

MOSQUITO TRAP

The application relates to a mosquito trap.

- 5 Female mosquitoes bite animals or human beings for reproducing. However, this bite can transmit dangerous diseases like malaria, dengue fever, and West Nile virus.

10 The female mosquito bite acts to suck out tiny amounts of blood for reproducing. The blood contains protein that allows the female mosquitoes to produce eggs. After this, the female mosquitoes lay their eggs in water. Later, larvae hatch from these eggs. The larvae live in the water and they strain organic matter from the water for sustenance. The larvae afterward transform into pupae and the pupae later transform into adult mosquitoes.

- 15 It is an object of the application to provide an improved mosquito trap.

The application provides another apparatus for attracting mosquitoes.

20 The apparatus includes at least one mosquito-breeding container.

In particular, the breeding container includes a water level sensor.

25 The apparatus also comprises a computing processor. The processor is provided for obtaining a water level measurement pattern from the water level sensor. The processor then compares the water level measurement pattern with a predetermined breeding container water level pattern. The processor later sends an alert message to a user when the breeding container water level measurement pattern deviates from the predetermined breeding container water level pattern by a predetermined amount.

30 In other words, this application provides a processor for monitoring a water level pattern of the mosquito-breeding container. This monitoring of the water level allows a user to observe the function of the breeding container. A fault of the breeding container can cause a deviation of the water level pattern from the predetermined pattern. This monitoring then allows a maintenance staff to be alert of the deviation for addressing the deviation.

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The application provides a network of mosquito traps.

The network comprises a plurality of apparatus for attracting mosquitoes and a computer server being connected communicatively to the plurality of apparatus.

The apparatus includes a sensor and a computing processor.

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In particular, the sensor is used for providing a sensor measurement pattern of the apparatus.

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The processor is connected to the sensor. The processor is adapted for obtaining the sensor measurement pattern from the sensor. The processor then compares the received sensor measurement pattern with a predetermined pattern. After this, the processor sends a server alert message to the computer server when the sensor measurement pattern deviates from the predetermined pattern by a predetermined amount.

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The computer server is adapted for sending a user alert message to a user in accordance with the received server alert message.

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The sensor measurement pattern can relate to a water level, to an electrical current of a water pump, or to an electrical voltage of the water.

In short, this application provides a network that includes a plurality of mosquito attracting apparatuses, wherein each apparatus includes a means for monitoring sensor measurement patterns of the respective apparatus.

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The application provides another network of mosquito traps.

The network includes a plurality of apparatus for attracting mosquitoes and a computer server being connected communicatively to the plurality of apparatus.

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Each apparatus includes a sensor and a computing processor.

In particular, the sensor is used for providing a measurement pattern of the apparatus.

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The processor is connected to the sensor. The processor is adapted for obtaining the sensor measurement pattern from the sensor and for sending the sensor measurement pattern to the computer server.

The computer server is adapted for comparing the sensor measurement pattern with a predetermined pattern and for sending a user alert message to a user, such as a super-

visor, when the sensor measurement pattern deviates from the predetermined pattern by a predetermined amount.

In short, this application provides a network that includes a plurality of mosquito attracting apparatuses and a computer server, wherein the computer server acts to monitor sensor measurement patterns of the respective mosquito attracting apparatuses.

In one aspect of the application, the processor is further adapted for transmitting the sensor measurement pattern to a further intermediate apparatus for transmitting to the computer server.

The application provides another apparatus for attracting mosquitoes.

An example of the mosquito attracting apparatus is the ovitrap.

The apparatus includes a mosquito-breeding container, a sensor, and a computing processor.

In use, the sensor provides a sensor positional status pattern of the breeding container.

The processor is connected to the sensor. It is adapted for receiving the sensor positional status pattern from the sensor, comparing the sensor positional status pattern with a predetermined positional pattern, and sending an alert message to a user when the sensor positional status pattern deviates from the predetermined data positional pattern.

In short, this application provides a mosquito attracting apparatus with a device that provides positional information of the apparatus. In use, the mosquito attracting apparatus is located a pre-determined location. This device allows a user to know when the mosquito attracting apparatus is moved from the pre-determined location. If this movement is not according to a preplanned schedule, the user can alert a maintenance staff to check the mosquito attracting apparatus.

Different implementations of the sensor are possible.

In one implementation, the sensor comprises a magnetic and a reed relay. The reed relay is connected to the processor. Operationally, the reed relay is placed in a pre-determined state when the mosquito-breeding container is provided at a pre-determined operating position.

In another implementation, the sensor includes a solar cell being connected to the processor. In one example of the implementation, the solar cell is blocked and thus placed in a different state when the mosquito-breeding container is provided at a pre-determined operating position.

The application provides an apparatus for attracting mosquitoes to lay their eggs. The apparatus then kills the eggs and larvae of the mosquitoes.

10 The apparatus comprises one or more mosquito-breeding containers, a purging container with a purging pump, and a purging tube.

The breeding container includes a water outlet, which is provided at a bottom of the breeding container. The breeding container is used for containing water. A mosquito attractant is often placed in or near the breeding container for attracting pregnant mosquitoes to the breeding container. These mosquitoes then deposit their eggs the water of the breeding container. After some time, larvae hatch from these eggs.

20 The purging pump is provided for transferring water, together with larvae and eggs, out of the purging container.

The purging tube is connected to the purging container and to the breeding containers. In particular, the purging tube is connected to the water outlets of the respective breeding containers.

