PREPARE4VBD newsletter

December 2023 Newsletter #3

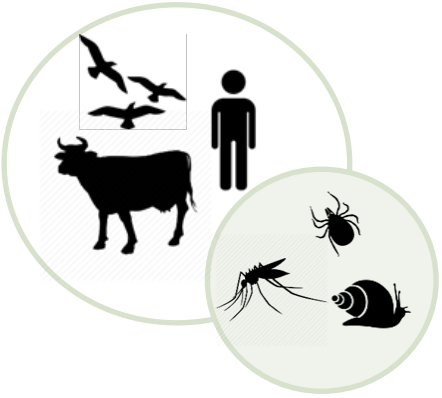
INSIDE THIS ISSUE

News and Views from the Coordinator

PREPARE4VBD reached an important milestone in November 2023, when we officially had our first periodic report, covering the first 18 months of the project, approved by the EU. It has been a long process, from the submission of the periodic report in the spring, followed by the review meeting in June 2023. But it has been a constructive process, with time to reflect on all the activities that has been performed so far by the all the partners in the Consortium. Thanks to all who contributed! In this issue of our Newsletter, we are happy to present research highlights that bears testimony to the enormous efforts carried out in this first period, not least by our partners in Africa, who has undertaken substantial and sometimes very challenging fieldwork activities. To highlight some of these activities, the preliminary results of liver flukes and snail surveys presented by our Ugandan partners, gives an important update on the situation with fascioliasis in Uganda – a highly neglected zoonotic disease until now. Bringing attention to this issue is a major achievement of our Ugandan partners and of PREPARE4VBD – one that we expect will also have an impact in terms of the attention given to this disease by the health authorities. It is also a very good example of the value and importance of applying a One Health approach to tackle zoonotic, snail-borne diseases. You can read more about this on page 2-3, followed by other news and presentations of PREPARE4VBD Fellows. Otherwise, the Coordinating team together with partner *icipe* in Kenya is busy planning our upcoming annual Consortium meeting and summer-school, to take place in Nairobi and Naivasha on the 24th February – 1st of March 2024. We look very much forward to seeing you all soon in Kenya!

> ... the preliminary results of liver flukes and snail surveys presented by our Ugandan partners, gives an important update on the situation with fascioliosis in Uganda –a highly neglected zoonotic disease until now.

With that, we wish you all a Festive Xmas season and Happy New Year!



About PREPARE4VBD

Vector-borne diseases (VBDs) constitute a major challenge facing African healthcare systems and economies, but also increasingly pose a threat to Europe as spread of vectors and zoonotic VBDs is anticipated more frequently in the future.

The PREPARE4VBD project address this challenge as s a multidisciplinary consortium bringing together **ten university and ministerial partners from five African and three European countries.**

PREPARE4VBD will develop new knowledge, detection tools and surveillance systems to improve preparedness in Africa and Europe for vector-borne diseases transmitted by mosquitoes, ticks and freshwater snails to livestock and humans.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101000365

PREPARE4VBD Research Highlights

PREPARE4VBD

Updates on the epidemiology of Human and Animal Fascioliasis in Uganda: Preliminary results from the field Investigations (2022-2023)

We are pleased to bring you the latest update on the epidemiology of human and animal fascioliasis in the areas surrounding Lakes Albert, Victoria, and Kyoga in Uganda. Fascioliasis is a zoonotic disease caused by *Fasciola hepatica* and *Fasciola gigantica*. The disease is prevalent in Uganda especially in cattle with prevalence ranging from 10% to 84%. In Uganda, studies have dated Fascioliasis infections way back in 1970 with observed prevalence of 35.24% (6,144/17433) liver samples from abattoirs and infection in Lymnea snails at 11.6% (983/8,511) across Uganda and later in 1972.

