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"Resilience of agricultural systems against crises"

The Origin of the '*Mycoplasma mycoides* Cluster' Coincides with Domestication of Ruminants

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Abstract

The '*Mycoplasma mycoides* cluster' comprises the ruminant pathogens *Mycoplasma mycoides* subsp. *mycoides*, the causative agent of contagious bovine pleuropneumonia (CBPP), *Mycoplasma capricolum* subsp. *capripneumoniae* the agent of contagious caprine pleuropneumonia (CCPP), *Mycoplasma capricolum* subsp. *capricolum*, *Mycoplasma leachii* and *Mycoplasma mycoides* subsp. *capri*. These pathogens are obligate parasites of goats, sheep and cattle and cause diseases characterised by clinical symptoms including pneumonia, mastitis, septicaemia, meningitis, wound infections, and arthritis. CBPP and CCPP are major livestock diseases and impact the agricultural sector especially in developing countries through reduced food-supply (animal losses) and international trade restrictions. In addition, these diseases are a threat to disease-free countries. Several studies have attempted to resolve the evolutionary relationships between the members of the '*M. mycoides* cluster' or to infer the evolutionary history of single members within the cluster. However, a comprehensive overview of the evolutionary history of the '*M. mycoides* cluster' and genetic relationship between populations is still lacking. We used a multilocus sequence typing (MLST) approach to gain insights into the demographic history of and phylogenetic relationships among the members of the '*M. mycoides* cluster'. We partially sequenced seven housekeeping genes representing a total of 3,816 base pairs from 118 members of the '*M. mycoides* cluster' as well as five strains isolated from wild Caprinae, spanning their geographic distribution and isolated over the last 100 years. Strikingly, the origin of the '*M. mycoides* cluster' dates to about 10,000 years ago, suggesting that the establishment and spread of the cluster coincided with livestock domestication. In addition, we show that hybridisation and recombination may be important factors in the evolutionary history of the cluster.

Keywords: Capricolum, hybridisation, recombination, mulfilocus sequence typing

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