

Factors associated to *Amblyomma variegatum* (TBT) presence on farms in Nevis in 2007-2009 and determination of areas of high risks for TBT.

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BACKGROUND

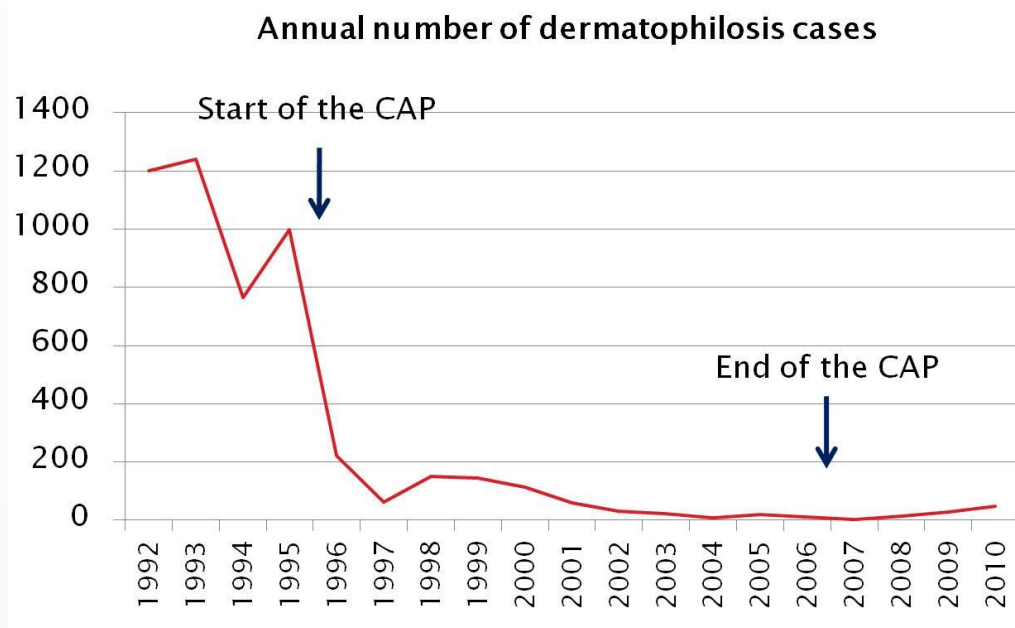
TBT in Nevis: major challenge to livestock industry

- **First reported during 1970's**
- TBT responsible for **high morbidity & high mortality** in ruminants in Nevis
- Control and eradication effort
 - Numerous control strategies used that are challenging to sustain
 - 1996-2006: Caribbean Amblyomma Programme (**CAP**)
- High level of surveillance facilitated the monitoring of the dramatic reduction of annual number of dermatophilosis cases, since the start of the CAP.



Justification of the study

- Since the end of CAP:
 - Regular increase of dermatophilosis cases
 - Objective: keep tick infestation at 2007 prevalence
- Economic issue:
 - Large amount of small ruminants consumed,
 - High import food bill.
 - Improve cost-efficiency of TBT surveillance & control
- Some areas with recurrent TBT infestation despite intensive surveillance & control



OBJECTIVES

Determine the factors associated with TBT presence on farms

MATERIALS & METHODS

Epidemiological unit – Ruminants farms

Study design – Matched case/control study

Study Population

- **Target** : all ruminants owners in Nevis
- **Source** : ruminants owners included in active TBT surveillance between January 2007 and December 2009 in Nevis (Vet Division monthly reports).

Sampling strategy

- **Case definition**: all farms that reported TBT infestation (on at least one animal).
- **Control definition**: farms without the occurrence of TBT but within the parishes where TBT cases occurred.
- 4 controls were randomly for each case reported, matching was by parish.

Data collection

- Nevis Livestock farmers register
- **Questionnaire** – designed to i/ describe environment and husbandry practices in the farms; ii/ to assess basic awareness of livestock farmers on TBT and treatment and iii/ understand reasons for TBT / dermatophilosis notification by farmers .
- Farms were georeferenced with GPS

Questionnaire administration

One person per parish with an agricultural background was recruited (short term contract) to administer the questionnaire.
Data were collected on paper version, then entered on a Access database.

