

Prevalence and genetic diversity of rotaviruses in swine raised under small-scale production system in East Africa

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Summary

The incidence of rotavirus (RV) infection in nursing and weaned pigs on small-scale farms (n=1-25 pigs per farm) under different management systems was determined. A total of 251 fecal samples collected from Kenya (n=140) and Uganda (n=111) were screened for rotaviruses (A, B and C) using RT-PCR assay. RVs were identified in 42.2% of the samples. Of these, 40.6%, 0% and 6.0% were positive for group A, B and C RVs respectively. 10.4% (11/106) of the RV positive samples were mixed group A and C RV infections. The incidence of RV was slightly higher in Uganda (45.5%) compared to Kenya (42.2%). More nursing piglets (82.9%) shed RV than weaned piglets (30.0%-37.5%). More pigs that were either housed and free-range (76.5%) or tethered and free-range (45.1%) or tethered only (38.3%) were RV positive than the free-range (12.5%) or housed (33.3%) or housed and tethered (0%) pigs. The Age and management system affected the prevalence of RV infections with housed and free-range system presenting high risk for RV infection. Partial (811-1604nt region sequence of VP4 gene of selected positive samples revealed that different P genotypes (P[6], P[8] and P[13]) are circulating in the study region with P[8] being more dominant.

Introduction

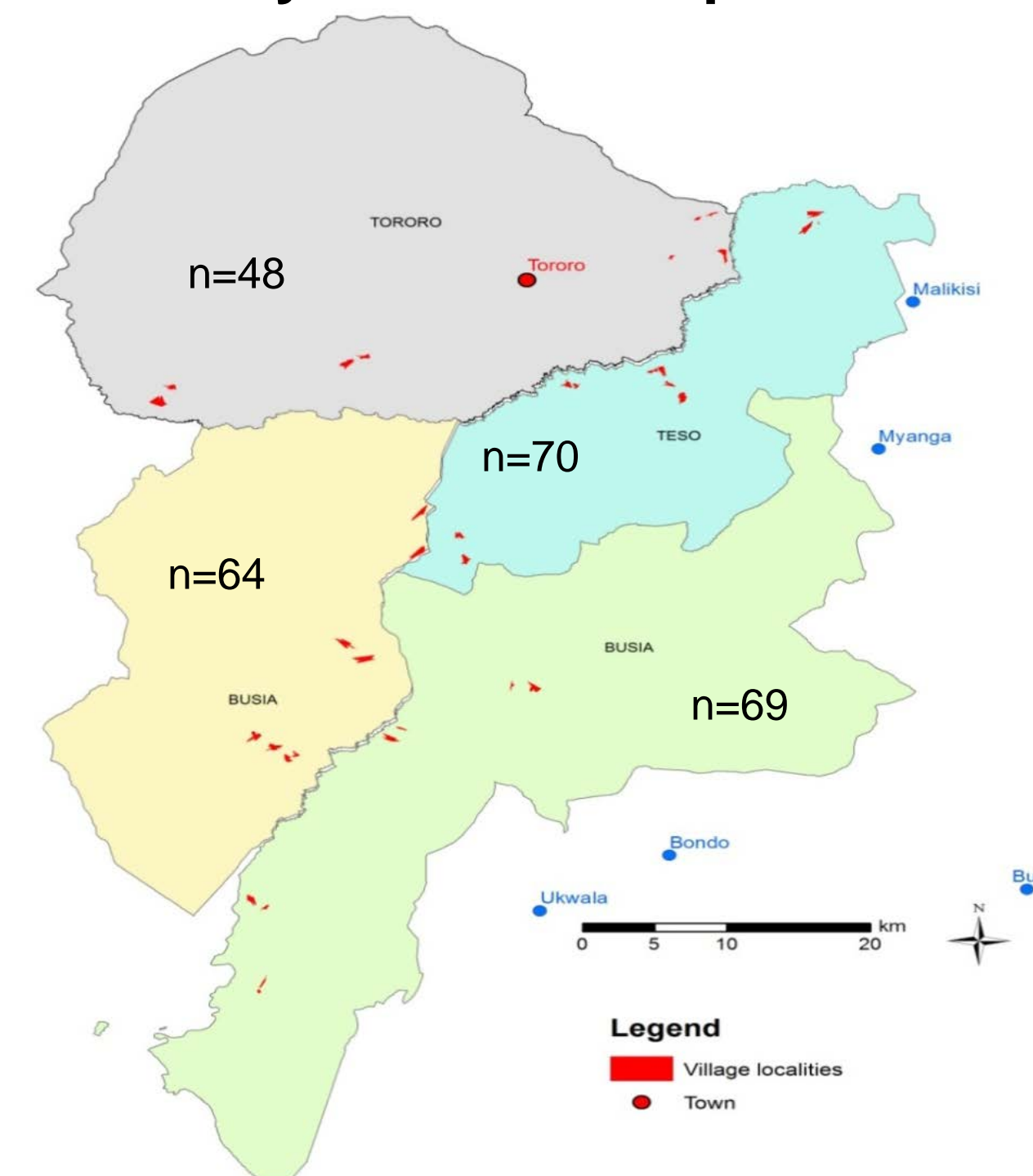
- Small-scale pig production (free range or small backyard herds) constitutes >70% of the total pig farmers in Kenya and Uganda.
- East Africa is known for the large population of wild (bush) pigs and warthogs that are in close contact with domestic pigs creating favorable conditions for intermixing and spread of viral strains.
- Pigs often live in close proximity to humans, causing public health concerns and a need for increasing health standards
- Viral diseases of swine (e.g. TGE, Circovirus, **Rotavirus (RV)**, swine influenza, PRRS) represent the greatest challenges in the control and prevention of infectious diseases.
- Rotavirus-associated enteritis is a major problem in young calves (Saif & Jiang, 1994), nursing and post-weaning piglets (Kapikian et al., 1996) and foals (Conner et al., 1983)
- The prevalence of porcine RV in the East African is unknown but is suspected to play an important role in diarrhea in suckling and weaned piglets
- Knowledge of the molecular epidemiology of porcine RVs is critical for development of accurate diagnostic tools for diarrhea in pigs and potential RV vaccines based on the dominant RV genogroups and genotypes.