25 The apparatus is provided such that, in use, the purging tube allows water with any egg or larvae to flow, by gravitational force, from the breeding container to the purging tube, and to the purging container.

30 The purging pump is further provided with a predetermined low water operating level, which is positioned below the purging tube, thereby allowing the purging pump to transfer essentially all water out of the breeding containers.

35 In short, this application provides a purging pump with a water operating level that is provided below a purging tube. In effect, if this operating level were not provided, the purging pump would not be able to purge or remove all water from the purging container. A portion of water with any eggs and larvae would then remain in the purging container during purging of the container.

The application provides another apparatus for attracting mosquitoes.

The apparatus includes one or more mosquito-breeding containers, a purging container with a purging pump, and a purging tube.

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The breeding container includes a water outlet, which is provided at a bottom of the breeding container.

The purging pump is provided for transferring water out of the purging container.

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The purging tube is connected to the purging container and to the at least one breeding container.

In particular, the water outlet of the breeding container is connected to the purging tube.

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The purging tube is provided for allowing water with any egg or larvae to flow, by gravitational force, from the breeding container to the purging tube, and to the purging container.

The breeding container also includes an inclined inner bottom surface. The inner bottom surface is inclined with respect to the horizontal plane.

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The inclined inner bottom surface is connected to the breeding container water outlet.

The inclination of the inner bottom surface acts to urge water with any egg and larvae of mosquitoes in the breeding container towards the breeding container water outlet, during transferring of water from the at least one breeding container to the purging container.

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In short, this application provides a mosquito-breeding container with an inclined bottom surface for urging water with mosquito larvae or eggs towards a water outlet of the breeding container. Without this feature, during purging of the breeding container, the inclined bottom surface allows for easy removal of the larva and eggs from the breeding container.

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The application provides a further apparatus for attracting mosquitoes.

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The apparatus includes one or more mosquito-breeding containers, a purging container with a purging pump, a purging tube, which is connected to the purging container and to the breeding containers.

In particular, the breeding container includes a water outlet that is provided at a bottom of the breeding container.

5 The purging pump is provided for transferring water, which is inside of purging container, out of the purging container.

10 The breeding container water outlet is connected to the purging tube. The purging tube is provided for allowing water with any egg or larvae to flow, by gravitational force, from the breeding container to the purging tube, and to the purging container

The purging pump comprises one or more blades and a water-return outlet.

15 The blades are used for cutting the eggs or larvae in the water, which being transferred out of the purging container.

The water-return outlet is used for channeling at least a portion of the cut eggs or larvae in the water, which is being transferred out of the purging container, back to the purging container.

20 In summary, this application provides a purging pump with blades for cutting larvae in water, which is being purged or being removed by the purging pump. The channeling back of the larvae allows the purging pump to cut the larvae several times. The return of the cut larvae back to purging container also allows odor from the cut larvae to attract mosquitoes to the breeding container.

25 In one aspect of the application, a cover is provided over the breeding containers and over the purging container for channeling odor of the cut larvae from the purging container to around the breeding container. This serves to attract mosquitoes to the breeding container.

30 The application provides another apparatus for attracting mosquitoes.

35 The apparatus includes at least one mosquito-breeding container, a purging container with a purging pump, and a purging tube, which is connected to the purging container and to the at least one breeding container.

The breeding container includes a water outlet, which is provided at a bottom of the breeding container,

The purging pump is provided for transferring water out of the purging container.

5 The breeding container water outlet is connected to the purging tube, wherein the purging tube is provided for allowing water with any egg or larvae to flow, by gravitational force, from the breeding container to the purging tube, and to the purging container.

10 The breeding container also includes an operable blinking light source for disturbing larvae in the breeding container. Before and/or during purging of the breeding container, the light source is activated in order to direct the larvae toward the breeding container water outlet.

15 In short, this application provides a means to direct larvae towards the bottom of the breeding container for easy removal of the larvae from the breeding container. The blinking light source serves to disturb larvae in water of the breeding container. When disturbed, the larvae usually dive to the bottom of breeding container where the larvae can be directed easily to the breeding container water outlet.

20 The apparatus often includes a filling container with a filling pump, as well as a filling tube for filling the breeding container. The filling tube is connected to the filling container and to a water inlet of the breeding container. The filling pump is provided for transferring water from a water source to the filling container. Water then flows, by gravitational force, from the filling container, the filling tube, and to the at least one breeding container. In short, the filling container with a filling pump acts to provide the breeding container with water.

25 The apparatus can also include a filling pump power supply timer switch, which is connected to the filling pump, for activating the filling pump at a predetermined time or schedule.

30 Similarly, the apparatus often includes a purging pump power supply timer switch, this is connected to the purging pump for activating the purging pump at a predetermined time or schedule.

35 The breeding container also often comprises mosquito bait, such as a coconut husk, for attracting pregnant mosquitoes to the breeding container, wherein these mosquitoes deposit their eggs.

The apparatus also often includes a hibernation valve, which is placed at a bottom part of the purging container, for releasing water from the purging container during hiberna-

tion of the apparatus. This allows water to be removed from the purging container and from the rest of the apparatus, thereby allowing the apparatus to be placed in dormant state.

- 5 The application provides a further apparatus for attracting mosquitoes.

The apparatus comprises at least one mosquito-breeding container with a water inlet.

