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Foot-and-mouth disease virus type C reported in Brazil

Official laboratory results of an outbreak of FMD reported in Brazil indicated FMD serotype C, which had not been reported in South America for almost ten years. The outbreak affected bovines on an island in the Amazon River where animal movement is performed exclusively by river boat, and which is separated from the World Organisation for Animal Health-recognized FMD-free zone with vaccination by more than 500 km. The Brazilian authorities quarantined the affected premises and curtailed animal movement.

Global Rinderpest Eradication Programme

Significant progress has been made in accreditation of rinderpest freedom, with many more countries signing on to the World Organisation for Animal Health OIE pathway. Most significant has been the progress in the Arabian Peninsula and Mongolia.

AND...

Participatory disease surveillance techniques

Bolivian and international practitioners of participatory epidemiology recently evaluated and adapted techniques used in participatory disease surveillance to the classical swine fever situation in Bolivian smallholder systems.

Avian influenza in Asia

Since June 2004, new cases of highly pathogenic avian influenza H5N1 have been reported in poultry in China, Malaysia, Thailand and Viet Nam. Countries in the region continue to implement control programmes and conduct scientific investigations, and FAO has launched Technical Cooperation Programme projects.

Rinderpest

Update on the Global Rinderpest Eradication Programme in 2004

Significant progress has been made in accreditation of rinderpest freedom, with many more countries signing on to the process described in the World Organisation for Animal Health (OIE) *Report of the Expert Consultation on Rinderpest Surveillance Systems, Paris, 16–18 August 1989*, commonly called the "OIE pathway". Most significant has been the progress in the Arabian Peninsula and Mongolia. Following a workshop held in Mongolia in October 2003 under the auspices of the Joint FAO/International Atomic Energy Agency Division, Mongolia was able to present a convincing dossier to OIE and has now been recognized as free from rinderpest disease. Serological surveys are in progress to complete the process of attaining freedom from rinderpest infection. Following visits and discussions with the Global Rinderpest Eradication Programme (GREP), it is expected that China and the Russian Federation will soon announce progress in demonstrating rinderpest freedom.

Acting on fears that some Middle Eastern countries lack commitment to GREP, FAO and OIE joined together to mount a regional Technical Consultative Group Meeting for the Middle East in Beirut, Lebanon. The African Union Interafrican Bureau for Animal Resources (AU/IBAR) sent a team to report on the situation of suspected rinderpest persistence in the Greater Horn of Africa. The meeting not only dispelled the fear of lack of commitment in the Middle East, but also resulted, through follow-up by the OIE regional representative, in many more countries' ceasing vaccination in order to join the OIE pathway by making a declaration of provisional freedom. The actions of Oman and Saudi Arabia were most welcome in this respect. The challenge now is to sustain progress and assist the last few countries in joining the OIE pathway. The apparent success of GREP must not be allowed to generate complacency. There is still a long way to go before the risk of resurgence of rinderpest is eliminated together with the last reservoir of infection. It is essential that vigilance against resurgence from suspected or hidden reservoirs of infection be maintained.

P. ROEDER

Cattle in an eastern Ethiopian market, free from rinderpest risk – or are they?

A serious cause of concern for several countries in the Middle East is the risk perceived to be posed by the trade in cattle from some countries in the Horn of Africa. The trade is unstoppable for many reasons, among which are the good quality of the traded beef cattle, economic considerations and political imperatives. Countries wish to mitigate this risk by requiring vaccination of cattle against rinderpest during quarantine before importation, but this procedure is not compatible with the OIE pathway, which, as it stands at present, requires that countries import only non-vaccinated seronegative cattle after appropriate quarantine. Even though most of

the traded cattle would be destined for slaughter, it has been considered that the presence of seropositive cattle in the country would compromise serosurveillance for rinderpest. This problem could be alleviated by marking vaccinated cattle either physically or serologically using a marked rinderpest vaccine for which a serological test system capable of differentiating between vaccinates and cattle exposed to field infection is available. Several countries are interested in adopting this practice if it is sanctioned.

Unfortunately, there is currently no OIE-recommended vaccine and test system available. The commercially available heterologous *peste des petits ruminants* (PPR) vaccine based on the Nigeria 75/1 isolate is possibly the closest candidate to approval, as discriminatory tests are recognized and widely used. However, endorsement of this system has been delayed because some authorities first wish to see a formal demonstration of the efficacy and innocuity of the PPR vaccine in cattle with confirmation that the serological tests are able to discriminate. AU/IBAR, through its Pan African Programme for the Control of Epizootics (PACE), wished to commission such studies at the Kenya Agricultural Research Institute's Muguga Laboratory (considered the regional reference laboratory for rinderpest for East Africa), but bringing this plan to fruition has been delayed for more than a year, and it is still not certain to proceed.

A case could be made for recommending the use of this PPR vaccine/test system on an experimental basis for a small number of key countries before the completion of the desired studies. It has been demonstrated that PPR virus infection of cattle produces a cross-reactive immunity that provides full protection against rinderpest virus infection; there is no evidence that PPR virus infection can cause disease in cattle; and it has been shown that many cattle are already seropositive to PPR in those countries in which the disease is endemic. For example, Drs Manzoor Al-Qadassi and Najib Al-Hammadi have recently shown that some 23 percent of cattle in the Tihama coastal region of Yemen are seropositive to PPR (personal communication). It was clear to participating countries at the Beirut meeting that their best form of protection against rinderpest would be to remove the risk of movement of rinderpest out of the Somali ecosystem permanently. Action to achieve this objective was urged.

Remarkably there has been no re-emergence of rinderpest in any of the countries/regions cleared of rinderpest in the past ten years

The United Arab Emirates continues to seek protection from requiring rinderpest vaccination of cattle. In fact, there is very little use of rinderpest vaccine anywhere. Only the Syrian Arab Republic continued until this year (2004) to run an institutionalized annual vaccination programme, although it is understood that Tajikistan and Georgia intend to restart some border vaccination despite the virtual absence of rinderpest risk.

Remarkably there has been no re-emergence of rinderpest in any of the countries/regions cleared of rinderpest in the past ten years; indeed, all accruing evidence confirms that both African lineage 1 and the Asian lineage of rinderpest virus have been extinct since 2001. Rinderpest has not been detected in Asia (neither the disease nor serological evidence of infection) since cases were found in 2000 in the Indus River buffalo tract of the Sindh Province of Pakistan. Although participatory

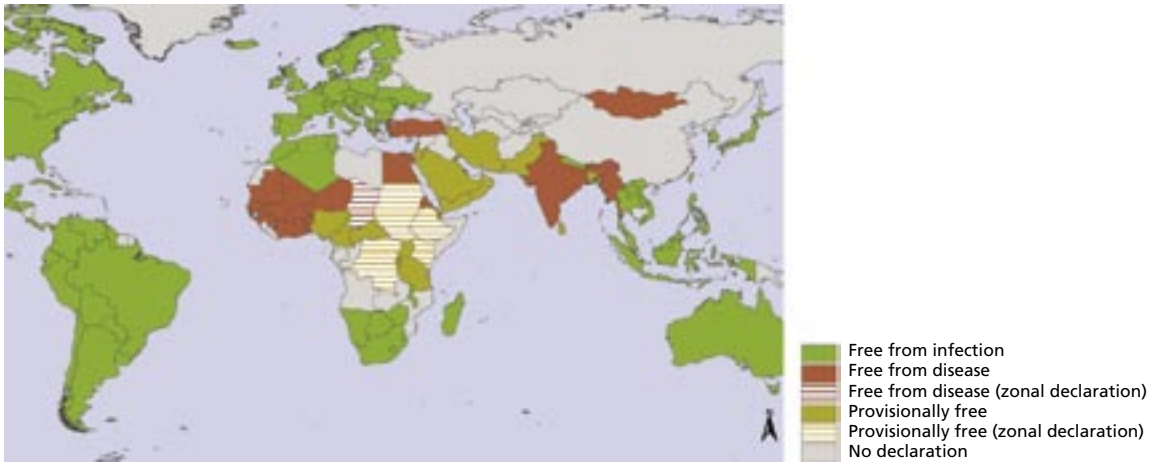
epidemiological studies suggest that the last cases might actually have occurred in early 2001, they are really of little significance, given that subsequent intensive investigations in Pakistan serve only to continue to confirm the absence of infection, not just of disease. Evidence from Afghanistan confirms that it has remained free since the 1995 incursion from Pakistan was eradicated in 1997. India continues to confirm that it eliminated rinderpest by eliminating the reservoir of infection in Tamil Nadu and Karnataka in the Southern Peninsula in 1995, and the whole country is now recognized by OIE as free from rinderpest disease.

Progress with the OIE pathway accreditation process is gaining momentum in Asia

Southeast Asia has undoubtedly been free from rinderpest since the late 1950s (with a possible, but unlikely, suggestion that it could have persisted in Viet Nam until the 1970s). Elsewhere in Asia, surveillance exercises, taken together, suggest that the other reservoirs of infection were resolved at about that time. The "Kurdish triangle" (the Islamic Republic of Iran, Iraq and Turkey) experienced its last infection in 1996, and Yemen last detected infection in 1997. Again formal surveillance data tend to confirm rinderpest absence. There can be little doubt that China, Mongolia and the Russian Federation are free from infection. Enigmatic rinderpest outbreaks in the Amur region of the current Russian Federation (1988), Georgia (late 1989, continuing into early 1990) and Siberia/Mongolia (1991 to 1993) can almost certainly be ascribed to reversion to virulence of the K37/70 vaccine that was used in an attempt to create an immunized buffer zone on the borders of the Union of Soviet Socialist Republics, and later the Russian Federation, with neighbouring countries.

Progress with the OIE pathway accreditation process is gaining momentum in Asia, and the surveillance data presented against a background of the complete absence of vaccination in most areas for many years support the understanding that the Asian lineage of rinderpest is extinct (apart from in laboratory archives). In Africa the OIE pathway accreditation process is providing confidence that West and Central

Accreditation of rinderpest freedom by the OIE pathway as of October 2004



African countries have been free from rinderpest since the last cases occurred on the Burkina Faso/Ghana border in 1988. The possibility that there might have been a later minor introduction from the Sudan into the Central African Republic (based on serological evidence from wildlife) does little to affect this understanding.

