# MediLabSecure (ENTOMO)
# – Newsletter n°35 – January 2023 –

Dear network members,

First thing first: we all wish you a **Happy New Year 2023**.
The aim of this newsletter is to give you an overview of all entomological activities for the 2023 year.

## NEWS FROM THE MEDICAL ENTOMOLOGY SECTOR

The first entomological activity of the third phase of MediLabSecure took place in Montpellier, France. During 1 week partners learned and worked on *Aedes* insecticide resistance, with theoretical and practical courses. We welcomed 14 participants from 13 countries, being 78% of expected participation. It was a successful training and the overall organisation and content was excellent for 68% of trainees.

During the next year the medical entomology sector will offer several activities.

- We will begin 2023, with a webinar to highlight the importance of the community-based communication, **Thursday 26th of January from 10 AM to 1 PM (CET)**. During this half-day, you will assist to two presentations of the importance to raise public awareness about vector-borne diseases and specific examples of these communications. These presentations will be following by discussion to share experiences and improve this important aspect of our sciences. The webinar will be open to all the network of MediLabSecure. The registration is mandatory, please follow this link: https://medilabsecure.us10.list-manage.com/track/click?u=8b939888cde0b1e7e49a16de6&id=ed46ef9ddc&e=5a56ffc324
- We will also provide a Policy briefs training to all the entomology network. This training will begin during spring. We will invite one person of each institute from entomology network to participate. The training will take place in four phases:
    - Webinar to present aim and programme
    - MOOC during several weeks (5-6 weeks): the designated person from each institute will follow the MOOC about policy brief autonomously.
    - A workshop will be organised. During few days it will be the occasion to share experiences and create by group some policy briefs, which will be helpful for everyone in their own country.
    - Finally, an online session will be organised several weeks later, to share results and experiences.
- A mapping tool activity will be organised in association with AVIA-GIS. The aim of this workshop is to enhance the knowledge about vector repartition in urban area. More details about the content will be provide in the next Newsletters.
- During the MediLabSecure regional meeting, at the beginning of the summer, we will be happy to provide the Entomology for non-entomologist courses.
- Finally, in autumn a training will be dispensed for the Sahel's countries during 1 week with theorical and practical courses to learn about ticks.

## ENJOY READING

Finally, with this newsletter, we would like to share with you two interesting articles recently published which could feed our knowledges about vectors. The first one was leaded by Vincent Robert (previous Medical Entomology leader) with the collaboration of several MediLabSecure partners. The second one is a study-case which highlights the importance of the vector-surveillances and the "together-work". This second article was object of a public engagement article in French, please find the link at the bottom of this part.

**Assessment of expertise in morphological identification of mosquito species (Diptera, Culicidae) using photomicrographs**
https://www.parasite-journal.org/articles/parasite/full_html/2022/01/parasite220073/parasite220073.html
https://doi.org/10.1051/parasite/2022045 – Parasite – Oct. 2022

In this article the aim was to resume a mosquito identification exercise dispensed to 63 peoples. Here the idea is to highlight the importance of an accurate identification of insects, particularly if the species is involved in disease outbreaks.

The participants received high-definition photomicrographs of 26 adult females and 12 larvae collected from the western Palaearctic. For the identification top three tools used were the MosKeyTool, the ID key following Becket *et al.* 2010 and the CD-ROM of Schnaffer *et al.* 2001.
Results from MosKeyTool was significantly better (80%) than with other tools.

