

Special disease analysis report

Issue: Foot-and-mouth disease type Asia-1 in China

Information compiled by EMPRES working with the EUFMD Commission Secretariat, FAO

The confirmation of FMD virus type Asia-1 infection in 2005 in cattle in Hong Kong Special Administrative region (Hong Kong SAR), and subsequently from widely dispersed location on the Chinese mainland, represents a major eastwards shift in the known distribution of this virus type. Extensive spread within the country may increase risk to neighbouring countries. One possibility that this may already have occurred was the receipt on 15th June by FAO of a report of Asia-1 infection in an area of the Russian Federation in the Amur region, close to the Chinese border, subsequently reported to the OIE on the 16th June.

The reservoir of FMDV type Asia-1 is generally considered to be in south Asia, particularly India and Pakistan, countries with very high bovine and buffalo population densities. This virus type has often been associated with epidemic spread out of these reservoir animal populations into west Asia as far as Turkey, and even in 2000 to Greece, but eastwards spread to involve dispersed, possibly widespread outbreaks on Chinese mainland appears to be a new and worrying development. Where entry into naive animal populations occurs, epidemics can be severe. As part of the EMPRES and EUFMD activities, FAO has tracked the reports of severe FMD outbreaks from central Asia and western China that occurred between 2003 and the present, and actively engaged with the countries concerned to improve reporting and follow-up actions.

The development in China appears to be the consequence of a failure of the disease reporting system in a number of countries, mostly in central Asia, resulting in country to country spread, and it would appear, spread from western China to eastern China in 2005.

In 2003, FAO received media reports, and unofficial reports from field based projects and organisations, of a serious change in FMD situation in several central Asian countries. FAO provided encouragement to the authorities of the countries concerned to confirm or refute the reports, and offered assistance for field or laboratory epidemiological investigations. The sequence of reports would suggest infection in Tajikistan was followed by outbreaks in Uzbekistan and Kyrgyzstan, and some point in 2003, in Kazakhstan. Three of these countries share borders with Xingjian Province of western China.

In December 2003, Tajikistan reported FMD to the OIE, and Kyrgyzstan reported FMD to the OIE Regional FMD Reference Laboratory in Vladimir, Russia. In January 2004, this laboratory confirmed Asia-1 type in samples from Tajikistan. A summary of the information received concerning Asia-1 infection in China, or dramatic disease events that might indicate Asia-1 incursion is given below.

Figure 1. Locations of reported FMD outbreaks in 2005, and of an unconfirmed epidemic in 2004