Objective

To investigate the prevalence of rotavirus genogroups (A, B, C) and group A RV genotypes in fecal samples from domestic pigs of various ages collected in western Kenya and eastern Uganda using RT-PCR assay and partial sequencing.

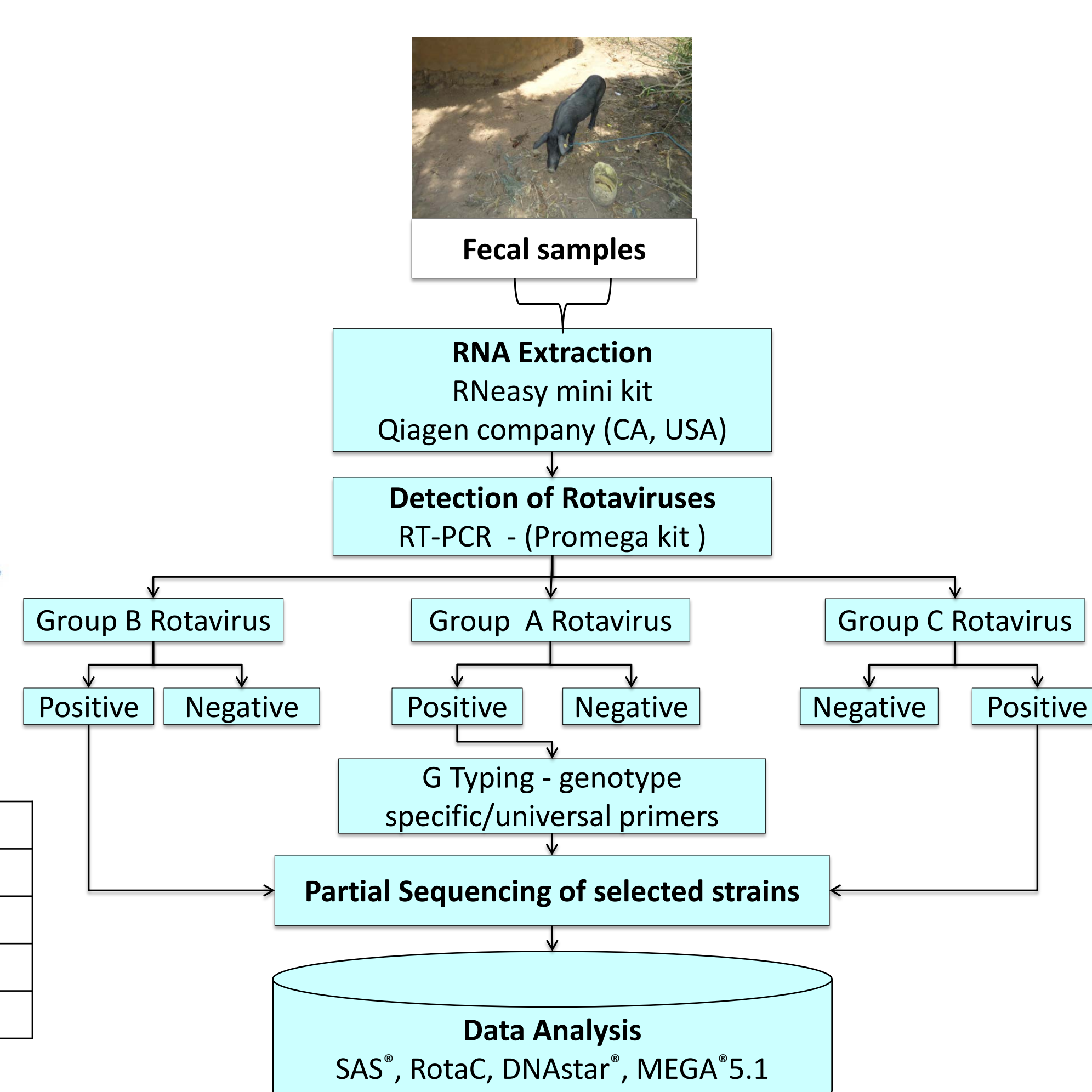
Methods

Study site and Sample number



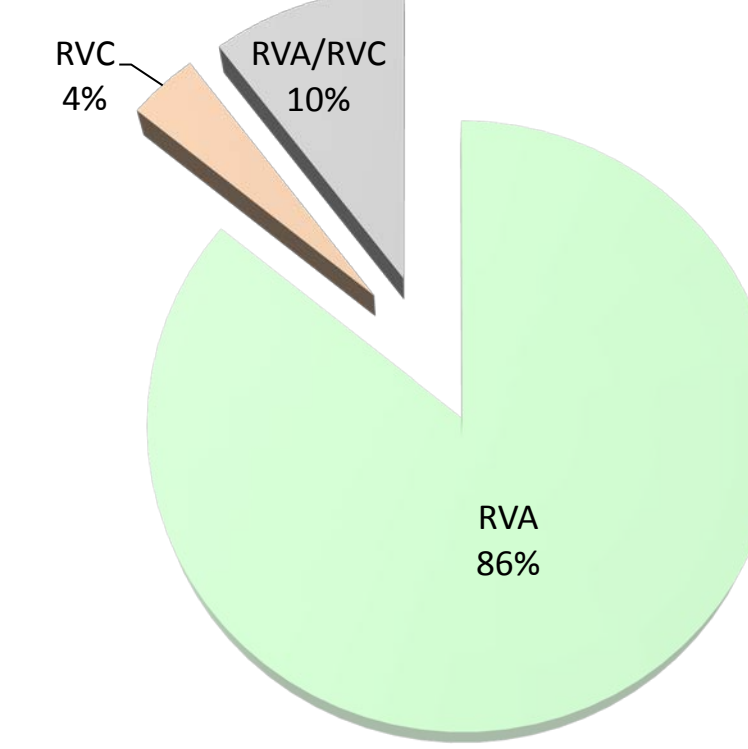
Age group (Mo)	Kenya	Uganda	Total
Nursing (<1mo)	22	19	41
Weaned (3mo)	48	42	90
Weaned (4mo)	70	50	120
Total	140	111	251

