



## « Resist » program :

**a new project to improve the control of ticks and tick borne diseases in Caribbean region!**

### EDITO

By Jennifer PRADEL (epidemiologist, CIRAD Guadeloupe) *chair of the Ticks & tick-borne Diseases (T&TBD) WG of CaribVET*

Ticks and Tick-borne diseases (TBDs) have been historically major constraints to the development of livestock in the French West Indies, in the wider Caribbean and in tropical and subtropical regions more generally. The use of chemicals to control ticks represents a significant portion of livestock management costs and the build up of chemical resistance by ticks results in increased use of these chemicals and higher costs to the animal owners. Observations show that several Caribbean islands face problems of acaricide efficiency. Thus, resistance phenomena are worth investigating and diagnosed early in order to slow down the spread of resistance by adoption of proper control measures.

In this context, the “Ticks and Tick-borne diseases” working group of CaribVET, lead by CIRAD Guadeloupe, prepared the “Resist” project “Assessment of Ticks Resistance to Acaricides in the Caribbean - Development of strategies to improve surveillance and control of TBDs in ruminants” to establish common approach of surveillance and control of ticks - Tropical Bont Tick (*Amblyomma variegatum*) and Cattle tick (*Rhipicephalus Boophilus microplus*) and tick-borne diseases (heartwater, anaplasmosis and babesiosis) in the Caribbean. This project will help us identify most common gaps and relevant research questions that would help the veterinary services in the region to improve surveillance and control of T&TBDs.

This is the first project designed and written by the CaribVET members as it is based on the recommendations of the 2<sup>nd</sup> Meeting of the T&TBDs WGs held in June 2011 in St. Vincent and the Grenadines. The long-term objective is to reduce acaricide usage and promote affordable alternatives taking into consideration costs and availability of products in the Caribbean region.

We are willing to strengthen communication including with other similar projects / regions where tick resistance has been suspected or confirmed: Indian Ocean (La Reunion Island), West Africa (Senegal, Burkina Faso) etc. in order to foster exchange of experience and increase impact of collaborations.

May 2014 be a fruitful year!

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# Resist Newsletter

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### SUMMARY



*Picture:* The GDSM stand (Groupement de Défense Sanitaire de la Martinique) with the CIRAD participation at the 1st Agricultural Show in Martinique, in November 14th to 16th. It was the opportunity to exchange with farmers about the Resist project and ticks issues in general.

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## Event : “ResisT” fact sheets

### A project to explore tick resistance to acaricides and improve ticks & tick borne diseases surveillance and control in ruminants .

By Stéphanie DEPRAZ (project manager, CIRAD Guadeloupe) and Jennifer PRADEL (CaribVET coordinator, CIRAD Guadeloupe)

“ResisT” is a project funded by Guadeloupe and Martinique regions (Fond de Coopération Régionale) that started in June 2013 and will run for 2 years. The kick off meeting of the project has been organized jointly with the 3rd Meeting of the T&TBD working Group of CaribVET, held in Guadeloupe from November 26<sup>th</sup> to November 29<sup>th</sup> 2013.

**Partners** of the project are the Veterinary Services of Antigua and Barbuda, Dominica, Guadeloupe, Martinique, St. Kitts and Nevis, St. Lucia, and the Groupement de Défense Sanitaire (GDS) from Martinique. Veterinary services of St. Vincent and the Grenadines and of the United States Virgin Islands are **collaborators** of the project. The Technical **Coordination** of the project is ensured by the CaribVET T&TBD Working Group and other Caribbean countries will be associated to the project main.

Main objectives of this project are the following:

- 1/ to confirm and better characterize the resistance of Cattle Tick, *Rhipicephalus (Boophilus) microplus*, in the French Antilles, where tick resistance to acaricides has been strongly suspected by field surveillance practitioners.
- 2/ to define and test integrated and innovative strategies for the control of *A. variegatum* and *Rhipicephalus (Boophilus) microplus*.
- 3/ to better assess the epidemiological situation re TBDs in the region, by strengthening passive surveillance and encourage the conduct of field surveys in the countries (serosurveys, with collect of blood samples and ticks).
- 4/ to improve laboratory diagnostic capacities of TBDs and of assessment of ticks resistance to acaricides.
- 5/ to strengthen internal and external communication, most especially to end-users, farmers, field veterinarians, and any stakeholder from the ruminant industry.

