Identification and Distribution of Mosquito Vectors of Medical Importance on the island of Cyprus (ID-Vec)

Technical Committee on Health

June 24, 2021

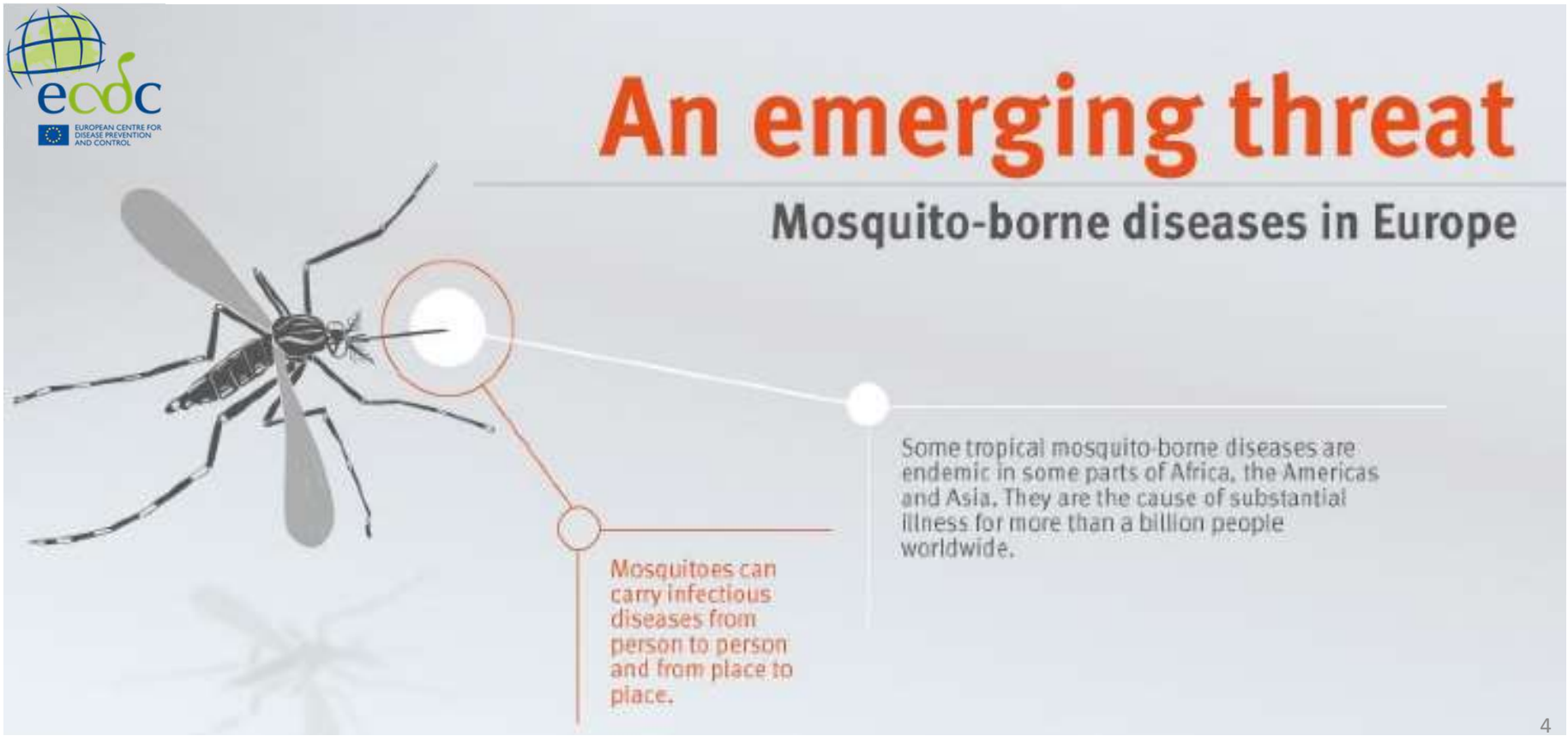
This action of the Technical Committee on Health is funded by the European Union and implemented by UNDP in coordination with OSASG

Agenda

- Welcome and Opening Remarks
  - Prof. Leonidas Phylactou, Co-Chair of the Technical Committee on Health
  - Dr. Cenk Soydan, Co-Chair of the Technical Committee on Health
  - Alain Joaris, Head of Cooperation, EUPSO, Cyprus Settlement Support
  - Angela Bargellini, Senior Political Affairs Officer, Office of the Special Adviser of the Secretary General on Cyprus
  - Jakhongir Khaydarov, Head of Office, UNDP - Cyprus
- Project implementation – objectives, activities, results and outputs
- Next Steps
- Questions and Answers

Opening Remarks

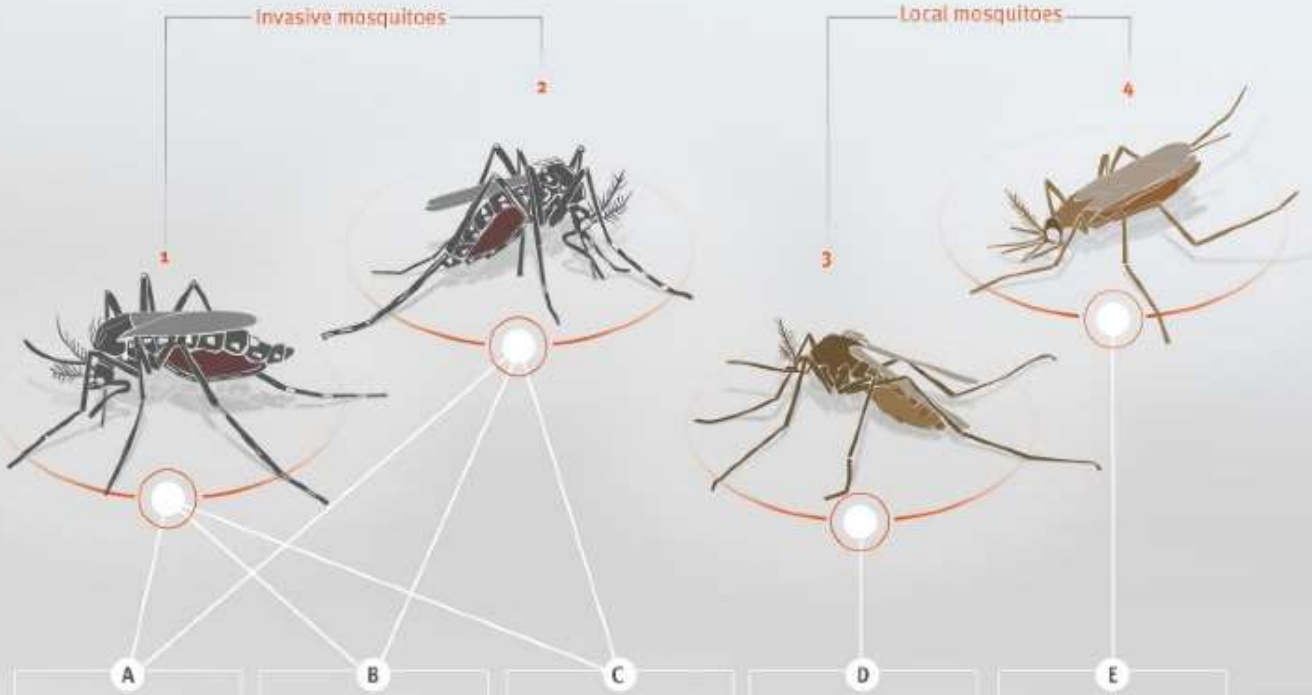
Mosquitoes: An emerging threat



Just one bite away from infection

Different species of mosquitoes can carry different diseases

Invasive mosquitoes are characterised by their ability to colonise new territories. A considerable increase in the spread of invasive mosquitoes has been observed in Europe since the late 1990s.



1. After its disappearance in the 20th century in Europe, ***Aedes aegypti*** has recently become established in Madeira. It is also present in some areas around the Black Sea coast.

2. ***Aedes albopictus*** is considered to be the most invasive mosquito species in the world. It is present in much of southern Europe.

3. ***Culex pipiens*** is the most widespread mosquito in Europe.

4. The ***Anopheles*** mosquito can be found from south-eastern Sweden to Portugal.

Chikungunya
Infected people suffer from fever and severe joint pain, which can last for months.

Zika
Mild disease with low fever and rash but most cases are asymptomatic. The risk of serious complications have been identified for some.

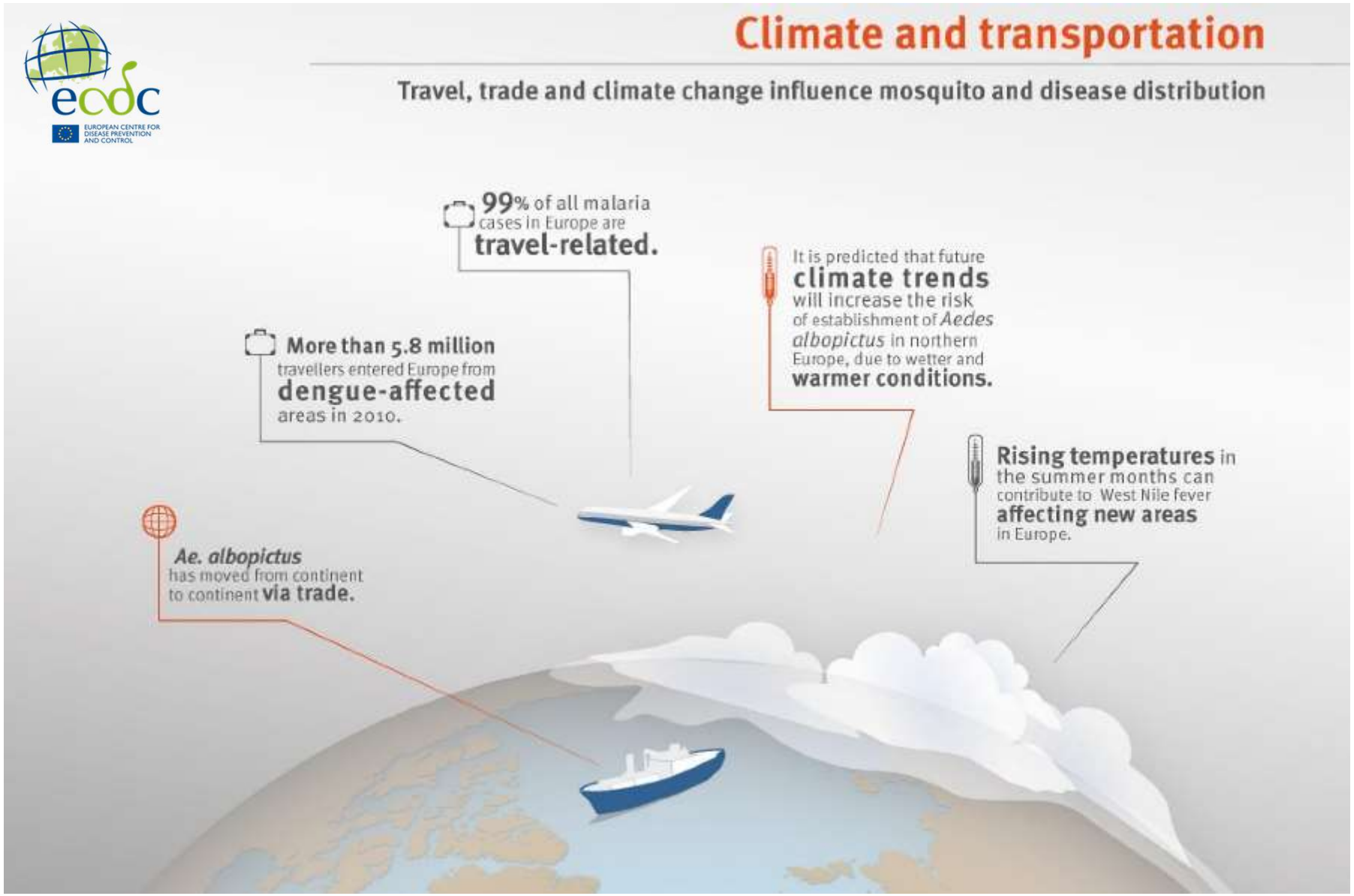
Dengue
Most infected people have fever lasting seven days. More than 390 million cases are estimated worldwide per year. The most important mosquito-borne disease affecting humans.

