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ISTITUTO
ZOOPROFILATTICO
SPERIMENTALE
DELL'ABRUZZO
E DEL MOLISE
"G. CAPOREALE"

Mosquito surveillance

Use of BG Pro traps and samples management

Silvio G. d'Alessio

PROVNA 2

Webinar, 15-July-2025

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COLLECTION STRATEGY



Mosquito ecology
Mosquito stages



Latitude



Temperature



Environment



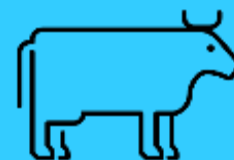
Climate events



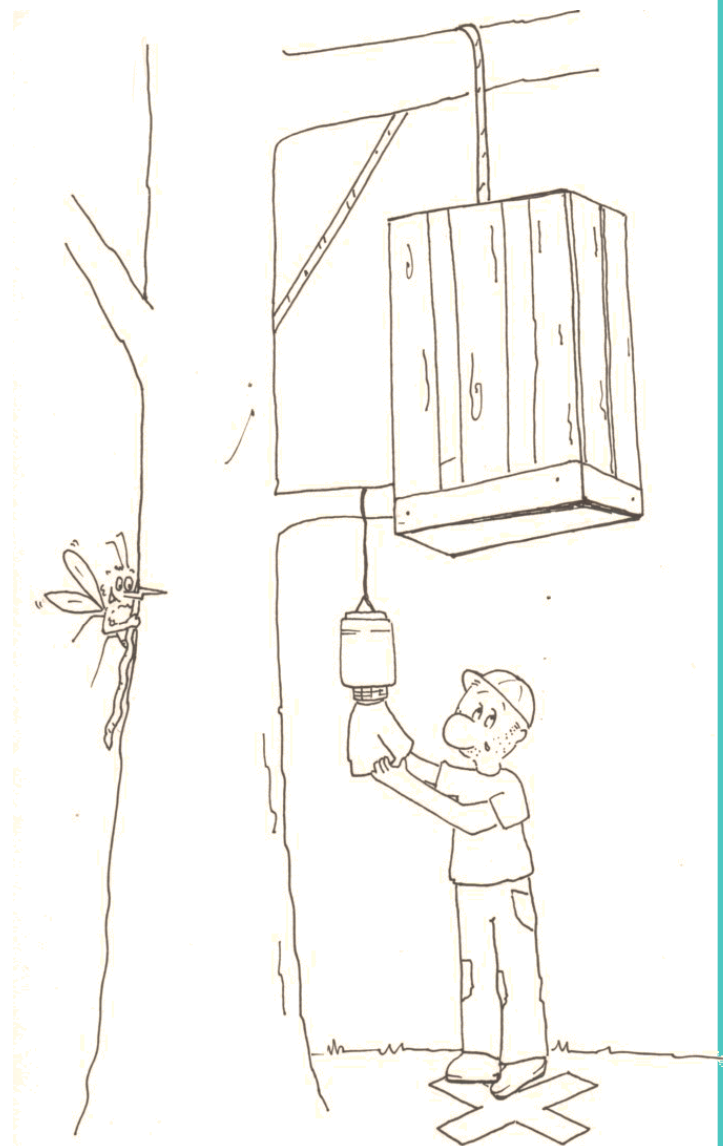
Human behavior



Cropland



Licvestock



Based on the difference or the similarity in the ecology of the mosquitoes species, we can use a wide range of attractants:

CO₂ → mammophilic species

Specific chemical lure (similar to human smell) → Human biter species

Light → Nocturnal species

Mixture for gravid mosquitoes (similar to breeding sites) → Adult gravid females

Animals (birds, mammals, humans) → Host-seeking mosquitoes, according to their host preference