Rinderpest virus of African lineage 1 persisted in Ethiopia until 1995, at which time an epidemic extended into Eritrea, and in the Sudan until 2001. In these countries there is convincing evidence for the absence of virus circulation. These were the last strongholds of African lineage 1 rinderpest virus, which has almost certainly joined the Asian lineage in being consigned to history in the wild. It is only the possible persistence of a supposedly mild form of rinderpest in the Somali pastoral ecosystem of Ethiopia, Kenya and Somalia that prevents the conclusion that rinderpest has been eradicated from Africa, and the world.

It is only the possible persistence of a supposedly mild form of rinderpest in the Somali pastoral ecosystem that prevents the conclusion that rinderpest has been eradicated from Africa, and the world

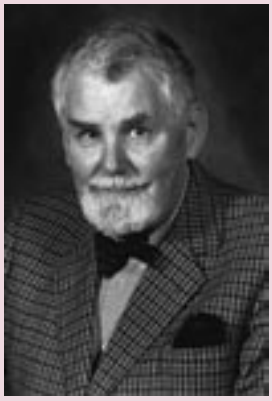
There is no cause for complacency, for there exists a significant body of experience recording the recent presence of a disease syndrome in cattle compatible with the concept of "mild" rinderpest. Its distribution relates closely to the area in which mild rinderpest virus strains were described in the 1950s and 1960s, with rediscovery in the 1990s. However, the last definitive detection of rinderpest virus was in African buffaloes (*Syncerus caffer*) adjacent to the Somali pastoral ecosystem in eastern Kenya in 2001. It was unequivocally identified as virus of African lineage 2 by the World Reference Laboratory for Rinderpest at Pirbright, United Kingdom. All subsequent investigations of what could be a mild form of rinderpest in cattle in Kenya and Somalia (and most recently in a contiguous area of southern Ethiopia in 2004) have failed to provide clear evidence of rinderpest virus presence, whether by virus detection or serology. In Ethiopia, after some initial problems were resolved, the observed disease was clearly shown not to have been rinderpest.

The current situation in this area is an enigma, and failure to resolve it threatens to compromise the ultimate success of GREP. The important conclusions are that 2001 was the last year that rinderpest virus of any of the three lineages known to have been responsible for rinderpest in the recent past was detected in the field, and that it is only in the Somali pastoral ecosystem that there is any suspicion that rinderpest virus is still present. The involvement of wildlife in virus maintenance must be considered, highlighting the need for wildlife surveillance to continue at an appropriate level. If indeed rinderpest is still present, as one must assume until it is proven otherwise, it seems to be able to infect cattle without provoking the clinical syndrome typical of classical rinderpest. It might not be readily detectable clinically.

The encouraging progress made in accreditation of rinderpest freedom across most of the territory in which rinderpest used to damage the livelihoods of livestock farmers suggests that finalizing this process will not be a major obstacle for GREP. The major challenges that remain are resolution of the Somali ecosystem enigma and elimination of this last reservoir of infection, if it is present. Vaccination should only be contemplated if it can be determined that rinderpest is still present there – and if it is still present, its location defined. The emphasis must be on progressing as rapidly as possible to accreditation of rinderpest freedom. Whether or not this will

require recourse to intensive focused vaccination depends essentially on activities undertaken during the last months of 2004 and in 2005 to 2006 by the two-year extension of PACE. A timely, successful outcome is not assured unless all the agencies and organizations involved commit themselves to the common ecosystem strategy developed by AU/IBAR-PACE with partners.

Gordon Ramsay Scott, O.B.E., Ph.D., F.R.C.V.S.



It is with great sadness that we report the death of Professor Gordon Scott, aged 80, on 14 April 2004 after a short illness. He will be mourned not only by his family but also by several generations of veterinarians whom he inspired with his professionalism, broad knowledge of tropical veterinary medicine and practical assistance with their studies at the Centre for Tropical Veterinary Medicine at the University of Edinburgh, United Kingdom. The world has lost an authority on virus diseases, particularly those caused by morbilliviruses.

A Scot by birth, he graduated from the Royal (Dick) School of Veterinary Studies in 1946 and then practised veterinary medicine in the United Kingdom for three years before joining the Colonial Service to work in Kenya. There he embarked on a distinguished career in tropical veterinary science, especially virus diseases. Initially he was posted to the Veterinary Research Laboratory, Kabete, but he later transferred to the East African Veterinary Research Organization, Muguga, where he was head of the Division of Virus Diseases and twice served as the organization's acting director. During his time in the Colonial Service he spent a year in Canada. He obtained an M.Sc. from the University of Wisconsin, United States of America. He obtained his Ph.D. in 1959 from the University of Edinburgh for work on the growth of Newcastle disease, rinderpest and Rift Valley fever viruses.

On return to the United Kingdom in 1963, he took up a lectureship in tropical veterinary medicine at the University of Edinburgh, later being promoted to senior lecturer and then reader. At Edinburgh, the Tropical Veterinary Unit evolved into the Centre for Tropical Veterinary Medicine, and he played a key role in the Diploma and Masters courses in Tropical Veterinary Medicine and Science. He remained active and involved in research and teaching long after "retirement". In 1990 the University of Edinburgh conferred on him the accolade of Professor Emeritus, adding to a long list of awards and honours received in recognition of his contributions to veterinary virology. He conducted research with students and colleagues from many countries, publishing more than 120 papers and innumerable book chapters on the major virus diseases of livestock.

Remembered for his encyclopaedic knowledge of virus diseases, it is with his work on rinderpest that his name will always be first associated. His expertise in this disease was invaluable to FAO, for which he undertook numerous field missions, conducted workshops, drafted manuals and provided expert opinion in every way possible, as he did for many other international organizations. None will forget his wise counsel, patience and constant availability to colleagues and students alike in providing advice on any subject, but notably for many students in the field of statistical analysis. He led by example and was universally liked and respected.

Gordon Scott played a leading role in establishing the Global Rinderpest Eradication Programme,[1] and when the disease is finally consigned to history in the near future, it will be due in no small measure to his efforts. We have lost a good friend, and his passing marks the end of an era.

[1] **G.R. Scott & A. Provost.** 1992. *Global eradication of rinderpest* (available at: http://www.fao.org/docs/eims/upload/171203/784.pdf).

Classical swine fever

Applying participatory disease surveillance techniques to classical swine fever surveillance in Bolivia

Livestock owners, especially traditional farmers, are a valuable source of epidemiological intelligence

Backyard swine rearing is an important livelihood strategy for many small farmers in South America. Disease is a major limiting factor in pig production throughout the region. Many small producers do not have access to regular veterinary services and are beyond the reach of state animal health services and surveillance systems. As a result, the extent and impact of infectious diseases in smallholder systems are often poorly understood within veterinary services, especially at the central decision-making levels. Lack of representative information leads to a tendency towards policies poorly adapted to the needs of small producers and leads to further marginalization of the poor.

Livestock owners, especially traditional farmers, are a valuable source of epidemiological intelligence for the detection and control of infectious disease often overlooked by conventional disease surveillance systems. Livestock owners are often well aware of the clinical presentation, main pathological lesions and epidemiological patterns of diseases that are important to their livelihood. They can describe how disease affects the benefits they derive from livestock and contributes to the risks and vulnerability associated with their livelihood strategies. *Participatory epidemiology* is the use of participatory rural appraisal methods that directly involve farmers in disease surveillance to collect information on the incidence, impact and dynamics of diseases of local importance. Participatory disease searching (PDS) was developed as one method of participatory epidemiology that hunts for outbreaks of a specific disease as part of a control programme. This approach was developed as part of the Global Rinderpest Eradication Programme (GREP), and it has increased the sensitivity of rinderpest surveillance programmes. PDS has been essential to the successes achieved in the global eradication of rinderpest and has been proven effective in diverse countries in Africa and Asia.

J. MARINER

A farmer catches a pig at Pampa Grande in the Reserva de Tariquía

At the request of FAO, Bolivian and international practitioners of participatory epidemiology recently evaluated and adapted the techniques used in participatory disease surveillance to the classical swine fever (CSF) situation in Bolivian smallholder systems. One month was spent interviewing swine farmers in six different communities in remote areas of the Tarija and Chuquisaca Provinces. The core of the approach was the use of open-ended interview techniques to encourage farmers to identify and describe disease problems in their own words. As problems were identified by the farmers, they were asked to describe the nature of the disease in detail and to

talk about its history and importance on their farm and in the area. Interviewers never introduced disease names into the discussion; the farmers controlled the direction of the interview. In this way, the interview data were more likely to reflect the experience and priorities of the farmer rather than biases on the part of the study team.

In the areas studied, CSF was frequently the first or only disease problem mentioned by swine owners. Livestock owners used the terms *cólera*, *peste* or *peste porcina* to refer to CSF. When the owners were asked to describe the disease, fever, diarrhoea, vomiting, neurological signs (trembling, staggering gait, convulsions, etc.) and death were the principal signs they mentioned. The course of the disease was reported to last from one day to several weeks. These descriptions were consistent with acute and subacute CSF. Abortion and weak piglets were not described as problems associated with CSF. This observation indicates either that chronic forms of CSF are not common or that farmers do not recognize chronic CSF. Peracute death syndromes were reported from areas apparently affected by CSF and were sometimes referred to as *peste* by respondents. The clinical course was so short and devoid of signs that it was not possible to validate these reports in the absence of laboratory support. Acute and subacute CSF were endemic or periodic problems in five of the six communities visited.

J. MARINER

A private veterinarian from the PDS team and a farmer discuss a CSF outbreak that occurred in June 2003 at Tolomosa Norte

Overall, small farmers who practised extensive production identified CSF as the most important infectious disease affecting swine. However, some non-infectious disease problems such as internal parasites were given greater importance. Intensive peri-urban producers were largely able to control CSF through vaccination and limitation of contact with other herds. Classical swine fever losses caused some small farmers to drop swine rearing from their mix of livelihood activities. In general, swine production was seen as a profitable but high-risk activity that supplemented more secure activities. It was concluded that CSF was primarily present in the extensive production systems and that control programmes should prioritize backyard swine production.