- 10 The mosquito-breeding container also comprises a lid for covering the water inlet in a vertical direction in order to deter any larvae in water of the breeding container from entering the water inlet.

- 15 In short, this application provides a lid for deterring or preventing larvae from entering a water inlet of the breeding container. In use, water flows into the breeding container through the water inlet. This lid acts to deter larvae from entering the water inlet.

The lid can include comprises a water flow lid throughput cross-section, which is smaller than a water flow water inlet throughput cross-section of the water inlet.

- 20 In effect, speed of water through the lid throughput cross-section is faster than speed of water through the water inlet throughput cross-section. This then acts to deter any larvae from entering the water inlet.

- 25 The lid can comprise a plurality of throughput channels, wherein the throughput channel extends outward in a radical direction.

The lid can include a plurality of a further throughput channel. The further throughput channel extends downwardly in the vertical direction.

- 30 The application provides another apparatus for attracting mosquitoes.

The apparatus includes at least one mosquito-breeding container and a filling container with a filling pump.

- 35 The filling pump is provided for transferring water to the filling container is provided for containing water and for transferring water to the mosquito-breeding container by gravitational force during a filling cycle.

The apparatus also includes an ammeter and a computing processor.

The ammeter is used for measuring an electrical current of the filling pump.

5 The computing processor is provided for obtaining an electrical current measurement pattern from the ammeter. The measurement pattern refers to a series of data over a predetermined period. The above pattern comprises electrical current levels and corresponding duration of these levels.

10 The processor then compares the electrical current measurement pattern with a predetermined filling pump electrical current pattern.

15 The processor later sends an alert message to a user when the electrical current measurement pattern deviates from the predetermined filling pump electrical current pattern by a predetermined amount.

20 In other words, this application provides a processor for monitoring an electrical current pattern of a filling pump. This monitoring of the electrical current pattern allows a user to observe the performance of the filling pump. A fault of the pump would cause a deviation of the electrical current pattern from the predetermined pattern. This monitoring then allows a maintenance staff to be alert of the deviation for addressing the deviation.

The application provides a further apparatus for attracting mosquitoes.

25 The apparatus includes at least one mosquito-breeding container and a purging container with a purging pump.

In particular, the purging pump is provided for transferring water out of the filling container.

30 The purging container is provided for receiving water from the breeding container by gravitational force during a purging cycle.

The apparatus also includes an ammeter and a computing processor.

35 The ammeter is used for measuring an electrical current of the purging pump.

The processor is provided for obtaining an electrical current measurement pattern from the ammeter. The processor then compares the electrical current measurement pattern with a predetermined purging pump electrical current pattern. The processor later sends

an alert message to a user when the electrical current measurement pattern deviates from the predetermined purging pump electrical current pattern by a predetermined amount.

- 5 In short, this application provides a processor for monitoring an electrical current pattern of a purging pump. This monitoring allows a user to observe the performance of the purging pump.

The application provides a further apparatus for attracting mosquitoes.

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The apparatus includes at least one mosquito-breeding container and a filling container for providing water to the at least one mosquito-breeding container during a filling cycle.

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The filling container includes a water level sensor for measuring a water level of the filling container.

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The apparatus also comprises a computing processor. The processor is provided for obtaining a water level measurement pattern from the water level sensor. The processor afterward compares the water level measurement pattern with a predetermined filling container water level pattern. The processor then sends an alert message to a user when the water level measurement pattern deviates from the predetermined filling container water level pattern by a predetermined amount.

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In summary, this application provides a processor for monitoring a water level pattern of the filling container. This monitoring allows a user to observe the performance of the filling container.

The application provides another apparatus for attracting mosquitoes.

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The apparatus includes one or more mosquito-breeding containers and a purging container.

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The purging container is used for receiving water from the mosquito-breeding container during a purging cycle. The purging container includes a water level sensor for measuring a water level of the purging container.

The apparatus also includes a computing processor. The processor is provided for obtaining a water level measurement pattern from the water level sensor. The processor later compares the water level measurement pattern with a predetermined purging con-

tainer water level pattern. The processor then sends an alert message to a user when the water level measurement pattern deviates from the predetermined purging container water level pattern by a predetermined amount.

- 5 In short, this application provides a processor for monitoring a water level pattern of the purging container. This monitoring allows a user to observe the performance of the purging container.

The application provides another apparatus for attracting mosquitoes.

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The apparatus includes at least one mosquito-breeding container, a filling module, a purging module, and a local computing processor. The filling module and the purging module are connected to the breeding container.

- 15 The filling module includes a filling container with a filling pump and a filling pump power supply with a filling pump timer switch.

In particular, the filling pump is provided for transferring water to the filling container during a filling cycle. The filling container is provided for transferring water to the breeding container by gravitational force.

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The filling pump timer switch is provided for connecting electrically the filling pump power supply to the filling pump. The filling pump timer switch comprises a filling pump time display for displaying an operating timing of the filling pump timer switch,

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Referring to the purging module, it includes a purging container with a purging pump and a purging pump power supply with a purging pump timer switch.

The purging pump is provided for transferring water out of the purging container during a purging cycle. The purging container is provided for receiving water from the mosquito-breeding container by gravitational force.

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The purging pump timer switch is provided for connecting the purging pump power supply to the purging pump. The purging pump timer switch comprises a purging pump time display for displaying an operating timing of the purging pump timer switch.