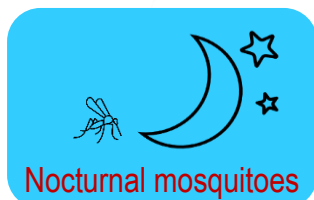
Genus	Specie	Habitat	Biting activity	Feeding behaviour
<i>Aedes</i>	<i>aegypti</i>	Container habitat	Diurnal	Mammals
<i>Aedes</i>	<i>albopictus</i>	Container habitat	Diurnal	Mammals
<i>Aedes</i>	<i>caspius</i>	Ground habitat	Diurnal/Nocturnal	Mammals
<i>Aedes</i>	<i>detritus</i>	Ground habitat	Diurnal/Nocturnal	Mammals
<i>Aedes</i>	<i>vexans</i>	Ground habitat	Diurnal/Nocturnal	Mammals
<i>Anopheles</i>	<i>pharoensis</i>	Ground habitat	Nocturnal	Mammals
<i>Anopheles</i>	<i>sergentii</i>	Ground habitat	Nocturnal	Mammals
<i>Anopheles</i>	<i>multicolor</i>	Ground habitat	Nocturnal	Mammals
<i>Culex</i>	<i>antennatus</i>	Ground habitat	Nocturnal	Mammals
<i>Culex</i>	<i>perexiguus</i>	Ground habitat	Nocturnal	Birds/Mammals
<i>Culex</i>	<i>poicilipes</i>	Ground habitat	Nocturnal	Birds/Mammals
<i>Culex</i>	<i>tritaeniorhynchus</i>	Ground habitat	Nocturnal	Mammals
<i>Culex</i>	<i>pipiens</i> s.l.	Ground and container	Nocturnal	Birds/Mammals
<i>Culex</i>	<i>theileri</i>	Ground and container	Nocturnal	Birds/Mammals



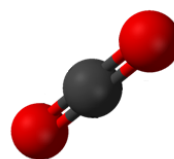


CDC – Light trap

ATTRACTANTS



Light



CO₂



Lure



BG – Sentinel



CO₂ from gas bottle

CO₂ at a rate of 175 ml/min
10 kg of CO₂ lasts ~20 days



CO₂ from DRY ICE

1 kg of dry ice = CO₂ at a rate of 387 ml/min



CO₂ from yeast fermentation

CO₂ production for 24 hours

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FLYING ADULT COLLECTION

Suction traps

BG Sentinel: diurnal at least 24h



~20 kg



CDC light trap: nocturnal



~2 kg



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Suction traps

CDC – Light trap



BG – Pro



BG – Pro

CDC light trap style: in hanging choice used with dry ice and LED light

dry ice



BG –Pro in CDC light trap style



CDC light trap



gas bottle

BG – Pro

BG sentinel style: in standing choice, used with BG-Lure (*Ae. albopictus*, *Ae. aegypti*)

Used with CO₂, it can capture different mosquito species

BG – Pro in sentinel style



BG Sentinel



BG – Pro: 2 in 1

In two different operation modalities:

- **BG Sentinel style**
- **CDC Light Trap style**



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	SPECIFICATIONS	CDC LIGHT	BG SENTINEL	BG PRO
Battery (12v)	W=2kg Life: 14h/18h	YES	YES	YES
Power bank (6v 10.000 mAh)	W=0,180Kg Life: 24h/48h	NO	NO	YES
Main power supply		NO	YES	YES
Automatic shutter		NO	YES	YES
Catch bag above the fan		NO	YES	YES
Dry ice container		YES	NO	YES
Standing mode		NO	YES	YES
Hanging mode		YES	NO	YES

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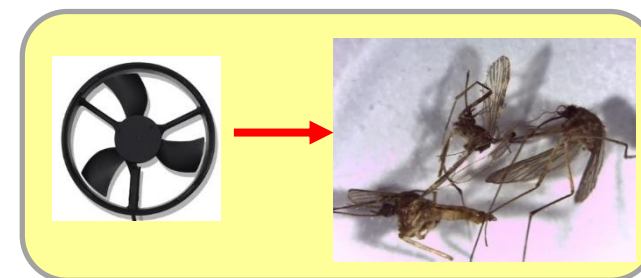
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Catch bag above the fan



Catch bag below the fan



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FLYING ADULT COLLECTION

Suction traps

BG – Pro



List of materials shipped to each countries

(double the amount for Tunisia):

- 15 BG pro traps -----



- 15 BG booster -----



- 15 BG mozzibait with cartridge -----



- 4 packs BG mozzibait (refill) set -----



- 15 cable for main power supply -----



- 7 spare nets (2 collection bags and 1 funnel nets) -----



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HOW



MANUAL BG-PRO

Typical EVS-style

- BG-Pro core
- Hanging version
- CO₂ *
- Optional LED light



Typical CDC-style

- BG-Pro core
- Hanging version
- Rainshield
- Optional LED light
- Optional CO₂ *



Typical Sentinel-style

- BG-Pro core
- Standing or low hanging version
- Optional BG-Lure
- Optional CO₂ *