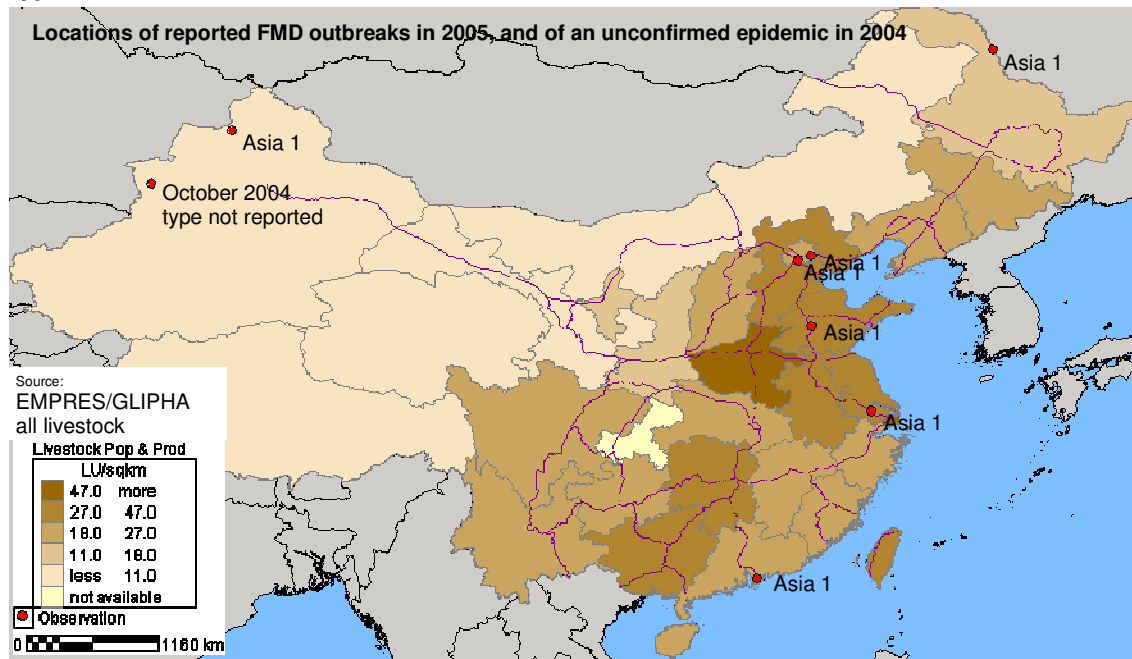
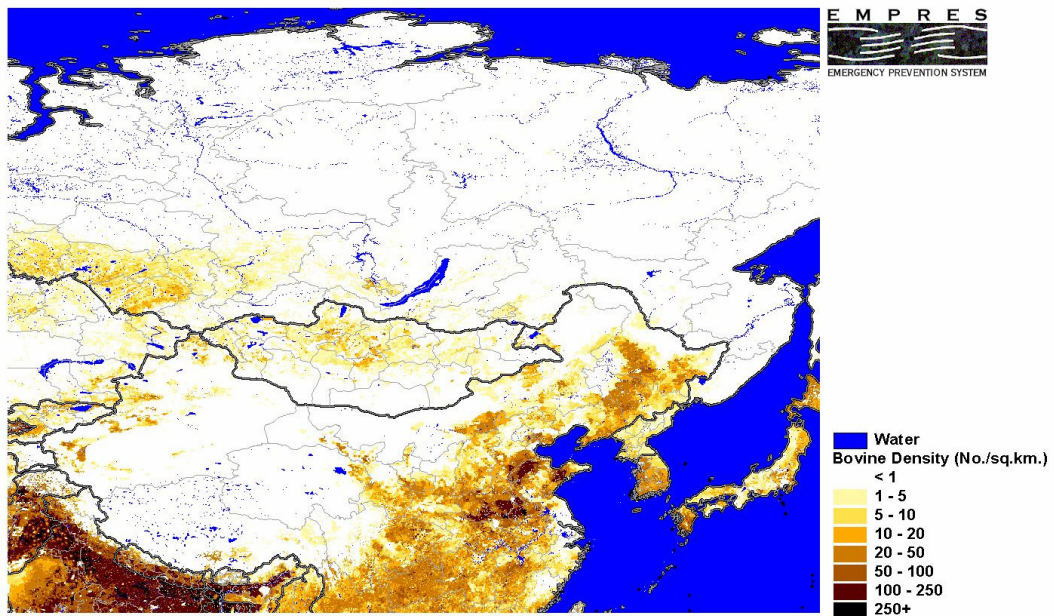


Figure 2. Predicted bovine density map for central-east Asia, illustrating the apparent gap between cattle populations in western China/central Asia and eastern China



Reported situation in 2005

March 23rd 2005; the authorities of the Hong Kong SAR reported to the OIE the detection of Asia 1 virus infection, in cattle. The infection was confirmed in samples submitted to the FAO World Reference Laboratory at Pirbright.

May 13th 2005; On the 13/05/2005 China reported to the OIE that outbreaks caused by Asia-1 type occurred in April (first observed 24/4/2005) in Wuxi in Jiangsu Province, and Tai'an in Shandong Province; .

May 26th 2005; China reported to the OIE that further Asia-1 outbreaks were detected

- Daxing in Beijing Municipality, and Sanhe in Hebei Province, both in eastern China
- At Hebukesai in Xingjian Uygur Province, located in western China, near the Kazakhstan border.

Media Reports

October 26th 2004; FAO analysed media reports which suggested a serious situation in western China, close to Kazakhstan border (Yili prefecture in the Xingjian Province) -FMD outbreaks were reported to be occurring with a different character from usual ("the virus had mutated"). The same report indicated that this region usually exports meat to other provinces in China, and that the situation had provoked aggressive control measures including slaughter. The outbreaks and virus type involved were not reported to OIE or FAO.

On the 24th of May 2005; media reports were received of an FMD outbreak in Sichuan province, type unknown. They reported that the initial outbreak was on the 15th of April 2005.

On 15th June, 2005, media reports were received of Asia-1 infection in cattle in Russian Federation, (Busse, Amur Province, 120 kilometers northwest of Blagoveshchensk. This area is close to Chinese border, but at least 1000 km from nearest outbreaks confirmed by the Chinese authorities in the reports previously cited. The outbreak was subsequently confirmed in reports of the Russian authorities to the OIE. This location of the outbreak suggests infection is present regions in neighbouring regions of north-east China close to Russian Federation border.

