



Biogents

Science for your protection

Instruction Manual

for the

Biogents Sentinel

An innovative trapping system
for mosquitoes & other
hematophagous insects

Introduction to the Biogents Sentinel trap

Congratulations on your purchase of the Biogents Sentinel trap. You have bought the latest innovation in mosquito traps that is the result of over 16 years of scientific research at the University of Regensburg, Germany. The BG-Sentinel incorporates patented, as well as, patent pending technology and was initially developed to enable researchers all over the world to monitor the yellow fever mosquito, also known as dengue mosquito, *Aedes aegypti* and the Asian tiger mosquito *Aedes albopictus*.



During its use on different continents it became evident that the BG-Sentinel also catches other mosquito species and blood seeking insects. This is why the trap is now used by scientists, healthcare professionals, PCOs (Pest Control Operators), and private households worldwide.

Numerous independent scientific studies have been conducted with the BG-Sentinel all over the world, and it has been successfully proven to be the most effective mosquito trap on the market. For an extensive list of all the publications on the BG-Sentinel, please visit our website.

The BG-Sentinel does not require CO₂ to attract:

- *Aedes aegypti*, *Aedes albopictus*, and *Aedes polynesiensis*
- Some *Culex* species like *Culex quinquefasciatus* or *Culex pipiens*

With the addition of CO₂ the BG-Sentinel attracts:

- Additional mosquitoes such as *Ochlerotatus*, *Aedes vexans*, *Aedes cinereus*, *Anopheles* or *Coquillettidia*
- Other hematophagous insects such as black flies (*Simuliidae*) or no-see-ums/biting midges (*Ceratopogonidae*)
- Increased numbers of the species mentioned above (attracted without CO₂)



Further developed versions of the Biogents Sentinel trap, called the Biogents Mosquitaire and Mosquitito, are specifically designed for private households. For more info on these traps please visit:

www.biogents.com or www.mosquitaire.com

Trust & Competence

The Biogents Sentinel trap is used (u), or was successfully tested (t), by independent, reputable organizations all over the world, including:

- The World Health Organization, WHO (u)
- The German, French, and US armed Forces (u)
- Centers for Disease Control and Prevention (CDC), USA (u)
- Pasteur Institute, France (u)
- Tropical Public Health Unit Network - Cairns, Australia (u)
- AQIS Australian Quarantine & Inspection Service (t)
- Federal University of Minas Gerais, Belo Horizonte, Brazil (u)
- Federal Ministry of Food, Agriculture and Consumer Protection, Germany (u)
- Bill and Melinda Gates Foundation projects in Asia and Brazil

The BG-Sentinel was developed by the same group of biologists that contributed to the development of the mosquito repellent "Icaridin" (Bayrepel).

Technology & Safety

- The BG-Sentinel uses innovative patented and patent-pending technology.
- The BG-Sentinel is safe and easy to handle, requires an electric power supply of only 12 Volts and does not emit toxic chemicals.

Flexible Use & Possible Upgrades:

- The BG-Sentinel is collapsible (diameter: 35 cm; height: 10 cm) and light (0.8 kg) making it easy to transport, carry, and store.
- The BG-Sentinel can be easily assembled in as little as 5 minutes and does not require the use of any tools.
- The BG-Sentinel can be safely used indoors (without CO₂) as well as outdoors, according to your needs.
- The BG-Sentinel is large enough to incorporate additional attractants (fragrances, small animals, worn clothing, animal hairs, lights) making it a very versatile research tool.
- You can upgrade the BG-Sentinel with the Biogents proprietary CO₂ device.
- Another upgrade is a larger catch bag for pest insects such as house flies or for mass trapping operations.

Eco-Friendliness:

- In contrast to most other traps, the BG-Sentinel trap does not catch beneficial insects such as honey bees, ladybugs, and butterflies.
- It does not use insecticides or pesticides.
- The trap requires no more than 3.4 Watts per hour.

User Information

Thoroughly read all information contained within this manual before operating the Biogents Sentinel mosquito trap.

Please only use accessories and spare parts that are recommended by the manufacturer. The use of other nets or gauze with the trap can significantly reduce the catch rate or even render it completely ineffective.

For best results, the trap needs to be permanently operated. If switched off, the catch bag needs to be properly removed to prevent the caught mosquitoes from escaping.

Parts List

The BG-Sentinel basic version trap comes with the following contents. For additional accessories, please see our Product Catalog.