Contents

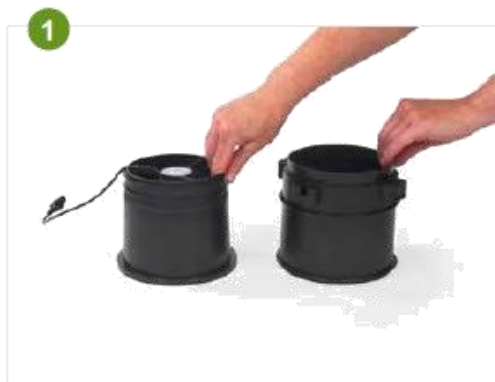


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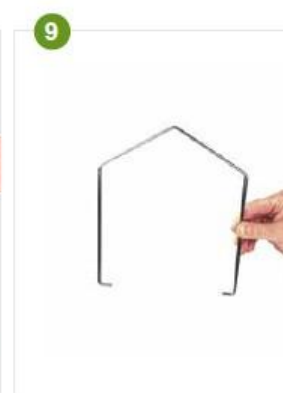
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CDC light trap style



! Standing trap:

If you want to set-up a standing trap, proceed with mounting the tripod, see [page 7, #12](#)



! Proceed with the optional rainshield, see [page 8, #18](#)

Option: Rainshield



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Typical Sentinel-style

- BG-Pro core
- Standing or low hanging version
- Optional BG-Lure
- Optional CO₂ *



BG sentinel style

Option: Standing Trap - Mount the Tripod



! Proceed with page 6, #7

A Power Bank



B Battery



C

Power supply

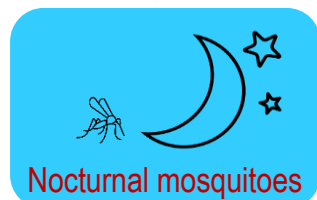




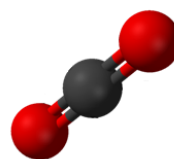
A power bank (5V) with a capacity of at least 10,000 mAh (weight ~ 180 gr.) is recommended. With this setup, the trap can run for 24 hours with the included LED light, or 48 hours without the light.

Using a 20,000 mAh the power bank nearly doubles the operating time of the trap (48h/96h).

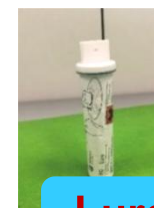
ATTRACTANTS



Light



CO₂



Lure



CO₂ from gas bottle

CO₂ at a rate of 175 ml/min
10 kg of CO₂ lasts ~20 days



CO₂ from DRY ICE

1 kg of dry ice = CO₂ at a rate of 387 ml/min



CO₂ from yeast fermentation

CO₂ production for 24 hours

Option: LED light

Some mosquito species are additionally attracted by light. In this case, you can add a LED band to the top of the upper cylinder. Please note: there are also mosquito species that are repelled by the LED light, such as *Aedes albopictus*.



ATTENTION:
with a 12 V battery the UV
light should not be used

Light

Bycatch

Unwanted insects trapped (bycatch) during collection could contaminate your mosquito samples, making species identification more time-consuming



Option CO₂: Gas Bottle

B



For each trap, a "BG Booster" kit was purchased, which includes:

- Carbon dioxide diffuser with CO₂ tube
- Pressure reducing regulator
- User manual



Biogents BG-Booster CO₂

- (FR) Permet l'ajout de CO₂ aux pièges Biogents
Manuel d'instruction
- (IT) Set di potenziamento CO₂ per le trappole Biogents
Manuale d'uso
- (ES) Kit para el uso complementario de CO₂ para las trampas
Biogents Manual de instrucciones
- (EN) CO₂ upgrade set for Biogents traps
Instruction Manual

(FR) Les mises à jour du manuel sont disponibles sur notre page Internet : www.biogents.com
 (IT) Potete trovare gli aggiornamenti di questo manuale, il manuale in altre lingue e altri consigli utili su BG-Mosquitaire all'indirizzo: www.biogents.com
 (ES) Actualizaciones del manual se pueden encontrar en la web: www.biogents.com
 (EN) Updates for the manual can be found on the website: www.biogents.com