Statistical analysis

- Database preparation: homogenization, appropriate coding, data validation
 - Explained variable: TBT presence. Explanatory variables : 51 quantitative & qualitative
 - **Descriptive study**: sample description, description of case and control populations
 - **Analytical study**: variables statistically associated with presence of TBT in farms
 - *Univariate analysis*: Chi-square test (quantitative variables); T-test or U Mann-Whitney test according to normality of quantitative variables. All statistical tests performed with OpenEpi.
 - *Multivariate analysis*: logistic regression. Criteria of inclusion in the analysis: factors with p-value <0.10 in univariate analysis. Criteria to conclude on significant factors: p-value <0.05
- Logistic regression performed with R.

PROVISIONAL RESULTS

Survey response

Overall, 146 farms were included in the study (representing 60% of the farms of the Nevis Livestock farmer register) among which 28 positive farms cases, mostly located in St John parish (see Fig.2). All farmers included in the study participated.

Respondent demographics

The great majority of farmers who responded to the survey were more than 50 years old (70%), had small ruminants in their farms (90%) whereas slightly more than one fourth of respondents own cattle.
Most respondent (2/3) lived in St John and St. James, whereas the remainder live in St. Georges and St. Thomas.

Univariate analysis

➤ **7 variables were found statistically associated to TBT farm status (Tables 1 & 2).**

- **Presence of cattle and pigs** on the farm are strongly associated to TBT presence.
- There are significantly more cattle and pigs in case farms than in controls (**Fig.1 & Table2**)
- Farmers with high awareness (attend vet meetings, think TBT is a problem or calling vets for ticks).

➤ No significant association of history of treatment, use of Bayticol, either during study period or during the Cap evidenced.

Table 1 and Fig. 1 – Animal population per farm according to TBT status. Result of univariate analysis