| Species | No. of no IDs (%/65) | No. of incorrect IDs (%/65) | No. of correct IDs (%/65) | Incorrect IDs (number of occurrences) |
|---|---|---|---|---|
| **Females** | | | | |
| *Culiseta longiareolata* | 1 (2%) | 1 (2%) | 63 (97%) | Miscellaneous (1) |
| *Aedes vexans* | 0 (0%) | 2 (3%) | 63 (97%) | Miscellaneous (2) |
| *Aedes albopictus* | 0 (0%) | 2 (3%) | 63 (97%) | Miscellaneous (2) |
| *Uranotaenia unguiculata* | 3 (5%) | 0 (0%) | 62 (95%) | (0) |
| *Aedes caspius* | 0 (0%) | 3 (5%) | 62 (95%) | Miscellaneous (3) |
| *Aedes aegypti* | 0 (0%) | 3 (5%) | 62 (95%) | Miscellaneous (3) |
| *Culiseta annulata* | 0 (0%) | 4 (6%) | 61 (94%) | Miscellaneous (4) |
| *Aedes vittatus* | 2 (3%) | 2 (3%) | 61 (94%) | Miscellaneous (2) |
| *Coquillettidia richiardii* | 1 (2%) | 3 (5%) | 61 (94%) | Miscellaneous (3) |
| *Orthopodomyia pulcripalpis* | 4 (6%) | 3 (5%) | 58 (89%) | Miscellaneous (3) |
| *Culiseta subochrea* | 2 (3%) | 5 (8%) | 58 (89%) | Miscellaneous (5) |
| *Aedes geniculatus* | 2 (3%) | 6 (9%) | 57 (88%) | Miscellaneous (6) |
| *Culex theileri* | 2 (3%) | 6 (9%) | 57 (88%) | Miscellaneous (6) |
| *Culex hortensis* | 5 (8%) | 3 (5%) | 57 (88%) | Miscellaneous (3) |
| *Culex pipiens/torrentium* | 2 (3%) | 8 (12%) | 55 (85%) | *Cx. martinii* (2), *Cx. perexiguus* (2), miscellaneous (4) |
| *Aedes japonicus* | 1 (2%) | 9 (14%) | 55 (85%) | *Ae. koreicus* (5), miscellaneous (4) |
| *Aedes detritus/coluzzii* | 2 (3%) | 8 (12%) | 55 (85%) | *Ae. leucomelas* (2), *Ae. flavescens* (2), miscellaneous (4) |
| *Anopheles plumbeus* | 2 (3%) | 11 (17%) | 52 (80%) | *An. claviger* (8), miscellaneous (3) |
| *Anopheles sergentii* | 1 (2%) | 14 (22%) | 50 (77%) | *An. superpictus* (5), *An. dthali* (3), *An. multicolor* (2), *An. cinereus* (2), miscellaneous (2) |
| *Anopheles claviger/petragnani* | 1 (2%) | 15 (23%) | 49 (75%) | *An. sacharovi* (7), *An. marteri* (4), *An. algeriensis* (2), miscellaneous (2) |
| *Anopheles ziemanni* | 2 (3%) | 18 (28%) | 45 (69%) | *An. hyrcanus* (12), *An. tenebrosus* (3), miscellaneous (3) |
| *Uranotaenia balfouri* | 3 (5%) | 19 (29%) | 43 (66%) | *Ur. unguiculata* (17), miscellaneous (2) |