Small farmers who practised extensive production identified CSF as the most important infectious disease affecting swine

Farmers had access to CSF vaccine through private veterinary pharmacies. Because of the high cost of professional travel relative to the value of animals, veterinarians rarely diagnosed or treated cases in the field. Primarily, farmers travelled to pharmacies and provided case descriptions, and veterinarians arrived at a presumptive diagnosis. Veterinarians could provide information that allowed general cross-checking of farmers' reports, but veterinarians could not provide first-hand, eyewitness accounts with specific names, dates and locations. In some areas, community animal health workers (CAHWs), or *promotores de salud animal,* acted as important intermediaries between urban veterinarians and rural farmers. The CAHWs were the best source of CSF surveillance intelligence encountered in this study. Their reports were highly detailed and specific and could be fully cross-checked against independent sources.

The conclusions of the study were that:

- CSF epidemiology is best understood from a social and institutional perspective.
- CSF is the most important infectious disease affecting smallholder swine-based livelihoods in Bolivia and is probably maintained in that system.
- Official statistics are not representative of the true CSF picture because of social bias inherent in present surveillance and reporting systems.
- Small farmers are able to recognize most forms of CSF, and their views should play a central role in assessing the national disease picture.
- Successful CSF control programmes will require institutional change within veterinary services that leads to a rural and participatory focus that directly addresses the problem of access to services (including surveillance).
- Small farmers lack access to on-farm services, and CAHWs will be a central component of successful surveillance and control programmes.

Jeffrey C. Mariner, RDP Livestock Services, and **Erick Eulert**, Consultant, FAO

Further reading on participatory epidemiology:

FAO. 2000. *Manual on participatory epidemiology: methods for the collection of action-oriented epidemiological intelligence.* FAO animal health manual 10. Rome (also available at http://www.fao.org/documents/show_cdr.asp?url_file=//DOCREP/003/X8833E/X8833E00.htm).

Foot-and-mouth disease

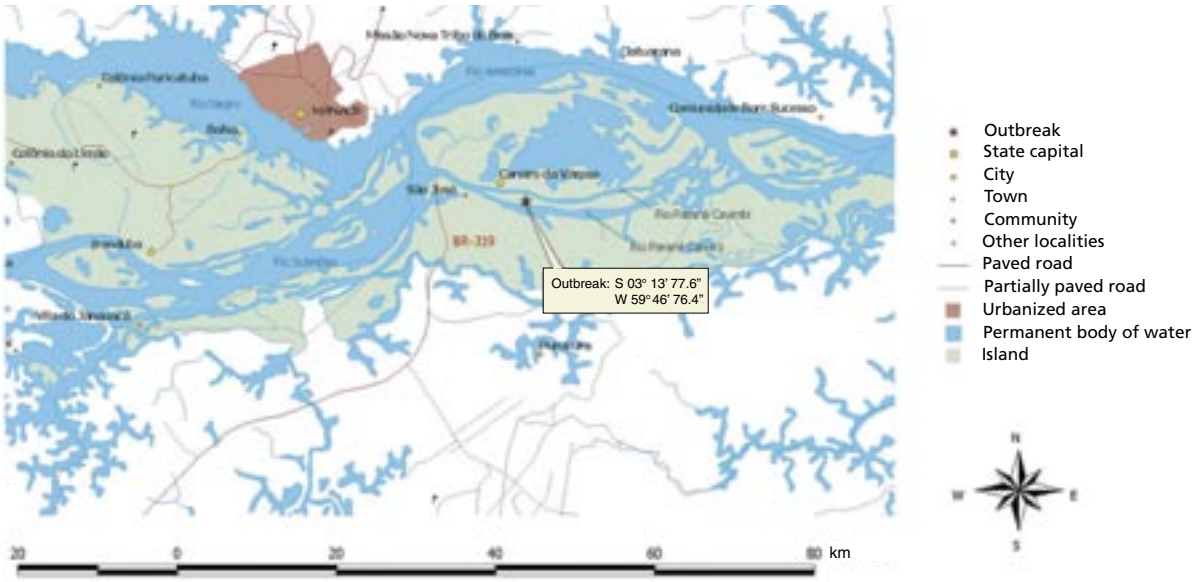
Outbreaks of FMD type C in Amazonas, Brazil

On 9 September 2004 the Ministry of Agriculture, Livestock and Supply of Brazil – MAPA – reported an outbreak of foot-and-mouth disease (FMD) in the Municipality of Careiro da Várzea, Amazonas (latitude 3º 13' 77.6" south, longitude 59º 46' 76.4" west).

The suspicion had been communicated to MAPA on 25 August by the owners of the operation, where a total of 4 bovines (1 to 2 years old) were reported to be affected. The animal population on the remotely located premises comprised 34 bovines, 15 sheep and 1 swine. The outbreak was located on an island in the Amazon River (Careiro Island), where animal movement is performed exclusively by river boat, and which is separated from the World Organisation for Animal Health (OIE)-recognized FMD-free zone with vaccination by more than 500 km. The results from the official laboratory in Belém, Pará, indicated FMD serotype C, which had not been reported in South America for almost ten years.

The Amazon region is enclosed in the northern livestock circuit, where the animal health and veterinary delivery systems are not as effective as those of other parts of the country. The area as a whole depends on the import of animals and meat from other parts of the country, and all livestock production is consumed locally.

Location of the outbreak of FMD type C virus in the Municipality of Careiro da Várzea, Amazonas, Brazil, September 2004



Source: MAPA/SDA/DDA.

Satellite image of the zone where FMD virus C outbreaks were detected, Brazil

The Brazilian authorities quarantined the affected premises and curtailed animal movement. An intense epidemiological surveillance was carried out around the zone; every farm on Careiro Island was quarantined, and five control posts and two surveillance boats were used to ensure no escape of the virus would occur.

Three secondary outbreaks were registered in the vicinity of the index farm, with 17 clinically affected bovids. On these premises there were 1 180 susceptible animals (973 bovines, 1 swine and 207 buffaloes). A total of 600 premises were visited and over 17 000 susceptible animals inspected. Every farm in the enclosed area was subjected to a new census and all bovine and water buffaloes (*Bubalus bubalis*) were vaccinated under official supervision. The Brazilian army, navy and local and federal government personnel involved in the activities included 12 veterinarians, 23 technicians and 78 assistants.

In Careiro da Várzea, 1 201 premises were subjected to supervised compulsory vaccination of a total of 70 477 bovines and 4 448 buffaloes. The epidemiological survey in Careiro da Várzea and neighbouring municipalities, including animal movement history, covered more than 17 000 animals without detecting clinical signs compatible with vesicular diseases. On 30 October 2004 all movement restrictions for animals and products were lifted. A minimum of two vaccinations was imposed for those animals entering the municipality.

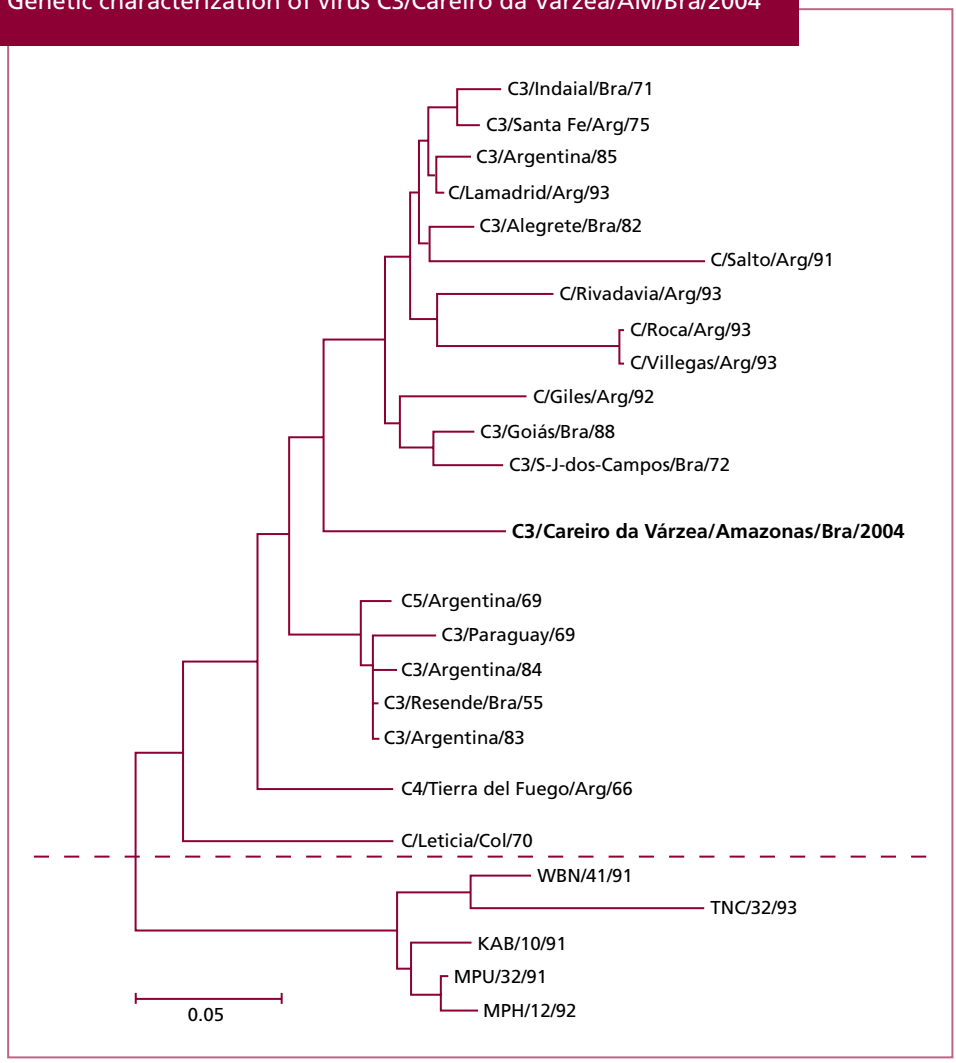
Characterization of the causing agent by PANAFTOSA

Samples of the isolates of FMD virus (FMDV) type C were analysed by the Pan American Foot-and-Mouth Disease Center–Pan American Health Organization/World Health Organization (PANAFTOSA–PAHO/WHO):

FMD serotype C had not been reported in South America for almost ten years

1. *Typing and subtyping.* Samples were processed at LAPA Laboratory in Belém with three passages on BHK (FC 50 percent), confirming the diagnosis of FMDV type C (registered as C3/Careiro da Várzea/AM/Bra/2004) (see Figure).
2. *Immunogenic characteristics.* A study on the expected percentage of protection (EPP) was carried out, using the sera bank at PANAFTOSA, collected from vaccinated and revaccinated animals with prototype vaccines of the region. The results showed EPP values of 52.15 percent at 30 days post-vaccination (DPV) and 95.91 percent at 30 days post-revaccination (DPR).
3. *Typing genetic characteristics.* BHK cell passage samples of the C virus sent by MAPA were submitted for molecular studies to be carried out at PANAFTOSA. Nucleotide sequence of the VP1 protein encoding gene were run and compared with type C reference strains. Results led to the conclusion that the isolate is historically endogenous to the continent. Nevertheless, it was not possible to establish a close relationship with any of the isolates of the PANAFTOSA–PAHO/WHO data bank (maximum homology of 89 percent). Results of the comparison between the isolate C3/Careiro and C3/Indaial/Bra/71 (vaccine strain) showed a

Genetic characterization of virus C3/Careiro da Várzea/AM/Bra/2004



genetic difference of 13 percent in the region studied. This result precludes the hypothesis that the virus resulted from an escape from the vaccine industry.

