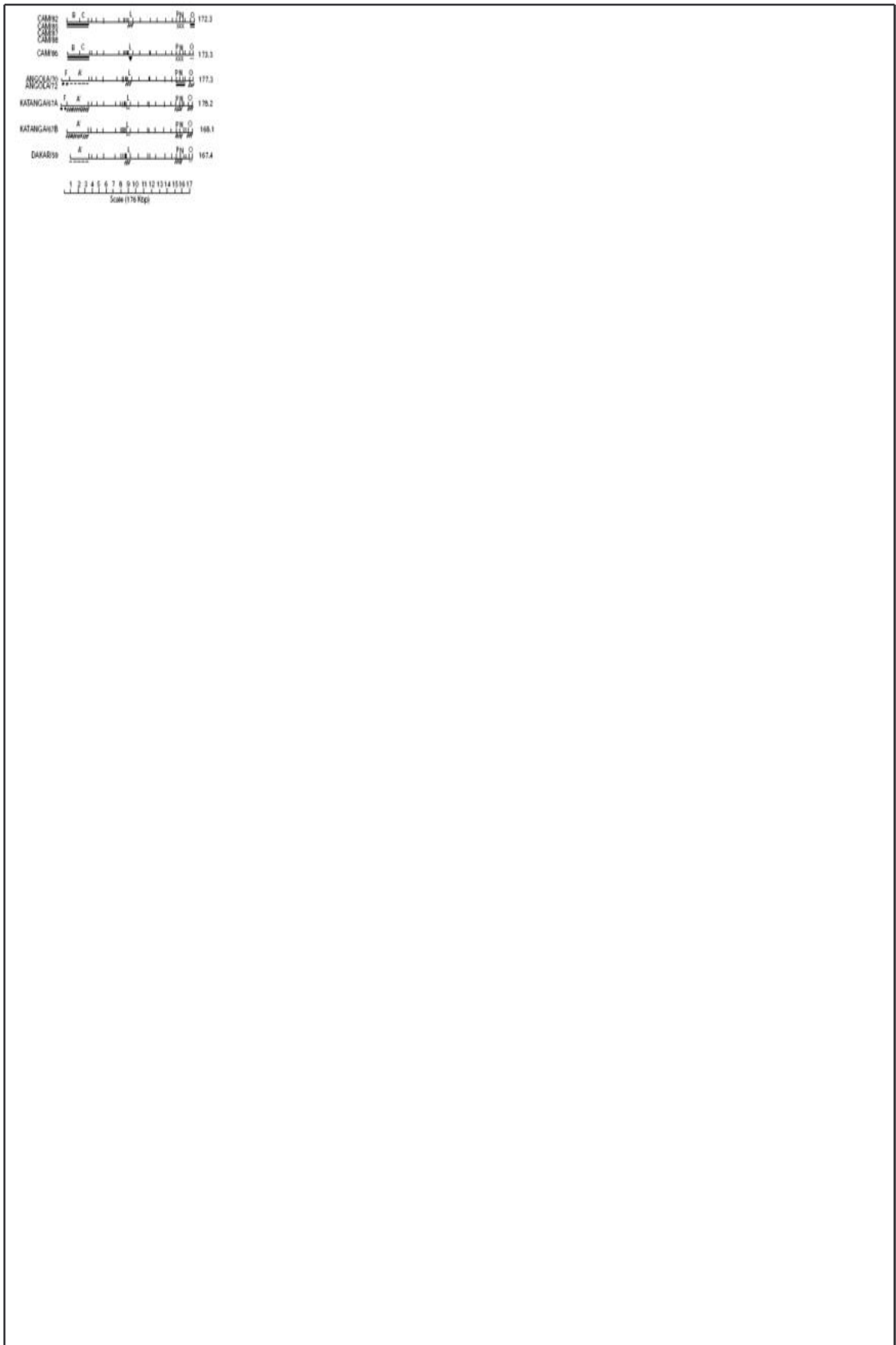


Figure 7: BamHI restriction enzyme site maps of virus genomes of Cameroon, Angola, Katanga/67 and Dakar/59 isolates of the African swine fever virus. The variable regions in each genome are indicated.

