

RVF surveillance in Mayotte: Tracking an invisible disease from the society point of view

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Abstract

Rift Valley fever circulates in Mayotte's ruminants' population since 2004 but no symptomatic case among ruminants was officially declared. An active surveillance system has been implemented but couldn't link any seroconversion with an abortion event in the same herd. Farmers declare to know Rift Valley Fever but are not able to describe it. Their general knowledge health practices tend to be quite homogenous independently from the intensification of their farming system. It seems that they comply with the RVF surveillance and the prevention system only passively. The preoccupation of the farmers and the decision makers goes to more visible disease such as blackleg, against which the only vaccination campaign in Mayotte is promoted.

Introduction

Rift Valley Fever (RVF) is a zoonosis of high concern all over Africa. It has caused abortion storms among livestock of many country (Tanzania, South Africa, Mauritania...) as well as epidemics (200 000 human cases in 1977 in Egypt, 155 deaths in Kenya in 2006...). Being arthropod-borne as well as directly transmitted through infected fluids (aborts, raw milk, etc.), its epidemiologic cycle adapts itself from country to country and through time following the evolution of environmental and socio-economic parameters (Chevalier 2010).

Mayotte is a French territory part of the Comoros archipelago. Persistence of RVF virus, proved by repeated serological cross-sectional studies since 2004, in this small (376km²) tropical island (Cêtre-Sossah et al. 2012; Lernout et al. 2013) was not expected (Afssa 2008). While sporadic human cases have been declared in 2007, 2011 and 2012 in the Comoros archipelago, no symptoms were related to RVF detection in animals (Maquart et al. 2014). Is the abortion declaration system failing to detect RVF circulation or is RVF circulating silently? This situation raises also questions on farmers and decision-makers' perception towards RVF in Mayotte after one alert to the population in 2007, 5 years of field research and one communication campaign on abortion declaration but still no visible impact.

This study was thus divided into 3 parts:

- Investigating the available data to clarify the existence of an impact of RVF virus circulation by comparing abortion declaration and seroconversions.

- Describing the farmers' knowledge, attitude and practice towards RVF in comparison with more common diseases like blackleg.

- Interrogating decision makers in public health policies to understand Mayotte's specificities that have to be taken into account in RVF management proposals.

Materials and methods

Serology and abortion declaration

Abortion declarations were checked in the veterinary services archive since 2010.

20 farms (2010, 2011) and 50 farms (2012, 2013) were chosen as sentinel herds by the local epidemiosurveillance network (SESAM). All animals were tested for RVF IgG presence.

Farmers knowledge, practice and perception

A previous study from Cirad had classified 70 cattle farmers into 3 types of handling: modern, intermediate and traditional. We selected 12 farmers representing those 3 different levels of cattle handling (n= 3, 3 and 6 respectively). They were interviewed with a double questionnaire with

- closed-ended questions on the farm general handling (no of cattle, type of production, commercialization and benefits) on health management concerning practices at risk for RVF: abortion (measures taken, call for a vet...), between herds contacts (number of contact through pasture, exchange system, reproduction practices...) and slaughter (location, use of prevention material...) management, and on health management in general (most common health problem, acceptability of vaccination, money constraint).

- and open-ended qualitative information : reason for cattle farming, perception and knowledge on cattle health, etc.

The survey was performed after getting oral consent from the farmers at the location of their choice (at home, on the farm...) and with the help of a translator for those who preferred to speak in *shimaore*.

Other stakeholders (n=19) related to veterinary public health management (politics, regional agency for health, veterinary services, epidemiologists, private veterinarians, farmers representatives) were individually interviewed to determine the specificity of Mayotte regarding to veterinary public health management. The interviews were recorded, individually transcribed and thematically analysed.

Result

Serology and abortion declaration

A total of 66 abortion declarations were found in the archive. 13 animals aborted in RVF sentinel herds, but they didn't seroconverted. In 2012 and 2013 none of the animals from the herds where an abortion was declared seroconverted. For anterior years, serology results are still to be confirmed.

