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EPIZOOTOLOGICAL SITUATION OF EQUINE INFLUENZA

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Summary

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The first epizootic of equine influenza in Bulgaria was in 1978 while the last one was identified in 1989-1992. The virus that caused the last epizootic in Bulgaria was antigenically related to the A_2 Miami 1/63/H3N8/ strain. After a screening serological examination of equine population, it was established that antibodies against the A_2 Miami 1/63 /H3N8/ serotype were the commonest while those to the A_1 Prague 1/56 /H7N7/ serotype were less in the absence of vaccination. The respective percentages against A_2 Miami 1/63 /H3N8/ in 1999 were 59% in adult horses and 56% – in mares.

The situation among the equine population concerning influenza as well as the necessity for a preventive program for its control were established.

Key words: haemagglutination inhibition, influenza, serotypes A_1 and A_2

INTRODUCTION

Equine influenza is one the the most important viral infections causing enormous losses among equine population. The sickness is accompanied by respiratory signs followed by complications in the upper respiratory tracts and sometimes – by abortions in pregnant mares in the first four months of gestation.

The first episootic of equine influenza in Bulgaria occurred in 1978 while the last one was established during 1989-1992. The virus, responsible for the latter, is antigenically related to the A_2 Miami 1/63 /H3N8/ strain (Chenchev et al., 1996; Chenchev et al., 1997). This outbreak caused great economical losses due to secondary complications, abortions in the first half of pregnancy and death of affected animals. Donkeys and mules, which are widely used in private farms as beasts of burden, were extremely heavily affected. Equine influenza is generally caused by two strains of the influenza virus, namely A_1 Prague 1/56 /H7N7/ and A_2Miami 1/ 63 /H3N8/ (Mumford, 1996; Wood et al., 1997). At present all viral isolates belong to both basic types. There is a slight difference in the genetic analysis which is not sufficient to differentiate serotypes three and four.

Both basic serotypes are part of the *Orthomyxoviridae* family. They contain RNA and have a spherical, oval or round shape. Their surface is covered with spikes and they are typified accoding to those characteristics. Their size varies from 80 to 120 nm. There are seven structural components in their virion. Three of them (of a protein origin – nucleocapsid, haemagglutinin and neuraminidase) are essential for the identification of the different viruses in serological reactions

(Chambers et al., 1994; Mumford, 1996; Wood et al., 1997).

From an epizootological point of view, equine influenza has no seasonal character, but at the same time, there possibly is a persistency in different regions of the world or in separate countries. It is particularly important to establish the potential sources of the infection. The sophisticated mechanism of transmission and the fast expansion of the infection (an airborne infection) reduce the effect of the imposed quarantine. Therefore, the principal way for controlling this equine disease is vaccination of animals. The vaccines that are used vary depending on whether they contain whole virions, partially destroyed or subunits with one of the basic protein components (haemagglutinin or neuraminidase) (Hannant, 1991; Chambers et al., 1994; Mumford, 1994; Mumford et al., 1994; Mumford et al., 1996).

A major objective of the present research was to determine the epizootological status among the equine population with regard to this infection and to establish the necessity for regular vaccination.

MATERIALS AND METHODS

The studies were performed in two consecutive years on 165 unvaccinated horses and mares. Eighty-five of them (18 horses and 67 mares) were tested in 1998 and 80 (23 horses and 57 mares) – in 1999. Blood samples (serum) were obtained from each animal twice yearly.

Blood sera were examined for antibodies against the two strains of equine influenza viruses by a haemagglutination inhibition test using microtitre plates. Sera were pretreated to remove non-specific haemagglutinins with 1.90M KJO_4 at room temperature for 60 min. Then, 1% glycerol dissolved in saline was added and equine sera were additionally inactivated at 56 ^{o}C for 30 min.Treated sera were further diluted from 1:10 to 1:640 in saline. As antigen (allantoic liquid), reference viral strains A_1 Prague 1/56 /H7N7/ and A_2Miami 1/63 /H3N8/ inoculated in 10-days chicken embryos were used. The dilution titres were 1:4 or 1:8 (Chenchev et al., 1991; Chambers et al., 1994; Chenchev et al., 1996; Mumford et al., 1996; Chenchev et al., 1997).

RESULTS AND DISCUSSION

After the performance of serological investigations it was proven that the percentage of positive samples against the A_2Miami 1/63 /H3N8/ strain was greater than that against the A_1 Prague 1/56 /H7N7/ strain. The fact that this percentage in horses, older than 2 years in 1999 was 59% (against the A_2Miami 1/63 /H3N8/ strain), was most disturbing. A similar situation was observed in mares – 56% seropositive animals respectively (Fig. 1).