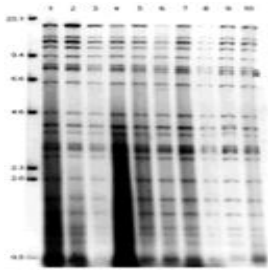


Table II: Sizes of BamHI-L restriction enzyme fragments in genomes of isolates of African swine fever virus from Cameroon and Europe (in Kbp)

Belgum95	6.4	Sardinia78	6.5	Malta78	6.6
CAN82	6.4	Montjo84	6.5	Sardinia82	6.6
CAN85	6.4	CAN86	6.5	Italy83	6.6
CAN87	6.4				
CAN88	6.4				

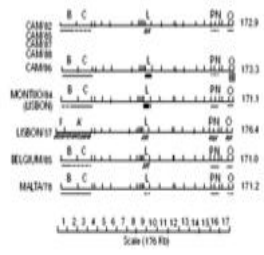


Figure 3: Restriction enzyme analysis of genomes of Cameroon and European isolates of the African swine fever virus with the restriction enzyme XbaI. Lanes 1-10 consist of ASFV isolates mentioned in the same order as in figure 1. Sizes of molecular weight markers in Kbp are indicated.

Figure 4: Comparison of BamHI restriction enzyme site maps of genomes of Cameroon and European isolates of African swine fever virus. Variable regions in the different genomes are indicated. Restriction site maps of the genomes of virus isolates from Europe taken from Wilkinson et al. (unpublished results).

Table III: Distribution of isolates of African swine fever virus from Cameroon and Europe into groups based on the sizes of BamHI-L restriction enzyme fragments

Group 1	Group 2	Group 3
Belgum/85	Montijo/84	Mota/78
CAM/82	Sardinia/78	Sardinia/82
CAM/85		Italy/83
CAM/87	Group 2a	
CAM/88	CAM/86	

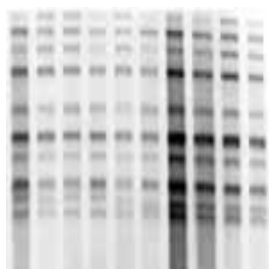
Figure 8: Hybridization of the plasmid DNA clone RK? with BamHI digests of CAM/82, CAM/86, Dakar/59, Katanga/67, Angola/72 and Lisbon/57 isolates of the African swine fever virus. Molecular weight markers in Kbp are indicated.

Discussion

References

1. ALMENDRAL J.M., BLASCO R., LEY V., BELOSO A., TALAVERA A., VINUELA E., 1984. Restriction site map of African swine fever virus DNA. *Virology*, 133: 258-270.
2. ANIMAL HEALTH YEAR BOOK, 1987. Rome, Italy, FAO, Animal Production & Health Division, p. 160.
3. ANNUAL REPORT OF THE INSTITUTE FOR ANIMAL HEALTH, 1994. Berks, UK, Compton, p. 132.
4. ANNUAL REPORT OF THE INSTITUTE FOR ANIMAL HEALTH, 1996. Berks, UK, Compton, p. 140.
5. BAROUDY B.M., VENKATESAN S., MOSS B., 1982. Incomplete basepaired flip-flop terminal loops link the two DNA strands of the vaccinia virus genome into one uninterrupted polymolecule chain. *Cell*, 28: 315-324.
6. BLASCO R., AGUERO M., ALMENDRAL J.M., VINUELA E., 1989. Variable and constant regions in African swine fever virus DNA. *Virology*, 168: 330-338.
7. CARRASCOSA J.L., CARAZO J.M., CARRASCOSA A.L., GARCIA N., SANTISTEBAN A., VINUELA E., 1984. General morphology and capsid fine structure of African swine fever virus particles. *Virology*, 132: 160-172.
8. DIXON L.K., 1988. Molecular cloning and restriction enzyme mapping of an African swine fever virus isolate from Malawi. *J. gen. Virol.*, 69: 1683-1694.
9. DIXON L.K., WILKINSON P.J., 1988. Genetic diversity of African swine fever virus isolates from soft ticks (*Ornithodoros moubata*) inhabiting burrows in Zambia. *J. gen. Virol.*, 69: 2981-2993.
10. EKUE N.F., 1989. PhD Thesis, University of Surrey, Guildford, UK, 231 p.
11. EKUE N.F., WILKINSON P.J., 1990. Absence of *Ornithodoros moubata*, the vector of African swine fever virus, from the main pig producing area of Cameroon. *Trop. Anim. Health Prod.*, 22: 127-131.
12. EKUE N.F., WILKINSON P.J., 1999. Analysis of the genomes of African swine fever virus isolates from Cameroon. *Revue Elev. Méd. vét. Pays trop.*, 52: 195-201.
13. FEINBERG A.P., VOGELSTEIN B., 1983. A technique for radiolabelling DNA restriction

