Self-limiting mosquitoes:
A new tool against the invasive malaria vector, *Anopheles stephensi*

Our Mission

We're building a healthy, sustainable and equitable future for humans on this planet by forging a new category of safe, sustainable, chemical-free, highly effective biological pest control solutions.

Oxitec At a Glance

100+ Scientific Publications

>1 billion

OXITEC MOSQUITOES DEPLOYED, AND COUNTING

>95%

Public approval in diverse project areas

7

FRIENDLY™ SOLUTIONS IN DEVELOPMENT

5

PROGRAMS UNDERWRITTEN BY WORLD-CLASS PARTNERS

250+

PASSIONATE PEOPLE

30+ PhDs

#1st

To launch a GM mosquito solution commercially

World-Class Partners, Collaborators and Regulatory Approvals

Select Partners and Underwriters

Select Current and Historical Collaborators

Positive Regulatory Approvals and Opinions

Oxitec's Malaria Program Targets Important Vectors

With the support of the Bill & Melinda Gates Foundation, Oxitec is developing urgently needed vector control tools for two malaria vectors that pose threats in the Americas, Africa and Asia.

Anopheles albimanus

- **Dominant malaria vector** in Meso-America
- **Malaria elimination has been challenging**, partly due to lack of effective vector control
- **Rural malaria vector**

Anopheles stephensi

- Asian native, **invasive new threat to cities across Africa**
- **Urban malaria vector**
- Arrival in Djibouti has led to **an increase of malaria cases**
- **Solutions urgently needed**

Eradication will require new approaches and products that target outdoor transmission.[1]

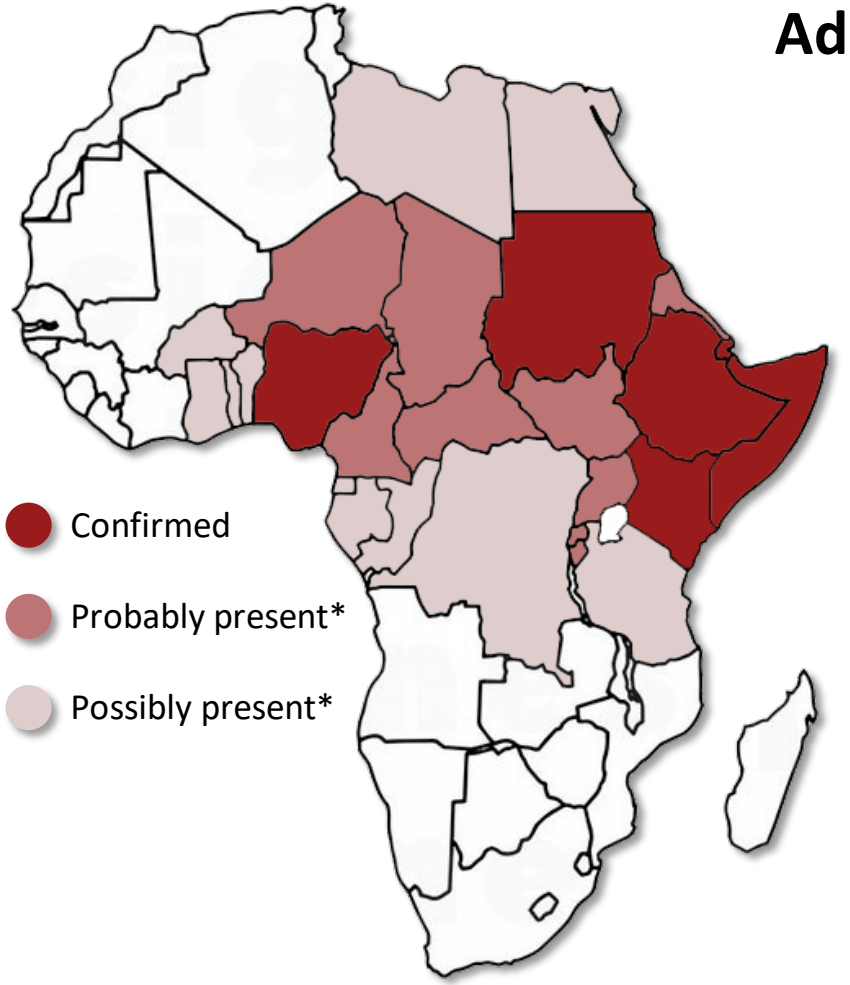
>70-fold increase in malaria in Djibouti in the 6 years after 2012[2]