Table 1. Abortion declaration compared with

	Total cattle population	Farms with longitudinal serological survey		
	Number of abortion declaration	Number of abortion declaration/ number of farms followed	Did aborted cow seroconverted ?	Number of seroconversion in the farms with/ without abortion
2010	8	2/20	No	NA
2011	11	4/20	No	NA
2012	22	5/50	No	0 / 3
2013	25	2/50	No	0 / 3

Farmers survey

With only 12 interviews for now, we cannot conclude on the quantitative analysis. It seems that there is no clear typology of health management corresponding to the level of intensification of the farm. All types of farm may call a vet for example (3/3, 3/3, 4/6). But the open-ended questions showed that the gravity of a disease is highly variable between farmers. Health expenses range from 0 to 4000 euros/year.

The farmers' perception and decision towards health come more from their personal experience. Only one farmer declared to use traditional plants preparation as a treatment. Ticks are the main preoccupation of farmers (9/12) and sea water is commonly used (1/3, 2/3, 5/6) for both skin problems and intern parasites.

All farmers know about blackleg and use blackleg vaccination and declare it as a very efficient prevention mean. Situation is less clear for RVF even if more than half declare to know RVF (3/3, 2/3, 3/6) many don't know about the 2007 alert and none of them cites RVF as a zoonoses.

Contacts between animals of different farms seemed limited regarding to the housing of animals (they were all either in a barn or attached in the property of their owner) because farmers are aware of the risk of disease transmission. But none took precaution while buying new animals or exchanging animals for reproduction or for leasing. So finally 6/12 farmers were at risk of introducing diseases in their herd.

No safety measures are taken while handling aborted calves or slaughtering animals.

Stakeholders interviews

These interviews showed that there is a very limited number of agents handling veterinary public health issues in Mayotte. At this time, cooperation and communication are seen as very efficient, but the turnover rate of French

civil servantw based in Mayotte is perceived as a threat to the network.

RVF is not a real concern for them, even if they are all aware of the potential risk coming from this disease they wait that an impact in public health is shown to react. They proved their interest for every human case suspicion.

Discussion

RVF impact and surveillance system efficiency

We were not able to link any abortion declaration with a RVF seroconversion. But we cannot conclude directly of the absence of impact of RVF. Serological tests may not be sensitive enough. After the declaration of two abortions in a goat herd in the same week of 2011, sampled were found positive for RVF virus with a new highly sensitive PCR method but didn't seroconverted (Maquart et al. 2014).

In 2010 and 2011, farmers were abortion directly encouraged to declare abortion but this had little impact. In 2012 and 2013, vets were encouraged by the surveillance network (SESAM) to communicate on abortion declaration. Declaration doubled.

Though compulsory and free of charge for the farmers, abortion declaration rate is known to be low, even in mainland France (Broner et al. 2013)

Farmers knowledge and practices

Farmers don't feel much concerned about RVF. Most of them probably never experienced it and the precaution alert in 2007 as well as abortion declaration towards RVF messages may not have reached them efficiently. A recent study showed that it was mostly farmers experiencing the diseases and losses that were able to describe it (Chengula, Mdegela, et Kasanga 2013).

In comparison with RVF, blackleg is widely known and actively handled. This proves the possibility to handle RVF if the farmers see a direct impact on their herds.

Practices at risk for human transmission are common. Animal introduction is also at risk, but not as important as it could be described like in Madagascar or east Africa (with big markets, transhumance...). Herd immunity could also play a protective role

Decision Making in Mayotte

Public policies towards RVF in Mayotte have to be adapted to its local context. So far the limitation of its impact on human or economy did not motivate a response to seroconversion or PCR evidences and prevention messages failed to reach the farmers.

More work is needed to understand the epidemiologic situation in Mayotte and prepare the most appropriate response. We have decided to continue this study with a larger set of farmers, including goat herds, and a quantitative survey to identify the existence of clusters of farmers concerning their health practice, and the link with RVF serology.

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