The Norwegian muskox (Ovibos moschatus) population lives on the high mountain plateau of Dovre and originates from animals introduced from Greenland. In the late summers of 2006 and 2012, severe outbreaks of pneumonia with mortality rates of 25-30% occurred. During the 2012 epidemic high quality samples from culled sick animals were obtained for microbiological and pathological examinations. High throughput sequencing (pyrosequencing) of pneumonic lung tissue revealed high concentrations of Mycoplasma ovipneumoniae in all six animals examined by this method and Pasteurella multocida subsp. multocida in four animals, whereas no virus sequences could be identified. Mycoplasma ovipneumoniae and P. multocida multocida were also isolated by culture. Using real time PCR on lung swabs, M. ovipneumoniae was detected in all of the 19 pneumonic lungs examined. Gross pathological examination revealed heavy consolidations primarily in the cranial parts of the lungs and it also identified one case of otitis media. Histologically, lung lesions were characterized as acute to subacute mixed exudative and moderately proliferative bronchoalveolar pneumonia. Immunohistochemical (IHC) examination revealed high load of M. ovipneumoniae antigens within lung lesions, with particularly intensive staining in the neutrophils. Similar IHC finding were observed in archived lung tissue blocks from animals examined during the 2006 epidemic. An M. ovipneumoniae specific ELISA was applied on bio-banked muskox sera from stray muskoxen killed in the period 2004–2013 and sick muskoxen culled, as well as sera from wild reindeer (Rangifer tarandus tarandus) on Dovre and muskoxen from Greenland. Serology and mycoplasma culturing was also carried out on sheep that had been on pasture in the muskox area during the outbreak in 2012. Our findings indicated separate introductions of M. ovipneumoniae infection in 2006 and 2012 from infected co-grazing sheep. Salt licks shared by the two species were a possible route of transmitting infection.