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Referring to the computing processor, it includes a processor time display for displaying timing information of the processor.

The apparatus is distinguished in that the filling pump time display, the purging pump time display, and the processor time display are provided in the vicinity of each other to facilitate verification of timing of the filling pump and timing of the purging pump.

5 In effect, this application provides pump time displays in the vicinity of the local server time display. In use, the mosquito attracting apparatus is often provided in the field. This arrangement of the pump time displays allows a worker in the field to view easily the time displays for faster maintenance of the apparatus.

10 In one implementation, the computer server receives timing information from a satellite for synchronization of server clock data.

The application provides another apparatus for attracting mosquitoes.

15 The apparatus includes a mosquito-breeding container, a water level detector, and a computing processor.

In particular, the water level detector has a magnet with a float and a reed relay.

20 The magnet and the float are provided in the mosquito-breeding container. The magnet and the float act to move towards the reed relay when a water level of the mosquito-breeding container rises. Similarly, the magnet and the float act to move away from the reed relay when the water level of the mosquito-breeding container falls.

25 The reed relay is fixed to the mosquito-breeding container.

Together, the reed relay with the magnet acts to provide a water level data pattern of the breeding container.

30 The processor is connected to the reed relay. The processor is adapted for receiving the water level pattern from the reed relay. The processor then compares the received water level pattern with a predetermined pattern. The processor sends sending an alert message to a user when the water level pattern deviates from the predetermined pattern.

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In short, this application provides a mosquito attracting apparatus with a means to detect a water level of the apparatus. A maintenance can dispatched to check the apparatus if the water level pattern deviates from a planned pattern.

The application provides a further apparatus for attracting mosquitoes.

The apparatus includes a power supply with a switch and a control unit. The control unit comprises a port with an Internet Protocol (IP) address for changing a state of the switch.

In effect, this application shows a means to reset an apparatus for attracting mosquitoes. The step of powering off and then powering on of the apparatus acts to reset the mosquito attracting apparatus.

The application provides a further apparatus for attracting mosquitoes.

The apparatus includes a mosquito-breeding container and an accelerator sensor being attached to the mosquito-breeding container.

The accelerator sensor transmits a predetermined alert signal to a controller when the accelerator sensor detects a movement of the breeding container.

In short, this application shows a mosquito trap with a device for detecting movement of the mosquito trap. In use, the mosquito trap is placed at a pre-determined position. The mosquito trap is later moved when it has collected mosquito eggs and larvae. The device then detects unplanned or unauthorized movement of the mosquito trap.

The application provides another mosquito trap. The mosquito trap includes an apparatus for attracting mosquitoes and an irrigation system with a rain sensor.

The rain sensor is provided for activating a pump to transfer water from the irrigation system to water mosquito-attracting plants, which are provided in the vicinity of the apparatus.

In short, this application shows a mosquito trap that includes an irrigation system for providing water to mosquito-attracting plants, which are placed in the vicinity of a mosquitoes attracting apparatus.

The application provides a further mosquito trap.

The mosquito trap includes an apparatus for attracting mosquitoes and a loudspeaker being provided in the vicinity of the apparatus for providing audio messages to people nearby.

In short, this application shows a mosquito trap with a loudspeaker for providing messages or announcements to people near a mosquito attracting apparatus. The messages can be related to the mosquito attracting apparatus for educational purposes.

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The application provides a further network of mosquito traps.

The network comprises a plurality of apparatus for attracting mosquitoes, and a computer server. The computer server is connected communicatively to the plurality of apparatus.

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The apparatus includes a communication module being adapted for sending a message repeatedly to the computer server until the computer server acknowledges receipt of the message.

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In short, this application provides network of mosquito traps, wherein each mosquito trap has a fail-safe communication device for providing a robust communication.

The application provides a further network of mosquito traps.

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The network includes a plurality of apparatus for attracting mosquitoes, and computer server. The computer server is connected communicatively to the plurality of apparatus.

The apparatus includes a slow data communication channel and a fast data communication channel, the slow data communication channel and the slow data communication channel are provided for exchanges messages with the computer server.

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The slow data communication channel is often more expensive to use and is available more often. The fast data communication channel is less expensive to use and is not often available.

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In short, this application has a mosquito trap with two means for communicating with a computer server. The two means have different features, from which a user can choose according to a need of the application.

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The application provides a method of operating a mosquito trap.

The method includes a step of transferring water from a filling container to a mosquito-breeding container by gravitational force for attracting mosquitoes to lay their eggs in the breeding container.

5 After this, a step of transferring the water in the breeding container to a water outlet of the breeding container is performed. A bottom surface of the breeding container is inclined for urging the water with any eggs or larvae inside the breeding container towards the breeding container water outlet.

10 In short, this application provides a way of urging water with eggs or larvae in a mosquito-breeding container out of the breeding container. Without this urging, during purging of water from the breeding container, eggs and larvae may remain in the breeding container.

15 The application provides another method of operating a mosquito trap.

The method includes a step of transferring water with any larvae from a mosquito-breeding container to a purging container by gravitational force.

20 The water with the larvae from the purging container is then transferred to outside of the purging container by a purging pump. The transferring is done such that one or more blades of the purging pump cut the larvae. In other words, the purging pump kills the larvae.