| *Anopheles dthali* | 4 (6%) | 22 (34%) | 39 (60%) | *An. sergentii* (9), *An. superpictus* (6), *An. turkhudi* (3), *An. rhodesiensis* s.l. (2), miscellaneous (2) |
| *Culex poicilipes* | 4 (6%) | 24 (37%) | 37 (57%) | *Cx. tritaeniorhynchus* (11), *Cx. vishnui* (3), *Cx. sitiens* (2), *Cx. thalassius* (2), miscellaneous (6) |
| *Aedes punctor* | 7 (11%) | 29 (45%) | 29 (45%) | *Ae. hexodontus* (3), *Ae. cataphylla* (3), *Ae. pullatus* (3), *Ae. cinereus* (3), *Ae. intrudens* (2), miscellaneous (15) |
| *Culex tritaeniorhynchus* | 4 (6%) | 37 (57%) | 24 (37%) | *Cx. mimeticus* (14), *Cx. sitiens* (4), *Cx. pipiens* (4), *Cx. vishnui* (4), *Cx. coronator* (2), *Cx. duttoni* (2), miscellaneous (7) |
| **Larvae** | | | | |
| *Culiseta longiareolata* | 7 (11%) | 2 (3%) | 56 (86%) | miscellaneous (2) |
| *Culex theileri* | 8 (12%) | 7 (11%) | 50 (77%) | *Cx. pipiens* (2), miscellaneous (5) |
| *Aedes caspius* | 9 (14%) | 8 (12%) | 48 (74%) | *Ae. vexans* (2), *Ae. detritus* (2), *Ae. punctor* (2), miscellaneous (2) |
| *Aedes aegypti* | 9 (14%) | 9 (14%) | 47 (72%) | *Ae. albopictus* (5), miscellaneous (4) |
| *Culex pipiens* | 8 (12%) | 13 (20%) | 44 (68%) | *Cx. torrentium* (3), *Cx. tritaeniorhynchus* (2), miscellaneous (7) |
| *Culex tritaeniorhynchus* | 7 (11%) | 14 (22%) | 44 (68%) | *Cx. territans* (4), *Cx. pipiens* (2), *Cx. martinii* (2), *Ae. detritus* (2), miscellaneous (4) |
| *Uranotaenia balfouri* | 10 (15%) | 12 (18%) | 43 (66%) | *Ur. unguiculata* (8), miscellaneous (4) |
| *Aedes vexans* | 10 (15%) | 15 (23%) | 40 (62%) | *Ae. cinereus* (4), *Ae. cyprius* (3), miscellaneous (8) |
| *Aedes vittatus* | 12 (18%) | 17 (26%) | 36 (55%) | *Ae. albopictus* (9), *Ae. aegypti* (4), miscellaneous (4) |
| *Aedes albopictus* | 9 (14%) | 18 (28%) | 38 (59%) | *Ae. cretinus* (7), *Ae. geniculatus* (3), miscellaneous (8) |
| *Anopheles dthali* | 10 (15%) | 25 (38%) | 30 (46%) | *An. sergentii* (14), *An. multicolor* (3), *An. gambiae* s.l. (3), *An. pulcherrimus* (2), miscellaneous (3) |
| *Anopheles ziemanni/ coustani/tenebrosus* | 10 (15%) | 43 (66%) | 12 (18%) | *An. maculipennis* s.l. (21), *An. hyrcanus* (13), *An. plumbeus* (2), *Ae. mariae* (2), miscellaneous (5) |

