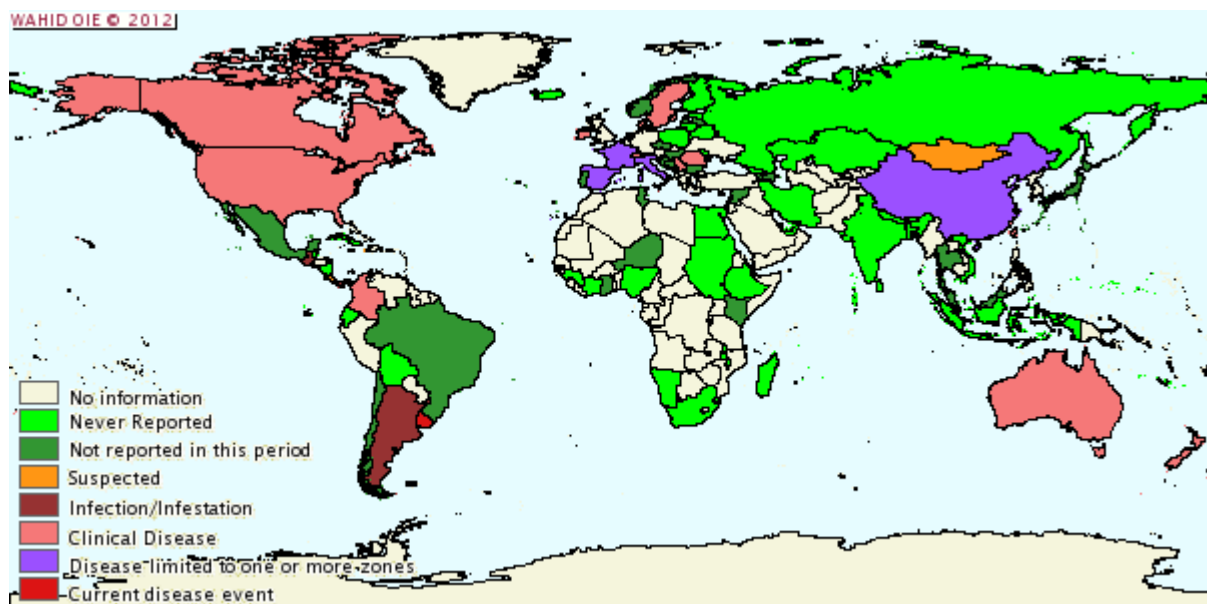


CAE, a Disease that Developed Countries Give to the Goats of Under-Developed Countries

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Live goat trading is regarded as “a major risk factor in the spread” for the spread of Caprine Arthritis Encephalitis (C.A.E.) , also called Caprine Retro-virus or Small Ruminant Lentivirus (SRLV), infection between goat herds.ⁱ A consensus conference of European Union scientists reported that the “export of European breeds of goats and sheep has resulted in the spread of SRLVs to various parts of the world . In contrast, certain indigenous goat breeds that have had no contact with imported goat breeds, suchare free of CAE.”ⁱⁱ More evidence to support these above statements is expanded on in the paragraphs below.

CAE virus infection is “rare among indigenous goat breeds of developing countries unless they have been in contact with imported goats” despite being widespread in Europe and North America.ⁱⁱⁱ Australia gave the disease to New Zealand 30 odd years ago with imported Australian goats. Every 6 months the OIE maps the presence and absence of CAE and by far the widespread areas are in Europe, North America and Australasia. See below:



As early as 1984, it was recognised that the main risk factor was exposure to imported goats from countries where CAE was endemic. In a global survey of goats using the AGID tests for CAE antibodies, 3729 goats were tested in 112 locations throughout the world.^{iv} These researchers found that over 90 per cent of the 1265 positive samples came from Canada, France, Norway, Switzerland and the USA, all of which had 65 per cent reactors or greater. Fiji, Great Britain, Kenya, Mexico, New Zealand and Peru had fewer than 10 per cent positive samples; the majority of these could be traced to importations of goats from countries where there was a high occurrence of precipitating antibody. Somalia, Sudan and South Africa had no reactors among 306 samples. No positive reactors were found in the 1116 samples from indigenous goats which were known to have had no contact with imported goats from countries which had a high occurrence. In 1985, a study of CAE in goats in Italy found that in 30 goat herds in 7 Italian regions, that there was a serological

positive rate of just under 35% but this was much lower in indigenous Italian breeds compared to imported breeds such as Toggenburgs, Saanens and Alpines.^v

