

**High Strategy Meeting
COST Action FA1404 – COREMI**

Working Group 2: “End users (One Health) - interdisciplinary approach”

**Identification of methods on the determination
of clinical aspects and prevalence PRM on humans**

Held on 18-19 April 2016

MiniRondeel 't Ei-land

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Technical Report

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The conclusions are summarised in the following points:

General conclusions

- Concerns on health issues related to PRM infestation in humans are most probably higher in *warmer countries* or in countries applying *inadequate PRM control measures*
- A *societal impact* is the effort of poultry farm workers to change profession due to PRM-related health issues
- The main challenges are to determine the extent of the importance of *Dermanyssus gallinae* in zoonoses to develop *tests for the diagnosis* of PRM infestation in humans
- The most efficient means to share knowledge on PRM-related One Health issues is to disseminate the available information to the medical and veterinary communities through *Continuing Education programmes*
- Additional health issues related to RMP control measures were identified and discussed as an introductory One Health area. These topics will be included in the *proposed WG 2 Training School*
- The output of this HSM may form the basis for the creation of best practice guidelines/recommendations proposed to be disseminated by the end of the Action

WG 2 will coordinate 1-2 joint position papers/commentaries in high-impact journals to increase the visibility of the outcome of this HSM to the relevant stakeholders including medical/veterinary audiences and health officials

Scientific challenges related to One Health

- i. Molecular evidence supports the fact that *Dermanyssus gallinae* is complex with at least two morphologically indistinguishable cryptic species: *D. gallinae* L1, found mainly in synanthropic birds (e.g. pigeons) and *D. gallinae* ss found mostly in hen farms. In order to verify the hypothesis that a particular strain of *D. gallinae* (most probably *D. gallinae* L1 but not *D. gallinae* ss) may preferably attack humans there is a need to:
 - collect reliable samples from bites in farms and urban environments
 - identify and determine the characteristics of the cryptic species through molecular and genetic approaches
 - conduct relevant epidemiological studies to determine the putative strain-related symptomatology, clinical signs and severity in humans
- ii. Various parasites feed together in birds and may contribute to PRM-related health issues. Based on sporadic evidence, the following questions need to be answered:
 - To what extent is *D. gallinae* a vector responsible for transmitting disease to humans?
 - Could *D. gallinae* spread infectious agents, including fungi, to animals and man?
 - Is the blood meal a unique route of transmission? What is the contribution of the cutaneous route? Are there other possible routes of disease transmission?
 - What is the (primary or secondary) role of pathogens in PRM-related human health issues?

Information related to the putative PRM-related immune responses in poultry farmers derived from *occupational health* investigations was identified as a starting point to provide answers to these questions

Laboratory diagnostic challenges related to One Health

- iii. Currently, there are no diagnostic tests to identify PRM infestation in humans. To develop *diagnostic tools*, concrete evidence on the pathophysiological significance of PRM infestation in man is need. A starting point would be the comparative investigation of the effects of *D. gallinae* components on human and avian immune and dermal responses.

Evidence can be provided by using the following experimental models that are available in the individual groups participating in the HSM:

- Cultures of eosinophils isolated from peripheral blood could act as a cellular model of systemic immune responses to *D. gallinae* extracts and components
- Primary skin cell cultures could be used for investigating the dermal responses to *D. gallinae* extracts and components

Interdisciplinary collaboration opportunities between WG 1-2 members and HSM participants were discussed

Molecular rather than immunological tests are preferable to discriminate between parasitic attacks and to diagnose PRM infestation in humans [see (i) above]. The dusty environment in poultry houses may possibly affect the immune response, thus influencing diagnosis.

Clinical – Occupational – Epidemiological challenges related to One Health

- iv. In addition to poultry farms, *human–avian interactions* occur in both rural and urban environments
 - Most reports are associated with bed bugs and pigeon nests next to bedroom windows
 - There are limited records on the incidence of PRM infestation in poultry farmers
- v. The incidence of PRM infestation in humans is *underreported* and thus *underestimated* both in Europe and world-wide. The main limitation is the absence of national data.
 - Many cases of PRM infestation may be reported as papular dermatitis of undetermined aetiology. Therefore, there is a need to *define the clinical entity* and to inform general practitioners and medical specialists on the *differential diagnosis*
 - In many European countries there is inadequate information on the availability of *environmental medicine*. There is a necessity to identify the gaps in national health systems for not reporting emerging cases of PRM infestation in humans
 - Physicians need to be motivated to provide information. The establishment of an *online portal* with dedicated parts where practitioners, clinical laboratory investigators, nurses and/or other health professionals will report cases of PRM-related health issues was suggested as an optimal measure to record, integrate and defragment information on PRM infestation in humans
 - The assistance of *biostatisticians* to conduct observational research (e.g. questionnaires) and to analyse and evaluate all accumulating data is a critical requirement for the success of any effort to provide evidence to medical professionals on the importance of *D. gallinae* in zoonoses
 - The effect of control measures against PRM on human health both for farmers and hobby hen keepers
 - Applying treatment to humans against acaricides are not effective when the source is not reduced
 - Disillusioned infestations

MC members will be asked to provide a list of publications, case reports and communications on PRM-related health issues reported in *national meetings*. The establishment, integration, analysis and sharing of the resulting database will be coordinated by a sub-committee defined by the MC

WG 2 will prepare a *memorandum and/or white paper* to inform EU officials and medical associations on the gaps in national health systems related to reporting and recording emerging cases of PRM infestation in humans

WG 2 will formulate a relevant query submitted to the Occupational Allergy Interest Group of the European Academy of Allergy and Clinical Immunology (EAACI) to consider supporting the *exchange of information* on PRM infestation in humans at the European level

Issues raised by WG 2 to be discussed and/or approved by the MC of COST Action FA1404 – COREMI:

1. Organisation of a WG 2 Training School on ONE HEALTH (Greece; July-August 2017; proposed budget: approx. €25000)
2. Creation of a sub-committee to coordinate the establishment, integration, analysis and sharing of a database of publications, case reports and communications on PRM-related health issues reported in national meeting
3. Establishment of an online portal with dedicated parts for practitioners, clinical laboratory investigators, nurses and/or other health professionals to report cases of PRM-related health issues
4. Preparation of a presentation template (in ppt format and a poster) to communicate the Action's objectives and outcomes in relevant meetings
5. Participation of the following experts, ECIs and young investigators as members of WG 2:

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Deliverables of this WG 2 HSM:

1. Technical report
2. Expansion of the Action by attracting experts and ECIs working in diverse (bio)medical disciplines and clinical specialties
3. Creation of interdisciplinary collaboration opportunities between the (bio)medical and veterinary communities
4. Identification of PRM-related One Health challenges and measures to resolve them proposed to the MC
5. Suggestion of organizing a WG 2 Training School on One Health
6. Preparation of at least one position paper/commentary coordinated by WG 2 Leader and co-Leader (to be published in a high-impact journal by Dec 2016)