Uganda has adopted the One Health approach to fascioliasis, which is crucial for its control in Uganda, a country with a significant agricultural sector that has diverse water bodies that contribute to the transmission of fascioliasis. The impact on livestock production and its potential to affect human health underscore the importance of understanding its epidemiology within a One Health framework. The total population of Uganda stands at 41.6million and agricultural sector is working to boost incomes through supporting local food security through training of livestock farmers and improved animal breeding with currently an estimated 14.2million cattle, 16million goats and 4.5million sheep populations. In recent years, there has been an increase in undocumented liver condemnation across abattoirs due to animal fascioliasis in these areas in Uganda. This rise in cases can be attributed to various factors, including climate change, increased agricultural activities, and inadequate sanitation practices. These factors have contributed to the proliferation of the intermediate hosts, such as snails, which play a crucial role in the life cycle of the parasite. In animals the infection tends to show remarkable reduction on milk production as well as weak reproductive rates with serious associated costs for treatment and meat condemnation that are a very big economic loss to the farmer. Whereas human infections are reported as a symptomatic, but non-specific symptoms tend to be reported in individuals such as fever, abdominal pain, diarrhea and nausea during acute or chronic form of the infections.

Fig 2. Photo with Jinja City Inspector: Field team (L-R: Fred Besigye, Moses Adriko, Inspector Jinja Abattoir, Dr Stella Nambuya, Dr Wagaba David).

Lead research and surveillance activities by Moses Adriko (MoH) and Dr Stella Nambuya (MAAIF) together with Dr Edridah Muheki Tukahebwa (The Carter Center), Dr. Alfred Mubangizi (MoH), Professor Lawrence Mugisha and Professor Vudriko Patrick (MaK-CoVAB) have being conducted to better understand the epidemiology of fascioliasis in the region. These studies aim to identify high-risk areas, assess the risk factors amongst livestock farmers and abattoirs and develop new strategies to prevent and manage the disease.

"These studies aim to identify high-risk areas, assess the risk factors amongst livestock farmers and abattoirs and develop new strategies to prevent and manage the disease."

Field Set up, Study area and Design

We undertook parasitological, malacological, and environmental DNA (eDNA) assessment surveys between September 2022 to August 2023 at the shores of Albertine Basin (Buliisa, Hoima and Kikuube districts), Victoria Basin (Jinja and Mayuge Districts) and Kyoga Basin (Apac and Lira Districts) (Fig 1). Prior local arrangements were made with the district health and veterinary authorities of the districts. At the district, meetings were held with team of district health officers and district veterinary officers (Fig 2). The districts provided a list of farms and contacts were the survey could be carried. Arrangements were made with the farm managers and farm owners to visit their farms on a scheduled date and activities explained to them well ahead of the survey.

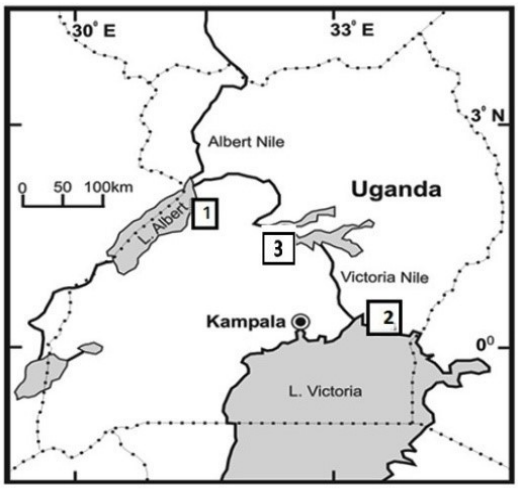


Fig 1. Map showing the location of surveyed districts in Uganda. 1: Albertine Basin, 2: Victoria Basin, 3: Kyoga Basin.

(To be continued on page 3)

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(continued)

The Laboratory analysis of the collected samples is being analysed using various methods in the laboratory at the College of Veterinary Medicine, Animal Resources and Biosecurity, Makerere University.

Fig 3. Interview with meat inspectors (left), and cattle liver inspection for flukes (right).

Preliminary results

1) A total of 753 liver fluke samples were collected from cattle across the three Lake Basins of Albertine covering Buliisa and Hoima districts, Victoria covering Jinja and Mayuge districts and Kyoga with districts of Apac and Lira. Preliminary morphological examinations reveal 622/753 (82.6%) identified as *Fasciola gigantica* and 131/753 (17.4%) *Fasciola hepatica*.

