Review on Outbreak Dynamics, the Endemic Serotypes, and Diversified Topotypic Profiles of Foot and Mouth Disease Virus Isolates in Ethiopia from 2008 to 2018

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Abstract: Foot and Mouth Disease (FMD) endemicity in Ethiopia's livestock remains an ongoing cause for economic concern, with new topotypes still arising even in previously unaffected areas. FMD outbreaks occur every year almost throughout the country. Understanding the outbreak dynamics, endemic serotypes, and lineage profiles of FMD in this country is very critical in designing control and prevention programs. For this, detailed information on outbreak dynamics in Ethiopia needs to be understood clearly. In this article, therefore, we review the spatial and temporal patterns and dynamics of FMD outbreaks from 2008 to 2018. The circulating serotypes and the topotypic profiles of the virus are also discussed. FMD outbreak data were obtained from; reports of MoARD (Ministry of Agriculture and Rural Development)/MoLF (Ministry of livestock and Fishery, NVI (National Veterinary Institute), and NAHDIC (National Animal Health Diagnostic and Investigation Center); published articles; MSc works; PhD theses; and documents from international organizations. To effectively control and prevent FMD outbreaks, animal health agencies should focus on building surveillance systems that can quickly identify and control ongoing outbreaks and implement efficient preventive measures.

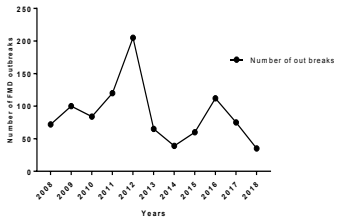


Fig 3- Numbers of FMD outbreaks (2008-2018) reports from different part of the country. The graph depicted that the highest outbreak recorded in 2012.The outbreak data was mostly retrieved from MoLF (Ministry of Livestock and Fishery) and different research works [41, 60].

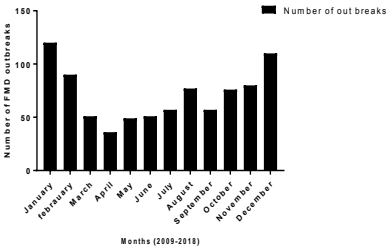


Fig 4- The average number of FMD outbreaks (2009-2018) by month in different parts of the country. This illustration shows seasonal dynamics with higher FMD outbreaks burdens occurred during peak dry season (from December to early February). The data of the outbreak was maintained from MoLF (Ministry of Livestock and Fishery) [41].

Recent publications

1. **Ashenafi, K. W;** Junfei. D.; Qian. L.; Jie. Z. Review on Outbreak Dynamics, the Endemic Serotypes, and Diversified Topotypic Profiles of Foot and Mouth Disease Virus Isolates in Ethiopia from 2008 to 2018. Viruses, 2019, 11, 1076; doi:10.3390/v11111076
2. A. Asefa Asmare and **W. Ashenafi** Kiros (2016): Dairy calf morbidity and mortality and associated risk factors in Sodo town and its suburbs, Wolaita zone, Ethiopia; Slovak J. Anim. Sci., 49, (1): 44–56
3. **Ashenafi Kiros**, Alemu Aylate,Hagos Asgedom, Biniam Tadesse and Aklilu Feleke(2016):Theprevalence and economic impact of bovine fasciolosis in Mekelle Municipal abattoir:J vet sci Res.1:4
4. **Ashenafi kiros**,Tesfaye Tesema Sisay, Muuz-Gebru Saile, Hagos Asgedom Weldabyezgi, Biniam Tadesse derib, (2017); Incidence of Heifer Mastitis and Identification of Major Associated Pathogens in Dairy Farms at Wolaita Soddo Town, Southern Ethiopia. J Dairy Vet Anim Res 5 : 5 PP 2-9 3
5. **Ashenafi Wubshet**, Wakuma Mitiku, and Wale Tesfaye. (2017):Review on stem cell therapy and their roles in cancer treatment.intj biotech and bioeng 3. 4, 65-73.
6. Thomas N, Kiros A, Pal M, Aylate A (2015) Bacteriological Quality of Raw Beef Collected from Municipality Slaughterhouse and Local Markets in and around Wolaita Soddo Town, Southern Ethiopia. Int J Vet Health Sci Res. 3(8), 75-81.
7. Aklilu Feleke Haile, Daniel Kebede, **Ashenafi** Kiros**Wubshet**(2017);Prevalenceand antibiogram of Escherichia coli O157 isolated from bovine in Jimma, Ethiopia: abattoir based surve. Ethiop. Vet. J. Vol 2.
8. **Kiros A**, Gezahegn M, Aylate A (2016). A cross sectional study on risk factors associated with lameness of working donkeys in and around Hawassa, Ethiopia. J. Anim. Health Prod. 4(3): 87-94.
9. **Ashenafi Kiros**, Hagos Asgedom, Reta Duguma Abdi (2016).A Review on Bovine Brucellosis: Epidemiology, Diagnosis and Control Options.ARC Journal of Animal and Veterinary Sciences. 2(3): 8-21.
10. **Ashenafi Kiros**, Tadele Gashaw and Ayichew Teshale (2016): Phage Therapy; A Review on the Biology and Therapeutic Application of Bacteriophage. AJAVS; 2:4 PP 15-25.
11. Biniam Tadesse, Biruk Tesfaye, **Ashenafi Kiros** (2017); Review on Adeno Virus; As a Vaccine Vehicle. AJAVS; 3:PP 28.
12. Alemu Aylate1, Mathewos Agize, Desta Ekero, **Ashenafi Kiros**, Gewado Ayledo and Kagnuro Gendiche (2017):In-Vitro and In-Vivo Antibacterial Activities of Croton macrostachyus Methanol Extract against E. coli and S. aureus.Adv. Anim. Vet. Sci. 5(3): 107-114. 16
13. Ermias Worku, **Ashenafi Kiros**, Hagos Asgedom1 and Biniam Tadesse. (2017); Alternative Control Methods of Gastrointestinal Nematode Infections in Small Ruminants: Biological Method and Use of Medicinal Plant Extracts.AJAVS; 3:2, pp.11-28.

Biography



He got Doctor of Veterinary Medicine and Masters Degree in Veterinary Microbiology from Haramaya and Addis Ababa University, Ethiopia. Dr. Ashenafi Kiros wubshet is dedicated veterinarian and microbiologist from Ethiopia. Currently a PhD fellow in in Lanzhou Veterinary Research Institute (LVRI), Chinese Academy of Agricultural Sciences (CAAS), China, Gansu province, Lanzhou City, PR China. He is doing his research in novel chimeric vaccine development against FMD SAT2 serotype with the Foot-and-Mouth Disease Diagnosis Research small Group, under the FMD disease Prevent and Control Innovation Team.