



## FELLOWSHIP SUMMARY REPORTS

- ❖ Please submit this Summary Report in Word, in Times New Roman, font size 11, using UK English spellings.

### Cover page

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Group of Parasitology, Department of Animal Reproduction of INIA-CSIC

Subject: Understanding the ecology of Mediterranean Hyalomma ticks in new areas (ECOTICKS)

Host institutions and host collaborators:

Department of Veterinary Sciences (DSV) of the University of Turin (UNITO):

**Dr. Laura Tomassone**

The Istituto Zooprofilattico Sperimentale della Sicilia "A.Mirri" (IZS Sicily):

**Dr. Alessandra Torina**

**Dr. Valeria Blanda.**

The dates of the fellowship:

9 to 22 of May (UNITO)

23 of May to 5 of August (ISZ)

I consent that my report can be posted on the Co-operative Research Programme's website, or alternatively, a short paragraph about my fellowship which could be used anonymously.





## 1. What were the objectives of the research project? Why is the research project important?

- a) To study the ecology of the tick *H.marginatum* under laboratory conditions and to compare to that of *H.lusitanicum*
- b) To study the main environmental factors that influence the developing of *H.lusitanicum* and *H.marginatum* to predict the possibilities of establishment in new areas
- c) Comparing the ecology of Hyalomma with other European ticks
- d) Comparative morphological and molecular identification and detection of pathogen DNA in ticks
- d) Dissemination and knowledge transfer

*Hyalomma* ticks are capable of maintaining and/or transmitting some parasites and bacterias as *Theileria*, *Coxiella burnetii* but also viruses as the Crimean-Congo haemorrhagic fever virus (CCHFv). Today, this genus is attracting attention due to its northward spread to areas where it is not common and the risk of CCHF transmission is of great concern.

In this proposal we intended to exchange the complementary experience of three tick teams to predict the chances of establishment of this genus in central and northern areas of Europe. We have exchanged our different but complementary experiences to understand ticks ecology and predict the risk of its establishment and transmission of pathogens in new areas.

## 2. Were the objectives of the fellowship achieved?

Or are they on the way to being achieved?

If not, for what reasons? (The data or research is still ongoing or being analysed; technical reasons (e.g. equipment not working, adverse weather conditions, unexpected results, etc.; other reasons?)

The objectives **a)** (To study the ecology of the tick *H.marginatum* under laboratory conditions and to compare to that of *H.lusitanicum*) and **b)** (To study the main environmental factors that influence the developing of *H.lusitanicum* and *H.marginatum* to predict the possibilities of establishment in new areas) have been partially achieved thanks to the previous laboratory work done before the stay. During the fellowship, due to the high summer temperatures we could only study *H. lusitanicum* in the field but we could not study *H.marginatum* because this species requires lower temperature and higher humidity. Nevertheless, this situation is an interesting result that can help us to better understand the ecological differences between the two species.

The objectives **c)** (Comparing the ecology of *Hyalomma* with other European ticks) and **d)** (Comparative morphological and molecular identification and detection of pathogen DNA in ticks) were achieved and the ecological differences between the tick fauna of Italy and Spain were deeply debated among the host collaborators and the applicant. Furthermore, the extensive discussion on morphological differences and similarities between closely related species reinforced the idea of the need for the training of health entomologists combining traditional morphological studies and new molecular techniques.

The objective **d)** (Dissemination and knowledge transfer) are on the way to be achieved and it is expected to be channeled through different ways (information sheets, dissemination talks in entities, schools, associations, articles in sectorial magazines (hunting, livestock, natural reserves, walking, etc.) along the next months as it was proposed in the application.

## 3. What were the major achievements of the fellowship? (up to three)





New contacts for future collaborations  
New motivations to develop my research activities  
Great possibilities to improve my work and my professional career

#### 4. Will there be any follow-up work?

- Is a publication envisaged? Will this be in a journal or a publication? When will it appear?

Yes, one of them is already sent and it is under review.

Other publication is in preparation and I think it could be ready in early 2023 to be sent.

- Is your fellowship likely to be the start of collaboration between your home institution and your host?

Yes, in fact we are already preparing a proposal to apply for an ERC project and in the next Spanish national call we will also try to prepare a common application.

- Is your research likely to result in protected intellectual property, novel products or processes?