"Urgent action is needed to prevent **urban malaria epidemics** from emerging and causing a **public health disaster**"[3]

"A **major potential threat to malaria control and elimination in Africa**"[4]

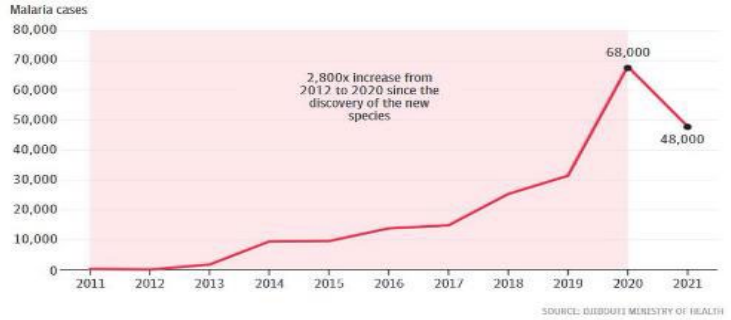
Solutions for *Anopheles stephensi* Are Urgently Needed

***Anopheles stephensi* has crossed the continent: it's spreading fast and the urban malaria threat is growing**



*Oxitec assessment, informed by expert engagement

Addressing the *Anopheles stephensi* threat is urgent



- Urban-colonising *Anopheles stephensi* caused **dramatic rise of malaria in Djibouti City since 2012**
- Recent research indicates **similar malaria spikes in Ethiopian urban communities**[1]
- **Spreading rapidly across Africa**, confirmed in the Horn of Africa and now Nigeria[2] and Kenya[3]
- Very large urban populations lay in the path of this new urban malaria threat – **126 million people are at risk**[3]
- Resistance and outdoor biting may **compromise the effectiveness of insecticide-treated bednets and indoor residual spraying**[4]

[1]Results described by Fitsum Girma, PhD, regarding recent off-season malaria outbreaks in Dire Dawa, eastern Ethiopia.
[2]Link [3]Sinka M, *et al.* 2020 [3]Ochomo E, personal communication [4]Hamlet *et al.* 2022

Team Culture: trust starts with who we are and how we've built our team.

Djibouti Friendly™ Mosquito Program Partners

Le Programme National de Lutte contre le Paludisme (PNLP) is the national lead in the fight against malaria in Djibouti.

L'Association Mutualis is a leading not-for-profit organization serving the public health needs of communities in Djibouti.

Oxitec is a leading developer of biological solutions to control pests that transmit disease, destroy crops and harm livestock.

"As a government, **we are focused on delivering safe, effective and sustainable vector control to protect our people from disease-spreading mosquitoes**.

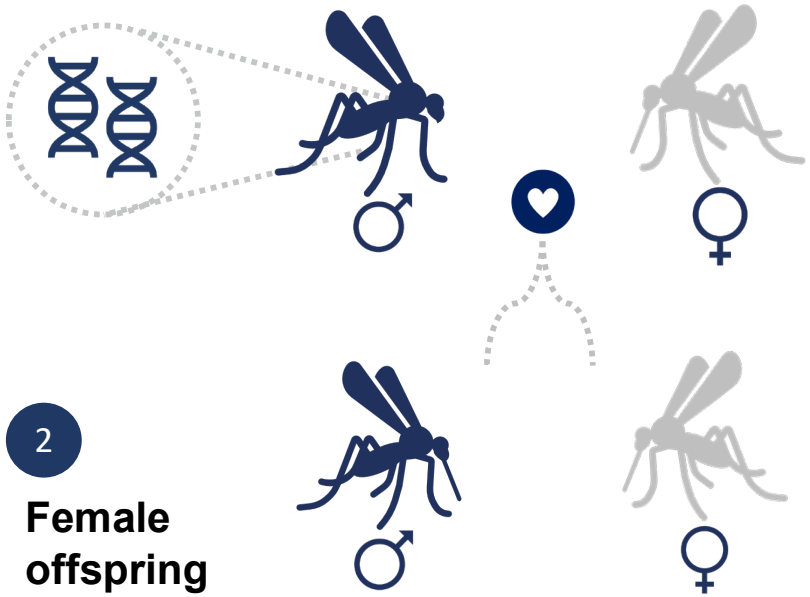
This new partnership demonstrates our government's commitment to lead the way in changing how malaria-spreading mosquitoes are combated.