Epidemiological study of the occurrence

Amazonas is included in an area considered by national authorities as of "unknown risk" for FMD. The state is presently in the process of improving its animal health services.

It covers an area of 1.5 million km^2 (18.4 percent of Brazil's surface) and has a bovine population of 1 152 108 head (0.6 percent of the country herd) and 11 950 farms (0.46 percent of the country). Production systems are family owned and operated, but some extensive farming also exists. Farming areas and animal movement are limited by the natural river tide (equatorial rain forest). Livestock produced is consumed within the zone, and additional livestock is supplied by imports from other states.

The Brazilian authorities quarantined the affected premises and curtailed animal movement

Location of the outbreak in relation to the FMD-free zone with vaccination

Source: MAPA/SDA/DDA.

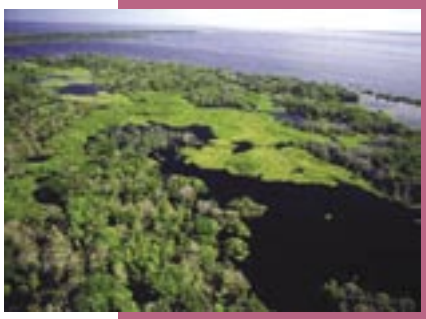
According to national authorities, disease detection capacity and vaccination levels are low in the region

According to national authorities, disease detection capacity and vaccination levels are low in the region. The conditions for livestock production, the ecology, animal density and animal movement in the area, in addition to the difficulties faced by the veterinary services, are compatible with viral circulation and maintenance of FMD endemism in the bovine population. Genetic characteristics of the isolate of an indigenous virus support the fact that clinical activity was detected when surveillance capabilities of local veterinary services were improved.

Epidemiological analysis carried out by national authorities never excluded the possibility of diagnosing FMDV type C in the area, for which reason trivalent vaccines (O1, A24 and C3) are still used and relevant in the country.

Brazilian authorities have developed a phased national FMD eradication programme based on a regionalized strategy in accordance with the so-called "livestock circuits". As a result of this approach, Brazil has achieved recognition by OIE of the southern livestock circuit (Rio Grande do Sul, Santa Catarina and Paraná States), and eastern and western circuits (São Paulo, Mato Grosso, Mato Grosso do Sul, Goiás, Minas Gerais, Rio de Janeiro, Espírito Santo, Distrito Federal and Bahia States). During the processes of recognition a variety of aspects were taken into account such as epidemiological evaluations, analysis of vulnerability and receptivity, absence of clinical disease as well as viral activity, and vaccination coverage.

The free zone is physically separated from the endemic by natural barriers such as the Amazon jungle and wide rivers complemented with buffer zones. Additionally, animal movement into the zone is controlled by barriers staffed by federal personnel. The free zone is surveyed by 1 135 veterinary units, composed of 2 126 official veterinarians and 8 146 auxiliaries.



R. WEBB

Aerial photo of the landscape in Amazonas

Brazilian animal health authorities have started to implement a FMD programme in the northern and northeastern circuits, which includes Amazonas.

It is accepted that the risk of type C virus spreading to FMD-free zones in Brazil and elsewhere in South America is very low mainly because of the absence of ecological and productive links with those areas and the enforcement of animal movement control activities. In the case of Brazil, with the exception of the State of Santa Catarina, where vaccination is not performed, the FMD-free zone with vaccination has a coverage that exceeds 90 percent with a trivalent vaccine (A, O and C).

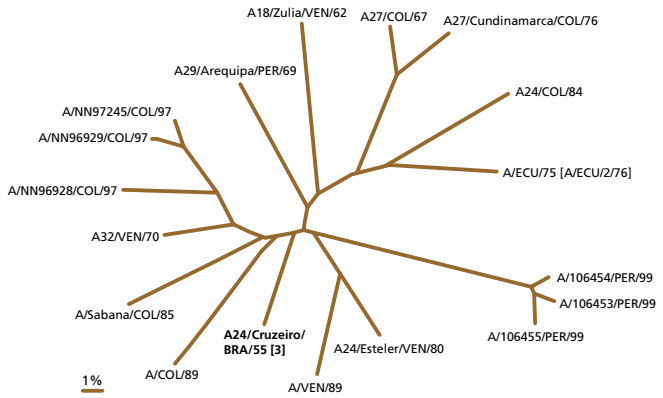
Dr Eduardo Correa Melo, Director, PANAFTOSA–PAHO/WHO

Foot-and-mouth disease in Colombia

FMD was detected in cattle on a farm in Norte de Santander Department, Tibú Municipality, in August 2004. The outbreak was located approximately 16 km from the border of the Bolivarian Republic of Venezuela, in the OIE-recognized FMD protection zone bordering the FMD-free zone where vaccination is practised. Measures were undertaken to control the disease, such as destruction of the animals affected, quarantine, movement control, surveillance and ring vaccination. FMD virus type A, subtype 32, was isolated and characterized by complement fixation test. A second outbreak, affecting two pigs that resulted positive for FMD virus type A, was subsequently reported 0.5 km from the first outbreak. The last outbreak of FMD reported to OIE had been in September 2002. The 23 months without FMD reports from

Area where FMD virus type A, subtype 32, was reported

Neighbour-joining tree showing the relationships between FMDV A24/Cruzeiro/BRA/55 and viruses from the northern part of South America



Source: PANAFTOSA, INTA-Argentina, PIADC & WRL FMD. N.J. Knowles, P.R. Davies, R.J. Midgley & J.-F. Valarcher.

Colombia likely represents the longest time the country did not have clinical disease since FMD was introduced over 50 years ago.

Above is a tree showing the relationship between A32 and A24 as well as other viruses from northern South America. The A32 subtype is represented by A Venezuela 70 (Bolívar, Bolivarian Republic of Venezuela), the predominant virus strain in the Bolivarian Republic of Venezuela from 1969–1980.

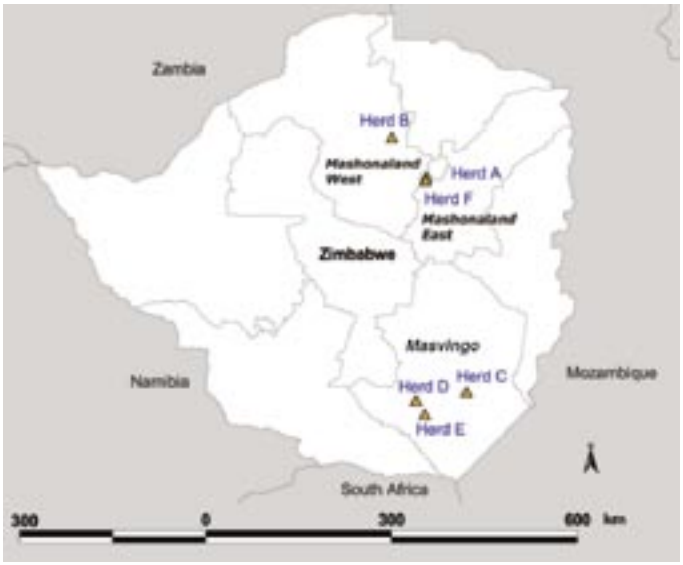
Dr Nick Knowles (Institute for Animal Health, Pirbright) has suggested that A32/Venezuela/70 is an antigenic variant of A24/Cruzeiro that may have arisen following the use of a live attenuated A24 vaccine in the region. He also noted that A32 has a one-way – virus neutralization (VN) and complement fixation (CF) – relationship with A22 Iraq. This is because the sequences of the G-H loop of VP1 are identical to each other and distinct from A24 – a case of antigenic mimicry.

Performance of serological tests for SAT-type FMD: a collaborative study in Zimbabwe

Serosurveillance can be used to investigate whether FMD virus circulation has continued after a disease outbreak has occurred, but knowledge about the performance of serological tests is crucial in the design of serosurveys. FAO recently undertook a collaborative study with the Zimbabwean Department of Veterinary Services to investigate the performance of serological tests, particularly in relation to SAT-type FMD virus infections.

Outbreaks of FMD in Zimbabwe provided an opportunity to carry out a field study involving the collection of specimens to evaluate different laboratory tests that had not yet been fully assessed with SAT serotypes. The primary objective was to assemble sera from cattle that had recovered from FMD in order to evaluate the

The six sampling locations of the field study



performance of different serological tests in the serodiagnosis of SAT-type FMD virus infection. An additional objective was to compare the performance of test methods used to detect infection in vaccinated animals where cattle had been vaccinated and subsequently infected by SAT-type viruses.

Specimens were collected from FMD-convalescent cattle between 27 April and 7 May 2004 by staff at the Department of Veterinary Services, Zimbabwe, with assistance from the European Commission for the Control of Foot-and-Mouth Disease (EUFMD) Secretariat. These specimens were then sent to the FAO/OIE World Reference Laboratory for FMD (WRL FMD) in Pirbright, United Kingdom, for testing. This report outlines the study's procedures and summarizes the preliminary laboratory data.