25 At least a portion of the water with the cut larvae is later returned back to the purging container.

30 After this, an odor of the cut larvae is spread from the purging container to around the mosquito-breeding container in order to attract mosquitoes to the mosquito-breeding container.

In short, this application shows a way of attracting mosquitoes to a mosquito-breeding container using larvae odor.

35 The application provides a further method of operating a mosquito trap.

The method comprises a step of transferring water to a mosquito-breeding container for attracting mosquitoes to the breeding container.

Blinking light rays are then provided to disturb any larvae in the water of the breeding container in order to direct the larvae towards a water outlet at the bottom of the breeding container. Larvae often dive downward when they are disturbed.

- 5 The water with the larvae is later transferred to the breeding container water outlet and is transferred out of the breeding container.

10 In short, this application provides a way of directing larvae in water of a mosquito-breeding container towards an outlet of the breeding container. Without this directing, during purging of water from the breeding container, larvae may remain in the breeding container.

The application provides another method of operating a mosquito trap.

- 15 The method includes a step of a computing processor obtaining an electrical current measurement pattern of a filling pump. The filling pump is provided for transferring water to a filling container. The filling container is provided such that water in the filling container flows to one or more mosquito-breeding containers by gravitational force.

- 20 The processor later compares the filling pump electrical current measurement pattern with a predetermined filling pump electrical current pattern. This is different from a person doing the comparison, which takes a much longer time and is not done as consistent as the processor.

- 25 The processor afterward sends an alert message to a user by the processor, when the processor detects a deviation of the filling pump electrical current measurement pattern from the predetermined filling pump electrical current pattern by a predetermined amount.

- 30 The message acts to alert and inform the user of the said deviation, wherein the user can then take appropriate actions.

In short, this application provides a way of monitoring an electrical parameter pattern of a filling pump for detecting a fault of the filling pump.

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The application provides another method of operating a mosquito trap.

The method comprises a step of a computing processor obtaining an electrical current measurement pattern of a purging pump. The purging pump is provided for transferring

water out of a purging container. The purging container is provided such that the purging container receives water from at least one mosquito-breeding container by gravitational force, during purging of water from the breeding container.

- 5 The processor later compares the purging pump electrical current measurement pattern with a predetermined purging pump electrical current pattern.

The processor afterward sends an alert message to a user when the processor detects a deviation of the purging pump electrical current measurement from the predetermined purging pump electrical current pattern by a predetermined amount.

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In short, this application provides a way of monitoring an electrical parameter of a purging pump for detecting a fault of the purging pump.

- 15 The application provides another method of operating a mosquito trap.

The method comprises a step of a computing processor obtaining a water level measurement pattern of a mosquito-breeding container.

- 20 The processor later compares the breeding container water level measurement pattern with a predetermined breeding container water level pattern.

The processor afterward sends an alert message to a user when the processor detects a deviation of the breeding container water level measurement pattern from the predetermined breeding container water level pattern by a predetermined amount.

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In short, this application provides a way of monitoring a water level pattern of a mosquito-breeding container for detecting of the breeding container.

- 30 The application provides another method of operating a mosquito trap.

The method comprises a step of a computing processor obtaining a water level measurement pattern of a filling container. The filling container is provided for transferring water to at least one mosquito-breeding container by gravitational force.

- 35 The processor later compares the filling container water level measurement pattern with a predetermined filling container water level pattern.

The processor afterward sends an alert message to a user when the processor detects a deviation of the filling container water level measurement pattern from the predetermined filling container water level pattern by a predetermined amount.

- 5 In short, this application provides a way of monitoring a water level pattern of the filling container for detecting a fault of the filling container.

The application provides another method of operating a mosquito trap.

- 10 The method comprises a step of a computing processor obtaining a water level measurement pattern of a purging container. The purging container is provided for receiving water from at least one mosquito-breeding container by gravitational force.

- 15 The processor later compares the purging container water level measurement pattern with a predetermined purging container water level pattern.

- 20 The processor afterward sends an alert message to a user when the processor detects a deviation of the purging container water level measurement pattern from the predetermined purging container water level pattern by a predetermined amount.

In short, this application provides a way of monitoring a water level pattern of the purging container for detecting a fault of the purging container.

- 25 In a general sense, the improved mosquito trap goes beyond equipping an existing ovitrap with a remote surveillance system. The improved mosquito trap provides a device with selected sensor types that allow operation of the device, wherein not only trap failures are detected, but also sensor failures can reliably be detected.

- 30 Among others, this provides an advantage of eliminating potential dangers that might arise from sensors, which provide erroneous measurements, thereby feigning a faultless device.

- 35 A mosquito trap can become a mosquito-breeding spot if it is not working properly. The improved mosquito trap avoids this by the following means.

The mosquito trap relies on the remote electronic measurement values for determining whether the mosquito trap is working properly or whether it needs maintenance.

The remote electronic measurement values, in relation to the state of the mosquito trap, would provide the following cases:

- a. remote electronic measurement shows that the mosquito trap is working properly while the mosquito trap is actually working properly,
- b. remote electronic measurement shows that the mosquito trap is not working properly and the trap is actually working properly, this is not critical because a maintenance team is then deployed to check the mosquito trap,
- c. remote electronic measurement shows that the mosquito trap is not working properly and the mosquito trap is not working properly, this is the normal case for a failure, and this is not critical because the maintenance team is deployed to check the mosquito trap, and
- d. remote electronic measurement shows that the mosquito trap is working properly, but the mosquito trap is not working properly, this would be a critical state, but verification of sensor readings of the mosquito trap and verification of the sensor readings with a predetermined schedule or pattern would detect the malfunctioning of the sensors.