A variety of **activities** will be conducted to meet those objectives (see map where activities are summarized):

- Assessment of acaricides efficacy on ticks will be conducted in Guadeloupe and Martinique and a new *in vitro* test - Larval Tarsal Test (LTT) - to assess level of tick resistance to acaricides will be implemented in CIRAD Guadeloupe.

## Update on “ResisT” activities

### • In Guadeloupe :

- Kick off meeting, November 26<sup>th</sup> - 28<sup>th</sup>, Petit Bourg, Guadeloupe: jointly organized with the 3rd meeting of T&TBD Working Group in Guadeloupe (CIRAD): presentation of the activities of the project, discussion about the implementation of each steps and the involvement of all partners.

[http://antilles-guyane.cirad.fr/actualites/resist\\_resistance\\_des\\_tiques](http://antilles-guyane.cirad.fr/actualites/resist_resistance_des_tiques)  
<http://www.caribvet.net/fr/caribvet/specific-working-groups/3rd-meeting-of-the-caribvet-t-tbd-working-group-guadeloupe-nov-2013>

- Implementation of the LTT (Larval Tarsal Test) in Cirad laboratory : new equipment that was not available at CIRAD has been acquired, material is being calibrated and the protocol (published by Lovis et al., 2013) is being adjusted to local conditions.

L. Lovis, Mendes MC, JL Perret, JR Martins, J. Bouvier, B. Betschart, H. Sager – Use of the Larval Tarsal Test to determine acaricide resistance in *Rhipicephalus (Boophilus) microplus* Brazilian field populations. *Veterinary Parasitology* 191 (2013) 323-331

### • In Martinique :

- 1st Agricultural Show in Martinique, November 14<sup>th</sup>: A lecture was given by P. Pelonde (GDS Martinique) and S. Depraz (CIRAD Guadeloupe) about the problematic of ticks resistance to acaricides. The presentation associated also M. Mahieu (INRA Guadeloupe) to enlarge the discussion to anthelmintic resistance. Title of the lecture was “Antiparasitics resistance: how research supports ruminant industry development in Martinique”.

[http://antilles-guyane.cirad.fr/actualites/1er\\_salon\\_de\\_l\\_agriculture\\_de\\_martinique](http://antilles-guyane.cirad.fr/actualites/1er_salon_de_l_agriculture_de_martinique)

- Field evaluation of acaricide efficacy : a sound protocol (easy to implement on the field and meeting scientific requirements) has been finalized in French by the GDS and CIRAD. It is being translated into English for validation by the CaribVET T&TBD.

- Feasibility study on the use of an anti-tick vaccine as an alternative to acaricides for the control of Cattle ticks: The only commercially available vaccine (GAVAC, produced in Cuba) is not authorized on European Market, documentation on production process of the vaccine has been requested from the manufacturer in Cuba in order for the French National Agency of Veterinary Medicine (ANMV) to evaluate the possibility of vaccine importation.

### • In Nevis :

- Feasibility study on the use of natural predators as an alternative to acaricides for the control of TBT: literature review has been done on the subject, however little quantitative studies have been conducted. Considering local constraints, chickens will be used in this study. Protocol will be drafted by the group in charge of the study coordinated by P. Bartlette and R. Pegram for further discussion by the T&TBD group.

### • In Antigua :

- Veterinary Services shipped blood samples from heartwater clinically suspects animals to CIRAD Guadeloupe during the first 3 months of the project in order to confirm suspicions by molecular methods.