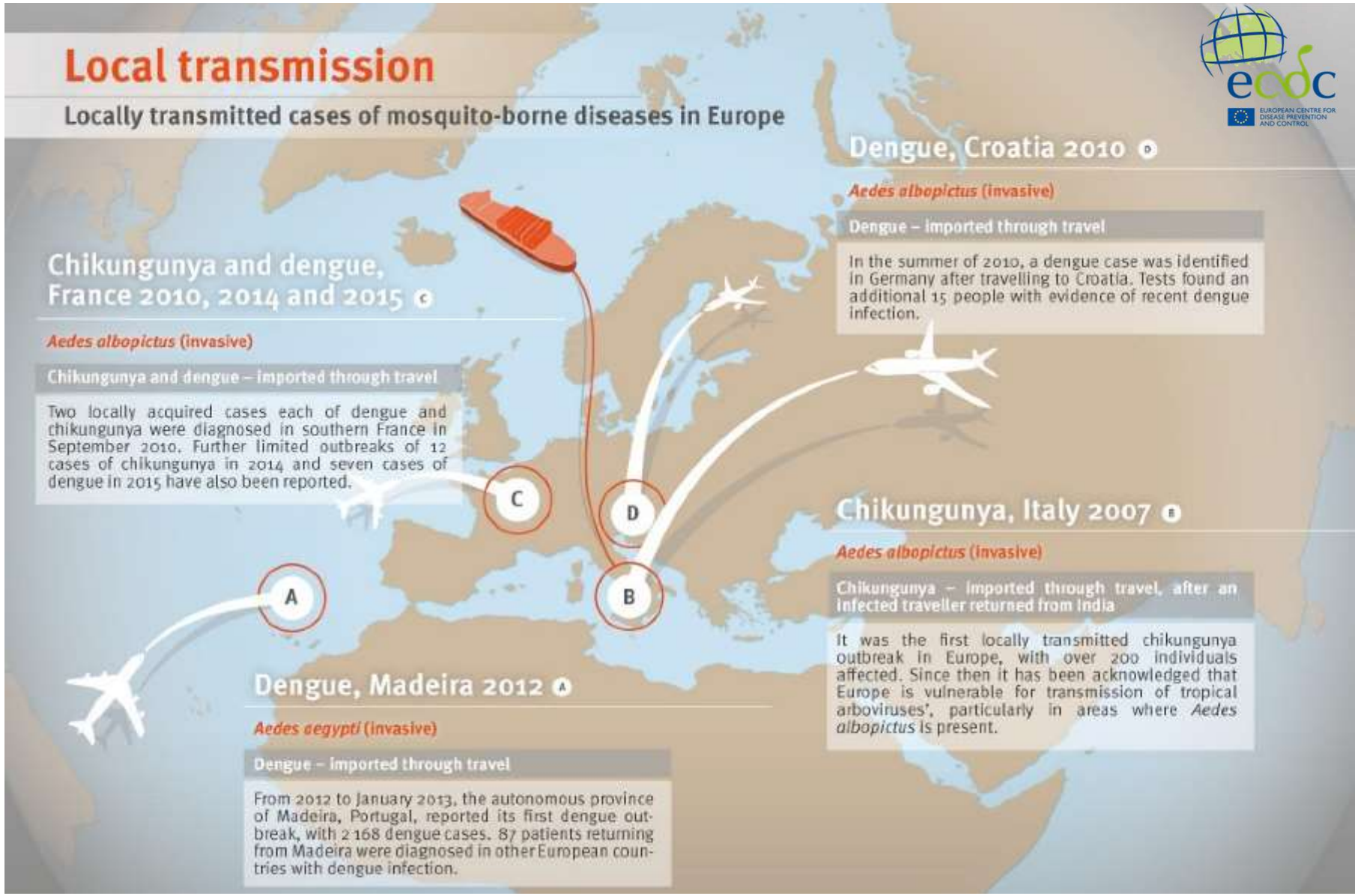
West Nile fever
Cases can be severe, most often among the elderly. An estimated 1 out of 140 to 320 persons infected can get severely sick.

Malaria
Worldwide, approx. 450 000 deaths every year. Early diagnosis and prompt treatment can prevent illness and death. Prophylaxis is available.

Climate and transportation

Travel, trade and climate change influence mosquito and disease distribution




Local transmission
Locally transmitted cases of mosquito-borne diseases in Europe
ecdc
EUROPEAN CENTRE FOR DISEASE PREVENTION AND CONTROL
Dengue, Croatia 2010 D
Aedes albopictus (invasive)
Dengue – imported through travel
In the summer of 2010, a dengue case was identified in Germany after travelling to Croatia. Tests found an additional 15 people with evidence of recent dengue infection.
Chikungunya and dengue, France 2010, 2014 and 2015 C
Aedes albopictus (invasive)
Chikungunya and dengue – imported through travel
Two locally acquired cases each of dengue and chikungunya were diagnosed in southern France in September 2010. Further limited outbreaks of 12 cases of chikungunya in 2014 and seven cases of dengue in 2015 have also been reported.
C
D
A
B
Chikungunya, Italy 2007 B
Aedes albopictus (invasive)
Chikungunya – imported through travel, after an infected traveller returned from India
It was the first locally transmitted chikungunya outbreak in Europe, with over 200 individuals affected. Since then it has been acknowledged that Europe is vulnerable for transmission of tropical arboviruses', particularly in areas where Aedes albopictus is present.
Dengue, Madeira 2012 A
Aedes aegypti (invasive)
Dengue – imported through travel
From 2012 to January 2013, the autonomous province of Madeira, Portugal, reported its first dengue outbreak, with 2 168 dengue cases. 87 patients returning from Madeira were diagnosed in other European countries with dengue infection.

PiCoordination and Information sharing

Project Implementation

Overview of the Action

- Implementation period: January 2020 - June 2021
- Objective: To establish a surveillance scheme with the aim to

A) Identify mosquito vectors both native and invasive species at an island level focusing on regions at higher risk for disease transmission

B) Map mosquito distribution to prioritize regions for which enhanced measures should be taken to control the mosquito population to protect public health

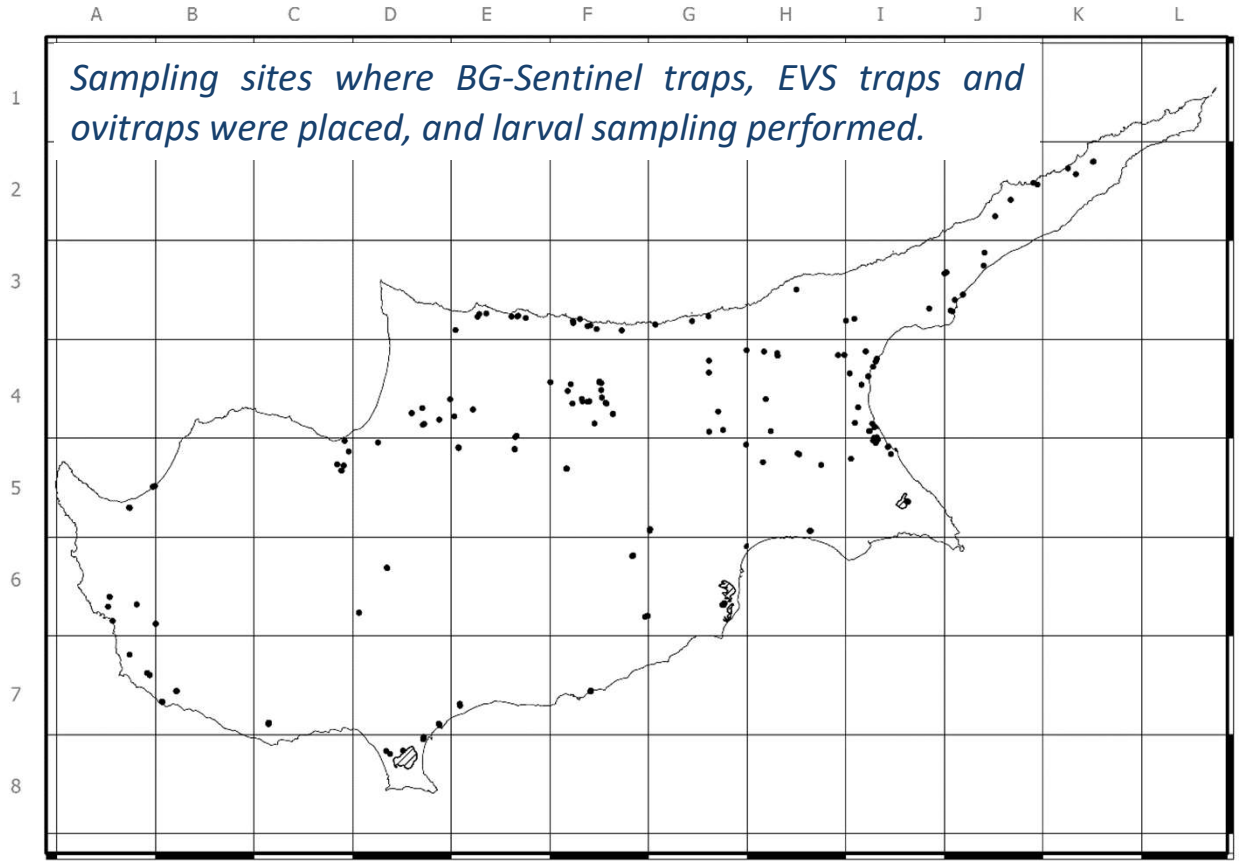
C) Enhance capacity building of Greek Cypriots and Turkish Cypriots to identify mosquitoes of medical significance and to perform surveillance programs

D) Increase public awareness on protection measures against mosquito bites

PiCoordination and Information sharing

Project Activities

1. Field activities



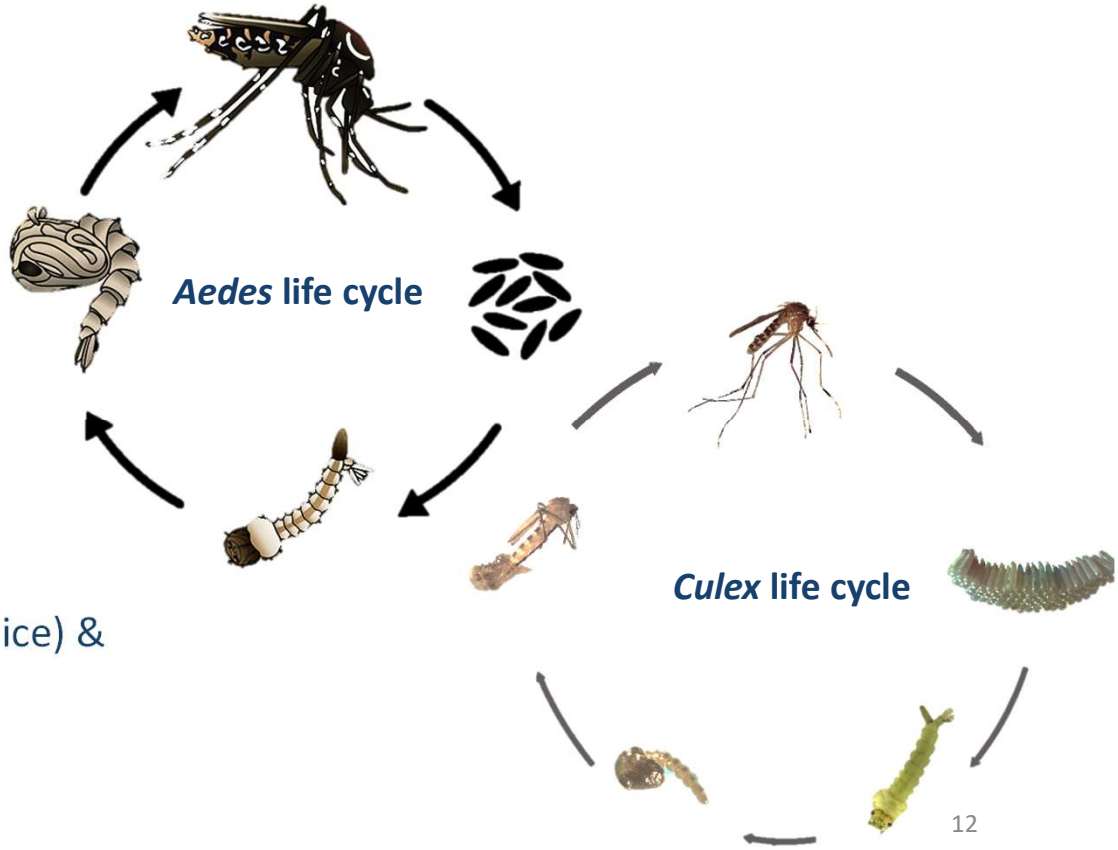
Activities

Data Collection

- presence/absence
- distribution
- abundance
- population dynamics

Sampling:

- Oviposition traps (ovitraps)
- Larval sampling
- BG-Sentinel traps with BG-Lure and CO2 (dry ice) & EVS traps with CO2 (dry ice)