The above case "d", which goes back to a faulty sensor reading or to an external manipulation of a person or an animal, is avoided by the present mosquito trap that provides an inherent validity check of the sensors. As water levels in all containers of the mosquito trap change at the same time and also change according to the predetermined schedule, the predetermined schedule is used to check the validity of the sensor readings.

Especially when reading the water levels with floats and when reading magnetic encapsulated relays of the mosquito trap, the distinct change of the sensor reading together with the change of the water level can be detected. A faulty float sensor would not change its state, but rather remain on one state alone. Sometime, a float sensor is hanging and it would change its state only after the water level has changed. This is then detected, and by comparison with the sensor readings of the other water level sensors, which detect communicating water levels, a distinct sensor validity warning is provided.

Manipulation by persons or animals cannot result in feigning a correct operation of the mosquito trap. This is because this manipulation would need to occur at all sensors at the same time and to occur according to the predetermined time schedule of the specific automated mosquito trap.

These time schedules can also be kept secret and they are randomly changed from time to time and from trap to trap, so that no person would be able to predict what manipulation has to occur in order to sabotage the trap, thereby making it look like a working mosquito trap, when it is not so.

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The above embodiments have safety features, which are summarized below.

10 The time display of the filling pump, the time display of the purging pump, and the time display of the local server together provide a mean for synchronization of the filling pump and the purging pump that is suitable for a maintenance staff in the field. The staff does not need a clock device or tools for the said synchronization. Carrying the clock device to the field requires effort as well care to protect the clock device from damage.

15 The buttons of these time displays provide a robust means of altering the dates or times of operating times of purging and the filling pumps, which is not costly and durable even in outdoor conditions that can be harsh.

20 The local server is able to detect any fault in the purging and the filling pumps quickly. The local server obtains electrical current readings of the pumps and it then compares patterns of the pump electrical current readings with predetermined patterns. Faults in the purging and filling pumps can cause the pump electrical current readings to deviate from the predetermined patterns. Any deviation from the predetermined patterns can trigger an alert message being sent to a supervisor for rectifying the deviation.

25 Similarly, the local server is able to detect any abnormality of the water levels of the breeding containers, of the filling container, and of the purging container quickly. The local server monitors the water level sensor readings of the breeding containers, of the filling container, and of the purging container. The local server later compares the monitored sensor readings with predetermined patterns. Water flow chokes, water pump failure, power supply failure, communication interruption or sensor failure can cause the sensor readings to deviate from the predetermined patterns. Any deviation from the predetermined patterns can trigger an alert message being sent to a supervisor for rectifying the deviation.

35 The water pumps can function even during a main power supply failure. The water pumps and the corresponding clock timers, which are used regulating the water pumps, are connected to a main power supply and to a backup power supply. The backup power supply allows the water pumps and the clock timers to continue working and to keep time when failure of the main power supply occurs.

The mosquito trap does not include valves for controlling the water levels of its containers, namely the breeding containers, the filling container, and the purging container, for improving reliable. Valves are not reliable in that they are susceptible to clogging, especially in dirty environments. Instead, the mosquito trap uses water outlets, connection pipes, and water pumps for controlling the water levels.

The overflow outlet of the filling container prevents overfilling of the breeding containers without use for electricity or complicated mechanism.

The mosquito trap is also efficient, wherein only one water pump is required for filling of the breeding containers and only one pump is required for the purging of the said containers.

- 15 Fig. 1 illustrates a top view of a mosquito trap,
- Fig. 2 illustrates a front cross-sectional view of the mosquito trap of Fig. 1 taken along a sectional line A-A,
- Fig. 3 illustrates another front cross-sectional view of the mosquito trap of Fig. 1 taken along a sectional line B-B,
- 20 Fig. 4 illustrates a side cross-sectional view of water pipe connections of the mosquito trap of Fig. 1 taken along a sectional line C-C,
- Fig. 5 illustrates a part of the water pipe connections of Fig. 4,
- Fig. 6 illustrates a top view of the water pipe connections of Fig. 4,
- Fig. 7 illustrates an opening of a steel tube of the mosquito trap of Fig. 4,
- 25 Fig. 8 illustrates a control module of the mosquito trap of Fig. 1,
- Fig. 9 illustrates a further control module of the mosquito trap of Fig. 1,
- Fig. 10 illustrates a front view of a centrifugal pump of the mosquito trap of Fig. 1,
- Fig. 11 illustrates a front cross-sectional view of a satellite mosquito-breeding unit of the mosquito trap of Fig. 1,
- 30 Fig. 12 illustrates a top view of the satellite mosquito-breeding unit of Fig. 11,
- Fig. 13 illustrates a power supply timer device of the mosquito trap of Fig. 1,
- Fig. 14 illustrates a first state of a water level sensor device of the mosquito trap of Fig. 1,
- Fig. 15 illustrates a second state of the water level sensor of Fig. 14,
- 35 Fig. 16 illustrates an operating voltage of the water level sensor of Fig. 14,
- Fig. 17 illustrates a method of operating the mosquito trap of Fig. 1, the method comprising a filling step and a purging step,
- Fig. 18 illustrates a method for operating of the filling step of Fig. 17,
- Fig. 19 illustrates a method for operating of the purging step of Fig. 17,