We're excited about working with Oxitec to **explore the impact that this new solution can deliver in our country's malaria-threatened communities**."

- DJIBOUTI'S MINISTRY OF HEALTH

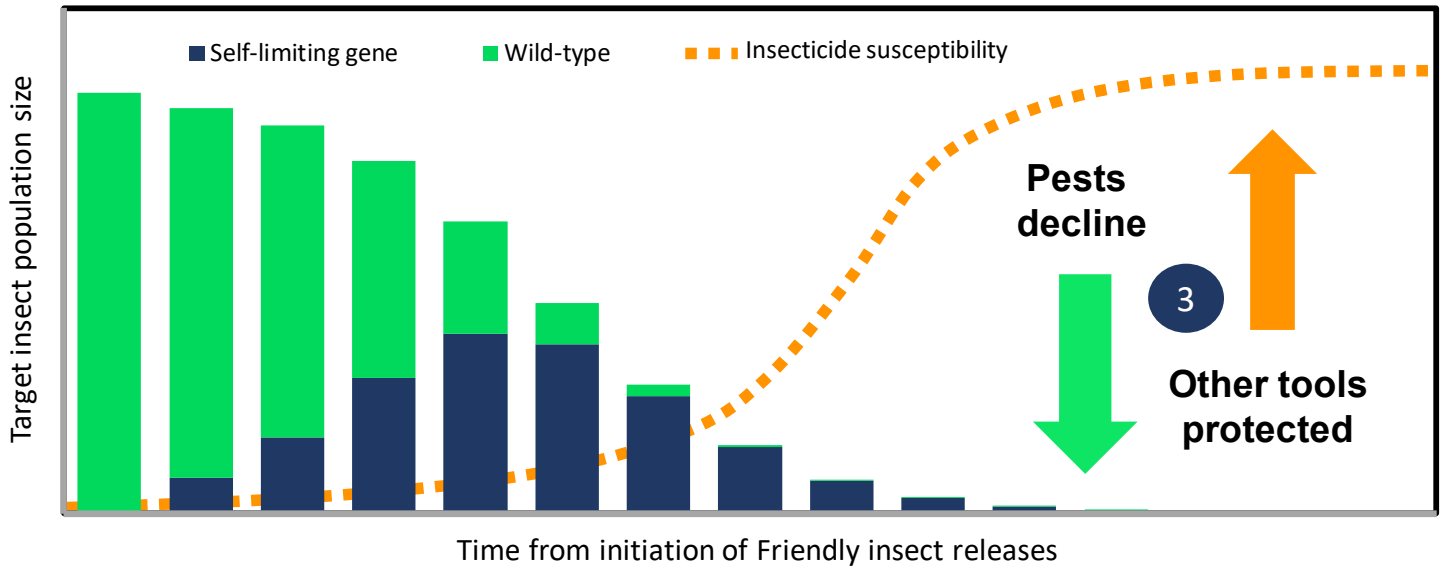
Oxitec's Friendly™ Technology Platform

1 **Released Friendly™ males find and mate with pest females**