Between 27 April and 7 May 2004, specimens were collected from 344 cattle at 5 outbreak locations in 2 different regions of the country

Collecting and processing samples

The initial plan was to "sample" at least 300 cattle at multiple outbreak locations in Zimbabwe. The criteria for herd selection were that clinical FMD had occurred between one and six months prior to collection and that convalescent or in-contact animals could be identified for sampling. In addition to collecting serum from each animal, it was agreed that other clinical specimens would be collected, including both oesophagopharyngeal (OP) fluid taken by probang cup and a swab from the nasopharynx[1] and saliva[2]. All necessary sampling materials were shipped to

[1] For virus isolation and reverse transcription polymerase chain reaction (RT-PCR), in an attempt to demonstrate persistent infection

[2] To assay FMDV-specific immunoglobin A (IgA) by enzyme-linked immunosorbent assay (ELISA)

D. SAMMIN

Linear breaks in the hoof of a convalescent animal

Zimbabwe from the WRL FMD, along with packaging to enable the specimens to be returned safely and in compliance with International Air Transport Association (IATA) regulations.

The following protocol was applied at each sampling location:

1. Epidemiological information was gathered relating to the most recent FMD oubreak.
2. The identity of each sampled animal was recorded; dentition was examined to estimate age, and the hooves were examined for evidence of "linear breaks".
3. Specimens were collected in the following order: 50 ml of blood was taken from the jugular vein; two different types of swab were used to collect saliva; a guarded brush swab was passed via the nares to collect nasopharyngeal mucus/cells; and fluid from the oropharynx and oesophagus was collected with a probang cup.
4. A field "laboratory" was established at each sampling location to process specimens on site; saliva was expressed from swabs; and specimens collected from the pharynx (OP fluid and nasopharyngeal swabbings) were divided into aliquots for RT-PCR (to which a lysis buffer was added) and for virus isolation.
5. All specimens were labelled and were immediately stored on ice, with the exception of blood, which was allowed to clot at ambient temperature.

When they were brought back from the field, specimens were further processed at the Central Veterinary Laboratory, Harare. Serum (20–25 ml) was harvested from each clotted blood specimen, heat-treated for 30 minutes at 56 °C and then stored at -80 °C. All of the other specimens were placed in 2-ml cryotubes, sealed with parafilm and stored at -80 °C.

Between 27 April and 7 May 2004, specimens were collected from 344 cattle at 5 outbreak locations in 2 different regions of the country. Linear breaks in the hooves of cattle at these locations were taken as an indicator of convalescence (from clinical FMD). The distance of these lesions from the coronary band, which allowed the time that had elapsed since infection occurred to be roughly estimated, was consistent with the epidemiological information gathered at each location. Virus isolation and typing had not been attempted on specimens collected from clinically affected cattle during the outbreaks at these locations. Therefore, at the time of sampling, it is was not known which virus strain or serotype was responsible for each outbreak. At some of the outbreak locations, cattle had been vaccinated with a trivalent vaccine (comprising SAT-1, SAT-2 and SAT-3 components) before and/or during the outbreak. Repeated vaccination may induce either serum antibody to non-structural proteins (NSPs) of FMD virus and/or FMD-specific IgA in saliva, which would be a complicating factor in the interpretation of test results. Therefore serum and saliva were collected from 60 cattle in a herd in which there had been no evidence of clinical FMD, but in which all cattle had been vaccinated on four separate occasions. All specimens were labelled, catalogued and stored as they were collected. When sampling was completed at all locations, a single shipment was sent to WRL.

D. SAMMIN

The field laboratory established at each sampling location

Shipping processed specimens

For air shipment of specimens to WRL FMD the following steps were taken:

1. Arrangements were made with an airline accepting infectious substances (categorized by IATA as "dangerous goods"), as specimens for delivery to WRL must be sent by air freight direct to London Heathrow and *not by courier.*
2. Packaging was in compliance with IATA regulations, was sufficient to allow the inclusion of 50 kg of dry ice as a refrigerant and was well-insulated enough to keep specimens frozen for at least 48 hours.
3. A shipper's declaration and other documentation (including labels) were completed in accordance with IATA shipping regulations and instructions provided by WRL (to ensure United Kingdom customs clearance).
4. A contact person at WRL was notified of the flight details and the airway bill number for the shipment.

N. FERRIS

The complete shipment on arrival at WRL

Results

Preliminary laboratory data were recently presented to the Open Session of the EUFMD Research Group (Chania, Greece, 12–15 October). These data may be summarized as follows:

SAT-2 viruses were isolated from probang specimens collected from herds A and B (both located in the Mashonaland provinces of northern Zimbabwe) while SAT-1 viruses were isolated from herds C, D and E (located in Masvingo Province, southern Zimbabwe). Although FMD had not been observed in herd F, there was serological evidence to suggest that subclinical infection had occurred.

FMD virus was detected by one or more detection methods in 28 percent of the probang samples collected

FMD virus was detected by one or more detection methods in 28 percent of the probang samples collected, the detection rate in different herds ranging from 14 percent (herd E) to 38 percent (herd C). However, the virus was rarely detected in nasopharyngeal swabs. One animal tested positive by virus isolation, and one by RT-PCR. Both of these animals were from herd D. Optimized RT-PCR (using custom-designed probes perfectly matching the genomic targets of viruses isolated at each location) was found to be more sensitive than virus isolation for detecting virus in probang samples. A standard RT-PCR protocol employing probes that had not been optimized for detection of these particular SAT isolates was of similar sensitivity to virus isolation.

The solid phase competitive ELISA (SPCE) and NSP antibody ELISA readily detected animals that had been infected with either SAT-1 or SAT-2 FMD viruses. NSP antibody ELISAs can therefore be considered as serotype-independent serodiagnostic tests that can be relied upon for the serodiagnosis of SAT-type FMD infections. Sensitivity estimates for the detection of FMDV "carriers" by NSP antibody ELISAs ranged from 75 to 90 percent with different ELISAs, a result very similar to the sensitivity values obtained with sera from experimental infections.

Summary of the sampled animals in each herd

Herd	Province	No. of cattle sampled and tested	Breed	Age	Vaccination status	Time elapsed since outbreak	Hoof lesions*	Serotype of virus detected in probang samples
A	Mashonaland East	130	Red Danish	110 < 18 months; 20 adult	x2 Pre-outbreak x2 Post-outbreak	> 2 months	27/50; approx. 20 mm	SAT-2
B	Mashonaland West	42	Mashona	Adult	Unknown	≥1 month	10/42; not measured	SAT-2
C	Masvingo	65	Beef-master	2.5–3.5 years	Not since 2001	~ 1 month	43/65; 11–18 mm	SAT-1
D	Masvingo	42	Brahmin X	Adult	Never	~ 4 months	22/42; 20–35 mm	SAT-1
E	Masvingo	65	Brahmin X	Adult	x2 Post-outbreak	~ 5 months	Not seen	SAT-1
F	Mashonaland East	60	European X	14–16 months	x2 Jul./Aug. 2003 x2 Feb./Mar. 2004	No history of infection	Not seen	No probang samples collected

* The number of animals in which linear breaks were apparent in one or more hooves/the number of animals examined; distance of linear breaks in the hoof wall from the coronary band

Acknowledgements

The authors wish to thank: Keith Sumption, Secretary, EUFMD, and Stuart Hargreaves, Department of Veterinary Services, Zimbabwe, for supporting this initiative from the outset; the European Commission (DG-SANCO) for financial support; Welbourne Madzima, George Gwaze, Nyasha Munjeri, Frank Chitate, Ann Muzira-Mujeyi, Maud Takawira, Mr Mponda, John Makwangudze, Thokozile Mswela, Ernest Dzimwasha and others at the Department of Veterinary Services, Zimbabwe, for their various parts in the field study; Geoff Hutchings, Nigel Ferris, Scott Reid, Andrew Shaw, Nick Knowles, Jean-Francois Valarcher, Satya Parida, Catherine Holmes, Debi Gibson, Mandy Corteyn, Rosa Fernandez and Pip Hamblin at the WRL, IAH, Pirbright, United Kingdom, for undertaking the laboratory testing of the specimens. A special mention must also be made of Wolfgang Boehle, FAO-SAFR, Harare, Zimbabwe, for his cooperation and assistance with all of the practical elements of this field study.

Dónal Sammin, EUFMD Secretariat, FAO, and **David Paton**, WRL, Institute for Animal Health, Pirbright, United Kingdom

Avian influenza

Situation in Asia as of September 2004

The particular strain of highly pathogenic avian influenza (HPAI) designated H5N1, the cause of the pandemic, is known to have been present in several Asian countries and regions, including Cambodia, China, Indonesia, Japan, Lao People's Democratic Republic, Republic of Korea, Thailand and Viet Nam, since 2003. Infection was probably introduced into one or more of these countries before the disease was recognized and international reporting started in January 2004. Pakistan has reported cases of HPAI H7N3 and low pathogenic avian influenza (LPAI) H9N2.

H. WAGNER

Live chicken market in Hanoi, Viet Nam

In June–July 2004, China, Thailand and Viet Nam reported cases in poultry. In August 2004, Malaysia reported its first case of HPAI H5N1 in poultry, China reported isolations of H5N1 viruses from pigs that were sampled in 2001 and 2003, and Viet Nam reported three fatal human cases of infection with HPAI H5N1. In September, Malaysia reported several outbreaks of HPAI H5N1 near its border with Thailand, while Indonesia, Thailand and Viet Nam continued to report cases in various poultry species. Thailand reported an additional human mortality caused by H5N1 infection. According to the World Health Organization (WHO), since the second wave began, Thailand has reported three human mortality cases caused by H5N1 infection, and Viet Nam five. In September 2004, deaths in tigers were reported to have occurred in a zoo in Chonburi Province, Thailand. Outbreaks of HPAI H5N1 in poultry in Asia are unprecedented in their geographical scope, rate of spread and range of susceptible hosts.

As countries in the region continue to implement control programmes and conduct scientific investigations, there is an increasing awareness of the significance of reservoirs of avian influenza viruses in wild birds, farmed ducks, live bird markets and, potentially, in pigs. The existence of such reservoirs has a bearing on the ability of governments to control avian influenza, including H5N1. While eradication remains the overall objective, countries are pursuing complementary measures, such as increasing biosecurity to prevent the passage of infection from reservoirs to farmed poultry. Where it is difficult to increase biosecurity, vaccination against HPAI to decrease the susceptibility of farmed poultry may be an option. However, vaccination should only be performed with an appropriate surveillance system in place.