Our research is not usually oriented towards products that need to be protected, but we do expect strong technology transfer and future collaborations in the short term.

#### 5. How might the results of your research project be important for helping develop regional, national or international agro-food, fisheries or forestry policies and, or practices, or be beneficial for society?

Please express this in terms of environmental/food security/food safety/economic/health (human and livestock and plant) benefits, etc.

The opportunity to develop high impact joint publications will provide tangible scientific outputs as reference material to inform assessments of tick spread risks in southern Europe and in extension globally. The participants are also members and/or collaborate with several research groups so we will promote active peer participation in the proposal as well as take the opportunity to fully disseminate what has been done as part of this grant. We will seek further opportunities (e.g. applying to international or national calls) to extend the benefits of this partnership.

I participate as a consultant, specialised in *Hyalomma* ticks, at the Spanish Ministry of Health to determine the real situation of CCHF by updating the knowledge of the ecology of both *Hyalomma* species. The results of the proposal have improved my knowledge of these ticks, which will allow me to provide better information that can serve as a basis for implementing appropriate control measures and recommendations. This also could directly improve tick control on farms, with the consequent economic enhancement of this sector; but, above all, it will also contribute to improving the health situation of many people who are at risk of being bitten by a tick and suffering directly from this and/other tick transmitted diseases (farmers, veterinarians, hikers, walkers, etc.) or who may become infected indirectly (nosocomial infections of nurses, doctors, etc.). The knowledge generated could be applied not only in the countries of the applicant and host institutions, but can also be promoted among other OECD members and other countries.

#### 6. How was this research relevant to:

- The objectives of the CRP?
- The CRP research theme?

The new knowledge generated by this work would help adapt to the effects of climate change, including the spread of vector-borne diseases, and provide strategies to support health in and around participating countries. Spain and Italy are the geographical link between two climatically different continents. Until now it was appreciated that the





tick species of southern Spain were quite similar to the Mediterranean or African species, but in northern Spain the tick fauna was more similar to the species found in north Italy and the rest of southern and central Europe. However, at present, Mediterranean and African ticks, especially *Hyalomma* spp., are expanding slightly northward. We have analysed the available information on the potential for the establishment of both *Hyalomma* species in other European areas (with special reference to the north of Spain and Italy), in order to assess the risk of transmission of new pathogens in these areas with special relevance for CCHFv. In this sense, our first impression - to be verified later in field studies - is that the expansion of *Hyalomma* into northern areas is already a reality but will proceed very slowly. This is in slight contrast to other European researchers who consider that the real chances of *Hyalomma* becoming established in Europe are currently very low.

Updating knowledge on tick ecology, and the differences between species, is really important in developing countries, where the direct effects of ticks and/or the effects of the pathogens they transmit are a major limiting factor for farm sustainability. Therefore, integrated control supported by a proper understanding of the physiological and ecological needs of ticks will result in increased efficiency of control methods leading to more sustainable farming and food systems.

## 7. Satisfaction

- Did your fellowship conform to your expectations?

Yes, more than I expected.

- Will the OECD Co-operative Research Programme fellowship increase directly or indirectly your career opportunities? Please specify.

Yes, I will directly try to apply the transferred technology on tick-borne pathogens. This could be get in a few years if I get the financial resources to acquire the equipment and develop the methodology.

- Did you encounter any practical problems?

The unique real problem was the high temperature that limited the possibilities to work with *Hyalomma marginatum* in the field.

- Please suggest any improvements in the Fellowship Programme.

I am very satisfied with the Fellowship Programme and I think it is well explained and structured.

## 8. Advertising the Co-operative Research Programme

- How did you learn about the Co-operative Research Programme?

The Spanish national contact point contacted the research staff of my institution several times before opening the call and subsequently assisted and advised us when necessary during the preparation and submission of the application.

- What would you suggest to make it more “visible”?

I think the Co-operative Research Programme is easily to find once you know that it exists. However, when you start thinking about applying there are some doubts about the topics on which your application should be presented, or how to approach it, and sometimes the response from the experts is a bit slow (although I guess they have to attend to their own work and the applications is an extra effort for them).

- Are there any issues you would like to record?





I would like to thank the OECD for the Co-operative Research Programme, which has greatly strengthened my research work and enabled me to establish new collaborations. I hope that the fruits of my work during my fellowship and beyond will enable me to contribute in some way to achieving the objectives of the programme.