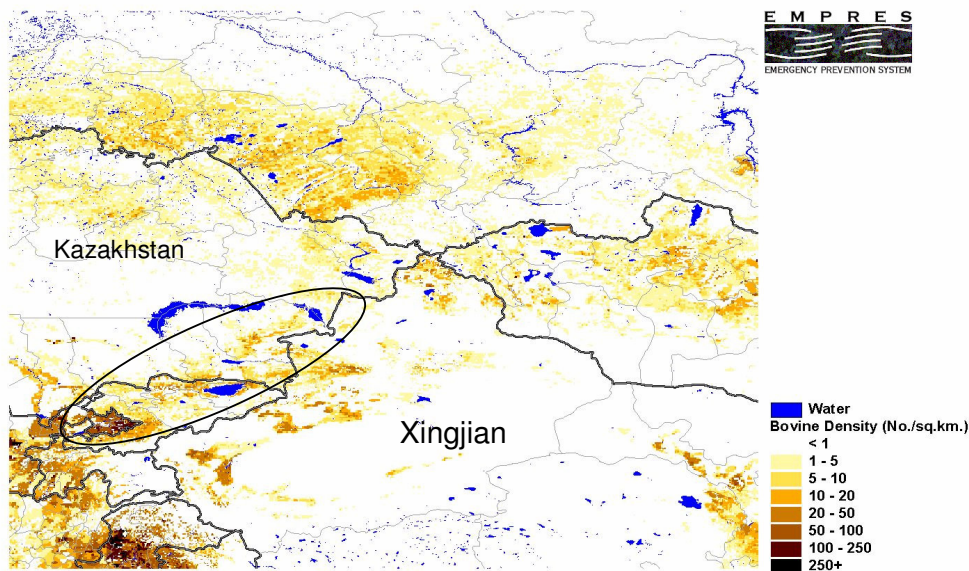
Disease mapping and analysis

Virus type analysis; the genetic information received from the FAO and OIE Reference Laboratories (WRL, Pirbright, UK, FGI-ARRIAH, Russia, and USDA Plum Island USA) indicates a closer relationship of the Asia-1 viruses isolated from the outbreaks in Hong Kong SAR to those from earlier outbreaks in central Asia (Tajikistan) and west Asia (Afghanistan and Pakistan), than with recent virus isolates from other south Asian countries (Nepal, India).

Pattern and implication of findings

The findings suggest that Asia-1 infection in central Asian countries in 2003 was followed by infection in ruminant livestock in Xinjian Province, China. This would fit with media reports of new disease pattern in the similar livestock systems of north west China (Xingjian) in October 2004. At some period and from unknown source, virus escape to eastern China occurred. Given the very significant swine population of eastern China and apparent export from Xingjian, it is possible that consumption by pigs of waste or contaminated meat may have been the vehicle of spread.

Figure 3 : Predicted Bovine density map¹ , illustrating areas of significant bovine density extending across the borders of several central Asian countries; transboundary risk of spread may be higher where bovine populations are on both sides of the border, such as can be seen between Kazakhstan and Xingjian, China .



Risk for other areas

Western China; until information is provided to clarify extent of infection and efficacy of measures, Kazakhstan, Russian Federation and Mongolia in their border can be considered at risk.

Other countries in central Asia: these countries are at risk from continued infection within the region and from endemic countries to the south. Intensified surveillance and communication to OIE and FAO should assist to better identify risk and provide early warning to neighbours to prevent further spread. FAO project support is available to assist countries concerned.

South-east and East Asia: until information is provided to clarify extent of infection and efficacy of control measures, countries bordering China to south and east can be considered at risk on geographical basis. Other trade and long distance transport links between these countries may affect risk and should be considered. The report of FMDV Asia-1 in far-east of Russian Federation (Amur oblast) would suggest increased risk to the DPR of Korea and Republic of Korea.

Risk of international spread.

The currently available information is limited. Each country needs to conduct their own risk analysis. However the distribution of the reports suggest an increased incidence of infection and this may contribute to increased risk through the pathway of animal products, live animals or other routes (such as contamination of fodder).

¹ Derived from work of the EUFMD Commission on FMD distribution mapping (William Wint and Keith Sumption, 2005)

Throughout most of the FMD Asia-1 recorded distribution, pig populations are insignificant compared to ruminant host numbers and density. The extension of Asia-1 to eastern China may allow significant exposure of pigs (Figure 5). In general for FMD pig infections are of significance since aerosol excretion provides a potent source of airborne virus for ruminants, and the virus contamination and survival in meat is more likely than in ruminants, providing a vehicle for infection to spread to other locations (including international). In such countries, disease establishment is almost always a consequence of feeding of pigs with food containing untreated ruminant or pig products. The transmission of FMDV Asia-1 to and between pigs is little studied, but can be expected to follow the norms established for other FMDV types in pigs.

FMD outbreaks reported to the OIE and unofficial reports of FMD -China.