The spread of HPAI H5N1 across national boundaries demonstrates that it must be managed as a transboundary animal disease (TAD). In response to the HPAI crisis in Asia, FAO has implemented Technical Cooperation Programme (TCP) projects. Following the country's recent outbreak of HPAI H5N1, the Government of Malaysia requested assistance from FAO.

FAO-EMPRES Avian influenza Web site:

http://www.fao.org/ag/AGA/AGAH/EMPRES/tadinfo/e_tadAVI.htm

Avian influenza in Asia reported as of October 2004, ordered by date of first official reporting to OIE

Country/region	Date of first official reporting to OIE (dd/mm/yy)	Virus subtype	Species affected since the start of the outbreak	Human case	Latest information[1]		
					Last-known case suspected and/or confirmed (dd/mm/yy)	Source of latest information	OIE declaration
Republic of Korea	17/12/03	H5N1	Layer, duck, magpie	No	24/03/04	Government, media Web sites	Yes
Viet Nam	08/01/04	H5N1	Chicken, quail, duck, Muscovy duck	Yes	01/10/04	FAO,[2] media Web sites	No
Japan	12/01/04	H5N1	Chicken, crow	No	05/03/04 (crow)	Government, media Web sites	Yes
Taiwan Province of China	20/01/04	H5N2 (LP)[3]	Chicken, duck, pheasant	No	09/03/04	Meeting report, media Web site	Yes
Thailand	23/01/04	H5N1	Tiger, chicken, duck, goose, quail, turkey, stork	Yes	22/10/04	Government, FAO, media Web sites	Yes
Cambodia	24/01/04	H5N1	Chicken, duck, goose, turkey, guinea fowl, wild bird	No	21/09/04	Government, FAO	Yes
China, Hong Kong SAR	26/01/04	H5N1	Peregrine falcon	No			No
Lao People's Democratic Republic	27/01/04	H5N1	Chicken, duck, quail	No	13/02/04	Government, FAO	No
Pakistan	28/01/04	H7N3; H9N2 (LP)	Layer, broiler	No	07/04	Government, FAO	No
Indonesia	06/02/04	H5N1	Chicken, duck, quail	No	08/04	Government, FAO, media Web sites	No
China, Mainland	06/02/04	H5N1	Chicken, duck, goose, quail, pigeon, pheasant, black swan	No	06/07/04	Government, FAO, media Web sites	Yes
Malaysia	19/08/04	H5N1	Chicken	No	22/09/04	Government, media Web sites	Yes

[1] Official (OIE) and non-official information (ProMED, press agencies, FAO tracking systems, etc.)
[2] FAO: FAO representative in concurrence with government sources
[3] LP: low pathogenic strain

FAO expert meeting on surveillance and diagnosis of avian influenza in Asia

An FAO expert meeting was held in Bangkok, Thailand, 21–23 July 2004, with the participation of experts from the World Organisation for Animal Health (OIE), FAO Reference Laboratories and other scientific and technical institutions. The objective of the meeting was to prepare guiding principles and minimum requirements for HPAI surveillance and diagnostic networks that can be applied by countries and regional networks in Asia. The use of vaccination was also covered. Responsibilities and activities of the national veterinary laboratories and surveillance teams that will participate in the network of the three Asian subregional projects (East, South and Southeast) were outlined. The principles and minimum requirements are also broadly applicable to other AI viruses. The guidelines may not be directly applicable to surveillance for LPAI viruses.[1]

FAO-RAP

Participants at the FAO expert meeting on avian influenza in Asia

FAO Recommendations on the prevention, control and eradication of highly pathogenic avian influenza (HPAI) in Asia

The newly published Position Paper *FAO Recommendations on the prevention, control and eradication of highly pathogenic avian influenza (HPAI) in Asia* presents the main scientific and technical issues and recommendations on prevention, control and eradication of HPAI. It has been prepared with the contribution of several experts and government officials. The contribution of OIE experts and the recommendations of the OIE Terrestrial Code[2] are of particular importance. However, it is important to note that these guidelines reflect the knowledge of HPAI in Asia today. As the disease epidemiology evolves and scientific knowledge and management tools become more comprehensive, management approaches may need to be modified. As such, these recommendations will be under continuous review.

The document includes the following themes:[3]

Factors to consider in determining the appropriate strategy for control. The strategies chosen by veterinary authorities to control HPAI in countries, regions or compartments are determined by a number of factors, to be considered in light of the particular situation of the country, region or compartment, such as the level of infection; the presence of wildlife reservoirs; farming and marketing systems;

Surveillance and monitoring are key to the prevention and control of HPAI

[1] The full text of *Guiding principles for highly pathogenic avian influenza surveillance and diagnostic networks in Asia* is available at: http://www.fao.org/ag/againfo/subjects/en/health/diseases-cards/Guiding%20principles.pdf

[2] OIE. 2004. *Terrestrial animal health code: 13th Edition.*

[3] The full text of F*AO Recommendations on the prevention, control and eradication of highly pathogenic avian influenza (HPAI) in Asia* is available at: http://www.fao.org/docs/eims/upload/165186/FAOrecommendationsonHPAI.pdf

likelihood of infection or reinfection in countries or compartments; involvement in international trade; animal health infrastructure; economic, political and social issues; public health issues.

Economic, political and social issues. The impact of HPAI has been distributed within the entire poultry market chain, affecting producers, consumers and employees in the retail industry. Conversely, the impact on geographic regions has been uneven, with some local areas losing more than 50 percent of their poultry. Various levels of assistance, in the form of compensation and credit, have been provided. The document considers economic appraisal, focusing on elements of a control strategy that can be included within an economic evaluation, and covers human issues that are important when planning a control strategy but are harder to value.

Disease control. Control of HPAI is achieved by reducing the amount of virus circulating in poultry and on farms. Measures such as stamping out, cleaning, disinfection and vaccination are implemented to reduce the amount of virus present. Additional measures, such as movement controls, enhanced biosecurity and, as appropriate, vaccination, are implemented to create barriers between uninfected poultry and foci of infection.

A precondition for effective disease surveillance and control is a competent, properly resourced and well-trained official veterinary service

Surveillance and monitoring are key to the prevention and control of HPAI. Early detection of incursions of virus by targeted surveillance gives veterinary authorities early warning of a potential problem, providing for the proactive introduction of risk management measures such as enhanced biosecurity. To this end, FAO recommends a general strengthening of animal disease surveillance and more emphasis on timely reporting to OIE and other international (FAO) and regional organizations.

A precondition for effective disease surveillance and control is a competent, properly resourced and well-trained official veterinary service. Facilities must be available to provide rapid and accurate diagnosis of disease and detection of infection. In some countries, resources from international organizations and donor countries support important elements of the required infrastructure. FAO, OIE and WHO will continue to work with countries in the region to enhance the veterinary infrastructure and the capacity to prevent and control HPAI. It is important to invest resources in the development and improvement of systems for active disease surveillance and timely reporting to OIE. This enables early warning of incursions to the official veterinary services in the affected and neighbouring countries, greatly improving the prospect of successful eradication.

The spread of HPAI H5N1 across national boundaries demonstrates that it must be managed as a TAD, with the cooperation of countries in the region – ideally through the formation of regional epidemiological and laboratory networks. This does not mean that all countries must adopt identical control and response strategies. However, regional coordination, communication and harmonization of approaches to surveillance, diagnosis and control will enhance understanding and facilitate control of the disease. Control strategies for AI must be based on knowledge of the major pathways of spread of the viruses. HPAI H5N1 virus is mainly excreted via the faeces and respiratory excretion of infected poultry. Most commonly, transmission is via

direct contact between birds, or through contact with the virus on fomites (clothing, shoes, equipment, etc.), or more rarely through airborne particles.

The use of vaccines. There is evidence that infection has been established in some parts of the region for some years and that the HPAI H5N1 viruses have become endemic in some countries. In response to this situation, some countries have commenced vaccination and others are considering the role that vaccines could play in their control programmes. A number of efficacious vaccines are commercially available. Based on field and laboratory evidence, these vaccines provide excellent protection against clinical disease in chickens, reducing mortality and the effect of the disease on production. Properly used high-quality vaccines confer good resistance to infection, so that the vast majority of vaccinated birds exposed to field virus do not become infected. For the few vaccinated birds that might become infected, shedding of virus is markedly reduced (both in the duration of excretion and the quantity of virus shed).

Vaccination reduces the total amount of virus contaminating the environment and acting as a source of infection to poultry and humans. However, the vaccine must be of high quality and have sufficient antigenic mass for the birds to develop a protective immune response. In addition to these technical considerations, governments must also consider the export issue as well as other non-technical factors in arriving at a decision to include vaccination as part of their control strategy. These factors include the social effects of widespread destruction of poultry on smallholder livelihoods and the economic consequences of failure to control the disease.

In determining the strategy for control of HPAI H5N1, all available control measures should be considered, and those that are feasible and likely to be cost effective in the local situation should be adopted

Adoption of the most appropriate control strategies. The strategy adopted by governments concerning their countries, zones or compartments is determined by the perceived importance of the disease politically, socially and economically. Issues that must be considered include public health, economics, sustainability of farming enterprises and adverse publicity associated with repeated outbreaks of the disease.

Conclusions. In determining the strategy for control of HPAI H5N1, all available control measures should be considered, and those that are feasible and likely to be cost effective in the local situation should be adopted. The selection of measures should be based on risk assessment and a thorough understanding of the HPAI status in the country or compartment. Stamping out and vaccination are not mutually exclusive strategies. Targeted vaccination has considerable value as part of a phased response strategy, allowing veterinary authorities to bring infection under control as a preliminary step on the road to eradication in specified compartments or entire countries, as appropriate to the circumstances.

FAO conclusions and recommendations. A tabulated summary of FAO conclusions and recommendations is provided as an annex to the document.

