Toxoplasma gondii in the Caribbean: prevalence and genetic diversity in free-roaming chickens

Clare M. Hamilton[1*], Radcliffe Robins[2], Reginald Thomas[3], Chunlei Su[4], Christopher Oura[5], Isabelle Villena[6], Elisabeth A. Innes[1], Frank Katzer[1] and Patrick J. Kelly[7]

*Email: Clare.Hamilton@moredun.ac.uk

Moredun

www.moredun.org.uk

1. INTRODUCTION

- *Toxoplasma gondii* is a zoonotic parasite of global importance.
- Free-roaming chickens are important sentinels in the epidemiology of *T. gondii* as they feed from the ground.
- Atypical strains of *T. gondii* are known to dominate in South America where they are associated with more severe disease in humans.
- Relatively little is known about the strains circulating in neighbouring Caribbean islands.
- AIM: to investigate the prevalence and genetic diversity of *T. gondii* on different Caribbean islands.

2. METHODS

- St. Kitts (n=81), Dominica (n=76), Antigua & Barbuda (n=45), Trinidad (n=41)

Heart + Brain

I.P inoculation (St. Kitts only)

❖ **Brain + Lung**
- Detection of *T. gondii* DNA by PCR
- Strain typing by RFLP

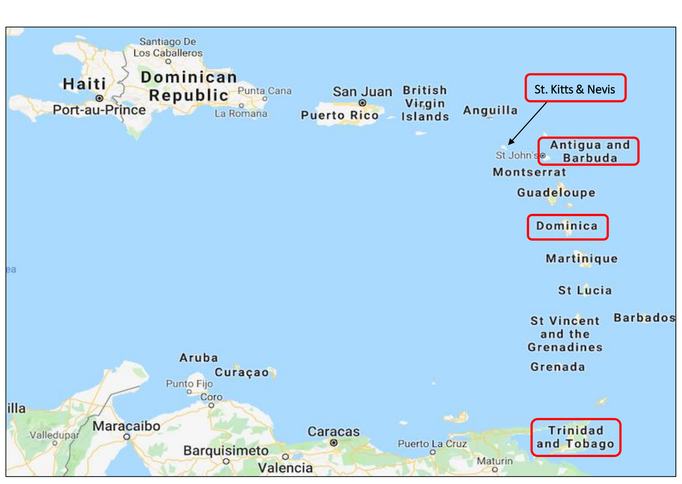
❖ **Blood**
- Detection of *T. gondii* antibodies by ELISA

❖ **Lung**
- Culture in Vero cells
- Pathogenicity study

All islands

❖ **Heart + Brain**
- Detection of *T. gondii* DNA by 529bp PCR
- Strain typing by RFLP

❖ **Blood**
- Detection of *T. gondii* antibodies by MAT



Map depicting locations of study islands in the Caribbean

- Hamilton et al. (2017) *Parasites & Vectors* 10: 104-112
- Hamilton et al. (2019) *Acta Parasitologica* 64: 738-744

3. RESULTS

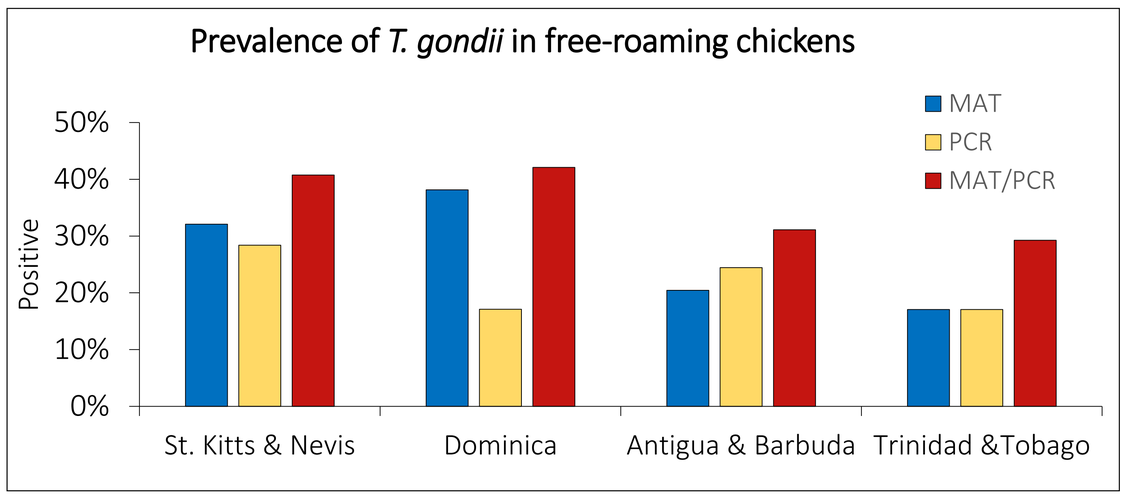


Table 1: Genetic diversity of strains isolated from free-roaming chickens

ISOLATES	SAG1	SAG2	SAG3	BTUB	GRA6	C22-8	C29-2	L358	PK1	APICO	ToxoDB Genotype
TgCkStK1	II or III	II	II	III	I	II	I	I	II	I	#264
TgCkStK2, 17-18	II or III	II	III	II	II	II	III	III	II	III	#265
TgCkStK3, 4, 10, 13-16	II or III	III	III	III	III	III	III	III	I	III	#141
TgCkStK5-6, 8, 12, 20-21	II or III	II	II	II	II	II	II	II	II	II	#1
TgCkStK7, 9, 11	I	I	I	I	III	II	III	III	I	III	#13
TgCkStK19	II or III	III	III	III	III	III	III	III	III	III	#2
TgCkAn03	I	I	I	I	III	II	na	III	I	na	Possibly #13 or #78
TgCkAn12	I	I	III	III	III	II	III	III	I	na	Likely #282
TgCkAn14	I	I	III	I	II	III	III	I	II	III	#281 (new)
TgCkAn17	I	I	III	III	III	II	III	III	I	na	Likely #282
TgCkAn18	I	I	III	III	III	II	III	III	I	III	#282 (new)
TgCkAn19	II or III	III	III	III	III	III	III	III	III	III	#2
TgCkAn28	I	I	na	III	III	II	na	I	na	na	Unknown
TgCkAn29	I	I	III	III	III	na	na	III	I	na	Unknown
TgCkAn33	II or III	III	III	III	III	III	na	III	III	na	Possibly #2
TgCkAn36	I	I	III	III	III	II	na	III	I	na	Possibly #282 or #88
TgCkTri05	na	III	II	I	III	na	na	na	na	III	Unknown

(TgCkStK = isolates from St. Kitts; TgCkAn = isolates from Antigua & Barbuda; TgCkTri = isolates from Trinidad)

4. DISCUSSION POINTS

- High prevalence of *T. gondii* in free-roaming chickens in the Caribbean indicating environmental contamination with oocysts.
- Predominance of atypical strains.
- Highlights chicken meat as a potentially important source of foodborne toxoplasmosis.

Funding: Ross University School of Veterinary Medicine (RUSVM); Moredun Research Institute (MRI); Scottish Government (Rural and Environment Science and Analytical Services Division).

Affiliations: [1]MRI, UK; [2]Pioneer Kennels and Vet Clinic, Antigua; [3]Livestock Development Unit, Dominica; [4]University of Tennessee, USA; [5]University of West Indies, Trinidad; [6]National Reference Centre on Toxoplasmosis, France; 7RUSVM, St. Kitts