Type	Administrative level	Administrative level 2	Reported start of event	Date of report	Number destroyed	Source
Unknown	Xinjiang Uighur ◀	Yili, Yining	Oct 2004	26/10/2004	Slaughter used, numbers not given	Media reports
Asia 1	Hong Kong SAR		09/03/2005	23/03/2005	560cattle/ 7147pigs/120caprine	OIE
Unknown	Sichuan	Wangyuan	20/04/2005	20/04/2005		Media reports
Asia 1	Jiangsu	Wuxi	24/04/2005	13/05/2005	223 cattle	OIE
Asia 1	Shandong	Tai an	24/04/2005	13/05/2005	40 cattle	OIE
Asia 1	Xinjiang Uygur ◀	Hoboksar	18/05/2005	26/05/2005	308 cattle	OIE
Asia 1	Beijing	Daxing	05/05/2005	26/05/2005	2464 cattle	OIE
Asia 1	Hebei	Sanhe	26/05/2005	26/05/2005	512 cattle	OIE

FMD outbreaks reported – Russian Federation

Type	Administrative level	Administrative level 2	Reported start of event	Date of report	Number destroyed	Source
Asia-1	Amur oblast	Busse	9 th June 2005	14 th June 2005	15 cattle	Report to OIE

Figure 4. Predicted buffalo density map for central-east Asia

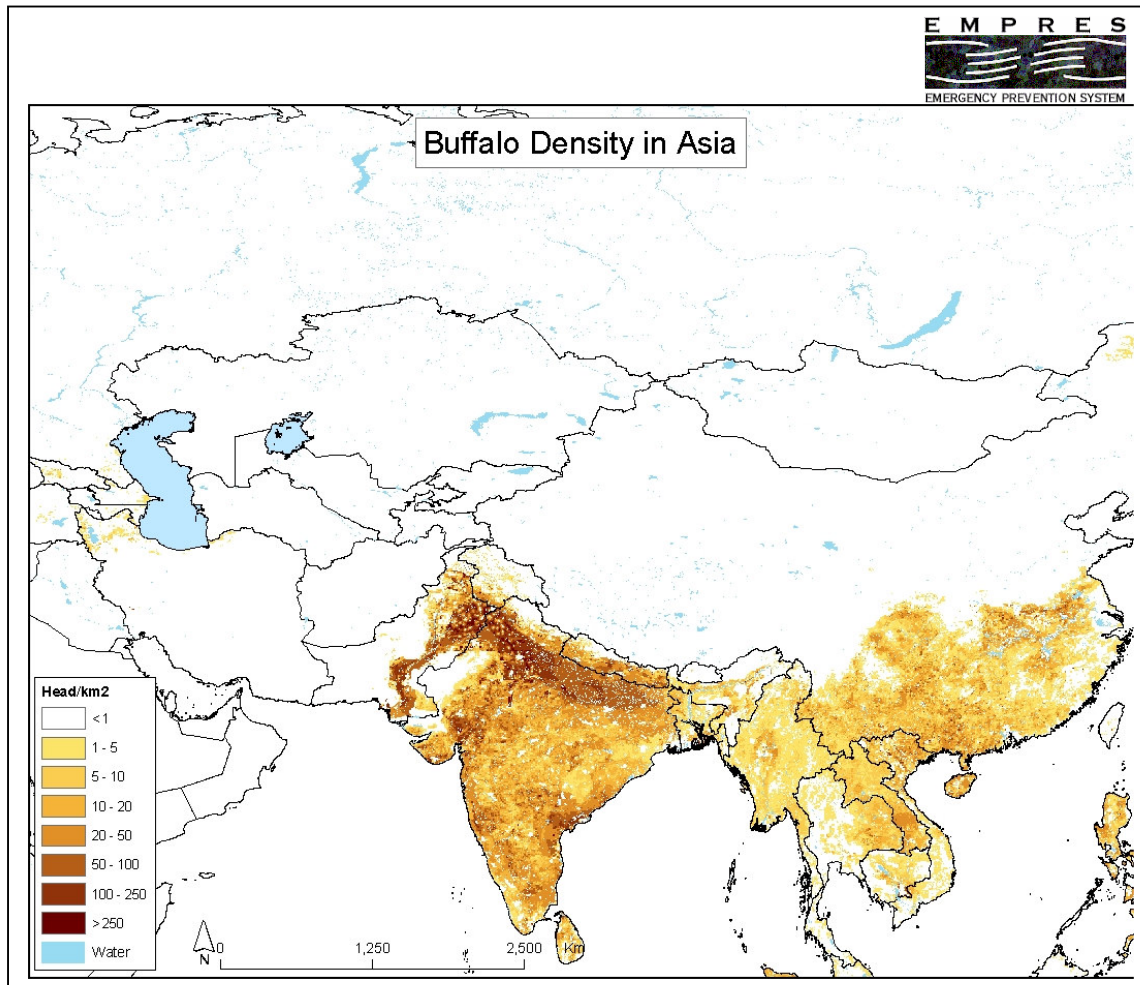


Figure 5. Predicted swine density map for central-east Asia