### • In French Guyana :

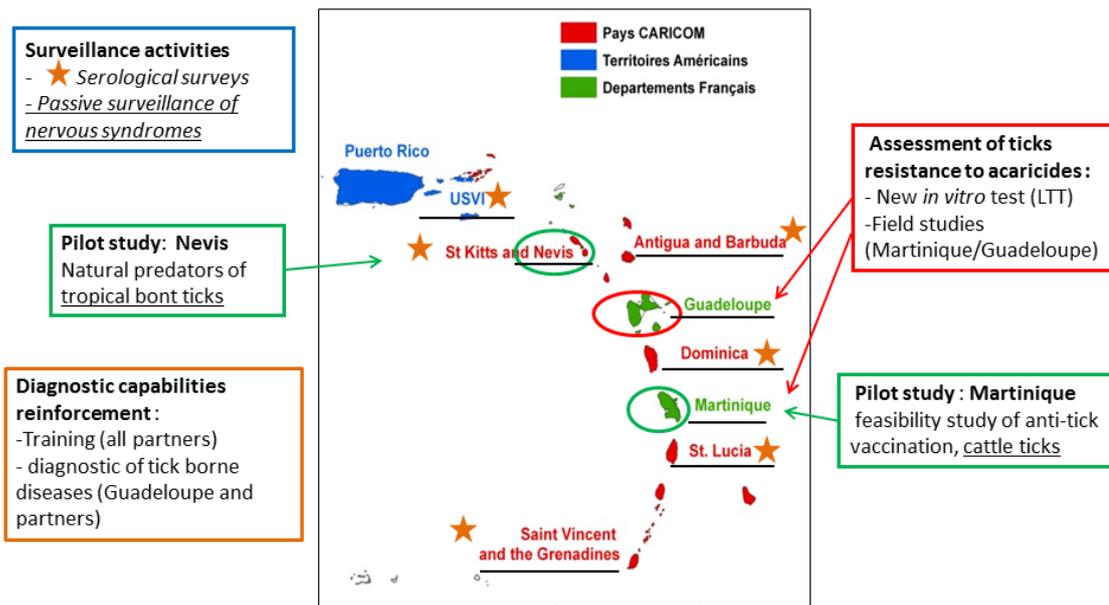
- Design of a sampling strategy and protocol for the SANITEL project in Guyana with Geraldine PETRIAUX, manager at IKARE who works as a co-opted member of the T&TBD WG.

- Feasibility studies will be implemented to reduce the use of acaricides and promote affordable alternatives taking into consideration costs and availability of products in the Caribbean region. One study will be conducted in Martinique to assess the use of anti-tick vaccine against Cattle tick, and one study in Nevis, for the use of natural predators (chickens or guinea fowls) in the control of the Tropical Bont Tick.
- Anaplasmosis and Babesiosis active surveillance (serosurveys, with collect of blood samples and ticks).
- Heartwater passive surveillance.
- Countries will be encouraged to use their own laboratory facilities and capacities to diagnose their samples. Only samples collected within the frame of passive surveillance will be processed at CIRAD Guadeloupe, the OIE reference laboratory for heartwater, for molecular diagnostics.
- A training workshop will be organized to strengthen diagnostic capacities on TBD and to introduce the methods of tick resistance assessment.
- Usage of different communication ways (Newsletter - oral presentation - meeting - technical form...). Other links will be build with other regions where similar problems or project are being conducted (La Reunion Island, French Guyana, New Caledonia, ...) to foster exchange of experience and increase impact of collaboration.

Information on the project will be shared among partners and collaborators through the "Resist" newsletter and the CaribVET website (<http://www.caribvet.net>).

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**Map :** planned activities in the different partners countries .



**Picture :** Cattle ticks eggs collection and isolation : essential step for the Larval Tarsal Test (LTT).



**Picture :** The project include passive surveillance of Heartwater, based on clinical signs and detection of *Amblyomma variegatum*.

## Similar project conducted in other regions

### Situation in West Africa

By Frederic Stachurski (Researcher in tick bio-ecology, CIRAD Montpellier) and Hassane Adakal (URBIO head of unit, CIRDES Burkina Faso, regional coordinator of WECATiC project)

In West Africa, most of the farmers rear traditional breeds like Fulani zebu, N'Dama, Baoulé or cross-bred cattle, as well as local sheep (Djallonké, Sahelian) and goats. The main tick species in the area are *Amblyomma variegatum* and, to a lesser extent but sometimes worrying, various *Hyalomma* (*H. marginatum rufipes*, *H. dromedarii*,...) and local species of boophilids (*Rhipicephalus* (*Boophilus*) *geigy*, *R. (B.) decoloratus*, *R. (B.) annulatus*). Since the indigenous cattle breeds are not very sensitive to tick-borne diseases (TBD), as a result of centuries of natural selection and cohabitation with the pathogens, and since the animals, despite more or less significant tick control measures, are annually infested by numerous ticks which maintain enzootic stability due to regular infection by the pathogens, TBD (particularly cowdriosis and babesiosis) do not lead to important losses. Farmers are therefore mainly struggling against direct losses due to ticks, especially those infested by *A. variegatum* adults, using either traditional manual tick removal either acaricides applied by spray or by pour on. However, the situation is tricky and unstable since: 1. small ruminants do not get enzootic stability for cowdriosis and show high mortality; 2. farmers are reluctant to use expensive acaricides as recommended by the manufacturers and are prone to reduce concentration (which would eventually lead to selection of resistant tick populations) or to use inadequate products 3. some farmers, like those involved in peri-urban dairy production, are increasingly breeding pure European or cross-bred cattle which are more sensitive to TBD: thus they have to develop more important tick control strategies. Above all, the introduction of *R. (B.) microplus* in Benin and Ivory Coast around 2004, very probably through cattle importation from Brazil, has drastically changed the situation. Since 10 years, the geographic distribution of this tick is expanding. It is now present in Burkina Faso, Mali and Togo where it was identified after farmers have reported treatment failures. It is actually speculated that the imported tick populations are resistant since all acaricides available on local market seem to be inefficient. Besides, as well known in southern Africa, the tick is displacing the local boophilids which might have serious consequences regarding epidemiology of anaplasmosis and babesiosis.