Egg surveillance

75 oviposition traps

- Black plastic bowls
- An oviposition support (e.g. a wooden stick)
- From 17th of November 2020 to the 23rd of January 2021
- Protection from rain, wind and direct sun light
- In 8 region (Nicosia, Kyrenia, Morphou, Lefka, Mesaria, Famagusta, Trikomo and Karpasia)
- Check in weekly basis

Oviposition traps

Egg surveillance

Oviposition traps

Egg surveillance

Oviposition traps

24 oviposition traps

- potential points of entry
- closed to or under vegetation
- near buildings



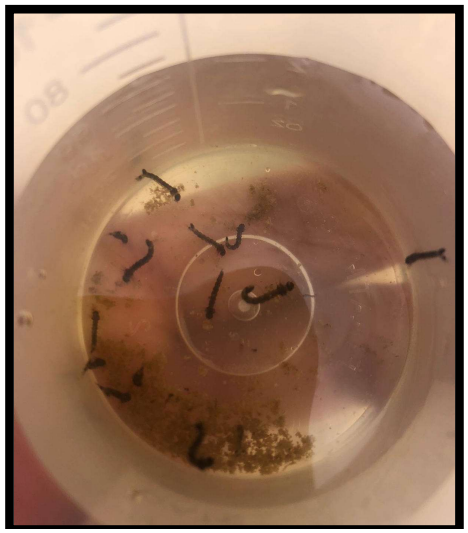




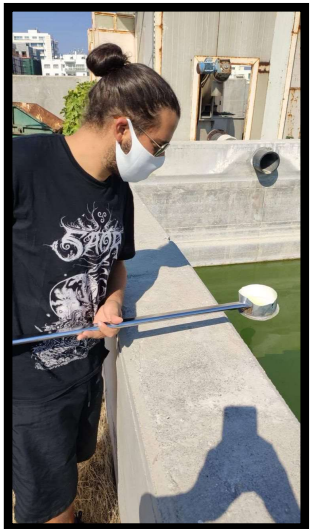

Larvae surveillance

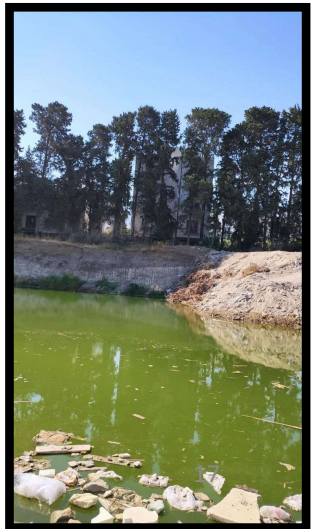
- Dipping submersion technique
- Dry season (18th of August 2020 to 31st of October 2020)
- Wet season (18th of February 2021 to 24th of February 2021)
- 29 sites for larvae surveillance
- In 8 region (Nicosia, Kyrenia, Morphou, Lefka, Mesaria, Famagusta, Trikomo and Karpasia)

Larvae surveillance



Larvae surveillance





Larvae surveillance

- 350ml standard white dipper with extendable pole
- Five dips at each site
- If no larvae are collected, then it was extended to 10 dips
- Natural and manmade water collectors

Larvae surveillance

Larvae surveillance of rocky beaches

Larvae surveillance

Larvae surveillance of Limassol wetland



Larvae surveillance of Paralimni



Larvae surveillance of Larnaca saltmarsh



Larvae surveillance of Oroklini lake


Adult surveillance

BG-Sentinel Traps

- Data collection from BG-Sentinel traps in wet season (10th of December 2020 to 30th of January 2021)
- Placing at ground level (BG-Sentinel)
- Data collection from EVS traps in wet season (9th of January 2021 to 23rd of January 2021
- Hanging on the trees (EVS)
- In 8 region (Nicosia, Kyrenia, Morphou, Lefka, Mesaria, Famagusta, Trikomo and Karpasia).
- 1 kg dry ice per day per trap

EVS Traps

Adult surveillance

EVS Traps

Catch bags of EVS Traps

Adult surveillance

BG-Sentinel Traps

Adult surveillance

BG-Sentinel Traps

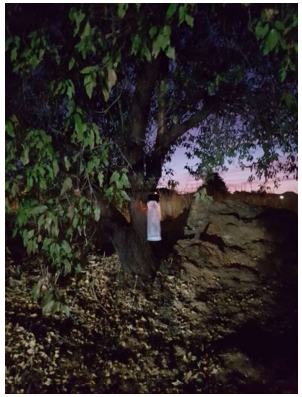
- 23 sites
- urban,
- suburban or
- rural environments
- retain humidity
- protected from the wind
- easily accessible by the main roads

Sampling on a biweekly basis

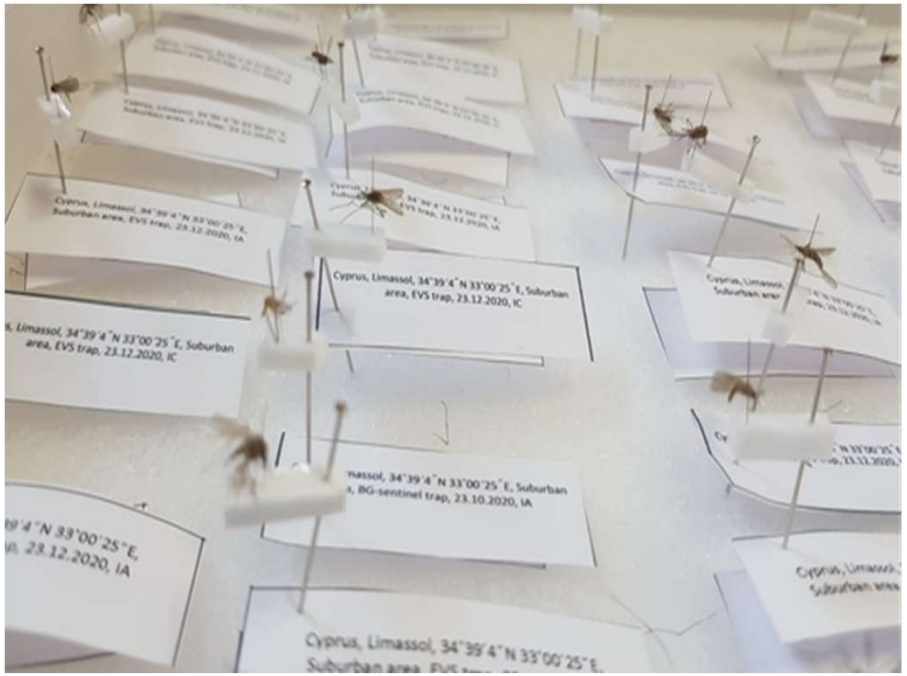
Dry season (1st of July to 30th of September 2020)

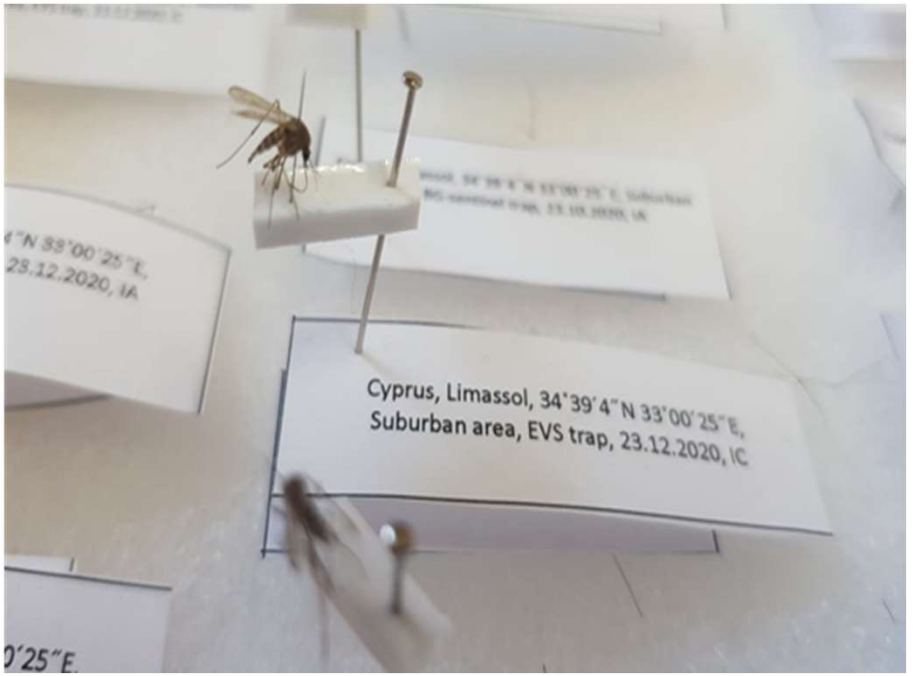
Wet season (1st of October 2020 to 28th of February 2021)