1. Black intake funnel
2. Funnel net
3. Catch bag (2x)
4. White gauze cover
5. White plastic trap
6. Mounting poles (3x)
7. Inner suction tube
8. Fan
9. Fan Cable

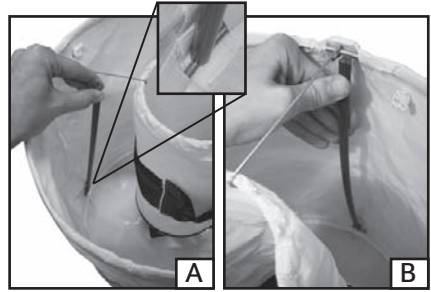


Assembling the Trap

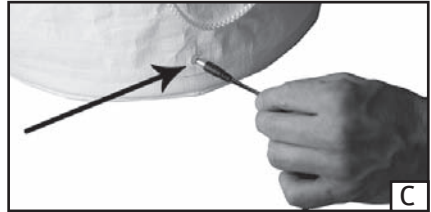
1. Take the trap and all of the contents shown above out of its green carrying bag pictured to the right.
2. Unfold the collapsed, white trap (5) containing the inner suction tube (7) and fan (8) and straighten it out into a standing position.



3. Insert the three mounting poles (6) into the inner side of the trap by first placing the pole onto the metal ring in the openings on the bottom of the trap [Fig. A] and then slightly bending it to place the top of the pole under the metal ring that encompasses the top of the trap. [Fig. B]



4. Thread the cable from the chosen source of power supply through the opening located at the bottom of the trap [Fig. C] and connect it to the fan cable (9).



5. Place the white gauze cover (4) over the top surface of the trap and make sure it is taut. Pull the drawstrings tight and tie them together. [Fig. D]

IMPORTANT: The white gauze cover should be pulled over the trap before the black intake funnel with attached funnel net and catch bag is placed into the trap. This ensures a secure placement of the intake funnel and simplifies the removal of the catch bag by allowing it to be easily lifted out.



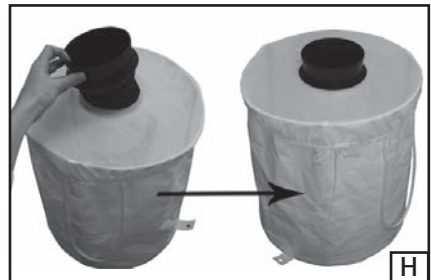
6. Next, pull the funnel net (2) around the bottom section of the intake funnel (1), and then place the catch bag (3) around the funnel net on the intake funnel. Make sure the seam of the catch bag is facing outward. Secure the catch bag around the intake funnel by tightening the cord on top of the bag. [Fig. E-G]

NOTE: The funnel net makes it difficult for mosquitoes to escape in case the electricity is cut off.

HINT: Position the catch bag roughly 3-5 cm below the top of the funnel net to increase the volume of the catch bag and to aid in removing the catch bag. [Fig. G]



7. Lastly, insert the intake funnel with the attached funnel net and catch bag into the central opening of the trap. [Fig. H]



Power Supply and Electricity

The suction fan requires a power source of 9 to 12 V DC (max. 280 mA). An optional power supply unit (EU Version 220V input, 12V output) with fitting plug connection is available. There are also extension cords, battery mounting support cables, and extra plug connections available. Please refer to our Product Catalog.

When using batteries, we usually recommend 12 Volt motorcycle or car batteries. These are easily rechargeable and readily available in most places. As a rule of thumb, you will need a battery capacity of 10 to 11 Ah for each trap with a 24 hr trapping period (for a 48 hr period you will need a capacity of 20 to 22 Ah and so on). This includes a security factor which should give you a peace of mind in most real-life situations.

Positioning of the Trap

The correct placement of the trap is an important factor that heavily influences its effectiveness.

Outdoor Use (the trap can be operated with or without CO₂):

Position the trap in a location that is sheltered from wind, heavy rainfall*, and direct sunlight.



Not in wind



Not in heavy rainfall



Not in direct sunlight

*Rainfall will not damage the trap as long as the fan is switched on.

NOTE: The trap should not be placed too close to walls (min. distance of approx. 1 meter)

Optimal Positioning:

- Ideal locations to position the trap are close to resting areas of mosquitoes such as bushes, shrubs, hedges, or any other foliage; however placing the trap in very tall grass or under bushes will impair its effectiveness.
- The trap should also be positioned close to mosquito breeding sites such as various kinds of temporary stagnant water ranging from small lakes to collections of rain water in rain barrels or old tyres. Many mosquitoes do not need a large amount of water for breeding; even a can filled with rain water can be an ideal breeding place.