Laboratory sample processing

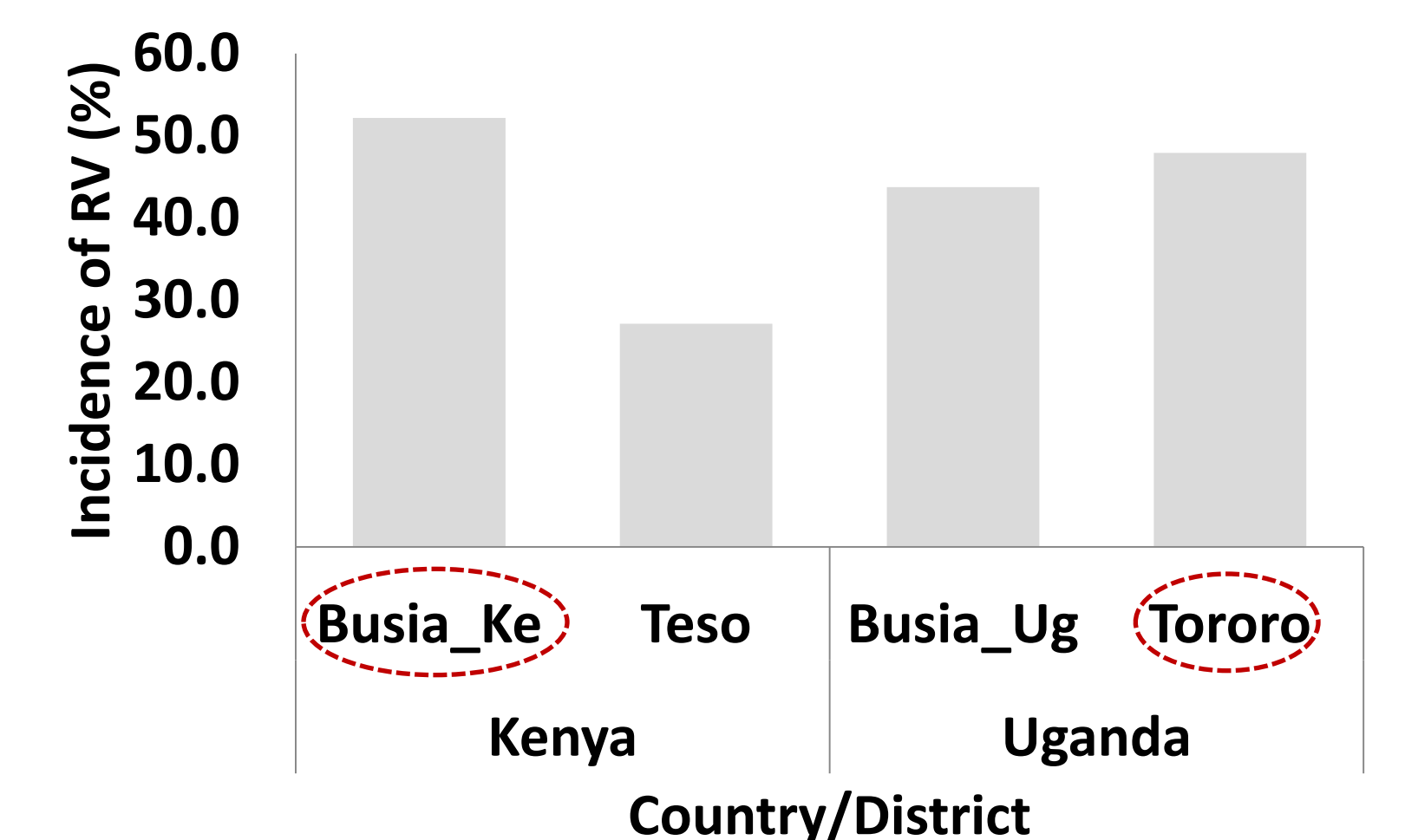


Results

