Seroepidemiological survey of Rift Valley fever and *Peste des Petits Ruminants* in the Sahrawi Arab Democratic Republic, Western Sahara

Di Nardo A1, Rossi D2, Mohammed Lamin Saleh S3, Mohammed Leilifa S3, Hatri Hamdi S3, Sabatini M4, Di Gennaro A5, Savini G5, Thrusfield MV6

1 Institute for Animal Health, Ash Road, Pirbright, Woking, Surrey, GU24 6QF, United Kingdom
2 Africa 70 (International Non-Governmental Organization), Rabouni, Algeria
3 Dirección Nacional de Veterinaria, Ministerio de Salud Pública, República Arab Sahraui Democrática, Rabouni, Algeria
4 Faculty of Veterinary Medicine, University of Perugia, Via S. Costanzo, 06126 Montebello (PG), Italy
5 Istituto Zooprofilattico Sperimentale dell’Umbria e del Molise “G. Caporaso”, Via Campo Boario, 64100 Teramo, Italy
6 University of Edinburgh, Veterinary Clinical Sciences, The Royal (Dick) of Veterinary Studies, Easter Bush Veterinary Centre, Roslin, Midlothian, EH25 9RG, United Kingdom

**INTRODUCTION**

The seroprevalence of Rift Valley fever (RVF) and *Peste des Petits Ruminants* (PPR) in sheep, goat and camel populations of the Sahrawi Arab Democratic Republic (SADR), Western Sahara (WS) was estimated for the first time. Sera were collected from a field study conducted in the whole SADR territory between March and April 2007 (Fig. 1).

**METHODS**

The survey was based on two-stage cluster sampling of 23 clusters (Fig. 2), considering a finite population as per the 2007 census (Tab. 1). The sample size was calculated assuming the expected prevalence ($P_{est}$) = 15%, with the absolute precision ($d$) = ±5%, and the between-cluster variance ($V_c$) = 0.0039 for RVF, where for PPR a $P_{est}$ = 18%, with $d$ = ±5%, and $V_c$ = 0.0026 was assumed. A total of 982 samples were collected from sheep ($n$=461), goats ($n$=463) and camels ($n$=58). The sample size obtained was tested in CSurvey.

**RESULTS**

Low RVF seroprevalence was reported (1%; 95%CI 0.9% to 1.1%), where 11 of 982 samples tested positive, whereas, 264 of 976 animals were found positive for PPR (29.3%; 95% CI 28.9% to 29.7%) (Tab. 2). Analysis of serological results by species revealed a significant increase of seroprevalence in goats (PPR, $p$=0.0022; RVF, $p$<0.0001) and older animals (RVF, $p$=0.02; PPR, $p$<0.001). A high prevalence of RVF was reported in Tifariti region (5%; 95% CI 3.7% to 6.6%) (Fig. 5), where spatial analysis revealed a high prevalence in the Tifariti site 10 (7.7%; 95% CI 5.2% to 10.2%) and in the Meheiras site 15 (7.1%; 95% CI 3.5% to 12%) (Fig. 3, 6), reporting higher finding in goats in both of clusters, 15.4% (95% CI 11.6% to 20.1%) and 14.3% (95% CI 7.1% to 23.4%), respectively.

A high prevalence of PPR was reported in the Wilaya (30.1%; 95% CI 29.7% to 30.5%) and Bir Lehou (33.5%; 95% CI 30.3% to 36.9%), Tifariti (45.2%); 95% CI 42% to 48.5%) and Agwanit (31%; 95% CI 28.4% to 33.7%) regions (Fig. 8), where spatial analysis revealed high prevalence in 27 Febrero site 1 (34.5%; 95% CI 31.1% to 38%), Asward site 3 (40%; 95% CI 42% to 44%), El Aouin site 4 (32.7%; 95% CI 32% to 33.5%), Bir Lehou site 5 (33.3%; 95% CI 29.2% to 37.7%), Tifariti site 9 (39.3%; 95% CI 33.8% to 45.1%), Tifariti site 10 (49.6%; 95% CI 45.5% to 53.7%) and Agwanit site 20 (34.5% (95% CI 31.2% to 38%) (Fig. 9).

**CONCLUSIONS**

Data about RVF and PPR prevalence and distribution are reported for WS for the first time. Although the overall prevalence reported for RVF is not alarming, the presence of clusters with high prevalence deserves more attention because it suggests RVF activity in the Maghreb region, where the high prevalence reported for PPR is likely to suggest its endemic occurrence in WS. The high prevalence found in Tifariti may indicates a hot spot for RVF and PPR risk from this region.