2) Feacal samples were collected from a total of 2396 animals. The coprological examination using Flotac indicated that the most common gat infections found in the animals were *Calicophoron daubneyi* ova observed at 52.0%, Strogyloides ova at 46.0% *Paraphistomes* at 27.8%, *Moniezia* ova at 14.8% *Nematodirus* ova at 8.5%, *Fasciola* ova at 4.5%, *Taenia* ova at 5.0% and *Strongyle* ova at 2.3%. The same animals were tested for Schistosomes using the point-of care rapid circulating cathodic antigen (POC-CCA) with diagnostic test results of 0.75%.

3) The zoonotic component of *Fasciola* in humans is not well documented in Uganda and our study reports a few cases (0.7%) identified among 305 participants in the study compared to other parasites like *Schistosoma mansoni* (41.6% POC-CCA Vs. 42.0% Flotac) and 22.0% hookworm, 7.2% Ascaris *lumbricoides* and 7.2% *Trichuris trichiura* cases seen in the study.

4) The purpose of snail sampling and water collection (for eDNA analysis) was to detect possible environmental transmission as well as asses the *Fasciola* infection level in the snails. All the water sites located within the selected villages and farms was sampled for snails and water. During the study a total of 18 sites the following snails were found: 124 *Lymnaea natalensis*, *154 Biomphalaria pfeifferi* and *104 Bulinus Forskalii.* The collected water samples were filtered and preserved following a protocol developed in the PREPARE4VBD project. Molecular analysis of snails and water samples will be done as the next step.

Efforts to combat fascioliasis in the region have been underway. The Ministry of Health through the one health approach, in collaboration with Makerere University College of Veterinary Medicine, Animal Resources and Biosecurity (CoVAB), Ministry of Agriculture, Animal Industries and Fisheries (MAAIF), Ministry of Tourism, Wildlife & Antiquities and Ministry of Local Government and international partners, have been implementing various control strategies through a strategic plan 2018-2022. The goal of this plan is to build a resilient, sustainable system to prevent and respond to zoonotic disease, address AMR and Biosecurity. These include health education campaigns to raise awareness about the disease, improved access to clean water sources and the distribution of antiheminthic drugs to treat infected individuals. Additionally, veterinary services have been strengthened to address the impact of fascioliasis on livestock, regular deworming of animals, proper disposal of animal waste and promotion of good hygiene practices have been emphasized to reduce the risk of transmission.

In conclusion

It is essential for the high-risk communities, healthcare providers, and veterinary professionals to work together in a coordinated manner to control and prevent the spread of fascioliasis. By implementing sustainable interventions and promoting good hygiene practices, we can reduce the burden of this neglected zoonotic tropical disease and improve the overall health and well-being of the affected communities and their livestock. This update provides valuable insights into the current status of fascioliasis in the areas surrounding Lakes Albert, Victoria and Kyoga in Uganda.

Fig 4. Fecal collection from cattle in Uganda.

Fig 5. Field sample preparation in Uganda.

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Introducing the PREPARE4VBD Fellows

In this edition of the PREPARE4VBD newsletter, we asked Dennis Getange (PhD@*icipe*), Sophy Nukeri (PhD@UKZN), Tiem van der Deure (PhD@UCPH) and Pulane Malatji (postdoc@UKZN) to tell us a bit about themselves.

Dennis Getange is a PhD Student at International Centre of Insect Physiology and Ecology (*icipe*) and University of KwaZulu-Natal (UKZN) working on developing simple and affordable molecular tools for surveillance of tick-borne pathogens (TBPs).