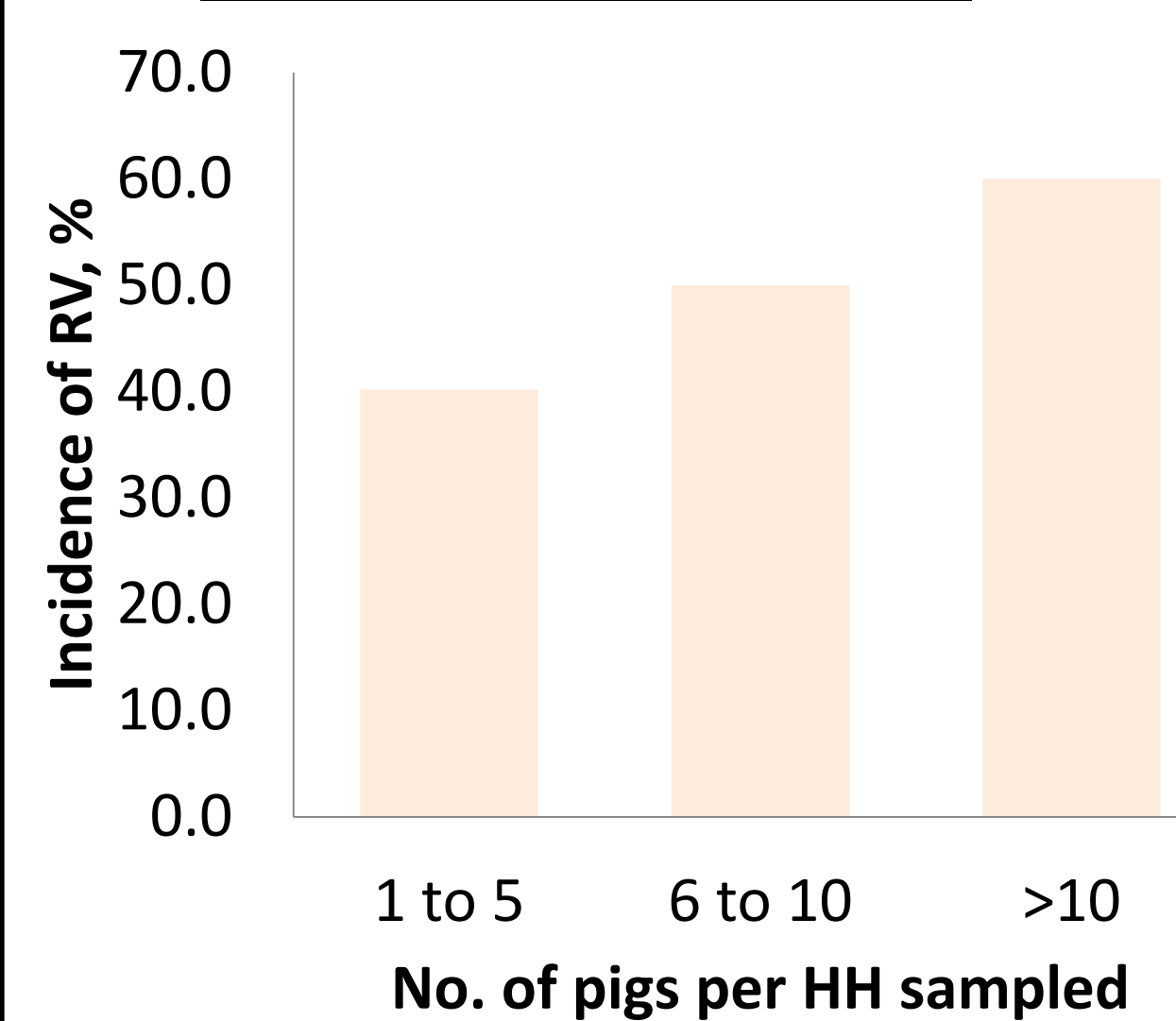
RVAs were dominant in nursing and weaned pigs