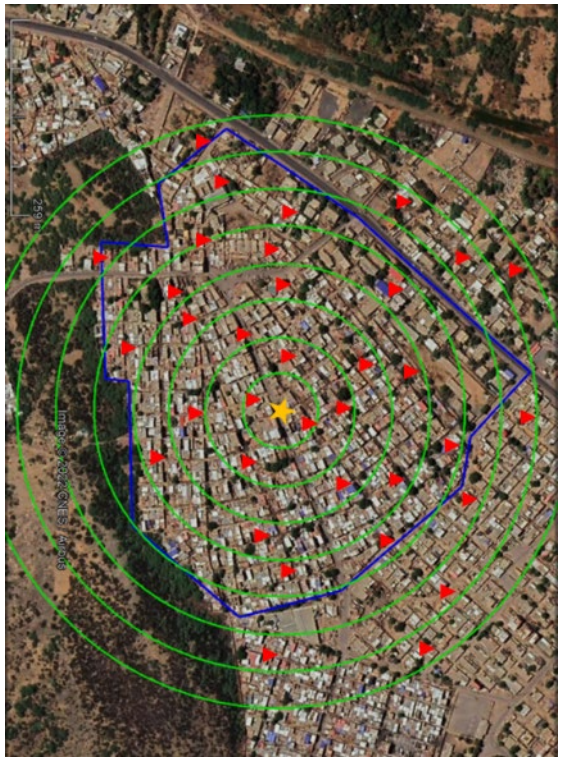
2 **Female offspring cannot survive**

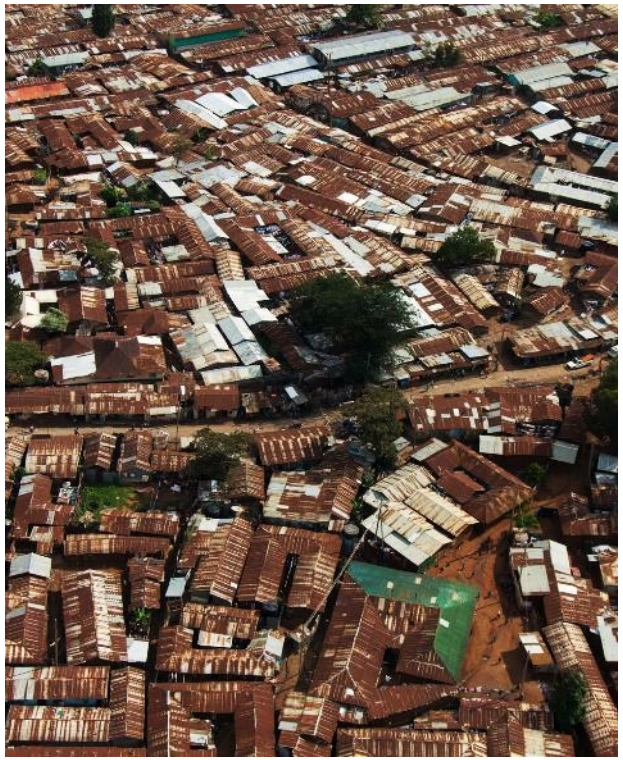
Self-limiting gene prevents female development to adulthood



The Djibouti Friendly™ Mosquito Program

The program follows a phased approach towards field pilots of Friendly™ *Anopheles stephensi* in Djibouti.