Important: Do not place the traps in tall grass or under bushes. The trap and all its upper surfaces should be clearly visible to patrolling mosquitoes, so that its specialized appearance is effective in attracting the mosquitoes. A distance of at least 1.5 meters above the top of the trap needs to be kept clear. Any distance lower will hinder the visual signals and air currents of the trap and consequently reduce the catch rate.

Keep the traps out of strong wind. Strong winds not only deter the mosquitoes but can also affect the suction from the ventilator decreasing the catch rate.

The BG-Sentinel is very stable and durable but also lightweight. To keep the trap from toppling over you can:

1. Insert tent stakes into the holes in the side flaps. [Fig. B4]
2. Attach strings to the handles of the trap and fasten them to the ground with tent stakes.
3. Hang the trap from the handles above the ground.



Sheltering the Trap from Rain:

Even though rainfall does not damage the trap, it can make it very difficult for insect identification purposes. In these cases, it would be best to position the trap under some form of shelter (e.g. an overhang, roofed area, or a self hung tarpaulin) to keep it out of direct rainfall.

It is important to comply with the following regulations when sheltering the trap from rain:

1. Whatever is placed over the trap must be at least 1.5 meters above the top surface of the trap. Any distance lower will hinder the visual signals and air currents of the trap and consequently reduce the catch rate.
2. Make sure the shelter covers an adequate area around the trap, so that rain cannot enter from the sides.
3. Make sure the shelter is stable and durable.

Indoor Use (do not add CO₂):

It is important that the trap is not placed in front of, or close to, backgrounds with a lot of contrast (i.e. in front of a book shelf) because the trap uses a black and white contrast as a visual stimulus and the mosquitoes could be distracted from the trap. A good position would be in front of the window, for example.

The trap is a competitor with human beings. To optimize results, leave the trap constantly running even if no humans are present in the room/house for a period of time and leave interior doors open to allow mosquitoes to find the trap.

Handling the Trap

If for some reason you want to switch off the trap, first you need to remove and close the catch bag that is in use at the time. (See instructions below) This is because the funnel net only makes it difficult for mosquitoes to escape but not entirely impossible. Only a running fan ensures that the mosquitoes cannot escape from the catch bag.

Always remove the catch bag
before switching off the trap!

Removing the catch bag:

When replacing a full catch bag with a new one (following steps 1 thru 4) the fan should be kept running to ensure no mosquitoes escape out of the catch bag.

1. The black intake funnel should be placed loosely in the suction tube so that it can be easily lifted (i.e. the white gauze cover should be stretched over the trap before the catch pipe is inserted into the suction tube when assembling).
2. Lift the intake funnel approximately 10 cm out of the trap and keep the catch bag within the suction current of the fan while removing it to ensure that no mosquitoes escape. [Fig. C1]
3. Carefully pull the catch bag off of the intake funnel and simultaneously pull the cord of the catch bag tightly shut. You can set the intake funnel on the side of the trap while closing the catch bag. [Fig. C2]
4. Pull the funnel net out of the catch bag and make sure the catch bag is tightly sealed by tying the cord around the top of the bag to ensure that no mosquitoes can escape. [Fig. C3]



For further use of the insects (e.g. identification/classification) it is best to put them in a freezer for at least an hour to kill them. After several hours (or in some cases up to a day depending on ambient temperature and humidity) the caught mosquitoes will eventually dehydrate and die within the trap. The trap does not damage the insects, but identification is complicated if the insects stay in the trap for more than 3 days and dry out or if they get wet.

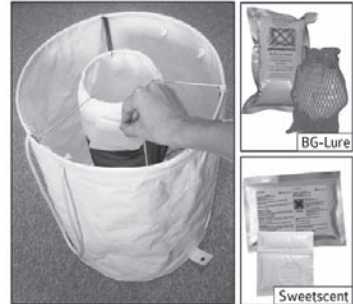
You should attach the catch bag to the intake funnel with the seam facing outwards in order to avoid mosquitoes getting stuck in the seam while emptying the catch bag.

Lures and Attractants

In principal all kinds of lures can be used with the trap. Simply place the lure inside the trap in the black mesh pocket located on the outside of the suction tube. We offer our special patented BG-Lure, which mimics the scent of human skin and releases a mixture of several compounds for up to five months. We also offer the Biogents Sweetscent attractant which is similar to the BG Lure, but only lasts 2 months, and is ideal for indoor use. Both products use substances which are classified as non-toxic and attract blood seeking insects that prefer to feed on humans.