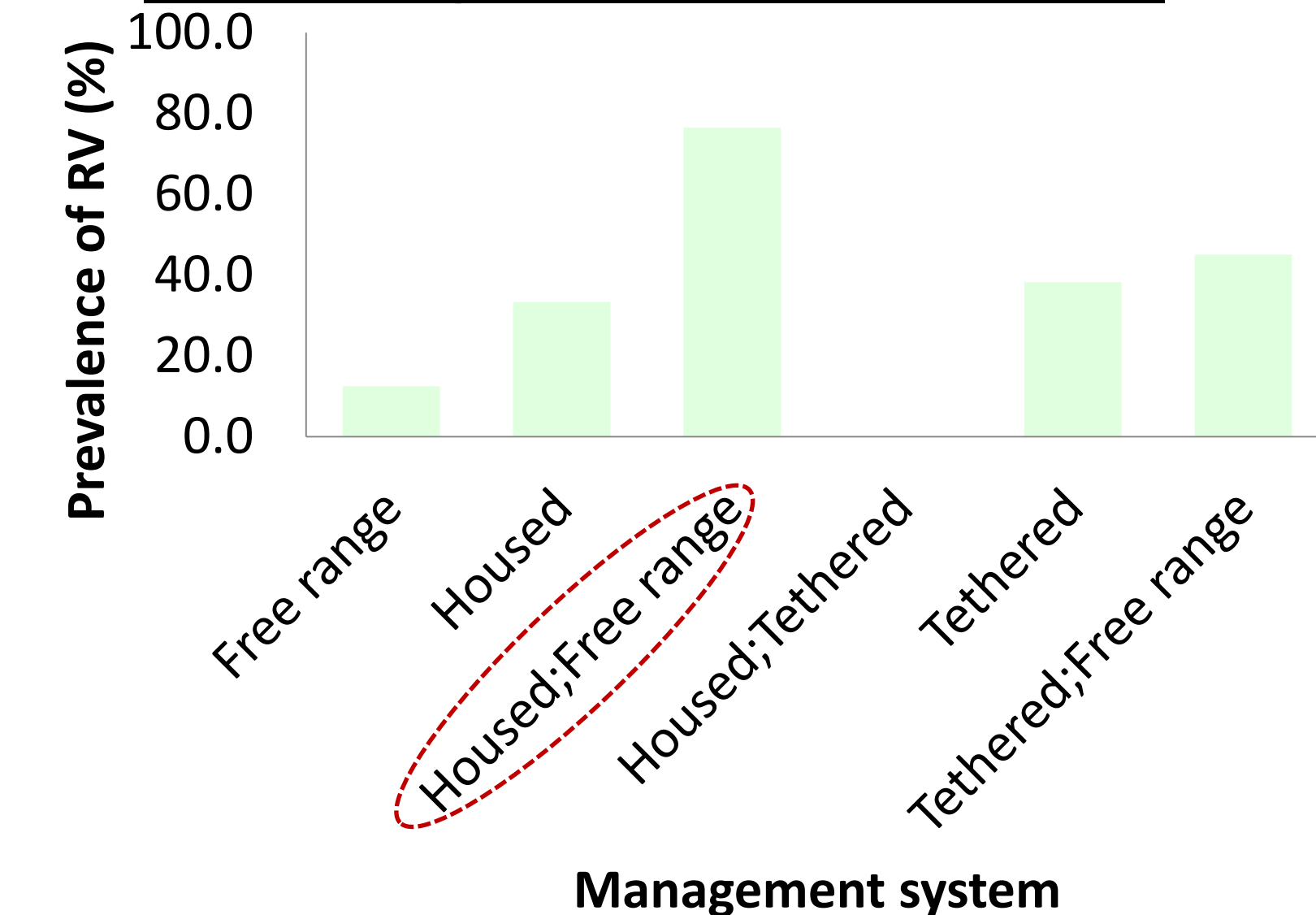
High RV incidence in Busia, Ke and Tororo, Ug proximity to major town and pig density may play a role