***Table 2:*** *Number of identifications for 26 mosquito females and 12 larvae. Mosquito species are listed in decreasing percent correct responses.*
This article shows the importance an integrated taxonomy associating morphology with the complementary molecular approach is really importance to identify adult and larvae mosquitoes.

In the article, you can find several useful documents, among them the "Read me first" document in French and English *(Supp. File 1 & 2)* with details about how identify insects, tools used to identify mosquito species *(Supp. File 5)* or also the comments with mistakes and difficulties of identifications *(Supp. File 7 & 8)*.

**An alien in Marseille: investigations on a single *Aedes aegypti* mosquito likely introduced by a merchant ship from tropical Africa to Europe**
https://www.parasite-journal.org/articles/parasite/full_html/2022/01/parasite220074/parasite220074.html
https://doi.org/10.1051/parasite/2022043 – Parasite – Sep. 2022

This article aim is to show the importance about surveillance of mosquitoes in particular at international entry points, like ports. The second important point highlights in this article the capacity to understand and control mosquito when several areas of competences work together.

In the port of Marseille, a routine survey in conduct from May to November, included larval surveillance control of potential breeding sites and surveillance of adult mosquitoes with mosquito trap networks.
During the summer 2018, a female mosquito was collected in one of the traps and identified *as Aedes aegypti* using MosKeyTool, for morphological identification, and by PCR, for molecular identification and confirmation.
Because *Ae. aegypti* is not present in the Mediterranean area and particularly in France, a sequencing from abdomen was performed to identify the genotyping and do population genetic analysis. This SNP study identified the subspecies as *Ae. aegypti formosus* and Cameroon as the likely source of introduction. The rest of the tests assigned the individual to a population for Burkina Faso, which may rule out due to the continental isolation.
Finally, in association with the port authorities at the port of Marseille, the authors collected helpful information to find the vessel. One issue appears, the most helpful information, which is the countries of origin of the vessels was not mentioned in the database. To fill the gap a database of regular shipping lines was built and use to identify the vessel. After all this investigation, authors identified one boat which left Douala, Cameroon, 20 days before arriving in Marseille and docked 350 m away from the point of capture where the female mosquito was found.

An increase of surveillance during this summer shown that this introduction was not followed by establishment but it could happen.
Unfortunately, the authors didn't collect information confirming the presence of larval sites or appropriate developmental conditions within this boat, because the investigation was too long, and the vessel left the port before.

To resume and highlight key point of this paper, an acute surveillance of international point of entries is essential to avoid establishment of new mosquito species, particularly if the species is involved in disease outbreaks. A morphological and molecular identification is essential to confirm the mosquito specie and genetic analysis to highlight the mosquito origin. Finally, raise awareness among the importance of surveillance and complete database for port authorities, for example, it is essential to keep time and have a better control of potential introduction.

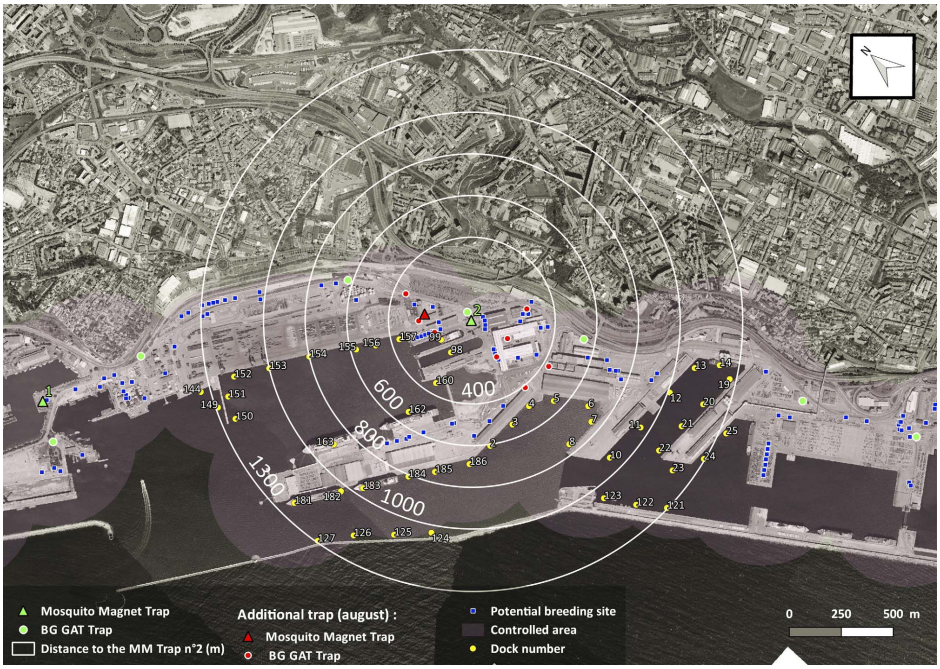


***Figure 1:*** *Map of the eastern dock of the "Grand port Maritime de Marseille" (GPMM), France with location of traps, breeding sites and docks.*

Public engagement article (in French):
https://theconversation.com/traque-des-moustiques-invasifs-au-coeur-dune-enquete-sanitaire-inedite-a-marseille-190571

If needed, we may help to get the full pdf of these articles.

If you have any suggestions or information you wish to share, please let us know and send an email to mls.entomo@ird.fr

Best regards,

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All the previous entomo newsletters are available on the MediLabSecure website.