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Picture : Fulani bovine herd, Burkina Faso.



Credit : Frederic Stachurski

Picture : Experimental footbath in Burkina Faso, to control ticks infestation.

### Focus on the WECATiC project in West Africa :

A regional initiative called "Integrated control of ticks and emerging tick-borne diseases in West and Central Africa (WECATiC)" coordinated by the Centre International de Recherche-Développement sur l'Élevage en zone Subhumide (CIRDES) and funded by the Australian government (AusAID) currently involves Benin, Burkina Faso and Cameroon as beneficiary countries. The project aims at improving the control of the two most important tick species affecting animal production in West and Central Africa, *R. (B.) microplus* and *A. variegatum*. The project is also attempting to demonstrate the usefulness of the footbath technology to control *A. variegatum* in order to increase its adoption by the farmers. The scientific base of the project is very broad, ranging from socioeconomic studies (how farmers and herdsmen currently control ticks?) to basic tick biology, acaricide resistance diagnosis and molecular diagnosis of ticks and tick-borne diseases. Innovative platforms are established as a way to enhance farmers' uptake of the solutions/technologies the project will suggest.

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Links : [www.cirdes.org](http://www.cirdes.org)

[http://www.coraf.org/documents/fiches\\_projets/Integrated%20Management%20of%20Ticks%20and%20Tick.pdf](http://www.coraf.org/documents/fiches_projets/Integrated%20Management%20of%20Ticks%20and%20Tick.pdf)

## Partners and collaborators corner



**Stéphanie Depraz** joined us in CaribVET in June 2013 and more especially as a project manager on the Resist project.

I'm veterinarian and obtained my DVM in Toulouse (France) in 2012 where I gained experience in animal health medicine and epidemiology. When I started my veterinary studies, I discovered that I was very interested by the epidemiology and research aspects, and decided to follow this way.

So I did also a Master degree in Animal health and epidemiological surveillance in tropical countries and several trainings in various countries and organisms. I'm very happy to join the CaribVET network and excited to develop and carry out this project with all partners. This experience is very interesting for me because I can link research and surveillance, and work on new topics. I'm looking forward to meet the CaribVET members and share knowledges with them.



**Rupert Pegram**, Tick Ecologist, former CAP programme manager and member of the Ticks and TBD WG of CaribVET.

I am a veterinary entomologist specializing in tick ecology and control. I worked in Africa (in Somalia and Ethiopia for the British Government and the World Bank, and in Zambia and Zimbabwe for FAO of the UN) for 25 years, mainly on projects to assess the economics and control of ticks

and tickborne diseases. My PhD focussed on the Biosystematics of *Rhipicephalus* ticks in the *R. sanguineus* and *R. simus* groups, and I have published over a 100 scientific papers, mainly on ticks and TBDs. In 1994 I was transferred to the Caribbean to manage the Caribbean *Amblyomma* Programme for 13 years until my retirement. I now live in Antigua.

## Calendar

## ResisT project activities :

## February 2014 :

- Collection of cattle ticks (*R. (B) microplus*) in Guadeloupe for the first LTT Trial.
- Field evaluation of acaricides efficiency in Martinique with farmers volunteering to participate in the study.
- Template protocol development for active surveillance / serosurvey on Anaplasmosis/Babesiosis.
- Finalization of draft template protocol for heartwater passive surveillance.
- First draft form for a regional survey on TBT status, Anaplasmosis and Babesiosis situation, acaricide usage and efficacy.