- Fig. 20 illustrates a first operating main cycle of the method of Fig. 17,
 Fig. 21 illustrates a filling micro-cycle of the first operating main cycle of Fig. 20,
 Fig. 22 illustrates a purging micro-cycle of the first operating main cycle of Fig. 20,
 Fig. 23 illustrates a second operating main cycle of the method of Fig. 17,
 5 Fig. 24 illustrates a filling micro-cycle of the second operating main cycle of Fig. 23,
 Fig. 25 illustrates a purging micro-cycle of the second operating main cycle of Fig. 23,
 Fig. 26 illustrates a third operating main cycle of the method of Fig. 17,
 10 Fig. 27 illustrates a measurement frequency of the third main operating cycle of the method of Fig. 26,
 Fig. 28 illustrates a display of a local server of the mosquito trap of Fig. 1,
 Fig. 29 illustrates a report of the local server of the mosquito trap of Fig. 1,
 Fig. 30 illustrates mosquito disturbance light rays for the mosquito trap of Fig. 1,
 15 Fig. 31 illustrates breeding container security light sensors for the mosquito trap of Fig. 1,
 Fig. 32 illustrates an improved purging pump with a predetermined low water operating level for the mosquito trap of Fig. 1,
 Fig. 33 illustrates a management web server that is connected communicatively to the local server of the mosquito trap of Fig. 1,
 20 Fig. 34 illustrates a variant a mosquito-breeding container of the mosquito trap 10 of Fig. 1,
 Fig. 35 illustrates a further method of operating the mosquito trap 10 of Fig. 1,
 Fig. 36 illustrates a state diagram of the mosquito trap 10 of Fig. 1,
 25 Fig. 37 illustrates a cross-sectional view of a drain for the mosquito trap of Figs. 1 to 3,
 Fig. 38 illustrates a maintenance staff member in front of three time displays of the mosquito trap of Fig. 1,
 Fig. 39 illustrates a time display for the purging pump of the mosquito trap of Fig. 1,
 30 Fig. 40 illustrates a table of screen displays for the time display of Fig. 39,
 Fig. 41 illustrates the mosquito trap of Fig. 1, which includes water level sensors and water pump ammeters, wherein each of the water level sensors and the water pump ammeters comprises a computing processor for treating data,
 35 Fig. 42 illustrates the mosquito trap of Fig. 1, which includes interfaces that comprise a computing processor for treating data,
 Fig. 43 illustrates the mosquito trap of Fig. 1, which includes a local server that comprise a computing processor for treating data,

- Fig. 44 illustrates the mosquito trap of Fig. 1, which includes a Wireless Local Area Network (WLAN) router that comprise a computing processor for treating data,
- Fig. 45 illustrates the mosquito trap of Fig. 1, which includes a mosquito management web server that comprise a computing processor for treating data,
- Fig. 46 illustrates a cluster of the mosquito trap of Fig. 1,
- Fig. 47 illustrates another cluster of the mosquito trap of Fig. 1,
- Fig. 48 illustrates mosquito trap cluster 550a, which is a special embodiment of the mosquito trap cluster 550 of Fig. 47,
- Fig. 49 illustrates a wireless ad hoc network for the mosquito trap of Fig. 1,
- Fig. 50 illustrates an improved lethal ovitrap,
- Fig. 51 illustrates detected states of a reed relay of the ovitrap of Fig. 50,
- Fig. 52 illustrates a predetermined pattern of states of the reed relay 613 of the ovitrap of Fig. 50,
- Fig. 53 illustrates a network for the ovitrap of Fig. 50,
- Fig. 54 illustrates another improved lethal ovitrap, which is a variant of the ovitrap of Fig. 50,
- Fig. 55 illustrates a water level detector for the ovitrap of Fig. 50,
- Fig. 56 illustrates an improved lethal ovitrap with a remote-controlled power switch,
- Fig. 57 illustrates an improved lethal ovitrap with an accelerator sensor,
- Fig. 58 illustrates an improved lethal ovitrap with a computer with a loudspeaker,
- Fig. 59 illustrates an improved lethal ovitrap with an accelerator sensor, and
- Fig. 60 illustrates an improved lethal ovitrap with a larvicide dispenser.

In the following description, details are provided to describe embodiments of the application. It shall be apparent to one skilled in the art, however, that the embodiments may be practiced without such details.

Some parts of the embodiments have similar parts. The similar parts may have same names or similar part numbers. The description of one part applies by reference to another similar part, where appropriate, thereby reducing repetition of text without limiting the disclosure.

Fig. 1 shows an improved mosquito trap 10. The mosquito trap 10 includes a mosquito harvest module 13 and a control module 16 being connected to the mosquito harvest module 13.

Referring to the mosquito harvest module 13, it comprises a filling unit 19, a purging unit 22, and a plurality of satellite mosquito-breeding units 26.

5 The mosquito-breeding units 26 are arranged essentially in a straight line. The breeding units 26 are connected with the purging unit 22 via a horizontal plastic water pipe 24, as seen in Fig. 2. The breeding units 26 are also connected with the filling unit 19 via a horizontal plastic water pipe 20, as seen in Fig. 3.

10 Referring the breeding units 26, each breeding unit 26 includes a satellite breeding container 30 with a water filling inlet 32, and with a water purging outlet 34, as seen in Figs. 1, 4, and 6.