FAO Recommendations on the prevention, control and eradication of highly pathogenic avian influenza (HPAI) in Asia

http://www.fao.org/docs/eims/upload/165186/FAOrecommendationsonHPAI.pdf

Workshops

Discussions after the launch of project OSRO/RAF/404/SAF in Lusaka, Zambia, 4 August 2004. Left: William Amanfu, FAO-EMPRES, Rome; centre: Fred Musisi, Regional Project Coordinator, Johannesburg, South Africa; and right: Honourable M.F. Sikatana, Minister of Agriculture, Zambia

Inception workshop for project OSRO/RAF/404/SAF: Control of Epidemic Foot-and-Mouth Disease and Contagious Bovine Pleuropneumonia in Southern Africa

Continuing outbreaks of transboundary animal diseases (TADs), particularly contagious bovine pleuropneumonia (CBPP) and foot-and-mouth disease (FMD), in previously free areas of the South African Development Community (SADC) are threatening not only the animal health status of the region and hence the livelihoods of the rural communities, but also the ability to trade in livestock and livestock products. A project was therefore designed with the specific objective of facilitating emergency animal disease control and surveillance in order to halt the spread of CBPP and FMD in affected SADC member countries. As a follow-up to the activities of project TCP/RAF/2809(E) (Control of FMD and Other Transboundary Animal Diseases in Southern Africa), the Government of South Africa donated US$2.6 million to support the control of TADs in southern Africa, especially Malawi, the United Republic of Tanzania, Zambia and Zimbabwe.

The inception workshop held in Lusaka, Zambia, 4–5 August 2004, had the following objectives: i) to plan longer-term (16-year) strategies for CBPP and FMD; ii) to discuss operational and technical issues related to the implementation of project OSRO/RAF/404/SAF and to remove potential bottlenecks so as to facilitate smooth implementation of the project in a coordinated and timely manner; and iii) to raise awareness of CBPP and FMD in the region among bilateral and multilateral donors for possible assistance in support of animal disease control programmes in the region. The workshop was attended by Drs Fred Musisi, Regional Emergency Livestock Officer (RELO) based in Johannesburg, South Africa, and Graham Farmer, Regional Emergency Coordinator based at the United Nations Regional Inter-Agency Coordination Support Office (RIACSO), also in Johannesburg. Thirty participants attended this workshop, among whom were the Chief Veterinary Officers (CVOs) or high-ranking representatives of CVOs from the SADC countries Angola, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, United Republic of Tanzania, Zambia and Zimbabwe. Representatives came from the veterinary vaccine production companies Onderstepoort Biological Products of Onderstepoort, South Africa, and the Botswana Vaccine Institute of Gaborone, Botswana.

The workshop was opened by the Honourable Mr M.F. Sikatana, Minister of Agriculture of Zambia. He commended the action of South Africa in responding to the joint SADC/FAO appeal for support in animal disease control with a grant of US$2.6 million, which was the main financial resource of project OSRO/RAF/404/SAF. This gesture, he believed, was in response to the effect of animal disease

outbreaks on the economies of countries in the subregion and the expected salutary effect on national economies should these TADs be controlled. Minister Sikatana concluded that the often-spoken assertion that people have a right to food must be accompanied by people's responsibility to produce food.

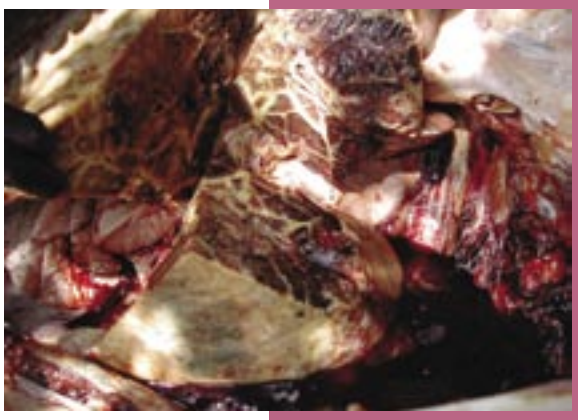
In his opening remarks, Mr Dong Quingsong, FAO Representative to Zambia, called on participants to the workshop to develop practical, tactical and workable control strategies to control the rampant outbreaks of TADs in the subregion, which have deleterious effects on people's livelihoods. Dr Fred Musisi, RELO, then outlined the objectives and expected outputs of the workshop. He also gave an update of the SADC/FAO TADs appeal. The principles behind the FAO/OIE initiative – Global Framework for the Progressive Control of Transboundary Animal Diseases (GF-TADs) – namely: (i) progressive control of transboundary animal diseases at source as an international public good; (ii) using FMD as a disease of primary concern to both developed and developing countries in its control; and (iii) a flexible regional approach to animal disease control, epidemiology and strategies that address control of priority diseases as agreed to by stakeholders (CVOs of SADC), were explained to participants by an EMPRES Officer from FAO Headquarters, Rome.

W. AMANFU

CBPP-affected cow presenting extended neck, abducted forelegs and abdominal respiration

CVOs of SADC countries had met in Pretoria in August 2003 under the auspices of an FAO Technical Cooperation Programme (TCP) project TCP/RAF/2809(E) and had agreed to a regionally coordinated approach to the control of TADs (CBPP and FMD) within the framework of the GF-TADs initiative. The inception workshop on OSRO/RAF/404/SAF could be the beginning of such an initiative, at which coordinated efforts in addressing technical, economic analysis, policy and institutional dimensions confronting the control of TADs within the subregion could be addressed.

A summary of FAO technical assistance through TCP projects in the control of CBPP within the subregion was given by the EMPRES Officer. This summary included: (i) discussion about improvements in CBPP surveillance capabilities that to date had enabled Malawi to keep out incursions of CBPP from the southern United Republic of Tanzania; (ii) a report that Botswana had been able to mount a coordinated surveillance system for CBPP control through improvements in laboratory diagnostic capacity and staff training in synergy with FMD surveillance activities; (iii) news that, despite TCP assistance, the situation of CBPP occurrence had deteriorated in Zambia, with spread of disease from the northern and southern provinces, threatening neighbouring countries such as Botswana, Namibia and Zimbabwe; and (iv) information on disease prevalence in Angola.



W. AMANFU

Marbling in a CBPP-affected lung

Two working groups on CBPP and FMD were formed using the templates established at the 2003 CVOs' meeting as a basis to determine critical gaps that needed to be considered in the long-term progressive control of the two

diseases. Such information could form the basis for seeking further donor support in controlling TADs in SADC countries. Country presentations clearly showed that the spread of FMD and CBPP in these countries needed to be considered in all dimensions of early detection, early warning, early reaction and coordinated research – EMPRES precepts. Dr Wilna Vosloo, Deputy Director of the Onderstepoort Veterinary Institute, South Africa, gave a presentation on the molecular epidemiology of FMD virus in South Africa. She pointed out the need to submit samples from cases of FMD outbreaks in order to use currently available genetic typing techniques that could provide clues to the origin of FMD outbreaks (virus circulation and type) – information that is critical in FMD control.

The meeting was productive, and the level of technical presentations was high. Dr Fred Musisi, the Emergency Operations Service and the Animal Health Service should be commended on their joint effort, which has demonstrated livestock production (animal disease control component) as being an important entry point in improving people's livelihoods, and thus as being worthy of donor and national support.

Communication

Controlling transboundary animal diseases in Central Asia

The project "Controlling Transboundary Animal Diseases in Central Asia" (GTFS/INT/907/ITA) is funded through the Italian contribution to the Trust Fund for Food Safety and Food Security. It started its operations on 2 August 2004 with five countries participating – Afghanistan, Pakistan, Tajikistan, Turkmenistan and Uzbekistan. It seeks to assist these countries to develop their capability to control the major transboundary animal diseases that can threaten food security by compromising livestock production. The emphasis will be on training staff in field and laboratory procedures for animal disease surveillance and diagnosis, and on assisting them to develop communication links with neighbouring countries to improve regional disease intelligence and cooperation. The major diseases referred to are rinderpest, foot-and-mouth disease and *peste des petits ruminants*.

T. ALI

Cattle and buffaloes from Pakistan in Kabul market, Afghanistan

The first priority is to encourage and assist countries to join the World Organisation for Animal Health (OIE) pathway by ceasing rinderpest vaccination and making a declaration to OIE of provisional freedom from rinderpest. Depending on the timing of the latest vaccination some countries might be eligible to apply to OIE for accreditation as being free from rinderpest disease (no disease and no vaccination for more then five years) or even free from rinderpest infection (no disease and no vaccination for more than ten years). Clearly, this project is of great importance to the Global Rinderpest Eradication Programme (GREP), for whom lack of progress on the part of countries in central Asia in verifying freedom from rinderpest is a growing cause of concern.

News

In brief...

Since the last *EMPRES Bulletin* – No. 24, 2003 – and the *Special issue on avian influenza* – No. 25, 2004 – significant events relating to transboundary animal diseases and outbreaks of EMPRES priority diseases in different regions around the world have been reported to the World Organisation for Animal Health (OIE) or FAO.

Rinderpest

OIE has published declarations of provisional freedom from rinderpest for the Central African Republic (February), Oman and Saudi Arabia (July) and Kenya on a zonal basis (August). See page 2.

Foot-and-mouth disease

Outbreaks of FMD occurred in Colombia in August 2004 (see page 15) and Brazil in September 2004 (see page 11). FMD virus type C was reported in Brazil after nearly a decade of absence.

Highly pathogenic avian influenza

HPAI has affected a number of countries in Asia since December 2003. See Table, page 22.

Publications

FAO Animal Health publications

A new title has been added to the FAO Animal Health publications list:
Towards sustainable CBPP control programmes for Africa. FAO-OIE-AU/IBAR-IAEA Consultative Group on Contagious Bovine Pleuropneumonia, third meeting, Rome, 12–14 November 2003.