EVS Traps



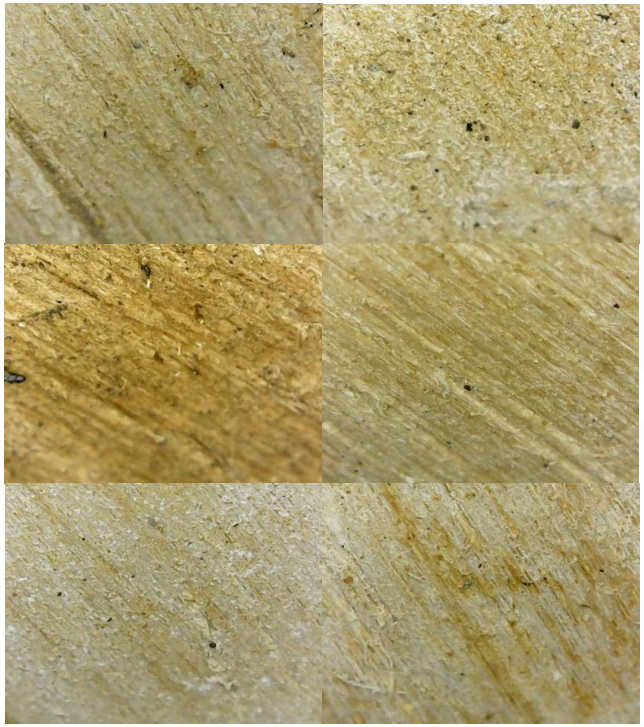
2. Laboratory analysis





Evaluation of eggs' presence – larvae mounting

Evaluation of mosquito eggs' presence



Mounting mosquito larvae

Morphological identification

Morphological identification

Morphological identification

Morphological identification of adult and larvae mosquito

MosKeyTool

Pinning of samples

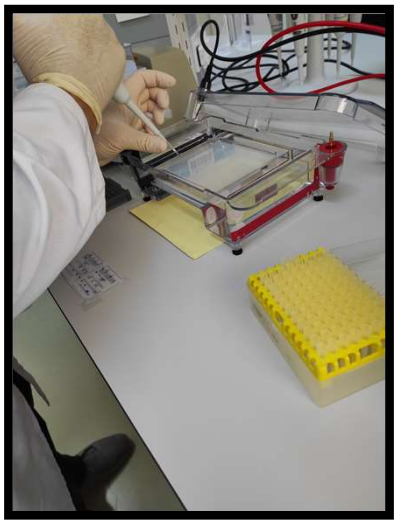
Molecular identification

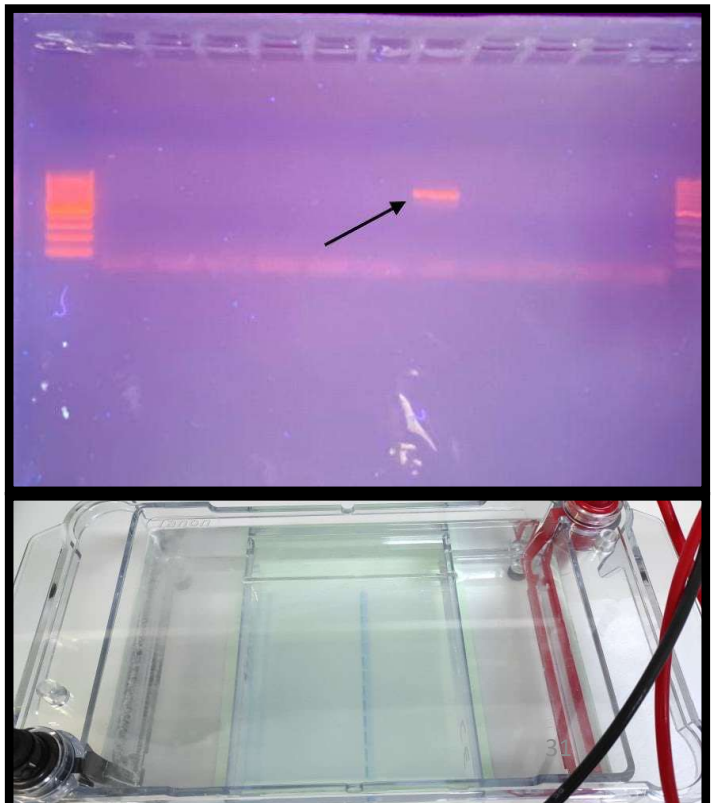
DNA extraction

Molecular identification

PCR

Gel electrophoresis

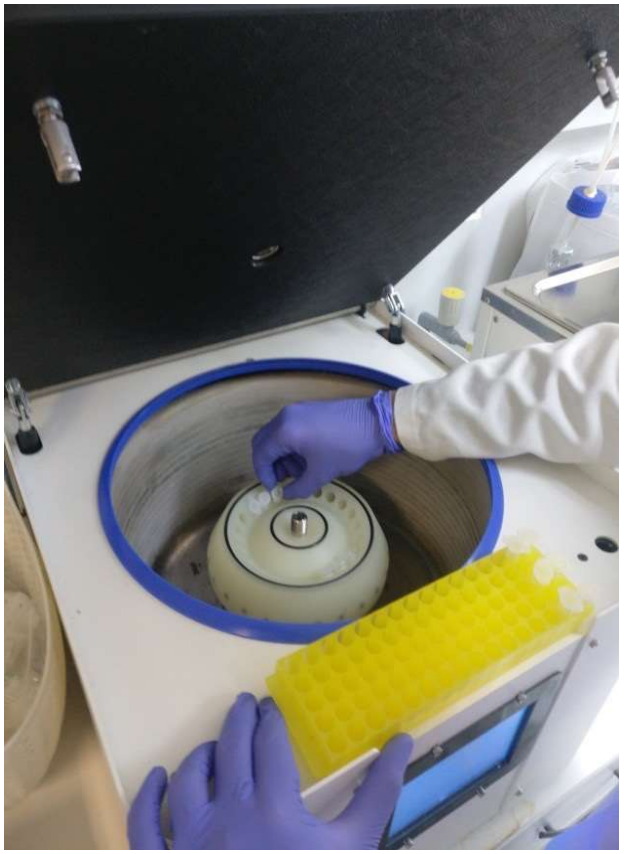


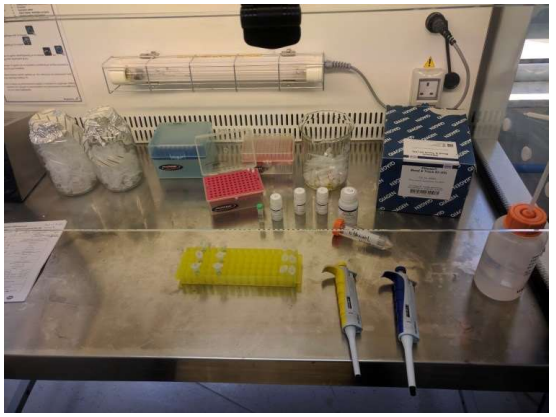


Molecular identification

DNA extraction

PCR





3. Data management

Database - DVectorBase

Egg and adult surveillance

TO BE COMPLETED BEFORE THE FIELD TRIP - information about the location				TO BE COMPLEATED IN THE FIELD: THE FIRST FIELD TRIP - information about the trap								TO BE COMPLEATED IN THE FIELD: EVERY FIELD TRIP - information about the sample										TO BE COMPLETED IN THE LAB					
Location name	Admin. unit (e.g. District NUTS3)	Place (e.g. town, village)	Postal code	trap ID [E (ovitraps), A (BGS traps) or V (EVS traps) + location name + numbering]	Latitude	Longitude	Altitude	Trap type (options= 'Ovitrap', 'BG sentinel + BG lure7', 'BG sentinel + BG lure7 + CO2', 'EVS', 'EVS + CO2', 'EVS + attractant + CO2' or 'EVS + attractant')	Land use (options= 'Urban habitat', 'Suburban habitat' or 'Other')	if Other, specify land use:	Comment trap	Sample name [trapID + startdatesample (YYMMDD)]	Start date	Start time	Average temperature start date (only for traps+CO2) [°C]	End date	End time	Average temperature end date (only for traps+CO2) [°C]	trap status (e.g. 'Good', 'Battery out', 'Ovipositon support missing', 'Trap broken', 'Trap missing', 'No water in the trap')	Comment sample	Trapping effort	Total number of eggs on tongue depressor	Mosquito species	Number per species [EGGS: Total no. E x No. specimens hatched-analysed (subsample) / total no. hatched-analysed individuals]	Life_Stage identified (options= Adult, Larva or Egg)	Number females (optional)	Number of males (optional)
Location name	province	city	postal code	trap name	Latitude	Longitude	Altitude	Trap type	Land use	land use specify	comment trap	sampling name	Start date	Start time	AvgTstart	End date	End time	AvgTend	trap status	comment sampling	trapping effort	totaleggs	species	nrperspecies	lifestage	Females	Males

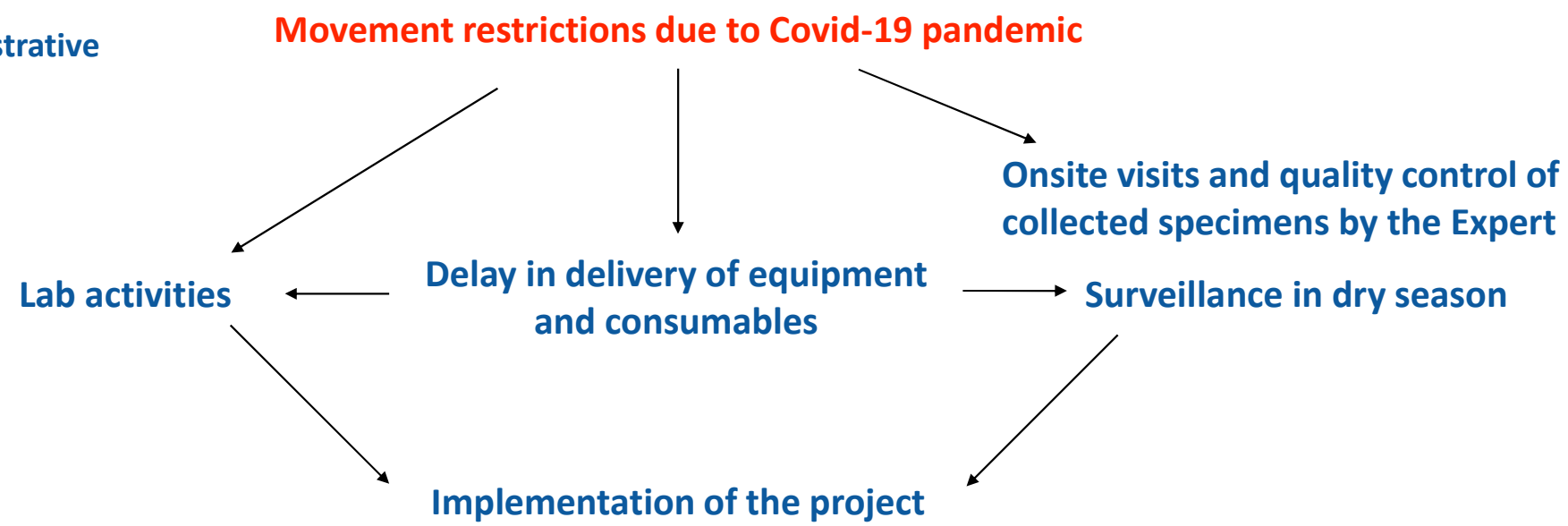
Larvae surveillance

TO BE COMPLETED IN THE LAB										TO BE COMPLETED BEFORE THE FIELD TRIP - information about the location												
Total number of larvae	Mosquito species	Life_Stage identified (options= Larva)	Life_Stage identified (options= Larva)	Life_Stage identified (options= Larva)	Identification method (options= Morphological, Maldi-TOF or PCR)	Site	Date (dd.mm.yy)	Depth (cm)	Comments	Temp.[°C]	pH	mV[pH]	ORP[mV]	EC[µS/cm]	EC Abs.[µS/cm]	RES[KOhm-cm]	TDS [ppt]	Sal.[psu]	Sigma T[sT]	Press.[psi]	D.O.[%]	D.O.[ppm]
Total number of larvae	Species	Number of Larvae 1,2 stage	Number of Larvae 3,4 stage	Pupa	Idmethod	Site	Date	Depth	Comments	Temp.[°C]	pH	mV[pH]	ORP[mV]	EC[µS/cm]	EC Abs.[µS/cm]	RES[KOhm-cm]	TDS [ppt]	Sal.[psu]	Sigma T[sT]	Press.[psi]	D.O.[%]	D.O.[ppm]

Challenges and opportunities

Challenges

- Technical
- Administrative



Opportunities

- **Team work**
  - ✓ Collaboration between Technical Team and Expert Scientist
  - ✓ UNDP support
  - ✓ Effective coordination by the Project Coordinators
  - ✓ Effective work of the Co-chairs
- **Experience**
  - ✓ Surveillance network
  - ✓ Standard protocols
  - ✓ Database
  - ✓ Identify major vector mosquitoes
- **Problem solving skills**
  - ✓ Research and application of various methods for molecular analysis

PiCoordination and Information sharing

Project Results

A) Identifying mosquito vectors both native and invasive species at an island level focusing on regions at higher risk for disease transmission

Mosquito species

Mosquito larvae of natural breeding sites

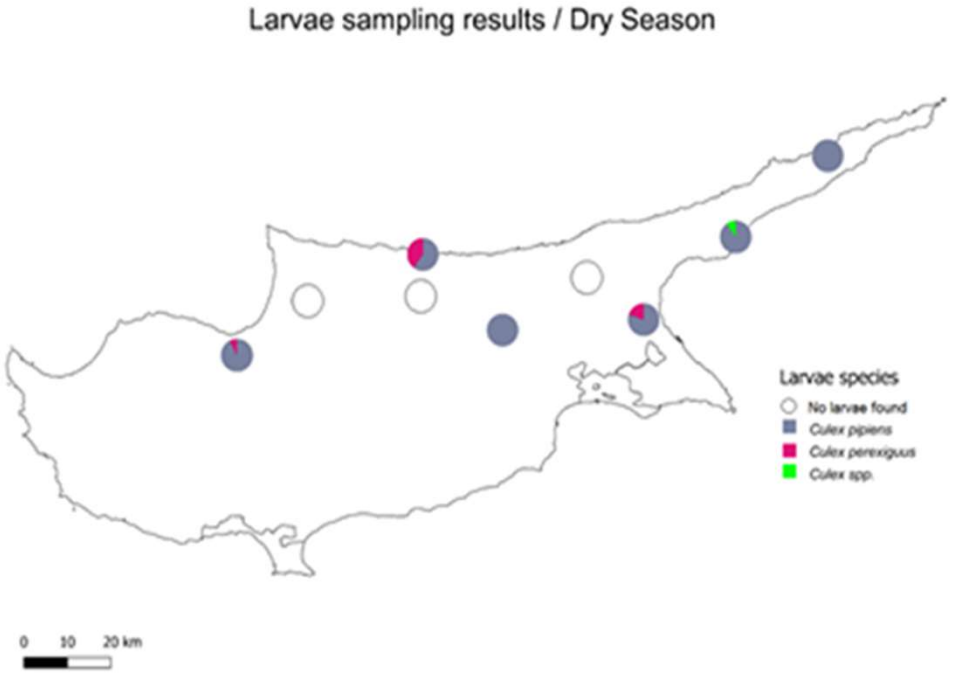
Wetland	Mosquito species
Akrotiri wetland	*Culex perexiguus, Culex pipiens, Culiseta subochrea, Culiseta annulata, Anopheles algeriensis, Aedes detritus, Aedes caspius*
Larnaca saltmarsh	*Culex pipiens, Aedes caspius, Aedes detritus, Culiseta subochrea, Culex modestus, Culex perexiguus*
Oroklini lake	*Culex modestus, Culex pipiens, Culex perexiguus*
Paralimni lake	*Culex perexiguus, Anopheles sacharovi, Aedes caspius*
Rocky beaches	*Aedes mariae*

Adult mosquitos – BG-Sentinel and EVS traps

	Mosquito species
Adult mosquitos identified	*Culex perexiguus*
	Culex pipiens
	Culex spp.
	Culiseta longiareolata
	Aedes detritus
	Culiseta spp.
	Aedes caspius
	Aedes mariae
	Culex theileri