STRAIN DEVELOPMENT

BASELINE ENTOMOLOGY PHASE I
WILD-TYPE MRR

BASELINE ENTOMOLOGY PHASE II
SELF-LIMITING MRR

FULL FIELD PILOTS
SELF-LIMITING NEIGHBOURHOOD-WIDE

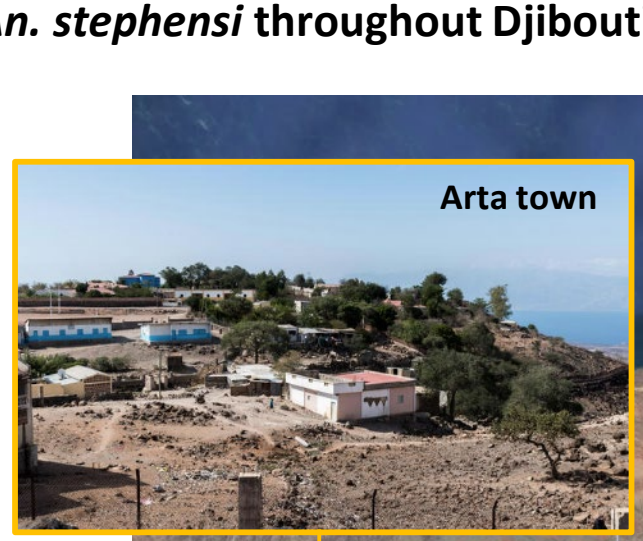
PNLP, Association Mutualis and Oxitec Established Operations in Djibouti

Labs have been refitted for rearing and field operations.

PNLP, Association Mutualis and Oxitec staff, based in Djibouti, are working closely together on the Djibouti Friendly Mosquito Program.

Djibouti Field Monitoring of *Anopheles stephensi*

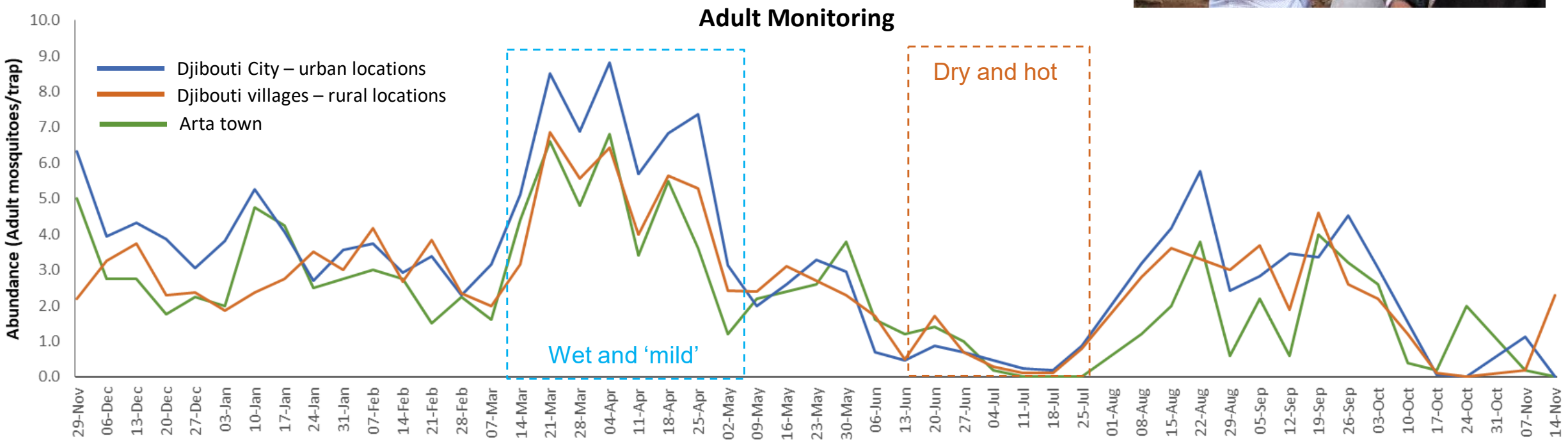
The Djibouti Friendly Mosquito Program has been monitoring *An. stephensi* throughout Djibouti since 2021.