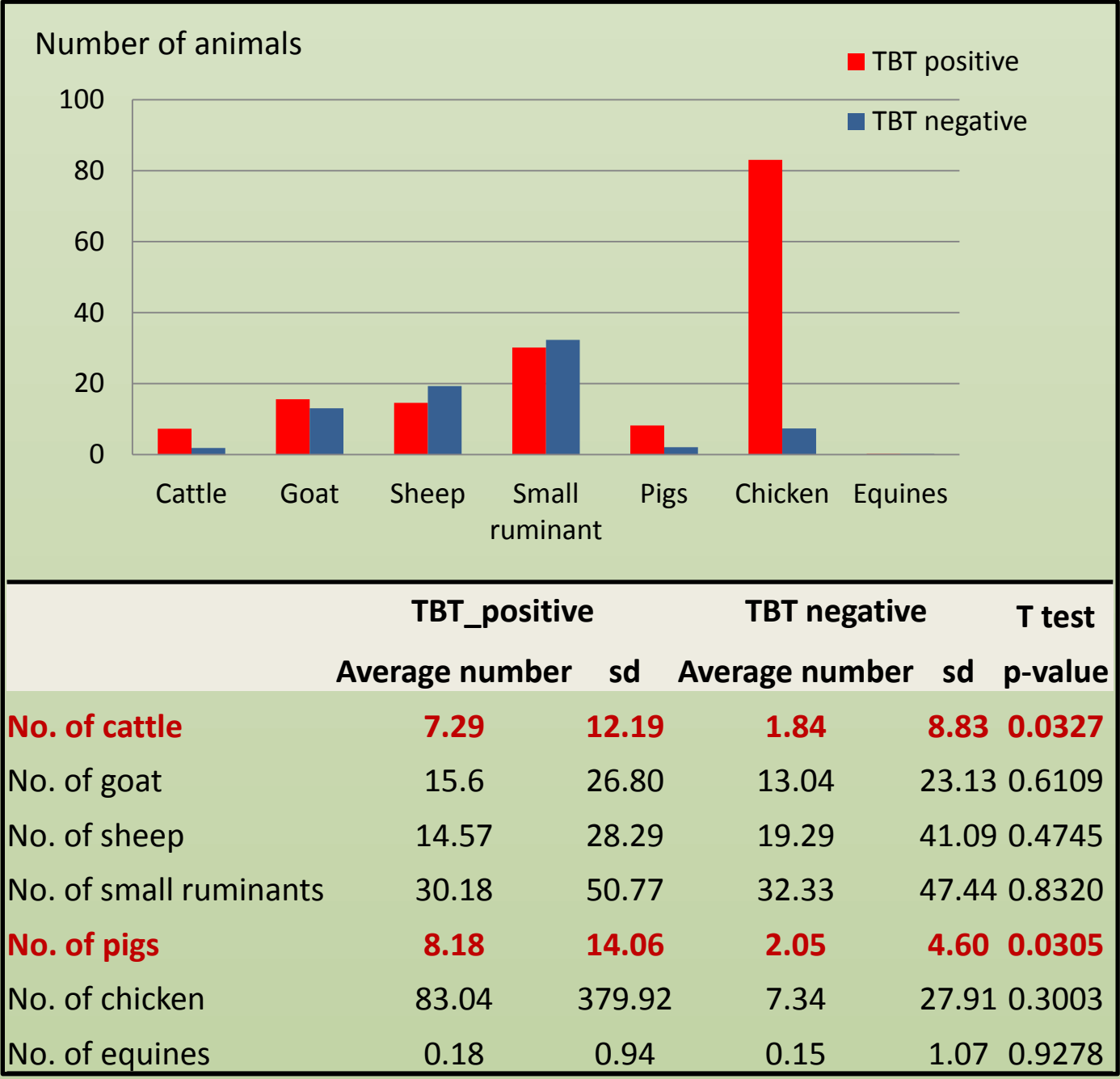


Fig. 2 – Positive farms location by parish

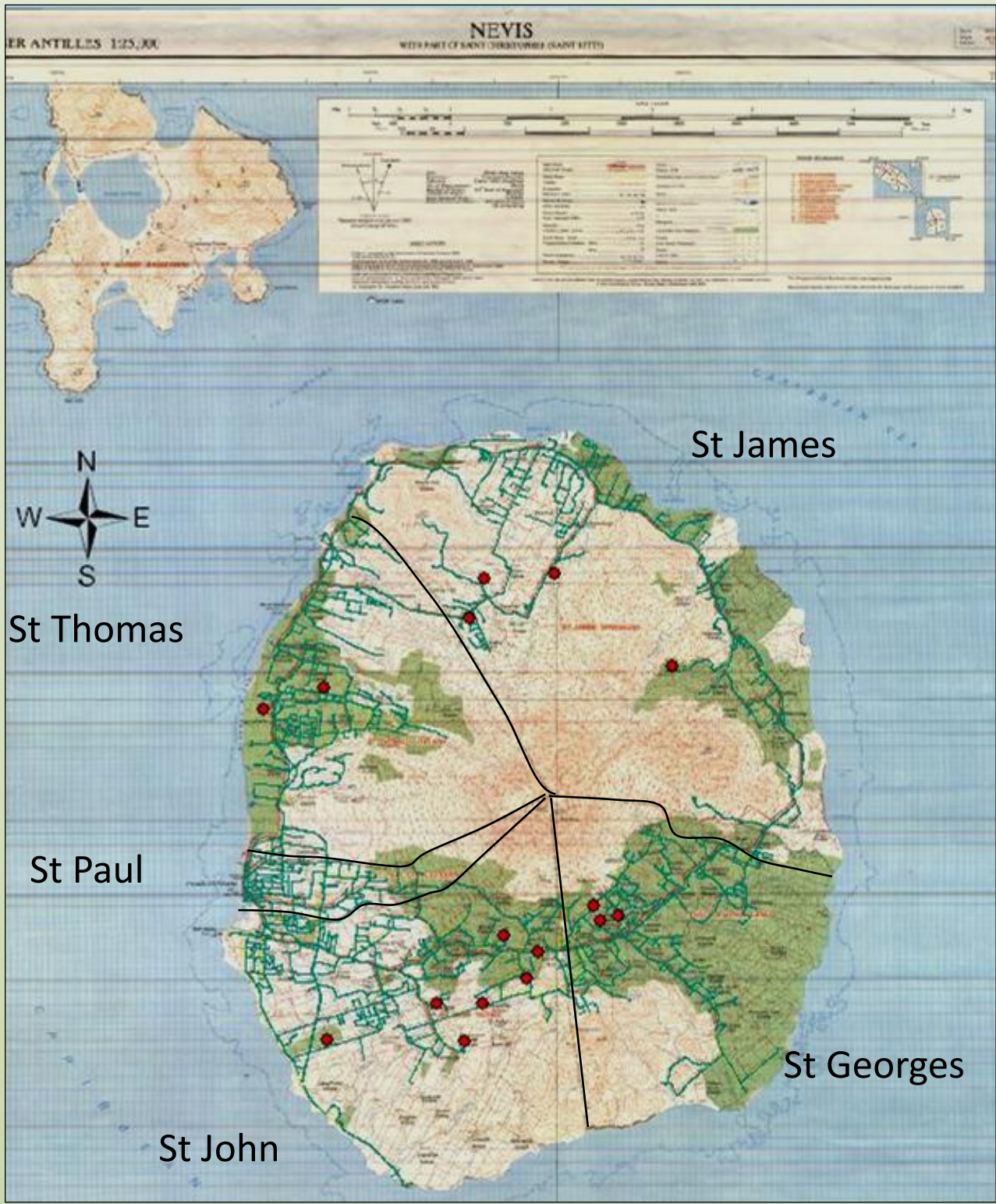


Table 2 – Results of the univariate analysis - qualitative

Variable	Odds ratio	Confidence Interval
Age category		
Less than 30	-	-
30-39	0.4856	0.105 2.246
40-49	2.267	0.8234 6.24
50+	0.9383	0.3873 2.273
Association member	2.271	0.6321 8.159
Attend Vet meetings	3.056	1.216 7.681
Trained in Agriculture	0.6154	0.1307 2.898
Species of animals present on the farm		
Cattle	12.13	4.686 31.37
Goat	1.075	0.4627 2.498
Sheep	0.6027	0.2629 1.382
Small ruminants	0.3833	0.1175 1.25
Pigs	2.778	1.179 6.548
Chicken	1.722	0.6052 4.897
Equine	0.8296	0.09307 7.395
Help with animals	1.133	0.3022 4.245
Contact with wildlife	1.823	0.5032 6.604
Contact with pets	1.096	0.4797 2.50
Keep different animals together (Mix herds)	0.7174	0.3287 1.566
Allow animals contact with other herds	1.25	0.5054 3.091
Share common pastures	0.6225	0.2703 1.433
Have several grazing areas	1.491	0.6488 3.428
Think TBT is a problem	3.64	1.418 9.344
Currently treating for TBT	2.307	0.9975 5.336
Treated for TBT during CAP	2.802	0.3465 22.66
Think CAP effective in controlling TBT	2.264	0.6318 8.116
Treated for TBT 2007	1.133	0.3022 4.245
Treated for TBT 2008	0.9438	0.3632 2.453
Treated for TBT 2009	1.732	0.6066 4.944
Buy Bayticol	2.157	0.902 5.158
Would like to change treatment protocol	2.055	0.7851 5.379
Would like to change treatment product	2.13	0.1862 24.35
Feel involved in current treatment program	0.6222	0.2029 1.908
Think farmers should be responsible for treatment	1.153	0.4968 2.677
Buy other acaricides	1.383	0.1384 13.82
Buy anti-helminthics	2.023	0.6477 6.32