- endonuclease fragments to high specific activity. *Anal. Biochem.*, 132: 6-13.
14. GONZALEZ A., CALVO V., ALMAZAN F., ALMENDRAL J.M., RAMIREZ J.C., DELA VEGA I., BLASCO R., VINUELA E., 1989. Multigene family in African swine fever virus DNA. *Family 360. J. mol. Biol. In: J. Virol.*, 64: 2073-2081.
 15. HARESHAPE J.M., MANU F.D., 1986. The distribution of ticks of the *Ornithodoros moubata* complex (Ixodoidea: Argasidae) in Malawi and its relation to African swine fever epizootiology. *J. Hyg.*, 96: 535-544.
 16. HARESHAPE J.M., WILKINSON P.J., MELLOR P.S., 1988. Isolation of African swine fever virus from ticks of the *Ornithodoros moubata* complex (Ixodoidea Argasidae) collected within the African swine fever enzootic area of Malawi. *Epidemiol. Infect.*, 101: 173-185.
 17. HESS W.R., 1971. ASFV. *Virology monographs*, 9: 1-33. New York, NY, USA, Springer-Verlag.
 18. HESS W.R., 1981. African swine fever: a reassessment. *Adv. vet. Sci.*, 25: 39-69.
 19. LEY V., ALMENDRAL J.M., CARBONERO P., BELOSO A., VINUELA E., TALAVERA A., 1984. Molecular cloning of African swine fever virus DNA. *Virology*, 133: 249-257.
 20. MANIATIS T., FRITSCH E.F., SAMBROCK J., 1982. *Molecular cloning: A laboratory manual*. New York, NY, USA, Cold Spring Harbor Laboratory, 342 p.
 21. SOUTHERN E.M., 1975. Detection of specific sequences among DNA fragments separated by gel electrophoresis. *J. mol. Biol.*, 9: 503-518.
 22. SUMPTION K.J., HUTCHINGS G.H., WILKINSON P.J., DIXON L.K., 1990. Variable regions on the genome of the Malawi isolate of African swine fever virus. *J. gen. Virol.*, 71: 2331-2340.
 23. THOMSON G.R., 1985. The epidemiology of African swine fever: the role of free-living hosts in Africa. *Onderst. J. vet. Res.*, 52: 201-209.
 24. VINUELA E., 1985. African swine fever. *Curr. Top. Microbiol. Immunol.*, 116: 151-170.
 24. WESLEY R.D., TUTHILL A.E., 1984. Genome relatedness among African swine fever virus field isolates by restriction endonuclease analysis. *Prev. vet. Med.*, 2: 53-62.
 25. WILKINSON P.J., 1986. Epidemiology of African swine fever. *Revue sci. tech. Off. int. Epizoot.*, 5: 487-493.
 26. WILKINSON P.J., PEGRAM R.G., PERRY B.D., LEMCHE J., SCHELS H.F., 1988. The distribution of African swine fever virus isolated from *Ornithodoros moubata* in Zambia. *Epidemiol. Infect.*, 101: 547-564



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