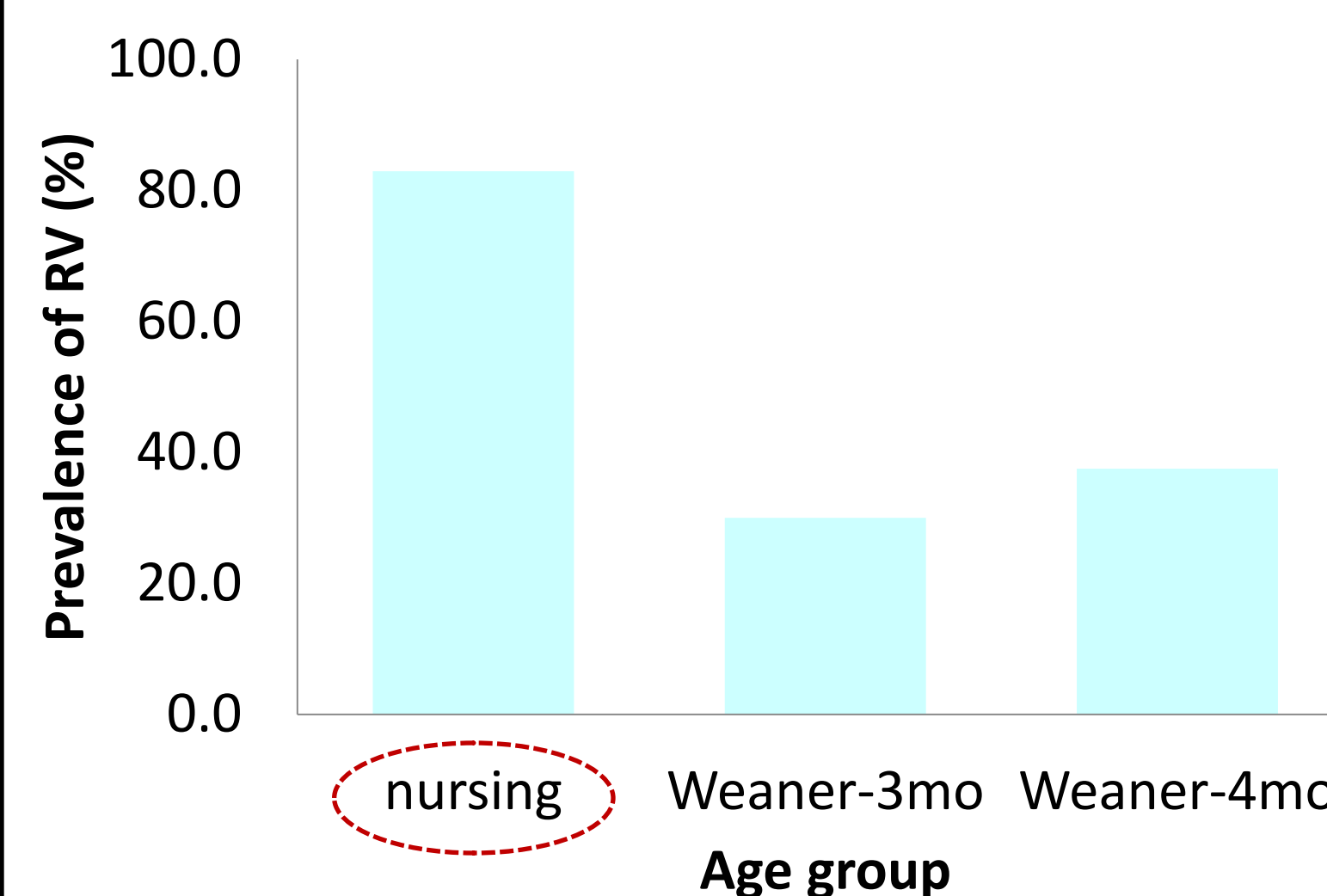
Number of pigs per household influence RV incidence