BG-Booster CO₂ | 09/2023

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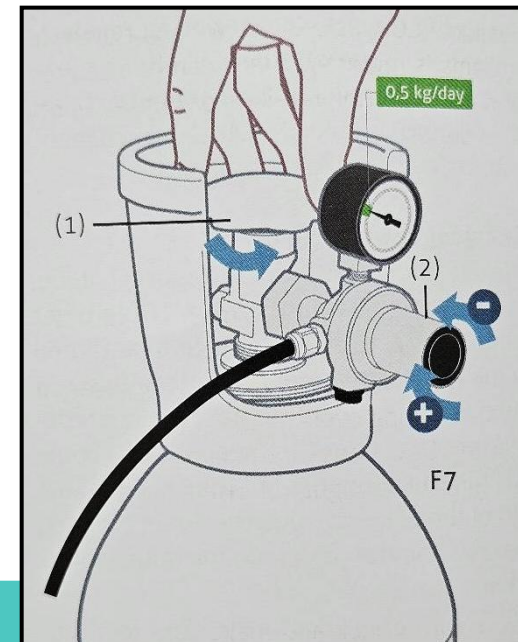
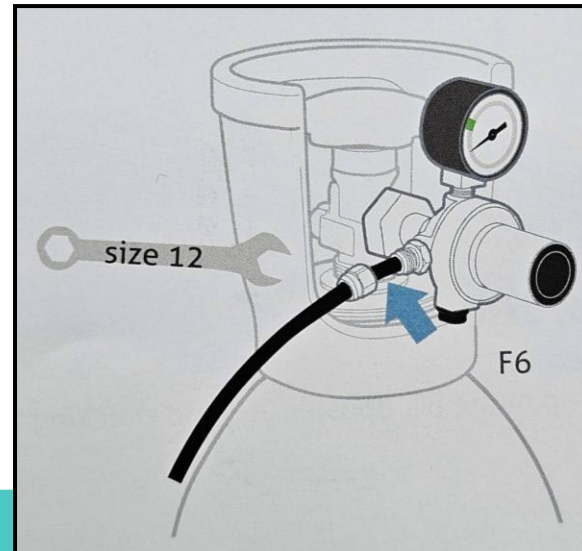
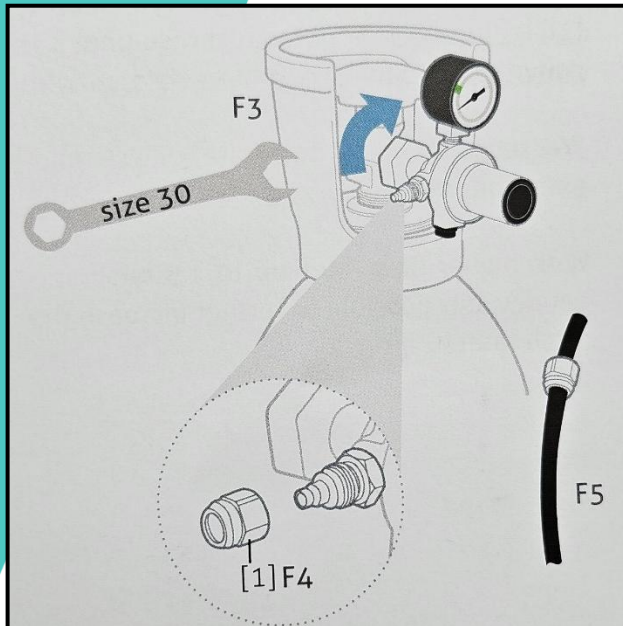
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From the user manual:

- It must be connected to a standard commercially available CO₂ cylinder (6 kg or larger), such as those commonly used in restaurants or bars, is recommended.
- A recommended flow rate is 0.5 kg/day (capture rates can be increased with flow rates up to 1.5 kg/day)
- Place the gas cylinder in vertical position fixed with ropes or cords
- Avoid exposure to direct sunlight



Attaching the pressure reducing regulator onto the CO₂ gas cylinder:

Screw the pressure reducing regulator onto the CO₂ gas cylinder. Make sure it is tight by using a wrench size 30 or pliers [F3].

Attaching the CO₂ tube:

The BG-Booster CO₂ includes a CO₂ tube. One end is attached to the CO₂ emitter nozzle, and the other end is to be attached to the pressure reducing regulator. Unscrew the nut on the outlet of the pressure reducing regulator [F4, (1)]. Thread the end of the CO₂ tube through the nut [F5]. Then fix the end of the CO₂ tube onto the outlet [F6], and re-screw the nut back onto the outlet with a wrench size 12.

Option CO₂: Dry Ice

A



For one night of trapping, place approximately 1 kg of dry ice into the carrying bag (which can hold up to a maximum of about 1.5 kg of dry ice).