Inserting the Sweetscent & BG-Lure:

1. Open the package that contains the lure.
2. Remove the lure from the package.
3. Place the lure inside the black mesh pouch (7) located on the outside of the suction tube (8).



Maintenance

All nets must be kept clean, including the white gauze covering, catch bag, and funnel net! Any dirt or dust can clog the pores of the nets and hinder the air flow. In case they need to be cleaned, wash them (by hand or machine) with unperfumed soap to avoid odour contamination! The residue from cleaning agents may have a repelling effect on the mosquitoes and consequently reduce the catch rate.

If the catch bag is damaged or torn it should be replaced, as the mosquitoes are able to escape. Extra catch bags, replacement sets and other accessories can be purchased from your supplier.

Adding CO₂

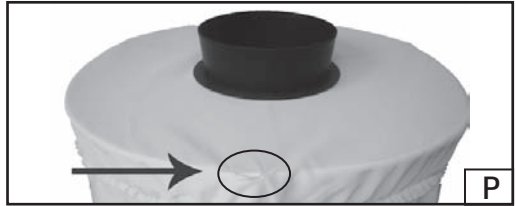
Without CO₂ the BG-Sentinel catches *Aedes aegypti*, *Aedes albopictus*, and *Aedes polynesiensis* which are vectors of Dengue, Chikungunya, Filariasis and Yellow fever. It also catches some *Culex* species such as *Culex quinquefasciatus* and *Culex pipiens*; however, the addition of CO₂ enables you to catch a broader range of blood seeking species as well as much higher numbers of the previous mentioned species.

Various sources of CO₂ can be used. The CO₂ nozzle can be attached to a gas cylinder, any well insulated dry ice container, or another CO₂ source that fits your preference and that is placed away from the trap. For more information on the addition of CO₂ please visit our website: www.bg-sentinel.com

CO₂ should be released by using the Biogents CO₂ nozzle, which is customized for the BG-Sentinel trap. Recommended flow rates of CO₂ are between 70 and 500 ml/min.

Attaching the new 2011 CO₂ nozzle:

1. Before inserting the nozzle onto the trap, cut a hole in the gauze cover to put the nozzle through for a better fit. Make sure the hole is in the correct location for the CO₂ nozzle. Due to the special fabric used, the hole that is cut will not fray. [Fig. P]
2. Assemble the CO₂ nozzle as shown in figure Q.
3. Insert the bottom of the CO₂ nozzle (the gray PVC pole) into the pocket formed by the seam on the top side of the trap [Fig. R] until the T-connector reaches the trap. [Fig. S]
4. Insert the end of the CO₂ tube into the T-connector on the CO₂ emitter nozzle. [Fig. T]
5. Now attach the other end of the CO₂ tube with the desired flow restrictor (if relevant) to the preferred CO₂ source. Figure U shows the Biogents specialized pressure reducing regulator.

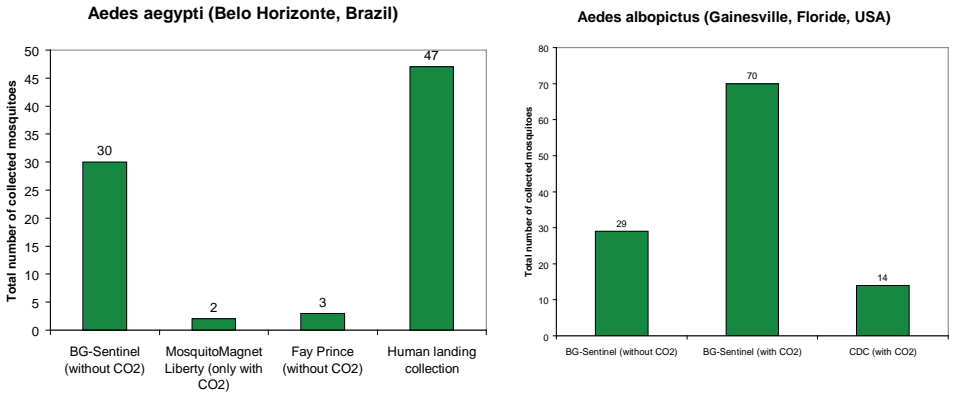


If you do not use the Biogents Eisenhans Carbonation Control System to regulate the flow and minimize the output of CO₂ while optimizing its release, then the CO₂ flow restrictor is needed to minimize the flow of CO₂ from the preferred source. Two options are available: 70 ml/min and 175 ml/min flow rates.

