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## FOOT AND MOUTH DISEASE VIRUS TYPE ASIA 1

IN

CENTRAL AND EAST ASIA

AN UPDATE AND COMMENTARY

Working document

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## **1 SUMMARY**

Recent outbreaks of the FMD virus type Asia 1 in China, Russia and Mongolia could suggest that the virus is either being spread relatively quickly through the region or it is already widespread but remains undetected as indicated by identification of serologically positive cattle without showing clinical signs in China.

Currently, the likelihood of the introduction of FMD type Asia 1 by legal trade to the UK from the affected countries in central and east Asia is considered negligible because of a ban on trade from these countries.

The likelihood of the virus introduction by illegal imports remains and is difficult to estimate. This emphasises the importance of ensuring that enforcement agencies are vigilant, a ban on swill feeding is effectively applied and maintaining an appropriate reserve of the virus antigen in the vaccine bank.

We continue to monitor the situation and will review the outcomes of this document if required.

## 2 INTRODUCTION

This update and commentary builds up on our preliminary outbreak assessment (<http://www.defra.gov.uk/animalh/diseases/monitoring/pdf/poa-fmdasiarussia.pdf>). It considers the likelihood of the introduction of foot and mouth (FMD) virus type Asia 1 to the UK following the confirmed outbreaks of this virus in China, eastern Russia, Mongolia and Myanmar.

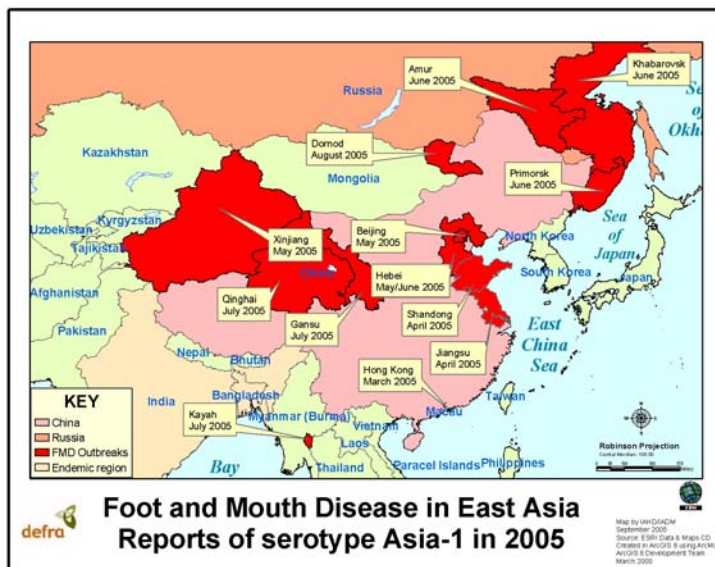
Our preliminary outbreak assessment concluded that this strain of FMD virus is being spread relatively rapidly through the region or it was already widespread but undetected as indicated by identification of serologically positive cattle without showing clinical signs in China.

## 3 FMD ASIA 1 OUTBREAKS – OFFICIAL NOTIFICATIONS

### 3.1 Outbreak reports

The first reported detection of FMD virus type Asia 1 (see map) was in Hong Kong Special Administrative Region of the People's Republic of China (Hong Kong SAR) in March 2005. Subsequently, this type of the virus was reported from two different

areas in China in April and in May 2005. The virus was then reported for the first time from eastern Russia close to the border with China in June 2005 (OIE, 2005).



China reported new outbreaks in two other provinces in July 2005. The virus was then reported for the first time from Mongolia and again from eastern Russia close to the border in China in August and September 2005 (OIE, 2005).

The virus was also reported from Myanmar in August 2005. In all outbreaks, the disease was detected in large and small ruminants (cattle, sheep, goats) but there were no reports that pigs were affected (OIE, 2005).

Although virus appear to be present in China and Myanmar, the first reports of this type of virus in east Russia and Mongolia raised concerns that the disease was being spread rapidly through the region (FAO-EMPRES, 2005).

