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Original Research

Late-Term Abortion, Stillbirth, and Neonatal Foal Death in Kyrgyzstan: First Isolation of Equine Herpesvirus Type 1 in the Country

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ABSTRACT

Late-term abortion, stillbirth, and neonatal foal mortality (commonly referred to as late fetal losses [LFLs]) of unknown etiology are a serious concern for horse farmers and breeders in Kyrgyzstan. Therefore, we investigated major infectious causes of LFL, with a focus on viral agents, for the first time in the horse population in the country. A total of 221 sera and 149 nasal swabs taken from mares in farms with a history of LFL within 1 year of testing as well as tissue samples collected from 17 LFL cases were investigated. Serologic studies revealed that equine herpesvirus type 1 (EHV-1) and type 4 (EHV-4) were prevalent in the population, although positivity rates were low with neutralizing antibody titers of 1:4 to 1:32 (median 1:8) against both pathogens. High antibody titers in the range from 1:32 to 1:512 (median 1:256) against equine arteritis virus (EAV) were detected in mares on a single farm, whereas three mares from different farms tested positive for Dourine. Virus isolation and PCR investigations of nasal swabs did not suggest ongoing active infection with EHV-1, EHV-4, or EAV in the examined mares. Bacteriologic and virological examination of tissue samples taken from LFL cases revealed the presence of *Escherichia coli* and/or *Streptococcus equi* (subsp. *zooepidemicus*) in 35% of neonatal foal death cases, and EHV-1 was isolated from a late-term abortion case representing the first isolation of this important pathogen of horses in the country and, to the best of our knowledge, in Central Asia.

1. Introduction

Kyrgyzstan is a landlocked country in Central Asia, surrounded by Kazakhstan to the north, by China and Tajikistan to the south, and by Uzbekistan to the west. It is almost entirely mountainous with only 7% of the land area suitable for arable agriculture. This characteristic makes the livestock sector one of the strongest and most important sectors of its economy [1]. The Kyrgyz population values horses as a source of meat and milk but also uses them as a means of transport and for sport activities. Kyrgyzstan has a total population of 433,000 horses, but numbers may be higher than the official figures [2]. The country is among the 10 biggest producers of horse meat with 22,000 t, approximately half of which is used for the farmers' own consumption [2]. The majority of horse farms in Kyrgyzstan are small and family owned, housing less than 10 animals

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[1]. Consequently, mare reproductive failure leading to late-term abortion, stillbirth, or neonatal foal dead (together referred to as late fetal loss–LFL) results in a loss of milk and meat and direct economic losses. Late fetal loss is a major problem for horse farmers and breeders in the country, and increasing numbers of cases have been reported to the health authorities in the last years. Late fetal loss may be caused by noninfectious and infectious causes, with equine herpesvirus type 1 (EHV-1), equine arteritis virus (EAV), and, much less commonly, equine herpesvirus type 4 (EHV-4) being associated with the syndrome [3]. Ascending placentitis leads similarly to abortion or the birth of premature and weakened foals [4].

The present study aimed to investigate the role of important abortigenic infectious agents in LFL for the first time in the country.

2. Materials and Methods

2.1. Sample Collection

A total of 221 blood samples and 149 nasal swab specimens were collected from 221 mares in 42 farms which had experienced LFL within a year before sampling. Farms located in Issyk-Kul region, Chui region, and city of Bishkek were sampled between January–May 2013 (40 farms) and February–May 2014 (2 farms) (Fig. 1 and Table 1). Three sport horse and 39 family-owned (for dairy and meat production) farms were included in this screening. Sampled mares were from 3 to 15 years of age (median age: 5 years). Nasal swabs were placed in 2 mL of transport medium (phosphate-buffered saline containing 100 U/mL penicillin and 100 μg/mL streptomycin) and kept cold during transport to the laboratory. At the time of sampling, special attention was given to body condition and presence of nasal or vaginal discharge. Upon arrival in the laboratory, samples were appropriately aliquoted and kept frozen. Tissue samples (consisting in lung and/or placenta for every case plus kidney, liver, spleen, or brain in some cases) were available from 4 late-term aborted fetuses, 2 stillbirths, and 11 dead neonatal foals (Tables 1 and 2). These samples were obtained from necropsies taken place from September 2012 to March 2013 (16 cases) and February 2014 (1 case). Equine herpesvirus type 1 vaccination was never practiced in the country before and during the sampling period.