Buy vitamins	1.689	0.5476 5.209
Buy supplementary feeds	2.3	0.8628 6.132
Call vet for ticks	4.444	1.875 10.54
Call vet for unrelated ticks matters	0.4349	0.1818 1.04
Think it's important to report ticks when seen	0.2193	0.04179 1.151
Check newly purchased animals for ticks	1.1	0.4047 2.99
Check incoming animals for ticks	1.256	0.5523 2.857

CONCLUSION & DISCUSSION

Discussion

These preliminary results tend to indicate that several factors may be associated to the presence of TBT in the farms, mostly related to animals present on the farm (cattle, pigs). Farmers are more aware of tick issues when they are concerned by TBT, likely resulting in the significant association between TBT status and farmers awareness.

Expected outcomes

- Produce **science based guidelines** for the farmers on Nevis for the control of the TBT,
- Adopt guidelines that would lead to a **reduction of the cost** of production of meat and meat products on Nevis.
- To develop the skills necessary to conduct future epidemiological studies which could be applied for the enhancement of the Veterinary services on Nevis

- Ultimately identify if certain risk factors relative to the awareness or behaviour of the farmers may have impacted the occurrence of Dermatophilosis /TBT on their animals/farms.

Perspectives

- Further data analysis (influence of animal management (tethered, roaming, housed, ...+ roaming distance) , investigation of correlation and interactions between variables
- Multivariate analysis to weigh the relative importance of variables
- Thorough interpretation of the results.
- Mapping of areas of high occurrence of TBT in Nevis

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