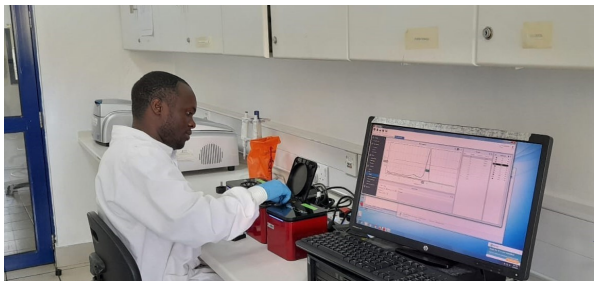
What do you like most about doing research? Research is all about pushing the boundaries of knowledge and uncovering insights that were previously unknown. The process of conducting research allows me to ask questions, design experiments, and seek answers to unknowns. I particularly enjoy the intellectual challenge that research presents and the satisfaction that comes with discovering new insights or finding solutions to a problem.

What excites you about your work? Knowing that, if successful, my research has the potential to make tangible and meaningful impacts on animal and public health makes me excited. Developing a simple, effective and affordable tick-borne disease surveillance tool will improve early detection, rapid response, prevention and control, and provide early warning systems before outbreak occurs.

What is your favorite food? When it comes to favorite food, I lean towards a bit of everything. However, I love the Kenyan Githeri (a mixture of beans and maize).

What is your favorite celebration? My favorite celebration is Christmas because it is rich in traditions, such as decorating a tree, exchanging gifts, gathering with family and friends, and enjoying special meals. The decorations, colorful lights, music, and general ambiance of the holiday season evoke feelings of warmth, joy, and cherished memories.

What do you like to do outside work? I enjoy watching football with friends and playing team sports to stay physically active. Additionally, I enjoy reading books and watching documentaries across various genres.



In the picture, I am screening for tick-borne pathogens from environmental DNA using Polymerase chain reaction – high-resolution melting (PCR-HRM) analysis in icipe's Martin Lüscher-Emerging Infectious Diseases (ML-EID) Laboratory.

Introducing the PREPARE4VBD Fellows

Sophy Nukeri is a PhD Student at UKZN working on assessing hybridization and determining the genetic diversity of Fasciola species in South Africa.

What do you like most about doing research? I love doing research because it allows me to explore the amazing intricacies of life. From understanding the tiniest molecules to observing the largest ecosystems, there is always something new to learn and discover. Biological research is a never-ending adventure that brings me joy and wonder. It also gives me the opportunity to contribute to the advancement of science and to help make the world a better place.

What excites you about your work? I work with parasites which are fascinating, diverse, and adaptable organisms. They have evolved to live in a wide range of habitats, from the tropics to the arctic, and they can infect a variety of hosts, including humans, animals, and even plants. Their complex life cycles and their ability to manipulate their hosts make them some of the most intriguing organisms on the planet. It is exciting to be a part of studying parasites that have important implications for public health, since many human diseases, such as schistosomiasis and fascioliasis, are caused by parasites.

What is your favorite food? Rice & Beef Stew

What is your favorite celebration? Christmas, because it brings families together.

What do you like to do outside work? Being indoors, watching movies.

In the picture, I am at one of the water sites, sampling freshwater snails.

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Introducing the PREPARE4VBD Fellows

Tiem van der Deure is a PhD student at the University of Copenhagen, working on ecological and epidemiological modelling of vector-borne disease.

What do you like most about doing research?
Having the opportunity to learn new things all the time. Just one year ago, I had never heard of many of the tools and concepts I now use every day.

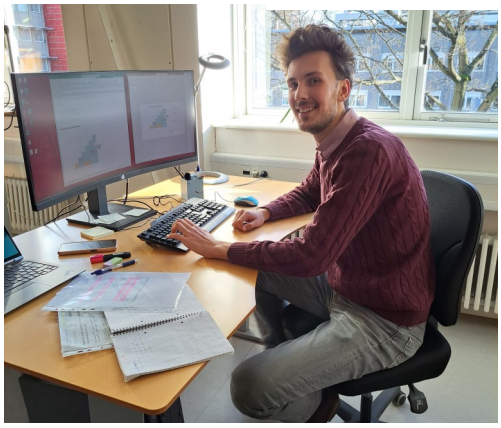
What excites you about your work?
Discovering patterns in raw data and learning new things about the real world! It is amazing to me that a much-simplified computer simulations can give such profound insights.