Monitoring *Anopheles stephensi* in Djibouti

Highlights

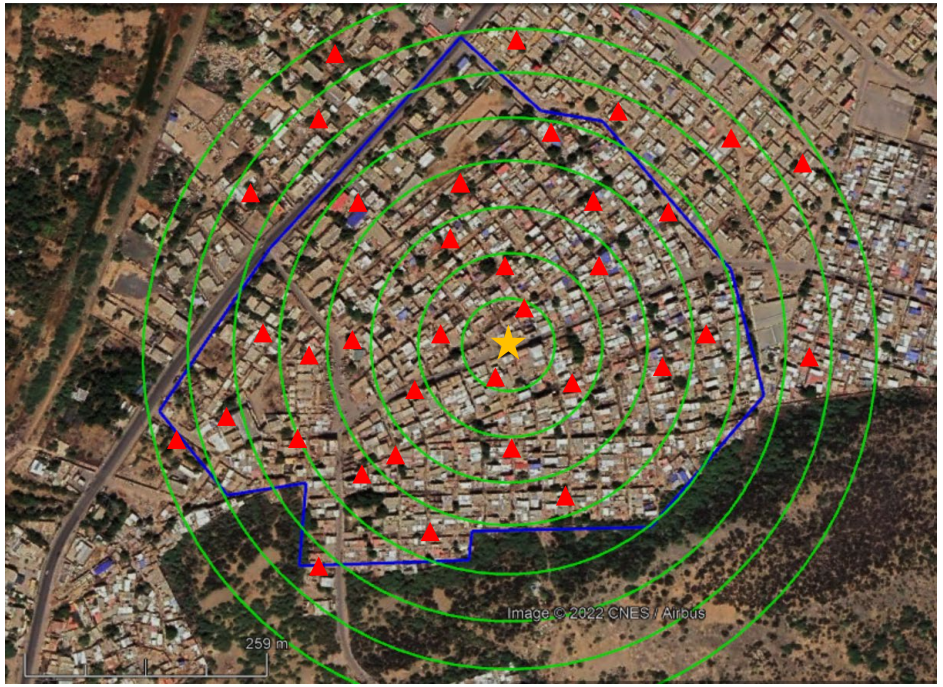
- Seasonal population dynamics, dictated by rainfall and temperature
- Good capture rates of adult male and female *An. stephensi* with BG traps and human lures
- Ovitrap monitoring and lab processing optimization is continuing



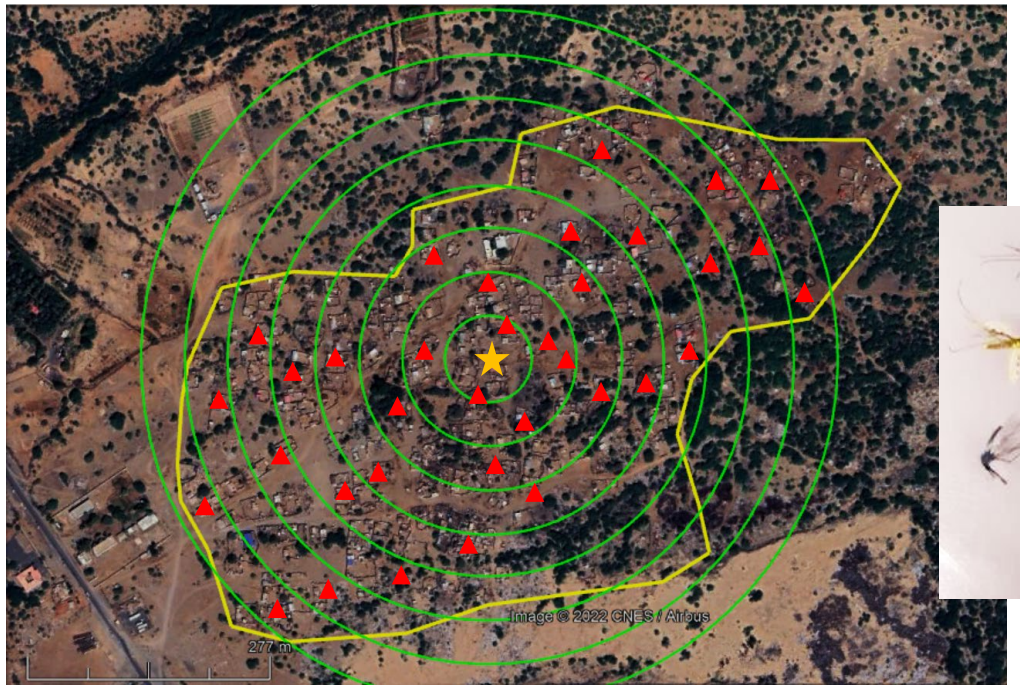
Wild-Type Mark-Release-Recapture Studies in Djibouti

Objective: Determine dispersal and longevity of *An. stephensi* in relevant, contrasting habitats.