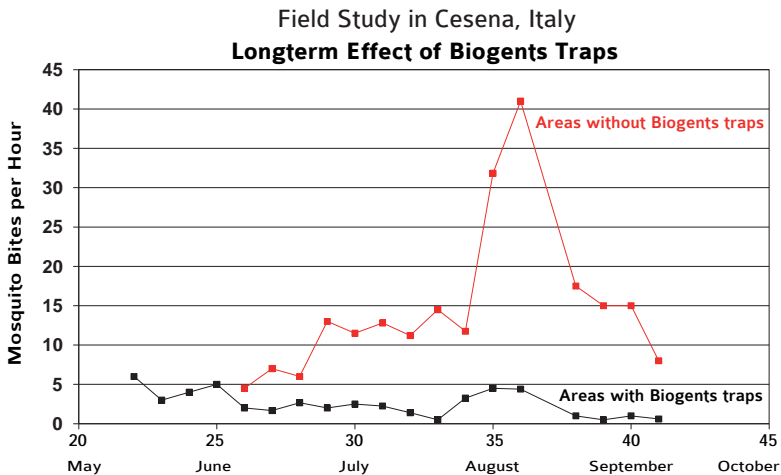
What can the Biogents Sentinel do?

Numerous independent scientific studies demonstrate that the BG-Sentinel is the most effective trap for the yellow fever mosquito, or dengue mosquito, *Aedes aegypti* and the tiger mosquito *Aedes albopictus*, even without the addition of CO₂.

The following two graphs depict the performance of the BG-Sentinel (without CO₂) with monitoring *Aedes aegypti* and *Aedes albopictus* mosquito species in Brazil and the United States, respectively.



The following graph depicts the performance of the BG-Sentinel trap (without CO₂) in controlling *Aedes albopictus* mosquito populations in Italy.



This field study was conducted in Cesena, Italy with *Aedes albopictus* and shows how the BG-Sentinel trap disrupts the normal population growth of the mosquitoes. The trap decreased the mosquito population and therefore decreased the biting pressure.

What the Biogents Sentinel cannot do

The Biogents Sentinel:

- is not able to reduce populations of millions of mosquitoes – a situation that can occur after floods (no trap can do this).
- is also not able to eliminate your mosquito problem over night – in the best case it should be left running for 24 hours a day, 7 days a week for as long as possible. Furthermore, the BG-Sentinel should be kept running even if the mosquito population has decreased to ensure that newly hatched mosquitoes (e.g. after heavy rainfall) or migrating mosquitoes can still be captured.
- cannot capture mosquitoes if insecticides or pesticides are sprayed in or around the trap.

NOTE: If your trap does not catch mosquitoes sufficiently, you might have a problem with specific mosquito species that are attracted by CO₂ and therefore you should try running the trap with CO₂.

Troubleshooting

Problems	Possible Reasons	Solutions
No mosquitoes in the catch bag	Fan is not running	Check the power supply
	Wrong placement of trap	Place the trap according to the advice mentioned above
	Your target mosquito needs CO ₂ as an attractant	Add CO ₂ to the trap according to the advice mentioned above
Fan not running	Power supply out of order	Recharge battery if you are using one
	Plug connections loose	Check that the single cables are tightened into the plug connections
Trap topples over	Area with too much wind	Place the trap in an area sheltered from strong winds
	Trap not secured down	Place tent stakes into side flaps of the trap to secure it to the ground
	Knocked over by wind or animals	Hang the trap above the ground from the handles

Safety Precautions

General

- Children or persons unfamiliar with these instructions must not operate the equipment.
- The operator or user is responsible for accidents or hazards occurring to other people or to their property.
- Thoroughly inspect the area where the equipment is to be used and remove all potential hazards.
- When the trap is not in operation it should be stored in a safe, dry environment.
- Please only use accessories and spare parts that are recommended by the manufacturer. The use of other nets or gauze with the trap can significantly reduce the catch rate or even render it completely ineffective.

Electrical

- When using a mains adapter always plug into a mains source that is in a safe, dry place (preferably indoors).
- Switch off and remove the mains adapter from the mains before all operations except insect removal.
- When using the car battery adapters always ensure these are connected correctly, bearing in mind any instructions from the car / car battery manufacturers.
- Regularly inspect the electrical cables for signs of damage and only use if in perfect condition. If damaged, the cable must be replaced.

Attractants

- All use of attractants should be carried out according to the manufacture's recommendations for use and safety guidelines.

Carbon Dioxide

- Many different sources of carbon dioxide are available. These have different hazards and safety precautions associated with them. Always follow the manufacturer / supplier guidelines for the source you have chosen.

If any further problems occur or you have any further questions, please contact us at:

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