Vol. 3 February 2019

Co-Funded by the European Union
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DMC-MALVEC

www.dmc-malvec.eu

Diagnosis**M**anagement**C**ommunication-**Mal**aria**Ve**ctor**C**ontrol

Editorial

DMC-MAVEC is a Horizon 2020 EU-funded project that aims to address challenges in organizing, interpreting and communicating vector control data through the development and integration of a fully automated diagnostic platform (LabDisk), a data management system (DDMS) and an innovative communication tool (GAME).

DMC-MALVEC had previously successfully passed the first periodic reporting period (18M) and now is getting ready for the second one (36M). For this reason, the third **annual meeting of DMC-MALVEC** took place in **Lusaka, Zambia** (January 21-24, 2019) and was coupled with a stakeholders meting and two workshops (GAME, LabDisk assays). Participants from **9 different countries** in Europe and Africa attended this three-day event ***(page 2)***.

During 2018 important progress was made in the project. Using a method developed by FORTH and Swiss TPH, we can now accurately predict the allelic frequencies of insecticide resistance mutations in pooled mosquito samples. This is an important milestone for our DMC-MALVEC LabDisk and for efficient malaria mosquito screening in Vector Control programs ***(page 4)***. Furthermore, FORTH in cooperation with Swiss TPH and FTD introduced a novel molecular tool for assessing detox gene expression, which we expect to be the next gold standard for monitoring metabolic resistance ***(page 5)***. Progress was also made towards improving DDMS functionality and training the partners in Africa. DMC-MALVEC's GAME Resisitance101 is now ready and available for download in Google Play and App Store ***(page 7)***.

The project's activities were communicated in major scientific conferences, worldwide, including the Multilateral Initiative on Malaria (MIM 2018) in Senegal ***(pages 8-9)***. During 2018 DMC-MALVEC increased significantly its visibility through scientific publications, targeted dissemination and communication activities to the general public ***(page 10)***. It will continue to do so, even more intensely in 2019, as the project enters its final phase. Get to know the project's innovative tools and its participants in meetings and conferences throughout the world (details in ***page 11***).

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News

Participants of the DMC-MALVEC – Annual Consortium and Stakeholders Meeting in Lusaka, Zambia, (January 2019)

The third **annual meeting of DMC-MALVEC** took place in **Lusaka, Zambia** (January 21-24, 2019) and was coupled with a local stakeholders meting and two workshops.
During the annual DMC-MALVEC meeting partners from **9 different countries** in Europe (Germany, UK, Switzerland, Luxembourg, Greece) and Africa (Cameroon, Ethiopia, Côte d'Ivoire, Zambia) had the opportunity to meet and review the project's activities and technical progress.

The second day of the meeting included **key-lectures from DMC-MALVEC participants** (**John Vontas**, FORTH, coordinator, on the value of molecular diagnostics for vector control; **Mike Coleman**, LSTM, WP4 leader, on the Integration of data in disease control). **Zambian stakeholders** from the National Malaria Elimination Program (**NMEP**), the Tropical Diseases Research Centre (**TDRC**), the Malaria Control and Elimination Partnership in Africa (**MACEPA**), and the President's Malaria Initiative (**PMI**) presented their work and discussed possible strategies of **incorporating DMC-MALVEC's tools to their programs**. To promote this direction, workshops with **hands-on experience for the GAME and the MALVEC LabDisk assays** took place during the second and third days of the meeting, respectively.

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News

LabDisk Assays Workshop (Zambia, January 2019)

During 23-24 January 2019 a hands-on workshop took place in Lusaka, Zambia, where analysts from the four African countries that participate in DMC-MALVEC (Cameroon, Côte d'Ivoire, Ethiopia, Zambia) were trained in performing, analysing and interpreting the LabDisk assays.

Upper Part: DMC MALVEC's Konstantinos Mavridis (FORTH) and Nadja Wipf (SWISS TPH) demonstrating the process for preparing mosquito samples for the LabDisk (pre-loading step). Lower part: Konstantinos Mavridis (FORTH) with OCEAC researchers Michael Piameu Philippe Nwane analyzing and interpreting results generated using the LabDisk assays during the workshop.