- Two sites short-listed: urban versus rural
- Replicated releases of ~10k powder-marked **wild-type male** mosquitoes from a central location, surrounded by a network of adult traps



Djibouti City, Ambouli neighborhood
- Typical urban area
- High household density
- Densely populated



Douda village
- Typical rural location
- Sparse households
- Low population density

POWDER-MARKED ADULT MALE MOSQUITOES

RELEASE POINT

ADULT TRAP

Friendly™ *Anopheles stephensi*: Planning the Path to Impact

INDICATIVE PATHWAY

Pilot facility
- Scale up to trial level within 6 months

Field validation
- Egg release device field validation
- Vector suppression

Implementation approval

Djibouti Beta Launch
- Solutions for community use in DJ

Commercial Hub
- DJ production line starts

Djibouti Growth
- National ramp

Other Countries
- Field pilots for registration

Expanding impact
- Garner momentum for broadest possible impact

FIELD PILOTS PROVIDE CRITICAL PROOF POINTS

DISPERSAL & MATING
How do Friendly™ Anopheles stephensi behave in the field?

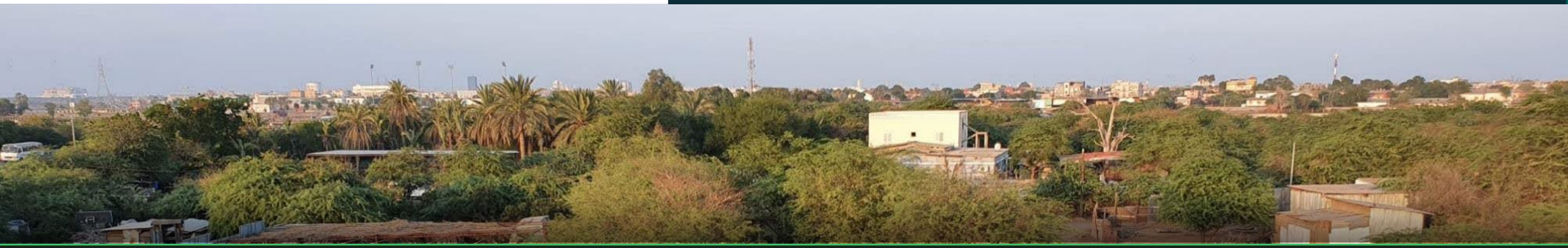
RELEASE NUMBERS
How many Friendly™ Anopheles stephensi need to be released?

Djibouti: Initial beta launch

of Friendly™ *Anopheles* in Djibouti City.

Regional Expansion: Address Wider Threat

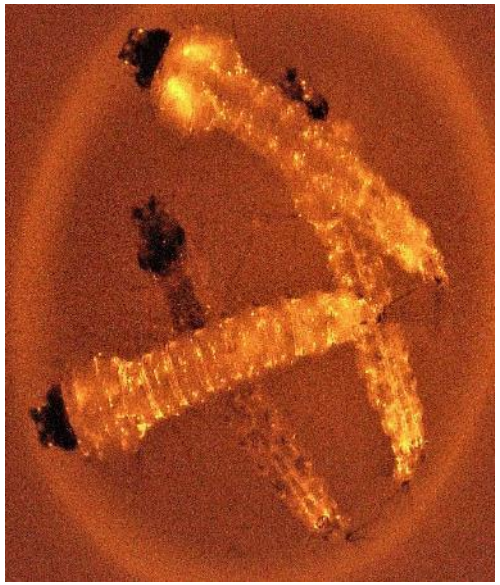
demonstrating performance and supporting local registrations.



Together We Will Deliver a Complete and Integrated Solution for Environmentally Sustainable Management of *Anopheles stephensi*

An Integrated Friendly™ Insect Pest Management Solution

Field-Ready Friendly™ Mosquito + **Scalable Production Systems** + **Distribution and Deployment Systems** + **Digital Platform for Integrated Deployment**



Thank you