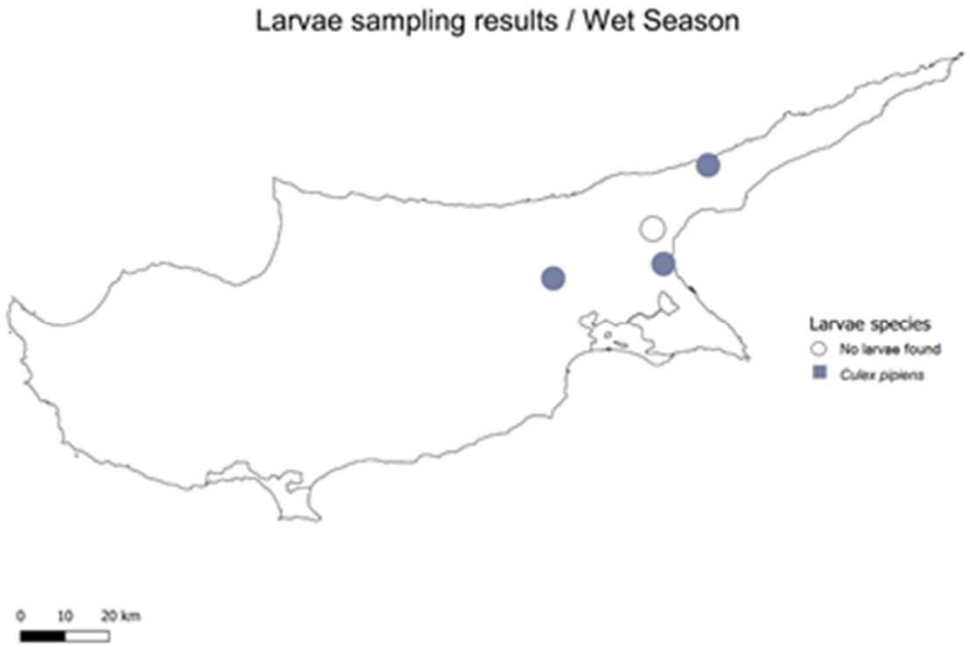
B) Mapping mosquito distribution to prioritize regions for which enhanced measures needs to be taken to control the mosquito population to protect public health

Larvae distribution and abundance (dry season)



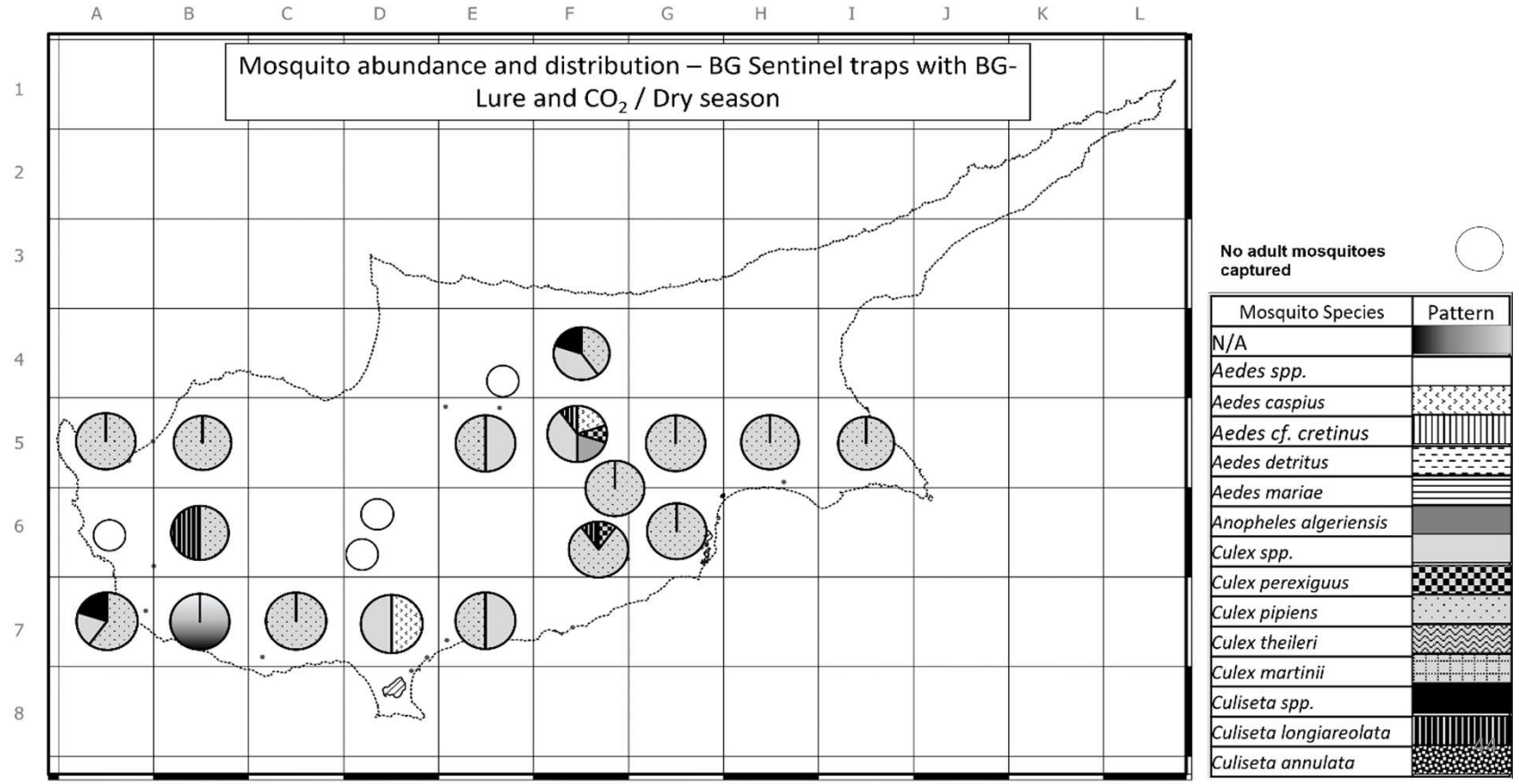
Sites	Visit date	Latitude (N.)	Longitude (E.)	Altitude (m)	Temperature (air °C)	Depth (Deeper than 1 m)	Habitat type	Movement (still/flowing water)	Light	Cleanliness (clean/dirty water)	Number of dips	Number of larvae	Control type
Alsancak 1	15.09.2020	35.34474	33.19357	8	34	No	Pool	Still	Sunny	Clean	1	0	Aquatain AMF
Alsancak 2	15.09.2020	35.34568	33.19455	12	34	No	Pool	Still	Sunny	Clean	1	0	Aquatain AMF
Bafra 1	16.08.2020	35.35077	34.06967	-6	38	Yes	Pool	Still	Dark	Dirty	1	5	Odonient
Bafra 2	30.09.2020	35.37683	34.29137	0	34	No	Sea side (salty)	Flowing	Sunny	Clean	1	34	Odonient
Bafra 3	16.08.2020	35.36868	34.07546	0	35	Yes	River	Flowing	Sunny	Clean	1	0	Fish
Dipkarpaz	29.09.2020	35.59599	34.24406	3	32	Yes	Pool	Still	Sunny	Clean	1	57	Veltomax G
Gecitkale	20.10.2020	35.27912	33.72889	18	29	No	Riverbed	Flowing	Sunny	Dirty	1	0	NA
Girne	15.08.2020	35.33485	33.30867	-5	30	No	Dumpster	Still	Sunny	Dirty	1	6	NA
Girne	15.09.2020	35.35077	34.08867	313	38	No	Tap	Still	Sunny	Clean	1	14	Veltomax G
Karpaz 1	22.09.2020	35.59282	34.35796	6	35	No	Swamp	Still	Sunny	Dirty	1	12	Veltomax G
Karpaz 2	22.09.2020	35.59212	34.35672	2	34	No	Swamp	Still	Dark	Clean	1	13	Veltomax G
Karpaz 3	22.09.2020	35.57216	34.32298	4	36	No	Riverbed	Still	Sunny	Clean	1	4	Veltomax G
Kyprulu	31.10.2020	35.11982	33.74037	5	28	Yes	Lake	Still	Sunny	Clean	1	0	Fish
Lefke 1	21.08.2020	35.09232	32.84418	98	36	No	Riverbed	Still	Sunny	Dirty	1	9	Vectobac
Lefke 2	21.08.2020	35.09282	32.84332	-7	38	No	Dumpster	Still	Sunny	Dirty	1	22	Vectobac
Lefkosa 1	16.09.2020	35.12401	33.36408	2	34	No	Riverbed	Still	Sunny	Dirty	1	0	NA
Lefkosa 2	17.09.2020	35.21083	33.32553	5	37	No	Riverbed	Still	Sunny	Clean	1	0	NA
Lefkosa 3	17.09.2020	35.20395	33.30321	4	38	Yes	Dam	Still	Sunny	Clean	1	0	Fish
Lefkosa 4	17.09.2020	35.23587	33.36465	12	34	Yes	Dam	Still	Sunny	Clean	1	0	Fish
Magusa 1	16.10.2020	35.15401	33.90078	2	34	No	Swamp	Still	Sunny	Dirty	1	0	Fish
Magusa 2	17.10.2020	35.18057	33.92131	1	33	Yes	Riverbed	Flowing	Sunny	Clean	1	0	Fish
Magusa 3	17.10.2020	35.13447	33.91392	3	33	Yes	Lake	Still	Sunny	Clean	1	0	Fish
Mehmetcik	29.10.2020	35.42178	34.02539	22	36	Yes	Lake	Still	Sunny	Clean	1	0	Fish
Ozankoy	24.08.2020	35.32948	33.33751	10	36	No	Riverbed	Still	Sunny	Dirty	1	0	NA
Smrsuts	31.10.2020	35.27943	33.84002	7	30	Yes	Lake	Still	Sunny	Clean	1	0	Fish
Tatlisu	23.10.2020	35.38743	33.75731	24	28	No	Riverbed	Flowing	Sunny	Clean	1	0	NA
Vecitkoy	29.10.2020	35.32541	33.07259	48	26	Yes	Lake	Still	Sunny	Clean	1	0	Fish
Zeytinli	29.10.2020	35.13975	32.93678	4	30	No	Riverbed	Flowing	Sunny	Dirty	1	0	Vectobac
Yeniyer	29.10.2020	35.29983	33.00549	9	29	No	Riverbed	Still	Sunny	Clean	1	0	NA

Larvae distribution and abundance (wet season)