## 4 SITUATION ASSESSMENT

The situation assessment of the recent outbreaks of FMD virus type Asia 1 in central and East Asia considers two assumptions. One assumption is that the virus was introduced at some point in time and then rapidly disseminated in the region. The

other assumption is that the virus may have been widespread but remained undetected in the region.

#### **4.1 Recent outbreaks in time and space**

At the beginning of 2005 outbreaks of FMD virus type Asia 1 were reported from Asia. The outbreaks in Hong Kong SAR occurred in March 2005; in east China in April and May, in western China in May, in central China in July, in east Russia in June, August and September and in Mongolia and Myanmar in August. No further outbreaks caused by this type of virus have since been reported from the region.

The FMD Asia 1 isolate from Myanmar appear to be distant and closely related to isolates collected in Myanmar or Thailand a few years earlier (Valarcher, J-F and Knowles, N.J., personal communication, November 2005). This could suggest that there is no direct linkage between the outbreak in Myanmar and the outbreaks in central and East Asia. Outbreaks of the FMD virus type 1 in Myanmar have also been reported in the past.

Isolates from Hong Kong are different from those collected in China and in Russia. They are closely related to some isolates collected in Tajikistan (Valarcher and others, 2005).

The FMD Asia 1 isolates from Mongolia were found to be closely related to the virus isolates collected in Russia and China in June and July 2005 (Valarcher, J-F and Knowles, N.J., personal communication, November 2005). This could suggest a close linkage between these outbreaks and lead to the assumption that such a quick dissemination may be linked to a common source of the virus.

#### **4.2 Possible origins of the virus**

The epidemiological information available leaves uncertainty as to what factors may have been involved in the virus introduction or its dissemination in central and East Asia.

##### **4.2.1 Historic situation in Asia**

FMD virus type Asia 1 appears to be present in some countries in Asia. This virus is known to be present in India and Pakistan (Perez and others, 2004) where cattle and buffalo populations are considered to be the reservoir of the virus (FAO-EMPRESS, 2005).

In India, the potential for the virus spread and a high rate of mutation is attributed to significant and unrestricted movement of animals within the country (Pattnaik and others, 1998).

In Pakistan, many areas of the Punjab region are also considered to be at high risk because of increased contact with infected animals moving from other infected areas. The Punjab region has a high density of cattle and is a historically important transportation route that connects India, Afghanistan, Iran and the Middle East (Perez and others, 2004).

According to FAO (FAO-EMPRES, 2005) the disease was reported in Tajikistan in 2003. Subsequently, outbreaks were reported in “*Uzbekistan and Kyrgyzstan and in Kazakhstan. Three of these countries share borders with Xingjian Province of western China*”. The virus was also reported in Iran in 2004.

#### **4.2.2 FMD Asia type 1 in China**

China reported outbreaks of the FMD Asia 1 virus in 1997-1999. The outbreaks of this virus were reported again in 2002 and 2005.

### **5 COMMENTARY**

It remains uncertain whether the virus was rapidly disseminated in the region or whether it is widespread but undetected to a large extent.

The FMD virus type Asia 1 involved in the recent outbreaks in China, Mongolia and Russia was found to be very closely related to viruses collected in India in 1980-1981 (Valarcher, et al., 2005).

The limited epidemiological information on the recent outbreaks leaves uncertainty as to what factors may have been involved in the virus dissemination in central and East Asia. As indicated on the map above (section 3.1) the outbreaks have occurred within a relatively short period of time. The map also indicates that there may have been two ‘closer geographical clusters’ of the outbreaks - one in central Asia involving outbreaks in China and Mongolia and the other in East Asia involving outbreak in east China and east Russia.

The clinical disease was only reported in ruminants and there appear to be no reports of the FMD virus type Asia 1 infection in pigs during the recent outbreaks in China, Russia and Mongolia. It is uncertain to what extent swill feeding of pigs may be a common practice in the affected areas in the region and to what extent it could have played role in the virus dissemination. There is a possibility that the movements of infected ruminants, rather than potentially contaminated products may have played a role in the dissemination of the virus.