The results obtained for both strains of equine influenza virus in 1998 and 1999 are presented on Fig. 2. The figure show a relatively low percentage of established seroreagents in 1998 (27% against the A_1 Prague 1/56 /H7N7/ strain and 39% against the A_2 Miami 1/63 /H3N8/ strain in mares). In 1999 however, the percentages of positive sera increased sharply under the conditions without prophylactic vaccination.

The results indicated that in the future, there would be a real danger for clinical manifestation of the disease among the equine population. This fact confirms the studies carried out by other European researchers in the last years (Hannant et al., 1991; Mumford et al., 1994; Mumford, 1997; Wood et al., 1997).

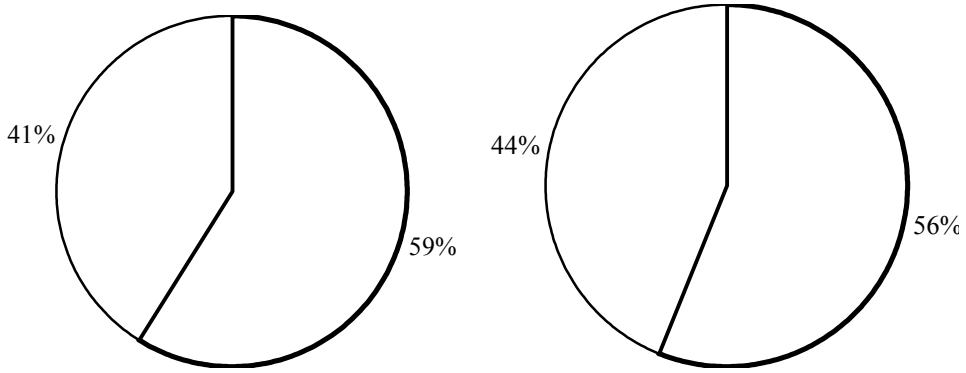

Fig. 1. Percentage of positive ( ) and negative ( ) samples against A_2Miami 1/63 /H3N8/ in horses (left) and mares (right) older than 2 years in 1999.

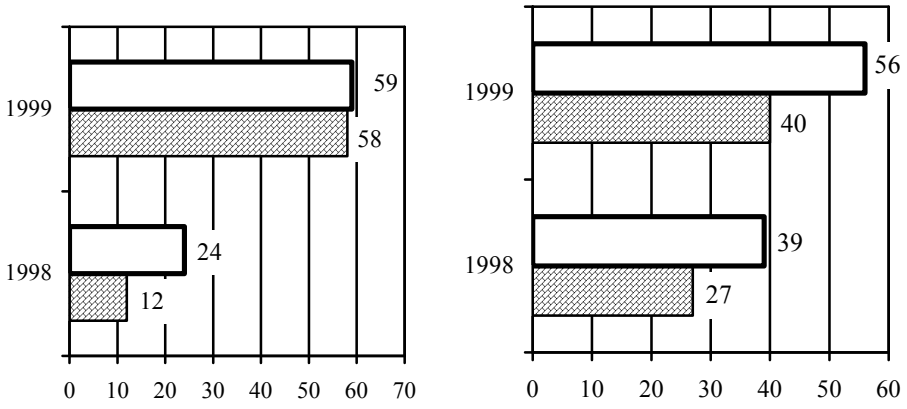

Fig. 2. Percentage of positive samples against two strains of equine influenza virus (– A_1 Prague 1/56/H7N7/ and – A_2Miami 1/63 /H3N8/) in blood sera from horses (left) and mares (right) older than 2 years.

The only way to prevent the outbreak of the epizootic is to vaccinate immediately the elite animals in the country. The change in the ownership of animals in the last years could have positive effects on the rearing and prevention needed to preserve animals health.

We have to emphasize the fact that the basic serotype, causing severe forms of clinically manifested illness, is the A_2 Miami 1/63 /H3N8/ strain. We have detected the existence of antibodies against this strain in the examined animals from different regions in Bulgaria. In previous communications of ours (Chenchev et al., 1999) we have suggested a scheme for vaccination of different categories of animals. After applying those measures, we believe that the outbreaks of equine influenza in Bulgaria would be prevented.

CONCLUSIONS

After the performance of a screening serological investigation among the equine population, we established that in the absense of vaccination, the percentage of seroreagents against the serotype A_2 Miami 1/63 /H3N8/ was higher compared to that against the serotype A_1 Prague 1/56 /H7N7/. In 1999, the seroreagents against A_2 Miami 1/63 /H3N8/ were 59% in adult horses and 56% in mares. This revealed an unfavourable tendency concerning the possible appearance of the disease.

For the future control of equine influenza, preventing measures according to a scheme should be taken in order to prevent the outbreaks of this epizootic in Bulgaria.

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