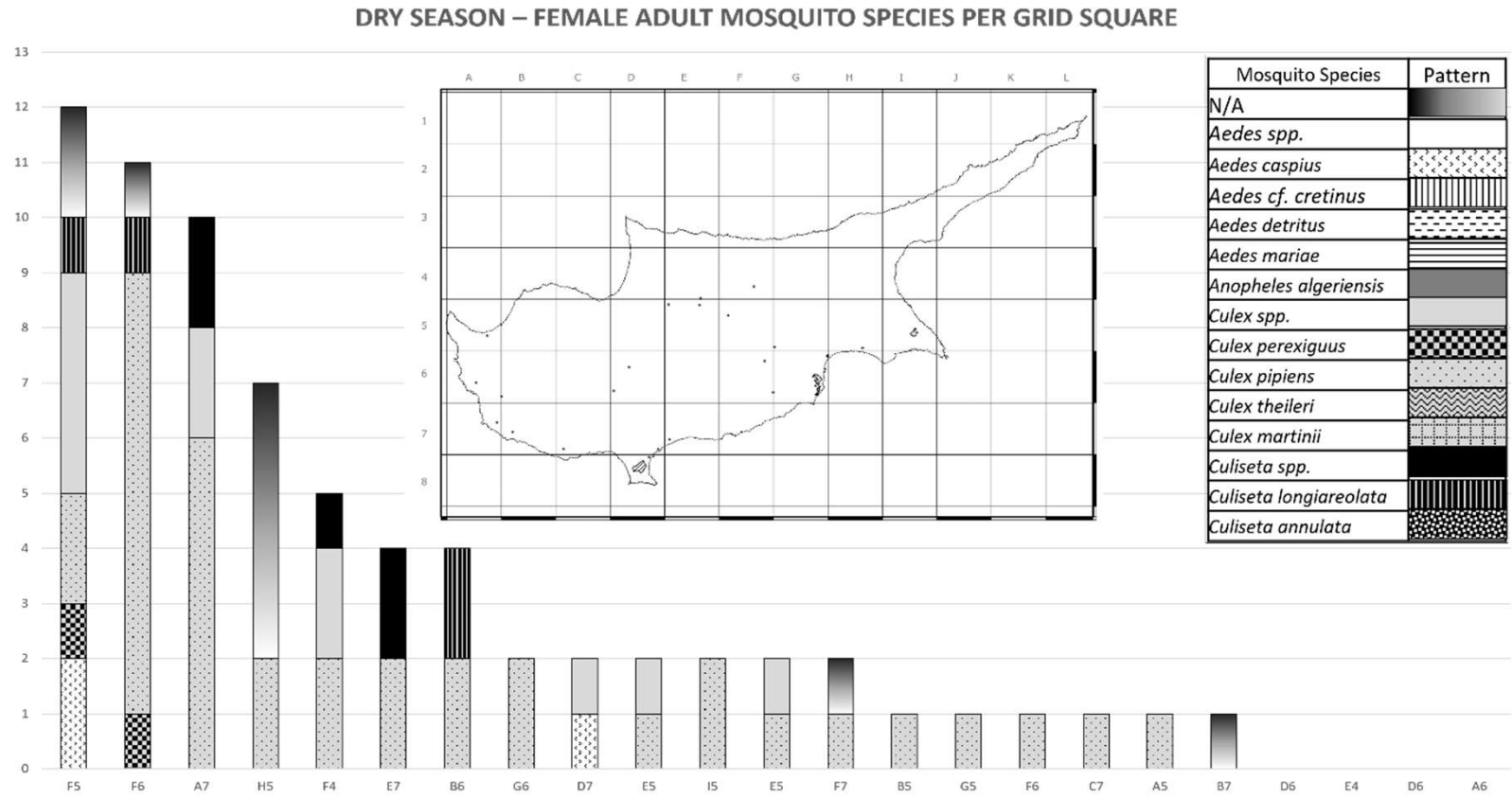


Sites	Visit date	Latitude (N.)	Longitude (E.)	Altitude (m)	Temperature (air °C)	Depth (Deeper than 1 m)	Habitat type	Movement (still/flowing water)	Light	Cleanliness (clean/dirty water)	Number of dips	Number of larvae	Control type
Alsancak 1	15.09.2020	35.3474	33.13017	8	34	No	Pool	Still	Sunny	Clean	1	0	Aquatain AMF
Alsancak 2	15.09.2020	35.3468	33.13055	12	34	No	Pool	Still	Sunny	Clean	1	0	Aquatain AMF
Bafra 1	16.08.2020	35.33077	34.06667	-9	38	Yes	Pool	Still	Dark	Dirty	1	5	Odonient
Bafra 2	30.09.2020	35.37683	34.09187	0	34	No	Sea side (salty)	Flowing	Sunny	Clean	1	34	Odonient
Bafra 3	16.08.2020	35.36808	34.07546	0	35	Yes	River	Flowing	Sunny	Clean	1	0	Fish
Dipkarpaz	29.09.2020	35.55599	34.24406	3	32	Yes	Pool	Still	Sunny	Clean	1	57	Veletomax G
Gecitkale	20.10.2020	35.27912	33.71069	16	29	No	Riverbed	Flowing	Sunny	Dirty	1	0	NA
Girne	15.08.2020	35.33485	33.30887	-5	30	No	Dumpster	Still	Sunny	Dirty	1	6	NA
Girne	15.09.2020	35.35077	34.06667	313	36	No	Tap	Still	Sunny	Clean	1	14	Veletomax G
Karpaz 1	22.09.2020	35.59282	34.35796	6	35	No	Swamp	Still	Sunny	Dirty	1	12	Veletomax G
Karpaz 2	22.09.2020	35.59212	34.35672	2	34	No	Swamp	Still	Dark	Clean	1	13	Veletomax G
Karpaz 3	22.09.2020	35.57216	34.32298	4	36	No	Riverbed	Still	Sunny	Clean	1	4	Veletomax G
Kayalar	31.10.2020	35.11682	33.76937	5	28	Yes	Lake	Still	Sunny	Clean	1	0	Fish
Lefke 1	21.08.2020	35.09232	32.84418	98	26	No	Riverbed	Still	Sunny	Dirty	1	9	Vectobac
Lefke 2	21.08.2020	35.09262	32.84332	-7	38	No	Dumpster	Still	Sunny	Dirty	1	22	Vectobac
Lefkosa 1	16.09.2020	35.12431	33.36438	2	34	No	Riverbed	Still	Sunny	Dirty	1	0	NA
Lefkosa 2	17.09.2020	35.22083	33.32553	5	37	No	Riverbed	Still	Sunny	Clean	1	0	NA
Lefkosa 3	17.09.2020	35.23195	33.30321	4	36	Yes	Dam	Still	Sunny	Clean	1	0	Fish
Lefkosa 4	17.09.2020	35.23547	33.26465	12	34	Yes	Dam	Still	Sunny	Clean	1	0	Fish
Magusa 1	16.10.2020	35.15431	33.90978	2	34	No	Swamp	Still	Sunny	Dirty	1	0	Fish
Magusa 2	17.10.2020	35.16057	33.91131	1	33	Yes	Riverbed	Flowing	Sunny	Clean	1	0	Fish
Magusa 3	17.10.2020	35.13447	33.91392	3	33	Yes	Lake	Still	Sunny	Clean	1	0	Fish
Mehmetcik	26.10.2020	35.42178	34.05539	22	38	Yes	Lake	Still	Sunny	Clean	1	0	Fish
Ozankoy	24.08.2020	35.32948	33.33751	10	36	No	Riverbed	Still	Sunny	Dirty	1	0	NA
Sinirozu	31.10.2020	35.27943	33.84001	7	30	Yes	Lake	Still	Sunny	Clean	1	0	Fish
Tatlisu	23.10.2020	35.38743	33.75731	24	28	Yes	Riverbed	Flowing	Sunny	Clean	1	0	NA
Gecitkoy	29.10.2020	35.12341	33.07215	48	26	Yes	Lake	Still	Sunny	Clean	1	0	Fish
Degirmi	29.10.2020	35.13071	32.91678	4	30	No	Riverbed	Flowing	Sunny	Dirty	1	0	Vectobac
Mevlevi	29.10.2020	35.20983	33.06149	9	29	No	Riverbed	Still	Sunny	Clean	1	0	NA

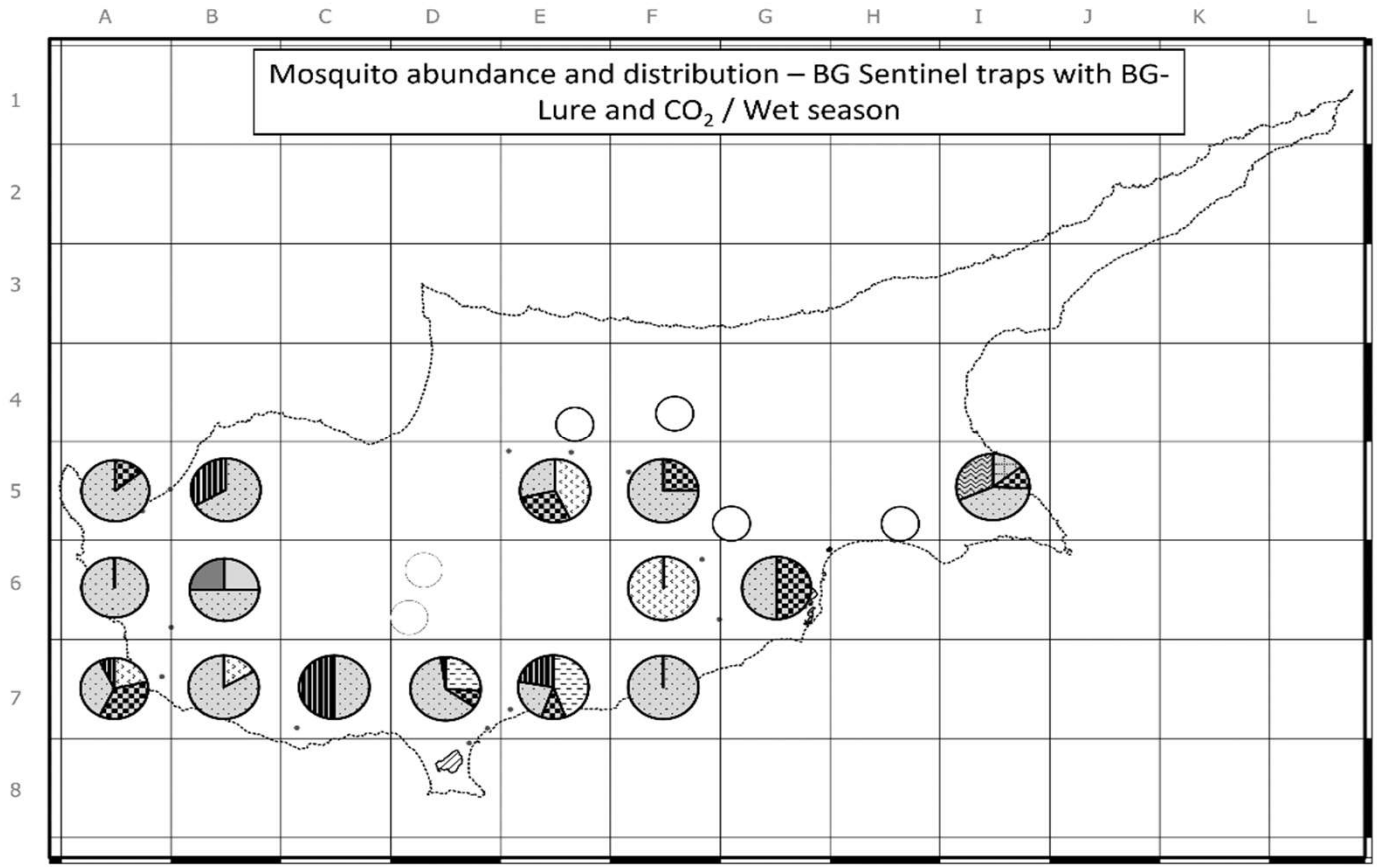
Adult mosquito distribution (dry season – BG-Sentinel)



Adult mosquito abundance (dry season – BG-Sentinel)



Adult mosquito distribution (wet season – BG-Sentinel)

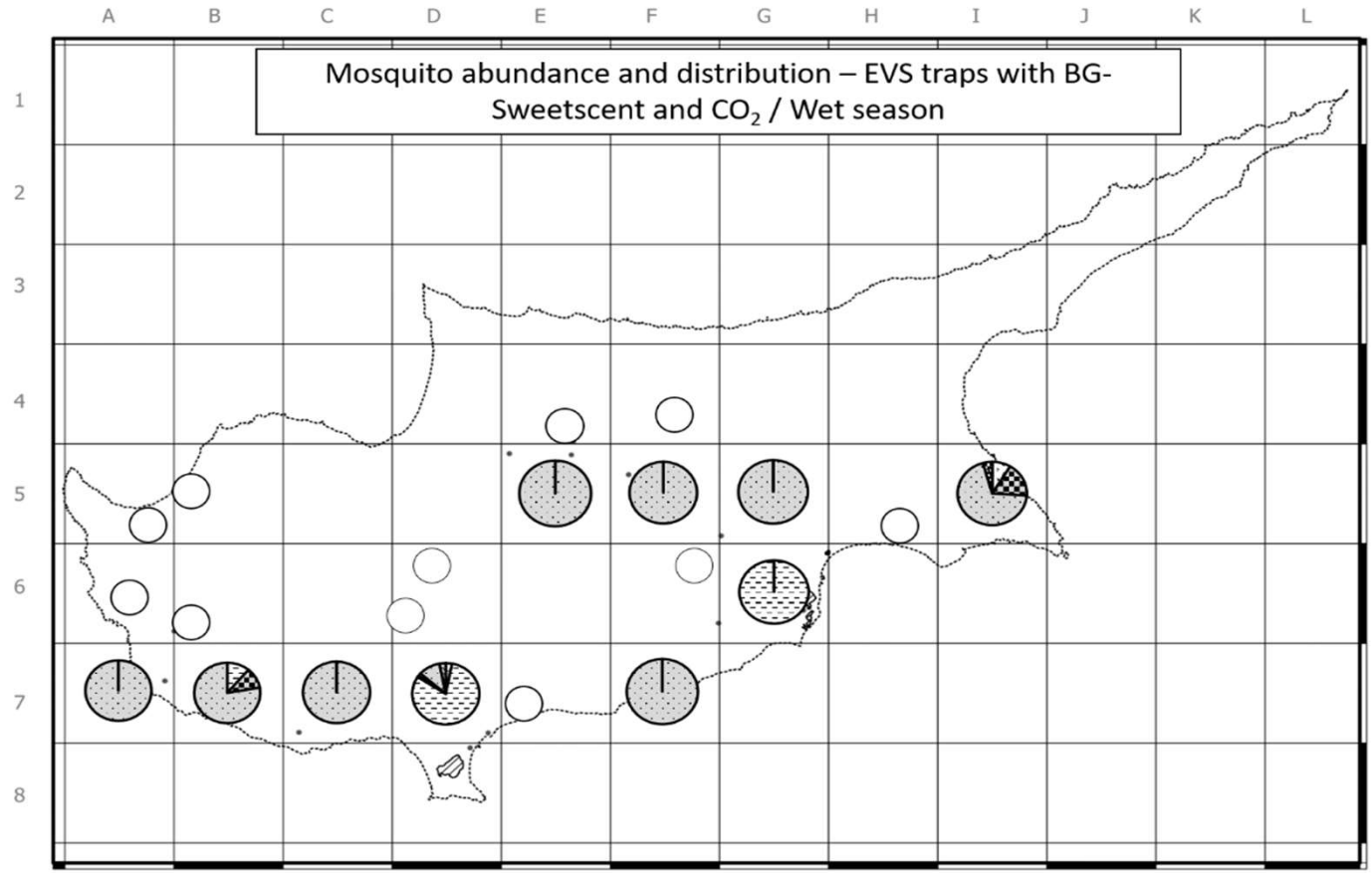


✱**N.B.** Mosquito eggs were not deposited in the placed ovitraps during wet season 2020 - 2021.