Option: "BG-Lure"



Once opened, BG-Mozzibait cartridge lasts up to 2 months

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COLLECTION DATA

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COLLECTION SITES



Field survey is needed for the exact location:
latitude and **longitude**

Online **satellite imagery** can be used to identify:

- Urban, suburban and rural zones
- Natural or artificial mosquito resting or breeding sites



Sites should meet the following criteria:

- good accessibility
- protected from wind
- out of public sight



RURAL SITE



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SAMPLE MANAGEMENT

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ADULT SAMPLES



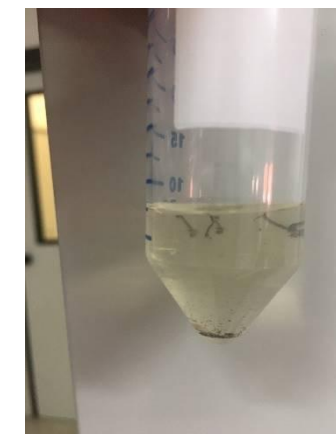
LARVAE SAMPLES



EGG SAMPLES



SAMPLE MANAGEMENT

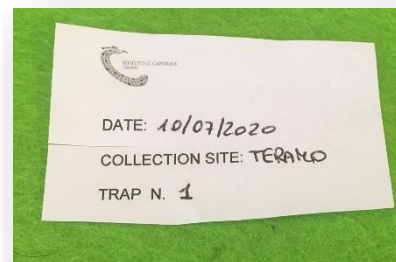


ADULT SAMPLES

✓ The **collection bag** must take place with the suction system **still** running

✓ Each catch bag or collection chamber must be labeled:

- collection site
- trap identification
- collection date



- ✓ keep the cold chain: dry ice or a cool box with ice pack
- ✓ be careful not to crush the mosquitoes (bags) and avoid direct contact of the sample with the dry ice or the ice pack
- ✓ not collect the samples too late in the morning to avoid:
 - dehydration of the mosquitoes
 - battery discharge (but with powerbank there is no problem)

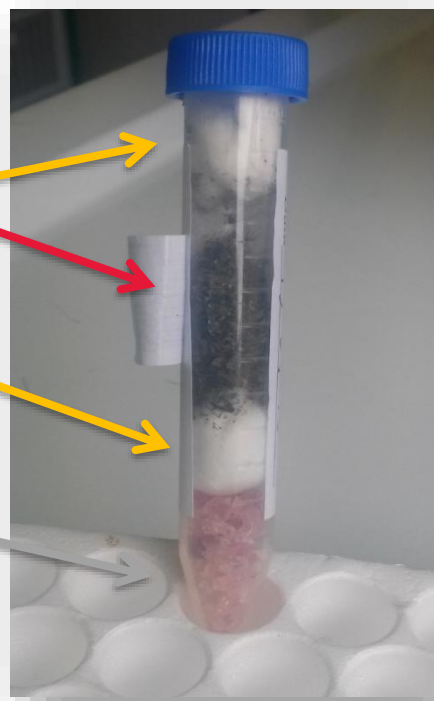
ADULT SAMPLES

- ✓ KILL THE MOSQUITOES
- ✓ EMPTY THE COLLECTION BAG (White sheet)
- ✓ TRANSFER THE INSECTS INTO A FALCON TUBE

Mosquitoes

Cotton wool

Silica gel



The samples must be stored fridge temperature (+ 4°C) and shipped refrigerated, as soon as possible, to the laboratories for the identification.