The assumption that this virus may be present in domestic cattle in China but undetected could be based on the official report by the Chinese authorities. This report indicated that in some cases the disease was detected in cattle based on serology alone. These cattle showed no clinical signs of the disease and were found in Hebei in May 2005 (OIE, 2005). The presence of infected cattle without showing clinical signs could allow the disease to spread without the detection unless effective disease control measures (including movement control) and serosurveillance are implemented.

There is also a possibility that the virus may be present but undetected in small ruminants in China, perhaps in wild sheep that may come into contact with domestic sheep because of shared pastures. According to Trimble (2003), China has the largest domestic sheep population in the world while the population of wild sheep is also considered large. Nevertheless, the potential role of sheep in the transmission of FMD virus remains unclear.

It is also tempting to suspect that yaks may have a role to play. According to Luo Ning and others (1996) (quoted in FAO, 2003) “*wild yak are still claimed to live in the*

*Altay and Kunlun mountains, and there is some concern in Xinjiang for their conservation in the face of the wild yak being hunted, here as elsewhere, for food by both miners working in Xinjiang and by local herders".* Although yaks have been shown to be susceptible to infection, there is currently no credible epidemiological information to involve them as having a potential for harbouring the virus.

In any case, it remains uncertain whether the recent spread in central Asia may have coincided with some practices (e.g. nomadic practices, seasonal migration) resulting in increased movements of susceptible animals within the relatively limited time and space. It also remains uncertain whether the virus detection in central China and Mongolia, and east China and east Russia may suggest existence of unregulated market-driven movement of susceptible animals.

The current vaccine strain that is available in the EU FMD vaccine bank will provide a good protection against the FMD Asia 1 virus that was detected in the recent outbreaks (Valarcher and others, 2005).

The following pathways are discussed in order to consider what would be an overall likelihood of introducing the FMD virus type Asia 1 to the UK.

### **5.1 Legal trade**

Trade in live susceptible species and their products between the UK and countries where FMD is present but not effectively controlled is banned.

Another type of FMD virus (type O) has been reported in Russia previously. Imports of FMD risk commodities into the EU and the UK are prohibited with the only exception being the Murmansk region in the European part of Russia. In this case fresh meat of reindeer may be imported under specified requirements.

### **5.2 Illegal imports**

The most recent data indicate that illegal imports from the affected countries and neighbouring countries within a broad region are intercepted on a regular basis.

### **5.3 Shipments**

Feeding swill to pigs is prohibited in the UK. Nevertheless, movements of ships worldwide is one of the potential pathways that would have to be always taken seriously because of the potential that swill from such ships may be offloaded and illegally fed to pigs.

As an example, some studies indicated that one ship moving from Indian subcontinent to North America has visited 17 ports in 13 countries within 31 days of voyage (Reiter, P., 2005). The last outbreak of FMD in the FMD free areas of South Africa (in KwaZulu-Natal) in 2000 was attributed to the feeding of waste from ships to pigs.

### **5.4 Situation in Middle East**

The last detection of FMD Asia 1 in Europe was in Greece in 1999 and Turkey in 2000.

The FMD virus type Asia 1 isolates from outbreaks in Turkey and Greece appear to be closely related to the virus isolated in Iran in 1999. It was suspected that the virus probably originated from India and Pakistan (Perez and others, 2004).

Therefore, a constant possibility of west-to-east movement of the virus from India and Pakistan via Iran to Turkey remains. Legal trade in susceptible ruminants and their products from these countries are banned.

## 6 CONCLUSION

Based on the disease report and situation assessment, the likelihood of the introduction of FMD type Asia 1 by legal trade to the UK from the affected regions in central and east Asia is negligible because of a ban on trade from the affected countries.

Nevertheless, the likelihood of the virus introduction by illegal imports remains and is difficult to estimate. This emphasises the importance of ensuring that enforcement agencies are vigilant, a ban on swill feeding is effectively applied and maintaining an appropriate reserve of the virus antigen in the vaccine bank.

We continue to monitor the situation and will review the outcomes of this document if required.

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