COST Action TD1303

European Network for Neglected Vectors and Vector-Borne Infections

(EurNegVec)

STSM Report

Morphological and Genetic research on tick populations of the Genus *Rhipicephalus*, with phylogenetic and phylogeographical analysis.

6th-26th October 2014

Basic Data:

Name: Gianluca D'Amico
Reference code: COST-STSM-ECOST-STSM-TD1303-061014-044116
Working Group: WG4
Estimated date: 06/10/2014 to 26/10/2014
Topic: Taxonomy, genetic diversity and phylogeography of ticks of the genus *Rhipicephalus* parasitic on dogs.
Contact person: Prof. Dr. Agustin Estrada-Peña
Host institution: University of Zaragoza, Faculty of Veterinary Medicine, Spain

Selection of the representative specimens of *Rhipicephalus* spp. ticks from different areas of the world: Kenya, Guinea-Bissau, Ivory Coast, Romania and Greece.

DNA isolation from the selected ticks.

Selection of target gene, sequencing.

Evaluation of the intraspecific and interspecific genetic variability of ticks from the same species collected in different locations.

Study of molecular phylogenetic and phylogeographic relationships

PURPOSE OF THE STSM

The short term scientific mission was carried respecting the original work plan and performing some additional work agreed with the supervisor and the MC Chair.
The aim of the working stage was to elucidate different taxonomical, morphological and genetic aspects related to *R. sanguineus* ticks collected in different areas of the world.
Considering the confusion and the unclear situation related with this group of ticks, misidentified as specimens and neglected as vectors, it was a great opportunity for us to have hundreds of samples to submit to one of the most qualified expert on ticks in the world: Prof. Agustin Estrada Pena.

Together with his team we intended to identify morphologically some problematic specimens and set up specific taxonomical keys for identification.
Moreover our collaboration focused also on another species of ticks, highly related to *R. sanguineus*, namely *R. rossicus*. Comparative identification and analysis were performed on the *Rhipicephalus* specimens from Romania and Spain.
Lack of international references and rarity of specimens made this visit in Spain fundamental for our research and useful for international research community working on this topic. The research was framed into the TD1303 COST Action objectives of WG4.

DESCRIPTION OF THE ACTIVITIES CARRIED OUT DURING THE STSM

A selection of representative specimens of *Rhipicephalus* spp. ticks from different areas of the world: Kenya, Guinea-Bissau, Ivory Coast, Central Africa Republic, Romania and Greece, (≈1000) were re-determined based on morphology, following the classic keys and descriptions provided by Walker and other bibliographic sources. Original descriptions and re-descriptions were also used; comparative morphological studies were also performed with the personal collection of ticks of Prof. Dr. Agustin Estrada-Peña.

- DNA previously isolated from the same group of ticks was compared through sequencing analyses with other *R. sanguineus* spp. ticks from various parts of the world.
  Further studies are required to evaluate the intraspecific and interspecific genetic variability of ticks from the same species collected in different locations in order to obtain molecular phylogenetic and phylogeographic relationships.
- In addition a certain number of mature unidentified ticks originating from field expeditions in sub-saharan Africa were submitted to identification using classic keys of taxonomy and unpublished keys generated in years of experience by Prof. Agustin Estrada-Peña.
- Immature ticks originating from wildlife (mainly birds and rodents) were identified when possible using the above-mentioned techniques.
- Well known identified specimens from Romania were chosen and re-identified with the purpose to generate correct identification keys, to be used for a book co-authored by several researchers under the TD1303 COST action.
- Where it was impossible to identify the specimens preserving the ticks entirely, special protocols for clearing and mounting were applied in order to allow clear evidence of the key characters used in taxonomy.

MAIN RESULTS

All the tick samples were identified and re-identified, allowing a correct analysis of the data collected in years of field expeditions in Europe and abroad, integrating and absorbing knowledge offered by one of the best teams working on vector parasites.
Ticks from our collection were compared with the same species, owned by the hosting institute, morphological geographically related differences were evidenced and phylogeographic analyses will follow up.
A correct identification of the tick species definitely opens the way for a further investigation regarding the pathogens transmitted and hosted as vector by these arthropods.

During the last 50 years, frequently incorrect identification, especially for the group of ticks of the genus *Rhipicephalus*, produced important mistakes and wrong attributions to their role as vectors for many pathogens and diseases.

FORESEEN PUBLICATIONS/ARTICLES RESULTING FROM THE STSM

The results of this STSM will be published as a paper in a peer-reviewed journal.
Part of the work performed during the STSM will contribute to the publication of a reviewed book on the main species of ticks and related pathogens in Europe.

CONFIRMATION BY THE HOST INSTITUTION OF THE SUCCESSFUL EXECUTION OF THE STSM

I herein confirm the present report regarding the COST-STSM-ECOST-STSM-TD1303-061014-044116 at University of Zaragoza (Spain).
11-11-2014

A. Estrada-Peña
Prof. of Clinical Parasitology
University of Zaragoza (Spain)