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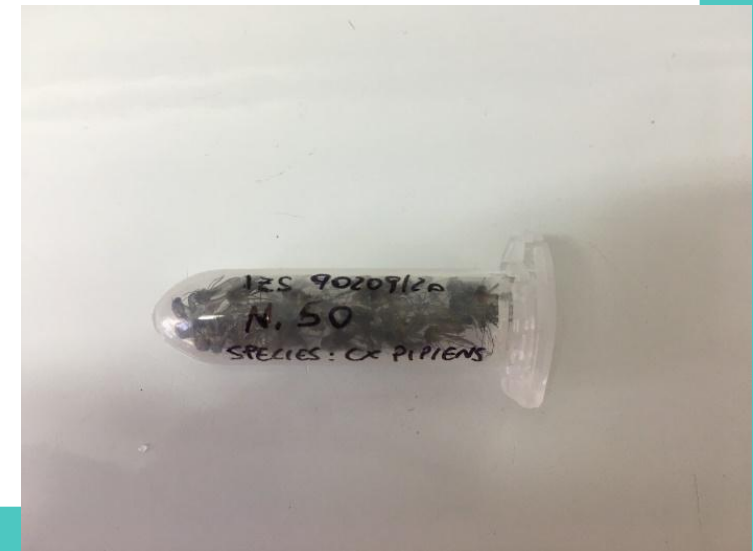
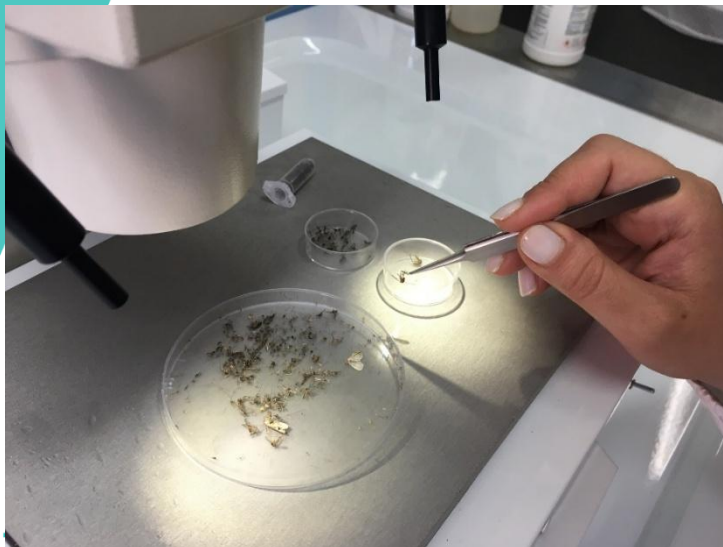
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ADULT SAMPLES

- Put all the insects from the Falcon tube to one or more Petri dishes
- Identify mosquito species under a stereomicroscope
- From each sample, pool the **females by species** and put each pool in properly labelled tubes (Eppendorf)
- Pool size depends on the expected infection rate, and the sensitivity of the screening method (no more than 50 specimens per pool is recommended)
- Pool should be stored at -80 °C for longterm storage, or -20 °C for shorter periods, avoiding thawing (defrost) and re-freezing



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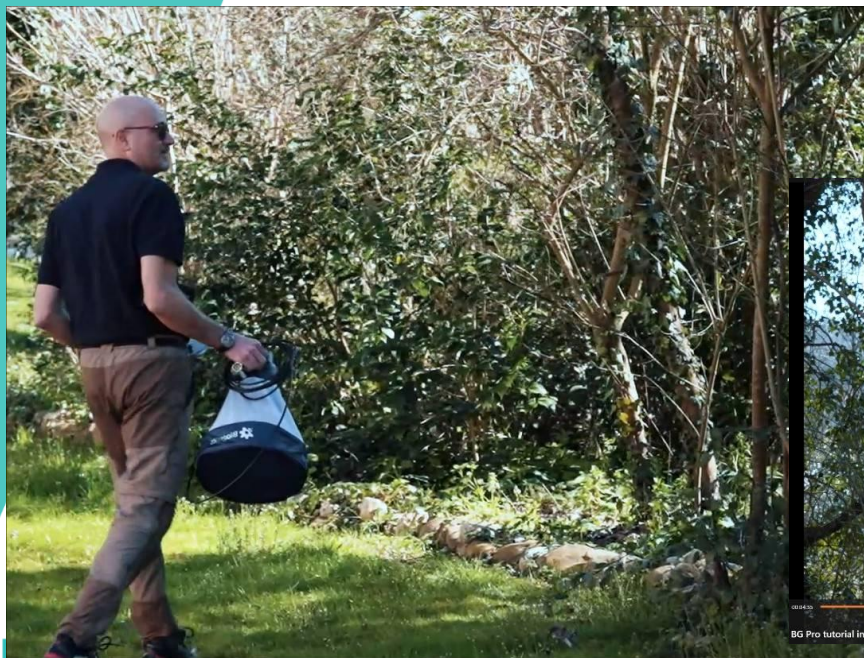
FIELD AND LABORATORY PROTOCOLS

Manual (ENG), protocol (ENG, FRA, AR) and video (ENG, FRA) are shared with you:

- manual BG Pro
- how to assemble the trap and which attractants and power sources can be used
- how to manage the adult mosquito samples



Protocols



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THANK YOU FOR THE ATTENTION

Entomology Unit
Public Health - IZSAM

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Serena Florio
Michela Quaglia
Silvio G. d'Alessio