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News

We can now accurately predict the allelic frequencies of insecticide resistance mutations in pooled mosquito samples

genes

MDPI

Article

Detection and Monitoring of Insecticide Resistance Mutations in *Anopheles gambiae*: Individual vs. Pooled Specimens

Konstantinos Mavridis [1,*], Nadja Wipf [2,3], Pie Müller [2,3], Mohamed M. Traoré [4], Gunter Muller [4] and John Vontas [1,5,*]

An important milestone for our DMC-MALVEC LabDisk and for efficient malaria mosquito screening in Vector Control programs

Our newly developed method was validated with in several populations and found to be **precise** and **accurate,** with minimal differences from individual genotyping (0.36–4.0%), as well as **sensitive** (detects a single heterozygous mosquito in pools of wild type mosquitoes).

https://www.mdpi.com/2073-4425/9/10/479

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News

We introduce a novel molecular tool for assessing detox gene expression in *An. gambiae* and we expect this to be the next gold standard for monitoring metabolic resistance

Mavridis *et al. Parasites & Vectors* (2019) 12:9
https://doi.org/10.1186/s13071-018-3253-2

Parasites & Vectors

RESEARCH Open Access

Rapid multiplex gene expression assays for monitoring metabolic resistance in the major malaria vector *Anopheles gambiae*

Konstantinos Mavridis[1*], Nadja Wipf[2,3], Sandrine Medves[4], Ignacio Erquiaga[4], Pie Müller[2,3] and John Vontas[1,5*]

The novel assays are **simple** to perform and **rapid** with optimum levels of **sensitivity**, **specificity** and **reproducibility**. They have already been successfully validated in field-caught samples.

The assays can also be applied with **minimal resources**: directly on lysates of mosquito specimens, without RNA extraction or DNase treatment.

https://rdcu.be/bfEp1

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Peer-Reviewed Scientific Publications

Until January 2019 a total of **7 peer-reviewed publications**, acknowledging the DMC-MALVEC project, have been produced:

(1) Mavridis K et al. Rapid multiplex gene expression assays for monitoring metabolic resistance in the major malaria vector Anopheles gambiae. *Parasit Vectors*. **2019**;12(1):9.

(2) Mavridis K et al. Detection and Monitoring of Insecticide Resistance Mutations in Anopheles gambiae: Individual vs Pooled Specimens. *Genes*. **2018**;9(10).

(3) Kefi M et al New rapid one-step PCR diagnostic assay for Plasmodium falciparum infective mosquitoes. *Sci Rep*. **2018**;8(1):1462.

(4) Mitsakakis K et al. Converging Human and Malaria Vector Diagnostics with Data Management towards an Integrated Holistic One Health Approach. *Int J Environ Res Public Health*. **2018**;15(2).

(5) Hin S et al. Temperature change rate actuated bubble mixing for homogeneous rehydration of dry pre-stored reagents in centrifugal microfluidics. *Lab Chip*. **2018**;18(2):362-70.

(6) Mitsakakis K et al. Diagnostic tools for tackling febrile illness and enhancing patient management. *Microelectron Eng*. **2018**; 201:26-59.

(7) Vontas J et al. Automated innovative diagnostic, data management and communication tool, for improving malaria vector control in endemic settings. *Stud Health Technol Inform*. **2016**; 224:54-60.

Patents

The project has already produced **2 patents**.

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Game On
Resistance101 is now ready and available in:

Google Play App Store

A Game Changer for Training in Insecticide Resistance Management

Resistance 101 is an engaging, arcade-style game that lets you learn about insecticide resistance and its role in the fight against malaria.

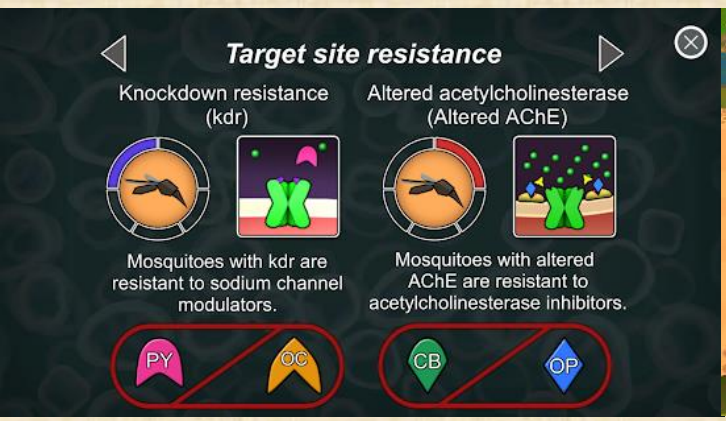
Explore different resistance mechanisms, learn how they manifest, and control mosquito populations through the use of insecticides.