Housed/free-range management system showed higher risk for RV infection

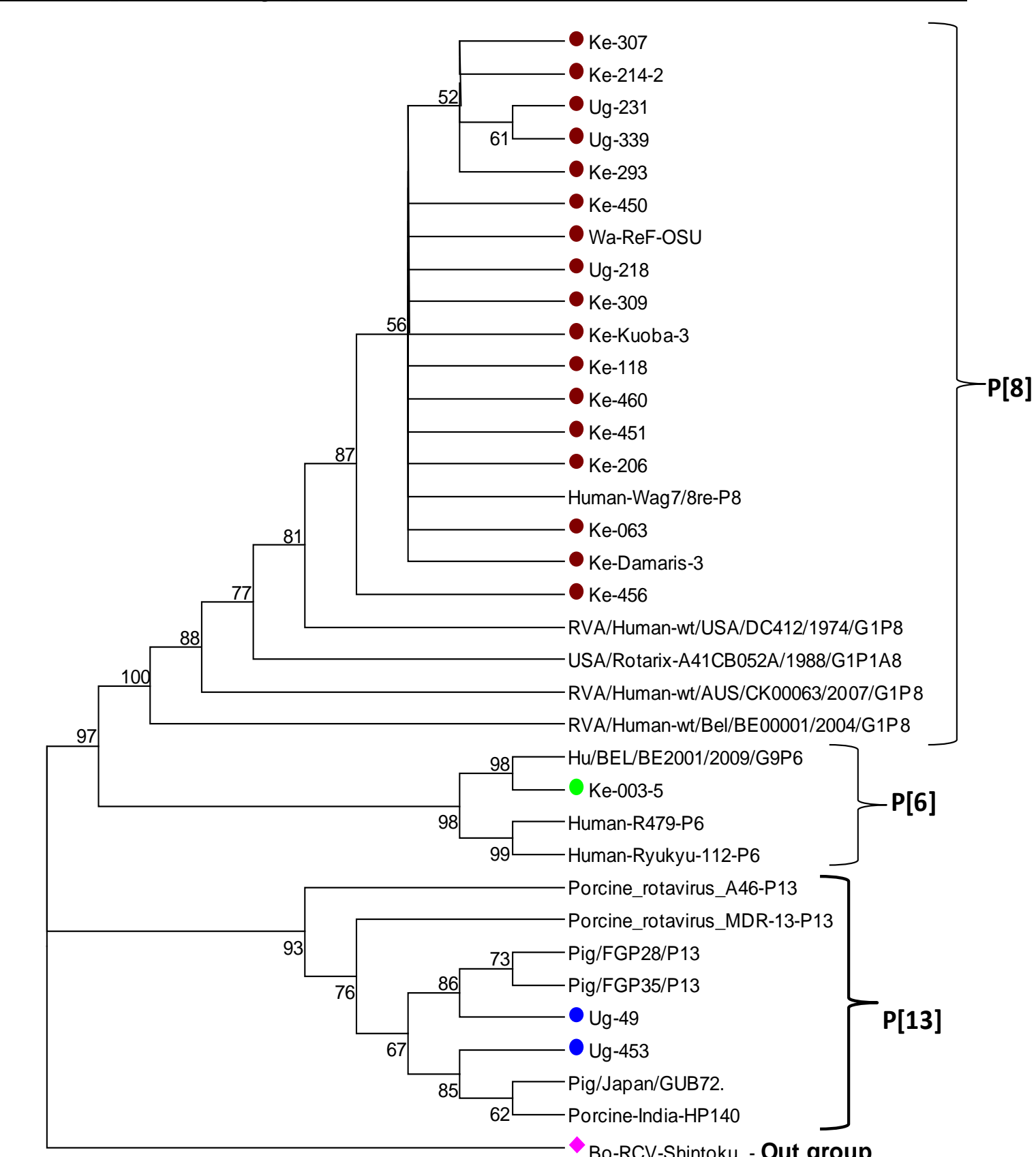


More nursing piglets shed RV than weaned piglets



Phylogenetic analysis of the partial (811-1604nt region) VP4 gene of RVA revealed multiple P types - P[8] is more dominant

- nt identity- Known strains | Field strains
- P[6] = 86.4-91.3% | -
 - P[8] = 95.6-100% | 97.8-100%
 - P[13] = 82.8-92.9% | 87.9%



Conclusions

- This study confirms the presence of RVs in the swine population in E. Africa.
- RVA is the dominant group** and both RVAs and RVCs occur alone and in mixed infections.
- Age and management system affected the prevalence of RV infections with **housed-free-range system showing the highest risk for RV infection.**
- Different P genotypes (P[6], P[8] and P[13]) are circulating in the study region with **P[8] being more dominant.**
- Epidemiological studies to investigate the prevalence and characterize the circulating RV strains in East Africa is an important step towards understanding the ecology, genetic diversity of RVs and their association with diarrhea in pigs.
- The study is important for the development of accurate diagnostic tools and potential RV vaccines based on the dominant RV genogroups and genotypes.

Acknowledgement

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