This and other FAO documents can be purchased through FAO sales agents. A complete list of publications, prices and agents is available at:
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Outbreaks reported, January–October 2004

Disease	Country/region	Reporting date	Location	Agent characterization
Foot-and-mouth disease	Brazil	September 2004	State of Amazonas, Careiro da Várzea District	Virus serotype C
		October 2004	State of Amazonas, Careiro da Várzea District	Virus serotype C
	Colombia	August 2004	Norte de Santander Department, Tibú Municipality (northeastern Colombia)	Virus serotype A, subtype 32
		August 2004	A new outbreak was reported, 0.5 km from the primary outbreak.	Virus serotype A
	Georgia	March 2004	Kaspi District, Doesi Village (central Georgia)	
	Malawi	May 2004	Karonga Agricultural Development Division, Chitipa District, Chiwanga Diptank	Virus serotype SAT-2
	Mongolia	February 2004	Dornogovi Province	Virus serotype O
	Nigeria	September 2004	State of Imo, Owerri District (southern Nigeria)	
	Peru	June 2004	Lima Department, Lurín District	Virus serotype O
	Russian Federation	April 2004	Amur Subject (Amurskaya Oblast), Tambovka District	Virus serotype O (pan-Asian group)
	South Africa	July 2004	Eastern edge of the buffer zone of the FMD Controlled Area, next to Letaba Ranch in Limpopo Province (northeastern South Africa)	Virus serotype SAT-2
	Tajikistan	January 2004	Gorno-Badakhshan Autonomous Region	Virus serotype A
	Zambia	February 2004	Northern Province, Mbala District, Kawimbe Veterinary Camp	Virus serotypes SAT-1, SAT-2, SAT-3 and O
		March 2004	Northern Province, Nakonde District, Central Veterinary Camp	Virus serotypes SAT-1, SAT-2, SAT-3 and O
		April 2004	Northern Province, Mbala District, Mwamba Veterinary Camp	Virus serotypes SAT-1, SAT-2, SAT-3 and O
		May 2004	Northern Province, Mpulungu District, Muzambwela Village	Virus serotypes SAT-1, SAT-2, SAT-3 and O
		June 2004	Northern Province, Chinsali District, Kaso Veterinary Camp	Virus serotypes SAT-1, SAT-2, SAT-3 and O
Contagious bovine pleuropneumonia	Democratic Republic of the Congo	June 2004	Ituri (northeastern Democratic Republic of the Congo)	
	Nigeria	July–August 2004	State of Kano (northern Nigeria)	
	Zambia	April 2004	Southern Province, Kazungula District, Bombwe Veterinary Camp	
		May 2004	Southern Province, Kazungula District, Nguba Village	
African swine fever	Italy	September 2004	Sardegna Region, Nuoro Province	
	Senegal	July 2004	Thiès Region, Thiès Department	
	United Republic of Tanzania	April 2004	Kasulu District, Kibuye Village Kasulu District, Muyovozi Refugee Camp Kigoma District, Bangwe Village	

Outbreaks reported, January–October 2004 *(cont.)*

Disease	Country/region	Reporting date	Location	Agent characterization
Classical swine fever	Albania	March 2004	Laç (western Albania) Lezhe (western Albania)	
	Bulgaria	May 2004	Burgas Region, Sredets District, Trakiytsi Village	
	Germany	September 2004	Rhineland-Palatinate State, Pirmasens District	
	Nicaragua	June 2004	Managua	
	Slovakia	August 2004	Lucenec District, Masková Locality	
Peste des petits ruminants	Côte d'Ivoire	July 2004	Lagunes Region, Abidjan Department, Jacqueville District (southern Côte d'Ivoire)	
Highly pathogenic avian influenza	Asia	Because HPAI has affected a number of countries in Asia since December 2003, an additional table represents Asia for this disease (see page 22)		
	South Africa	August 2004	Eastern Cape Province, Blue Crane Municipal District	Virus subtype H5N2
	United States of America	February 2004	State of Texas, Gonzales County	
Bluetongue	Croatia	May 2004	Vinkovci County, town of Gradište (eastern Croatia)	Virus serotype 9
	France (Corsica)	September 2004	Corse-du-Sud Department: Porto-Vecchio, Cauro and Sartène Districts Haute-Corse Department, Prunelli-di-Casacconi District	Virus serotypes 16 and 4
	Lesotho	March 2004	Leribe District	
	Morocco	September 2004	Ifrane Province Kénitra Province Khémisset Province Khouribga Province	
		October 2004	Kénitra Province, Khémisset Province Khouribga Province Larache Province Meknès Province Sefrou Province Sidi-Kacem Province Taounate Province Taza Province	Virus serotype 4
	Namibia	July 2004	Grootfontein	
	Spain	October 2004	Andalucía Autonomous Community, Cádiz Province, Jimena de la Frontera Municipality	

Source: OIE Web site: http://www.oie.int/

Contributions from FAO reference laboratories and collaborating centres

FAO/OIE World Reference Laboratory for Foot-and-Mouth Disease, Pirbright, United Kingdom
Report for January–September 2004

Country/region	No. of samples	Virus isolation in cell culture/ELISA									RT-PCR[1] for FMD (or SVD) virus (where appropriate)		
		FMD virus serotype							SVD virus	NVD[2]	Positive	Negative	Not tested
		O	A	C	SAT-1	SAT-2	SAT-3	Asia 1					
Bhutan	52	16	-	-	-	-	-	-	-	36	31	21	-
Botswana	2	-	-	-	-	2	-	-	-	-	-	-	2
China, Hong Kong SAR	12	9	-	-	-	-	-	-	-	3	11	1	-
Iran, Islamic Republic of	9	2	1	-	-	-	-	-	-	6	4	5	-
Israel	6	3	-	-	-	-	-	-	-	3	6	-	-
Italy	18	-	-	-	-	-	-	-	18	-	-	-	18
Malawi	8	-	-	-	5	2	-	-	-	1	-	-	8
Malaysia	13[3]	10	4	-	-	-	-	-	-	-	13	-	-
Mozambique	1	-	-	-	-	1	-	-	-	-	-	0	1
Namibia	1	-	-	-	1	-	-	-	-	-	-	-	1
Portugal	2	-	-	-	-	-	-	-	2	-	2[4]	-	-
Rwanda	3	2	-	-	-	1	-	-	-	-	-	-	3
Saudi Arabia	1	-	-	-	-	-	-	-	-	1	1	-	-
Sudan	37	11	-	-	-	-	-	-	-	26	1	36	-
Uganda	60	8	-	-	-	-	-	-	-	52	10	50	-
Yemen	111	38	-	-	-	-	-	-	-	73	40	71	-
Zambia	20	2	-	-	17	-	-	-	-	1	13	3	4
Zimbabwe	40[5]	-	-	-	7	35	-	-	-	1	-	-	40
Total	**396**	**101**	**5**	**-**	**30**	**41**	**-**	**-**	**20**	**203**	**132**	**187**	**77**

[1] RT-PCR: reverse transcription polymerase chain reaction for FMD (or SVD) viral genome; FMD: foot-and-mouth disease; SVD: swine vesicular disease
[2] NVD: no FMD, SVD or vesicular stomatitis virus detected
[3] One sample from Malaysia contained a mixture of FMD virus types O and A
[4] Positive by RT-PCR for SVD but negative for FMD viral genome
[5] Three samples from Zimbabwe contained a mixture of FMD virus types SAT-1 and SAT-2

FAO/OIE World Reference Laboratory for Rinderpest and *Peste des Petits Ruminants*, Pirbright, United Kingdom
Report for January–September 2004

Diagnostic samples

Country	Date received (dd/mm/yy)	Number	Material	PCR rinderpest
Ethiopia	04/06/04	4	Lymph nodes and spleens	Negative
Kenya	09/01/04	48	Lymph node aspirates and eye swabs	Negative
Sudan	12/03/04[1]	50	Various tissues and swabs	Negative
	24/08/04[2]	62	Various tissues and swabs	Negative
Yemen	20/09/04	7	Tissues and swabs	Negative

[1] Some samples tested for bovine viral diarrhoea virus (BVDV) and malignant catarrhal fever virus (MCFV). Some samples were PCR positive for MCFV-specific DNA and BVDV negative
[2] Some samples tested for MCFV. Some samples were PCR positive for MCFV-specific DNA

C-ELISA results from the examination of serum samples

Origin	Date received (dd/mm/yy)	Number	Species	C-ELISA[1] rinderpest
African wildlife via Denmark	18/08/04	45	Various wildlife from East Africa 1995–1999	Some positive
Sudan	12/03/04	24	Bovine	Negative
	24/08/04	15	Bovine	1 positive
Syrian Arab Republic[2]	24/06/04	62	Bovine	Most negative
United States of America	13/02/04[3]	3	Bovine	Negative
	19/02/04	6	Bovine	Negative
	19/03/04	15	Bovine	Negative
	08/04/04	15	Bovine	Negative
	12/05/04	15	Bovine	Negative
	02/07/04	9	Bovine	Negative
	06/08/04	6	Bovine	Negative
	06/09/04	12	Bovine	Negative

[1] Monoclonal antibody based H competitive ELISA
[2] Sera submitted for vaccine efficacy testing. Only one of three rinderpest vaccine batches induced seroconversion
[3] Sera from commercial company submitted for extraneous agent testing

Rinderpest and *peste des petits ruminants* vaccine titration

Country	Date received (dd/mm/yy)	Number	Virus	Pass/fail
Syrian Arab Republic	24/06/04	4 batches	Rinderpest	3 pass, 1 fail

New staff

Dr Akiko Kamata

Dr Akiko Kamata has joined the EMPRES group of the Animal Health Service, returning to the service where she served as an Associate Professional Officer from 1994 to 1996. Dr Kamata assumed duties as Animal Health Officer (Infectious Disease Analysis and Early Warning) on 19 January 2004. From Japan, Dr Kamata completed her undergraduate and Master's degrees in veterinary medicine at the Kitasato University, Japan. During the past five years she has worked at the Animal Quarantine Service and Chief Veterinary Office, Ministry of Agriculture, Forestry and Fisheries, Japan. Dr Kamata has a strong interest in geographic information systems (GIS) and reporting systems for the improvement of animal health and progressive control of transboundary animal diseases. She is currently in charge of developing and deploying TADinfo, the FAO animal disease database. Her work encompasses infectious disease analysis and early warning initiatives within the Animal Production and Health Division of FAO.

Dr Giancarlo Ferrari

Dr Ferrari joined the EMPRES group of the Animal Health Service as Project Leader of GTFS/INT/907/ITA (Control of Transboundary Animal Diseases in Central Asia), with Afghanistan, Pakistan, Tajikistan, Turkmenistan, and Uzbekistan as primary beneficiary countries, in August 2004. The project is supported by the Italian Government's contribution to the Special Programme for Food Security Trust Fund. Dr Ferrari is a veterinarian graduated from the Faculty of Pisa, with further academic work in biostatistics and epidemiology at the University of Rome. He previously worked at the Istituto Zooprofilattico Sperimentale delle Regioni Lazio e Toscana (Rome), beginning in 1987 as a virologist and subsequently serving as an epidemiologist and as Head of the Epidemiology Unit.

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