Take up the challenge! Master mosquito control across 26 levels of finger tapping fun.

Watch 8 stunning videos to learn the fundamentals of insecticide resistance.

Defy the odds, put your skills to the ultimate test and earn 3 stars for each level.

Completely free with no adverts or in-app purchase.



Screenshots from Resistance101, a game to better understand the fundamental concepts of insecticide resistance in mosquitoes

YouTube https://www.youtube.com/watch?v=7zsbFyN9aGs&feature=youtu.be

Selected conferences, meetings and public events

Type of activity	Title	Date	Place	Audience type	Audience Size	Countries
Meeting, Poster Presentation	Vector Control Working Group (VCWG-13) meeting	07-09 February 2018	Geneva, Switzerland	Vector control specialists from academia/research, public and private sector	270	International
Exhibition	Geneva Health Forum (Dissemination of DMC MALVEC newsletters and exhibition space showing LabDisk)	9-12 April 2018	Geneva, Switzerland	Scientific community, Industry, Stakeholders, Investors	800	International
Conference, Poster Presentation Oral Presentation Exhibition	7th MIM Pan African Malaria Conference (MIM 2018)	15-20 April 2018	Dakar, Senegal	Public and Scientific community	2500	International
Exhibition	World Malaria day commemoration, Showcase of the Resistance 101	25 April 2018	Kabwe, Zambia	Health Professionals, lay community	200	Zambia
Conference Poster presentation	Molecular Diagnostics Europe: Advanced Diagnostics for Infectious Disease	22-23 May 2018	Lisbon, Portugal	Scientific community	>100	International
Conference, Oral Presentation	XI European Congress of Entomology	2-6 July 2018	Naples, Italy	Scientific community	>200	International
Public Event	European Researcher's night	28 September 2018	Heraklion, Greece	Public	>500	European
Conference, Oral Presentation	E-SOVE, European Society for Vector Ecology Conference	22-26 October 2018	Palermo, Italy	Scientific community	>100	International
Confrerence Poster Exhibition	American Society of Tropical Medicine & Hygiene (ASTMH) 67th Annual Meeting	28 October - 2 November 2018	New Orleans, USA	Scientific community, Industry, Stakeholders, Vector control specialists from academia/research,	>4500	International

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MIM 2018

Dakar, APRIL 15-20, 2018

7th MIM Pan African Malaria Conference Multilateral Initiative on Malaria (MIM 2018)

The LabDisk and GAME components of the DMC-MALVEC project displayed in MIM2018, Senegal. Left Side: DMC-MALVEC's coordinator John Vontas at the "Automated "sample to answer" diagnostic platform (MalVec-LabDisk)" poster. Right side: Dr Claire Dormann (LSTM) at the GAME poster.

The Multilateral Initiative on Malaria (MIM) initiative was established in 1997 with a mission to strengthen through collaborative research and training, the capacity of malaria-endemic countries in Africa to carry out research that is required to develop and improve tools for malaria control and to strengthen the research-control interphase.

DMC-MALVEC had a very strong representation at the latest MIM (2018). Apart from presenting our updated research results (FORTH, LSTM, Swiss TPH, OCEAC), we had the opportunity to showcase all three pillars of DMC-MALVEC: DDMS, GAME and the LabDisk.

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Visibility of DMC-MALVEC

7 Peer Reviewed Papers

2 Patents

>40 publications in major scientific conferences

Targeted dissemination activities to policy makers, local stakeholder advisory groups , academic community

RBM Partnership To End Malaria

IVCC

Multilateral Initiative on Malaria

infraVec2

Communication to the general public (open days, social media, web page, popular press articles)

Meet us in 2019…

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Follow us on twitter

@DMCMALVEC

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Hahn Schickard

LSTM LIVERPOOL SCHOOL OF TROPICAL MEDICINE

Swiss TPH

fast-track DIAGNOSTICS TRUE POSITIVES. TRUE NEGATIVES.

NT laboratory

CSRS Centre Suisse de Recherches Scientifiques en Côte d'Ivoire

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Republic of Zambia MINISTRY OF HEALTH

OCEAC