No adult mosquitoes captured

Mosquito Species	Pattern
N/A	
Aedes spp.	
Aedes caspius	
Aedes cf. cretinus	
Aedes detritus	
Aedes mariae	
Anopheles algeriensis	
Culex spp.	
Culex perexiguus	
Culex pipiens	
Culex theileri	
Culex martinii	
Culiseta spp.	
Culiseta longiareolata	
Culiseta annulata	

Adult mosquito distribution (wet season – EVS)

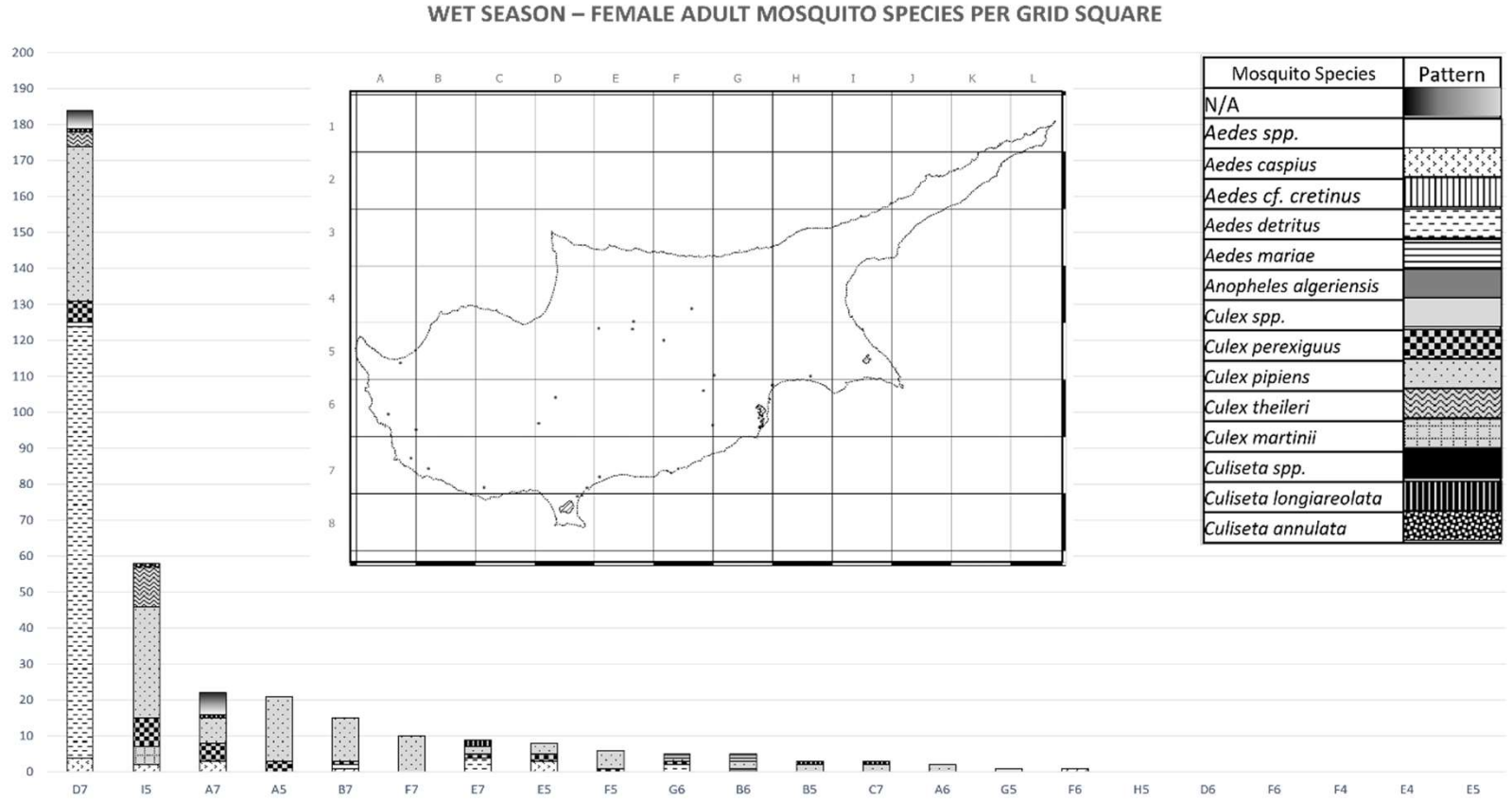


✱**N.B.** Mosquito eggs were not deposited in the placed ovitraps during wet season 2020 - 2021.

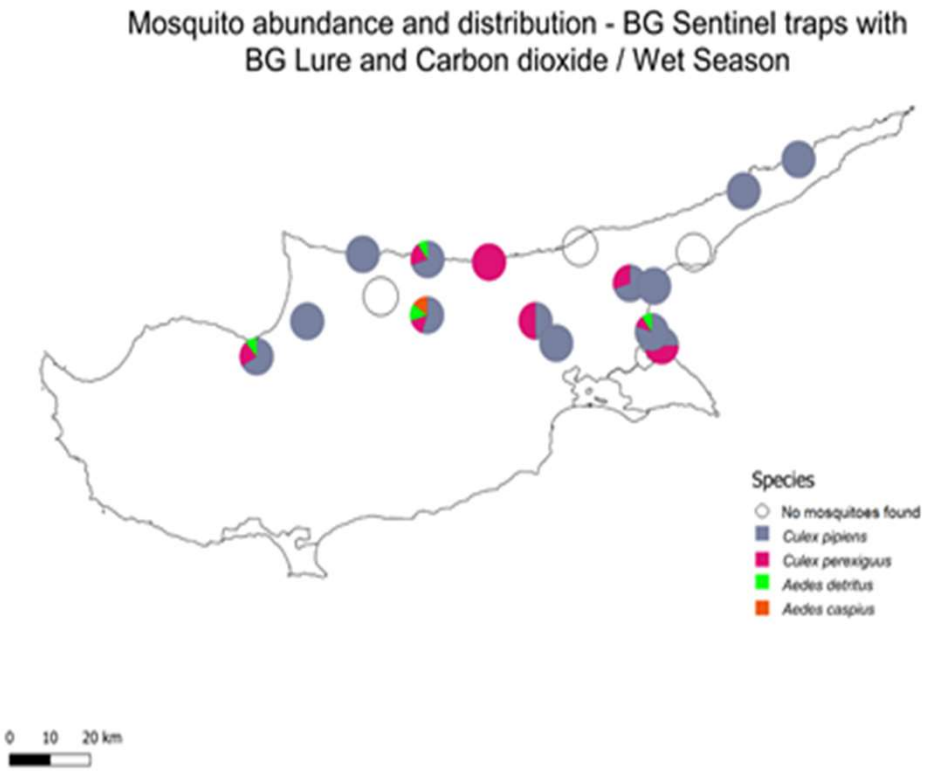
No adult mosquitoes captured

Mosquito Species	Pattern
N/A	
Aedes spp.	
Aedes caspius	
Aedes cf. cretinus	
Aedes detritus	
Aedes mariae	
Anopheles algeriensis	
Culex spp.	
Culex perexiguus	
Culex pipiens	
Culex theileri	
Culex martinii	
Culiseta spp.	
Culiseta longiareolata	
Culiseta annulata	

Adult mosquito abundance (wet season – BG-Sentinel-EVS)

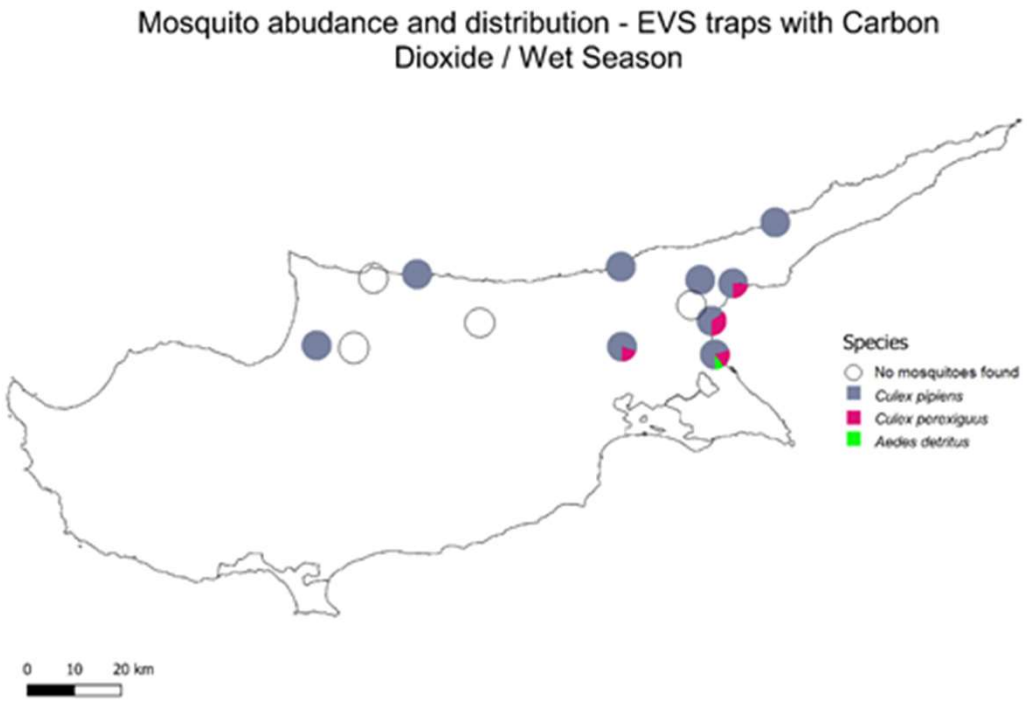


Adult mosquito distribution and abundance (wet season – BG-Sentinel)



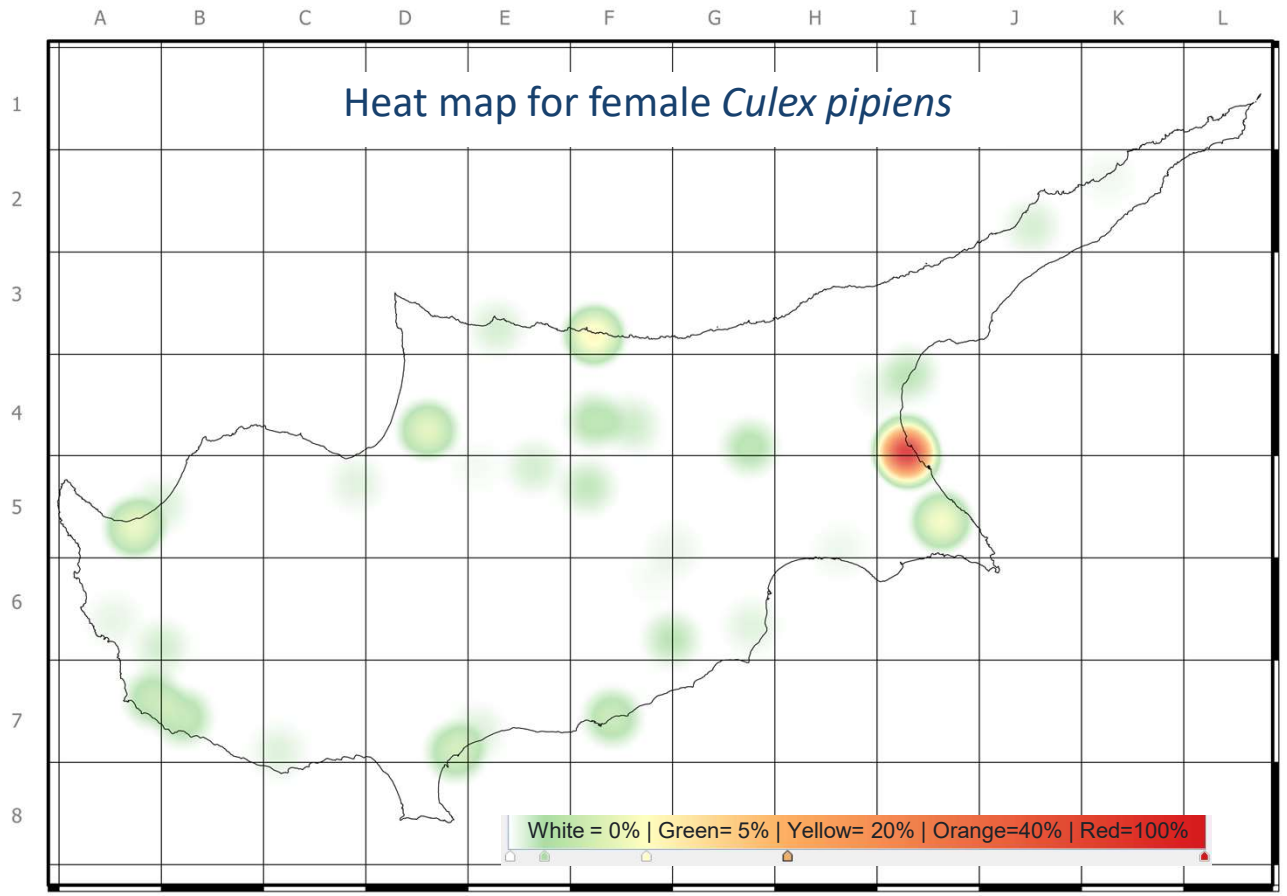
Surveillence region	Female (average)	Male (average)	Total
Nicosia	1.22	1.11	2.33
Lefka	0.88	0.63	1.5
Morphou	2.11	0.56	2.67
Famagusta	10.67	24	34.67
Trikomo	0.79	0.86	1.64
Karpasia	0.13	0.13	0.26
Mesaria	0.73	0.13	0.87
Kyrenia	1.7	0.15	1.85