What is your favorite food?
Growing up in the Netherlands, we had Indonesian (Javanese) food every week. It is one of the things I miss most about the Netherlands.

What is your favorite celebration?
I really enjoy the Danish midsummer celebrations on St. John's Day, when it gets dark around midnight and Danes make big fires and sing together.

What do you like to do outside work?
I love classical music and myself sing and play the cello. I am also a climate justice activist, like to learn new languages, and keep a vegetable garden with my girlfriend.

In the picture, I am analysing data from snail experiments.



Introducing the PREPARE4VBD Fellows

Mokgadi Pulane Malatji is a Postdoctoral fellow at UKZN working on mapping *Fasciola* species and their intermediate hosts in South Africa.

What do you like most about doing research?
We are forever evolving with the parasites we study; be it through learning new or developing old techniques or just studying how they keep mutating. Research offers a great opportunity to learn something new, and room is always big for growth. We get to interreact and share our outcomes with our fellow scientists; emerging or veterans. We get to also learn indigenous knowledge about various diseases through interactions and conversations with different communities.

In the picture, I am loading PCR products (freshwater snails) on an agarose gel.

What excites you about your work?
In as much as in get to continue doing what I love the most, i.e., studying one of my many favorite parasites in different stages and hosts, and developing new protocols developing protocols for detection and studying the different populations. I also get to experience a lot of "first feeling or observation" as I entered a new journey of supervising. I have always worked with and mentored students, but there is a different feeling and commitment that comes with officially supervising students. I get to see them learn new techniques or protocols, witness their hunger to not only complete their degrees, but learn as much as they can within their degrees. I do not take this for granted.

What is your favorite food?
Steak and vegetables.

What is your favorite celebration?
Christmas holidays

What do you like to do outside work?
I like taking aerobics classes.

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PREPARE4VBD

The fellows are an integrated and important component of PREPARE4VBD

By providing a cross-country supporting network and mentoring of a cohort of >15 early career scientist, PREPARE4VBD will enhance the individual and institutional capacity and help foster a new generation of experts in vector biology, VBD surveillance and control in both Africa and Europe. Capacity building in PREPARE4VBD not only include developing scientific and technical knowledge, but also broader competencies, such as writing, disseminating research and other generic skills for early career researchers. Such skills are essential to promote long-term career success for the fellows, but are also key in driving the implementation, impact and success of PREPARE4VBD.

News and Updates from the Project Management

Changes in the Project Management team

Our project manager Katrine Mohr has found new challenges, and has therefore resigned from the project. We wish Katrine all the best in her new endeavours! We are currently working on a solution, and mean while we would like to welcome Kirsten Groenlund Andersen, from IVH-UCPH, who has kindly stepped in to assist with the planning of the Annual Meeting and supporting the Coordinating Team @UCPH. Kirsten has many years of experience with cross-country research projects, and has lived in various African countries for many years, inclding Tanzania and Zambia. and A warm welcome to Kirsten!

PREPARE4VBD Annual meeting in Kenya 2024

The time for the next annual meeting in the PREPARE4VBD consortium is getting closer and UCPH is busy together with the hosting institution *icipe* in Kenya planning the meeting which will be helt 26. February - 1.March 2024.

Prior to the meeting, a summer school focusing on diagnostic methods and molecular tools for the project fellows and local students will take place 23.-25-February 2024.

Important deadlines:

- M32 (April 2024) – Deliverable 1.4 (UCPH)
- M32 (April 2024) – Deliverable 3.5 (*icipe*)
- M32 (April 2024) – Deliverable 4.5 (UCPH)
- M32 (April 2024) – Deliverable 8.5 (CSRS)
- M32 (April 2024) – Deliverable 8.5 (CSRS)

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The PREPARE4VBD newsletter series are biannual and will provide updates on project progress incl. research activities and capacity building, important deadlines in the project and upcoming events.

This PREPARE4VBD newsletter can be shared with relevant or interested institutions and stakeholders.

Find the PREPARE4VBD newsletters here:

prepare4vbd.eu/newsletter

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