## March 2014 :

- Validation of the first LTT experiments.
- Antigua, SVG, Nevis, Barbados, Martinique, Dominica (maybe French Guyana) to start organizing heartwater passive surveillance.
- French Guyana, SVG, Barbados, USVI and Dominica to start organizing TBD serosurveys.
- 1st draft of field protocol for assessment of natural predators in Nevis (sub-group pilot studies).

## April 2014 - May 2014:

- 1st draft of field protocol for tick collection & use of LTT test.
- Importation of engorged females from reference sensitive strains for assessment of level of ticks resistance (LTT test).
- First campaign for shipment of blood samples collected within the frame of regional passive surveillance of heartwater from participating islands.

## International meeting:

- ICAHS<sup>2</sup>, in Cuba, 7-9 May 2014 : The 2<sup>nd</sup> International Conference on Animal Health Surveillance will bring together animal health officers, researchers, risk managers and other decision makers with the aim of fostering better dialog between policy and science. The early bird offer for registration closes on **28 February**. The 9th CaribVET Steering Committee will be organized jointly the 5-6 May 2014.

## Publication :

**Third issue of Agronews**, published online in October 2013 (French only). This journal edited by CIRAD aims to inform and answer questions from the general public on agronomic research in the Antilles and Guyana. A special file is dedicated on tick borne diseases a priority health concern for the Caribbean.

[http://antilles-guyane.cirad.fr/actualites/agronews\\_antilles\\_guyane\\_n\\_3](http://antilles-guyane.cirad.fr/actualites/agronews_antilles_guyane_n_3)

# Entertain yourself!

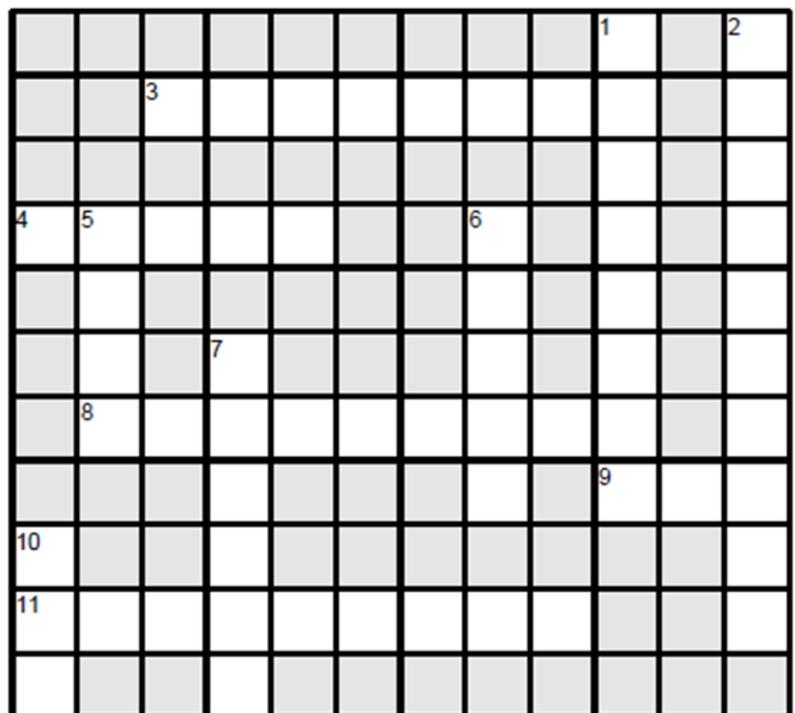
By Bryan Sandford (Member of T&TBD Working Group of CaribVET, Barbados).

## Across

3. Qualified for provisionally free certification by 2002
4. OIE Reference laboratory on Heartwater
8. Bayticol
9. Amblyomma variegatum
11. Commonly known as the Tropical Bont Tick, it belongs to the genus.....

## Down

1. The implementation of this network began in 1998 and consisted of two phases
2. This is transmitted by TBT
5. This institute was founded in 1942 and includes 14 member states of the Caribbean Region
6. Member Country of CAP still conducting active surveillance for TBT
7. Preferred host for TBT
10. Caribbean Amblyomma Programme



- For any suggestion or comments or if you want to be included in the Resist newsletter mailing list, please write to [cari-binfo@caribvet.net](mailto:cari-binfo@caribvet.net).
- To follow CaribVET news, don't forget the CaribVET website : [www.caribvet.net](http://www.caribvet.net)