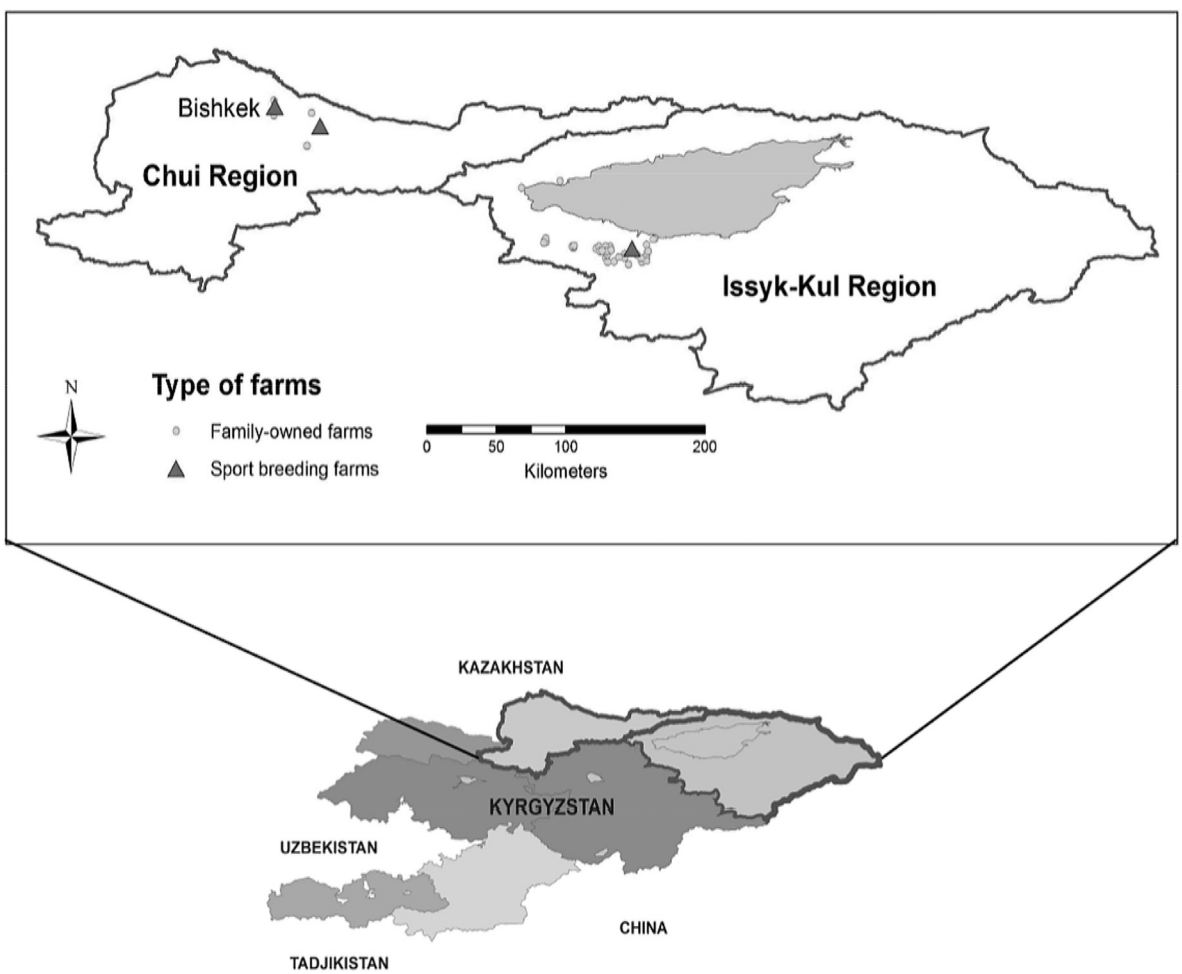

Fig. 1. Kyrgyzstan regions and location of farms sampled during the survey.