Many surveys of CAE prevalence in different countries have found that positive CAE results has found an increased prevalence in goats in close contact with goats imported from countries with a high CAE prevalence. Spain, which had not identified CAE although it was importing goats from France, finally did a serological surveillance project. This surveyed 22 native Spanish goat herds of the of caprine arthritis and Murciano-Granadina goat herds and found that of the 2513 lactating goats were tested with an agar gel immunodiffusion test and 12.1 per cent were found to be positive. Five of the herds were free of infection, six had a low prevalence of the disease, five had a medium prevalence and six had a high prevalence.^{vi} A serological survey of indigenous goats from five different regions in the Sultanate of Oman found that of the samples collected from slaughtered goats (N=1,110) and from the National Serum Bank (n=528) that 83 (5.1%) of screened samples were classed as seropositive. The results provide the first serological evidence for the presence of CAE virus in Oman.^{vii} South Korea surveyed its native goats for CAE using an enzyme-linked immunosorbent assay (ELISA) and an agar gel immunodiffusion (AGID) test. A total of 658 black goats of various breeds were sampled from 59 farms in three regions of Korea. The CAE-positive goats were predominantly detected in the Southern region (n=17) as compared with the Northern (n=1) and Central regions (n=0). Among 658 goats tested, 18 were positive in both ELISA and AGID, indicating a CAE prevalence of 2.73% (95% confidence interval: 1.74-4.28).^{viii} There was a prevalence of 12.5% of 72 Syrian goats via serological testing for CAE.^{ix} CAE was found in imported goats in Mexico.^x Over 560 dairy goats were blood tested for CAE in Brazil and 14.1% were positive.^{xi}

In this study, a serological survey in goat herds for antibodies against Caprine Arthritis Encephalitis Virus (CAEV) in Turkey is described. 808 serum samples were collected from three state farms and seven private flocks in different regions of Turkey. The serologic examination was performed by Agar Gel Immunodiffusion (AGID) technique. 16 (1.9%) out of 808 sera deriving from two state farms (n = 14) and one private herd (n = 2) were found to be serologically positive. The findings are discussed with regard to the relatively low prevalence of CAEV in Turkey, age and race dependency and the kind of origin of the serologically screened animals.^{xii}

Unfortunately there have been a lot of cases where developing countries have imported better dairy genetics but buying goats from non-accredited CAE free herds and then finding out they had introduced CAE into their country. One such case was Kenya and this was written up as a case study.^{xiii} The Kenyan government imported 30 Nubian does, 4 Nubian bucks and 2 Toggenburg bucks from the USA and kept them in closed herds, except that the bucks were used over native does for a 6 week mating period in 1979 and 1980 and sometimes penned with native bucks. In 1980, 9 of the imported Nubian does showed signs of arthritis and for 3 of the 9 emaciation as well. In 1981, all the goats were blood tested and it was found that 80% of the imported goats and their progeny were positive for CAE. The Kenyan government then quarantined and destroyed all the goats on the farms with the imported goats. By this stage 50% of the imported goats were showing clinical signs of CAE. Kenyan authorities then blood tested all native does and bucks that had been in contact with the imported bucks as well as native goats that had had no contact. Of the 555 goats that had had contact, there were only 2 positives. Also one native weaner male penned with the imported bucks for 5 months was found to be positive and was destroyed. They concluded that "under the conditions found in Kenya, horizontal transmission from bucks to does during the breeding seems to

be inefficient or non-existent. Furthermore transmission via sperm to offspring did not apparently occur.”^{xiv}

Another outcome, besides all the imported goats being destroyed, was the reputation of USA goat breeders was jeopardized and this case study was used by US veterinary experts to put pressure on the US dairy goat community to clean up CAE.^{xv} However progress in CAE eradication in the USA has been slow.

Serological Testing in General

It is essential that livestock trading and goat introductions into a herd, are not be based on a single individual goat blood test. This is because a number of factors can affect the serological test results. Vaccinations can affect the ELISA test and false negatives are possible e.g. with bluetongue vaccinations.^{xvi} “Negative test results do not reliably rule out CAE virus infection, because the time for post-infection seroconversion is variable and occasional goats have a very low titre that may not be detectable. Low antibody titres are common in late pregnancy.”^{xvii} Also some carrier goats can give a periodic false negative serological test results.^{xviii}

False positives are very uncommon but can occur if the goat is ill at the time of blood sampling. Also it is important that the sera samples are not haemolysed to get accurate results. Allowing the blood samples to clot before packing, chilling and sending to the laboratory is recommended. Veterinary submission to laboratories is essential to ensure proper handling and interpretation of results.

Semen and Embryo Transfer

Embryo Transfer is seen as a safe option for the introduction of new genetics or to salvage the genetics of positive CAE goats.^{xix} Normal washing of the embryo should provide protection. While the Small Ruminant Lentivirus and CAE virus have been found in semen, it is not considered a very high risk.^{xxxix} However, it is recommended that bucks have multiple serological tests for CAE or better still, sourcing from an accredited CAE free herd, before semen collected is recommended.

Conclusion

While the current OIE recommendation is for a single blood test for CAE prior to export (or of the dam if the kid is under 6 months), this is not enough to protect under-developed countries from getting CAE with improved goat genetics. The analysis of the CAE control (and Maedi Visna in sheep) schemes in the UK found that these accreditation schemes were effective with only 0.11 % losing their accreditation on an annual basis, mainly (54.5%) due to contact with their own positive animals.^{xxii} In order to protect developing countries global trade in goats for export should be sourced from tested free herds only. The use of whole herd testing to identify CAE or Small Ruminant Lentivirus (SRLV) herds as per the EU consensus conference is critical part of control and eradication.^{xxiii}

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