Adult mosquito distribution and abundance (wet season – EVS)



Surveillence region	Female (average)	Male (average)	Total
Nicosia	0.6	0	0.6
Lefka	0.2	0.2	0.4
Morphou	0.8	0.2	1
Kyrenia	0.2	0	0.2
Famagusta	12.2	0.4	12.6
Trikomo	1	1	2

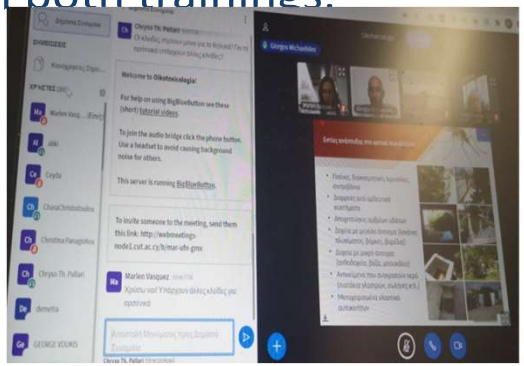
Heat map for female *Culex pipiens*

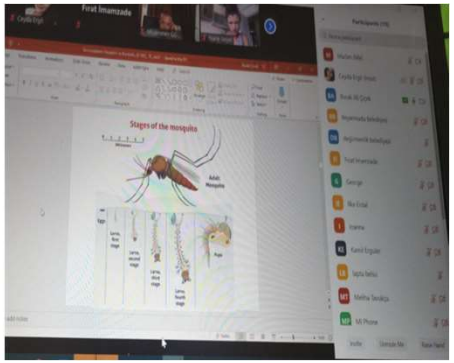


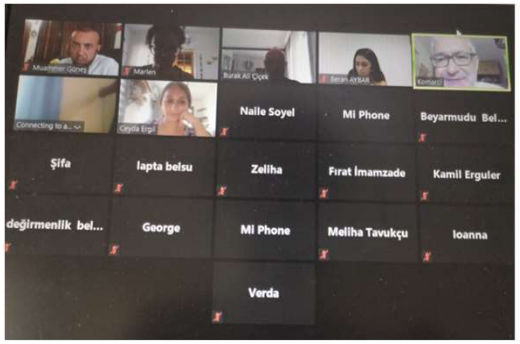
C) Enhancing capacity building of Greek Cypriots and Turkish Cypriots to identify mosquitoes of medical significance and to perform surveillance programs

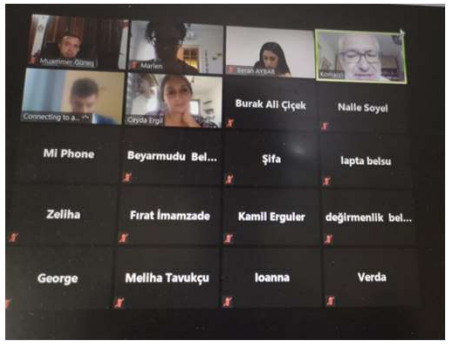
Training and educational material

Two virtual training events took place on the 28th and 29th of July 2020 due to mobility restrictions due to the COVID-19 pandemic. In total, more than fifty participants participated in both trainings.

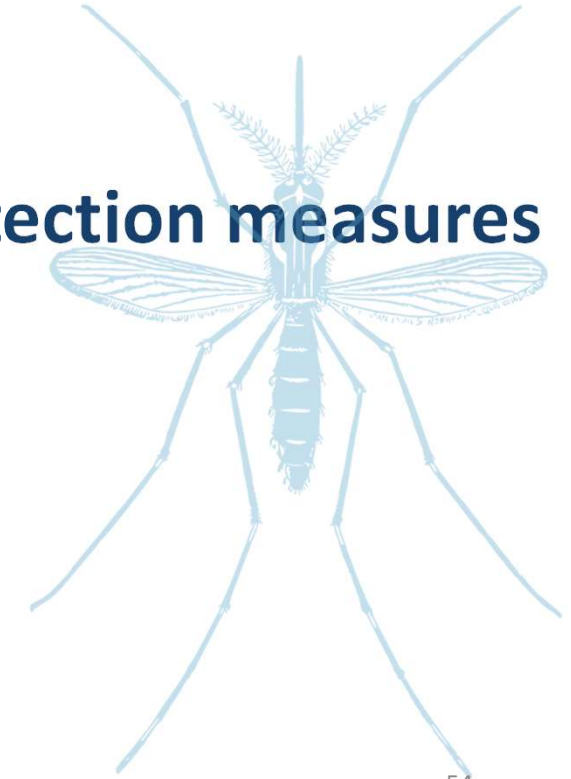








D) Increasing public awareness on protection measures against mosquito bites



Video

A video emphasizing the importance of collaboration between Greek Cypriots and Turkish Cypriots to achieve common health protection and environmental goals and the importance of mosquito surveillance in MBD prevention.

Leaflet

A leaflet focusing on

- self-protection measures against mosquito bites
- how the public can prevent mosquitoes from entering their homes
- how to minimize breeding sites at residences.

PROTECTION MEASURES AGAINST MOSQUITO BITES

An initiative of the **"Identification and Distribution of Mosquito Vectors of Medical Importance on the island of Cyprus (ID-Vec)"** project
Technical Committee on Health

Mosquito species are an infamous nuisance to humans and they have the ability to affect our quality of life, outdoor working conditions, athletic and leisure activities. Even just one mosquito entering your house can ruin your whole evening while enjoying a movie or can lead to poor sleep due to buzzing near your ear all night.

By way of viruses and parasites, some mosquito species also carry the risk of transmitting diseases to humans through biting, making them a public health concern. Mosquitoes can act as vectors of malaria, yellow fever, Chikungunya, West Nile fever, dengue fever, filariasis, Zika and other arboviral diseases.

"Disease vector is any agent which carries and transmits an infectious pathogen into another living organism" [1]

DID YOU KNOW THAT YOU COULD BE BREEDING MOSQUITOES IN YOUR OWN HOME?

The mosquito life cycle consists of four stages: egg, larva, pupa, and adult. Female mosquitoes bite animals and humans in order to produce eggs. Our blood provides them with the nutrients necessary for developing eggs. In a few days' time, eggs are either deposited directly on water, on surfaces of water-holding containers or the ground. Because mosquitoes need water for the first three stages of their life cycle, it is essential to monitor standing water sources[2]. These can be:

- ✗ Standing water in rain gutters, old tires, buckets, plastic covers, toys, manholes, or any other container where mosquitoes can breed.
- ✗ Water in bird baths, fountains, wading pools, rain barrels and potted plant trays.
- ✗ Temporary and/or swimming pools, rock pools.
- ✗ Channels, marches, riverbanks floodwater.

HOW TO ELIMINATE MOSQUITO BREEDING SOURCES FROM YOUR HOME [3]

- ✔ Eliminate standing water from all sources – natural and artificial.
- ✔ Clean debris from rain gutters to allow proper drainage.
- ✔ Empty and/or change the water in potted plant trays, bird baths, fountains, and wading pools at least once a week to prevent mosquito development.
- ✔ Check around air conditioner units and avoid puddles.
- ✔ Eliminate seepage from cisterns, cesspools, and septic tanks.
- ✔ Drain or fill temporary pools of water with sand.
- ✔ Keep swimming pool water treated and circulating.
- ✔ Cover unused containers that can collect rainwater when not in use.
- ✔ Drill holes in the bottom of tire swings to allow any water to drain.
- ✔ Fill in tree holes and hollow stumps that hold water with sand.

References

[1] Last, James, ed. (2001). A Dictionary of Epidemiology. New York: Oxford University Press. p. 185. ISBN 978-0-19-514169-6. OCLC 207797812.
[2] Success in Mosquito Control: An Integrated Approach. Mosquito Control. CDC and EPA. Last updated 2016. https://www.epa.gov/mosquitocontrol/success-mosquito-control-integrated-approach
[3] Tips to Prevent Mosquito Bites. Repellents: Protection against Mosquitoes, Ticks and Other Arthropods. CDC and EPA. Last updated 2019. https://www.epa.gov/insect-repellents/tips-prevent-mosquito-bites
[4] healthywa.wa.gov.au/FighttheBite
[5] https://www.iamat.org/country/cyprus/insect-bite-prevention#

This action of the Technical Committee on Health is funded by the European Union and implemented by UNDP in coordination with OSASG.

HOW TO PROTECT YOURSELF FROM MOSQUITO BITES

PHYSICAL MEASURES[5]

"Prevent mosquitoes from coming close to you in the first place."

- ✔ Install window and door screens if they are not already in place. Completely cover baby carriers and beds with netting.
- ✔ Ensure that all door and window screens do not have tears or holes and that they are tightly fitted.

PERSONAL PROTECTION

- ✔ A mosquito's first choice for biting is your bare, unprotected skin. When going outside, especially at times when mosquitoes are active, make sure you wear appropriate clothing that is difficult for the mosquitoes to penetrate. Wear light-colored, loose-fitting, long-sleeved shirts and long pants.
- ✔ Insect repellents containing DEET or picaridin are the most effective.[4] | Always follow the instructions on the label.

HOW TO CONTROL MOSQUITO LARVAE

At the larval stage, mosquitoes are concentrated, less mobile and easily accessible.

HABITAT MANAGEMENT[2]

- ✔ Involvement of the community is essential to these interventions, especially in urban areas. | Citizens and residents of high-risk areas of mosquito-borne diseases can be proactive in eliminating standing water or alerting the competent authorities about their presence to conduct mosquito control.
- ✔ Successful control efforts are those combining breeding source removal with other means of control.

What would happen if we used a magic wand to get rid of all the mosquitoes in the world?

"Do not forget that although they can be perceived as a nuisance, not all of them bite. Mosquitoes are a critical food source for living beings at the bottom of the food chain."

Next Steps

From distribution and abundance maps to risk maps

- Island-wide survey for native and invasive mosquito vectors (egg, larvae and adults) – Dry and wet season | Pathogen screening
- VBD Integrated Management Plan
- Early warning system for mosquito outbreaks / MBDs
- Enhance citizen science and public sensitivity regarding VBDs
- Increase public awareness on prevention and protection measures
- Establish the fundamental pillars for integrated vector management

Acknowledgements

Dr. Marlen I. Vasquez

Dr. Yeşim Örek Gümüşdağ

Prof. Dusan Petric

Ceyda Ergil

Dr. Burak Ali Çiçek

Meliha Tavukçu

Ioanna Angelidou

Acknowledgements


Prof. Dr. Şükrü Tüzmen


Gregoris Notarides


Dr. Katerina Drakou


Dr. Kamil Erguler


Ioannis Constantinou


Christiana Tourapi


Mustafa Soğancı


Dr. Mihaela Kavran


Marios Violaris


Dr. Filiz Gunay


Toumazis Toumazi


Dr. Aggeliki Martinou


Verda Değirmencioğlu

Questions and Answers

Thank you for your attention!