15 The bottom of the breeding container 30 has an inner bottom surface 44 that has a shape of a cone, as illustrated in Fig. 11. Outer parts of the bottom surface 44 are placed above an inner part of the bottom surface 44. In other words, the bottom surface 44 is inclined with respect to a horizontal plane.

20 The filling inlet 32 is placed at a bottom of the breeding container 30, as seen in Fig. 3. The filling inlet 32 is placed connected to the upper part of the bottom surface 44, as seen in Fig. 11. The filling inlet 32 is positioned above the pipe 20 and it is also connected to the pipe 20, as seen in Fig. 3. The pipe 20 is also connected to the filling unit 19.

25 The purging outlet 34 is also placed at the bottom of the breeding container 30, as seen in Fig. 2. The purging outlet 34 is also connected to the inner part of the bottom surface 44, which is placed at a lowest area of the bottom surface 44, as seen in Fig. 11. The purging outlet 34 is provided below the filling inlet 32 by a height difference of d . The purging outlet 34 is positioned above the pipe 24 and it is also connected to the pipe 24, as seen in Fig. 2. The pipe 24 is also connected to the purging unit 22.

30 Inside of the breeding container 30 contains water 45 and coconut husk bait 46, as illustrated in Fig. 11. The coconut husk bait 46 is suspended by a fastening means 48 and it is positioned such that the water 45 covers a lower portion of the coconut husk bait 46. Gravid female mosquitoes 49 rest on an upper portion of the coconut husk bait 46 to lay or deposit their eggs 51.

In a general sense, mosquitoes are a form of a vector. The vector refers to an insect or animal that passes disease from one person to another.

Referring to the filling unit 19, it includes a water source 37 and a filling container 40, as seen in Fig. 3. The water source 37 is placed essentially below the filling container 40.

5 The water source 37 includes a ballcock 57, a water source container 50, and a filling water pump 54. The filling water pump 54 is also called a "filling pump" for short.

10 The ballcock 57 is attached to a vertical sidewall of the water source container 50. The ballcock 57 includes a gate 63, a float 67, and a rod 70. The rod 70 is connected to the float 67 and to the gate 63 while the gate 63 is connected to a water supply line 64. The filling water pump 54 includes a body and a water source outlet 60. The body is placed essentially inside the water source container 50. The water source outlet 60 is placed vertically above the filling container 40.

15 The filling container 40 comprises a water-filling outlet 43 and a water overflow outlet 47. The filling outlet 43 is attached to a lower part of a vertical sidewall of the filling container 40. The filling outlet 43 is connected to the pipe 20, which is connected to the multiple filling inlets 32 of the breeding containers 30. The overflow outlet 47 is attached to an upper part of a vertical sidewall of the filling container 40. An inlet of the overflow outlet 47 is positioned vertically above the water source container 50 at a predetermined water level height h , as shown in Fig. 3. An outlet of the overflow outlet 47 is positioned outside of the filling container 40 and is positioned above the water source container 50.

25 Referring to the purging unit 22, it includes a purging container 74 and a purging water pump 79, as seen in Fig. 2. The purging water pump 79 is essentially placed inside the purging container 74. The purging water pump 79 is also called a "purging pump" for short.

30 The purging container 74 includes a water purging inlet 77 and a manual hibernation tap 80. The purging inlet 77 is attached to a vertical sidewall of the purging container 74. The purging inlet 77 is connected to the pipe 24, which is connected to several purging outlets 34 of the breeding containers 30. The hibernation tap 80 is attached to a bottom part of vertical sidewall of the purging container 74. The hibernation tap 80 is also placed at a lowest area of the inside of the purging container 74.

35 The purging water pump 79 includes a centrifugal pump 82 and a pipe 83, as seen in Fig. 10. One end of the pipe 83 is connected to the centrifugal pump 82.

The centrifugal pump 82 comprises a water pump inlet 84 and several larvae cutting blades 85. The pipe 83 includes a water outlet 81 and a larvae-return outlet 86. The wa-

ter outlet 81 is placed outside of the purging container 74, as shown in Fig. 2. The water outlet 81 is also positioned above a drain, which is described later. The pipe larvae-return outlet 86 is placed vertically above the purging container 74, as shown in Fig. 2.

5 As seen in Fig. 2, the breeding containers 30 and the purging container 74 are placed below a larvae odor lid 27. The larvae odor lid 27 loosely covers the breeding containers 30 and the purging container 74. The larvae odor lid 27 includes a plurality of mosquito openings 28.

10 Fig. 4 shows a horizontal steel tube 35, which is placed below the breeding containers 30. The breeding containers 30 rest on the tube 35, wherein the tube 35 supports the breeding containers 30. The tube 35 encloses the water pipe 20, the water pipe 24, as well as a supporting metal rod 36. The tube 35 is filled with concrete 38, which surrounds the water pipe 20, the water pipe 24, and the metal rod 36. The tube 35 is
15 placed on a metal strip 39 and is welded to the metal strip 39. The metal strip 39 is supported by the ground.

The steel tube 35 has a lateral rectangular profile with four corners. A first corner of the steel tube 35 is welded to the metal strip 39. The metal rod 36 with the pipes 20 and 24
20 are placed next to a second corner of the rectangular profile, wherein the second corner is positioned opposite to the first corner.

The second corner has several openings 33, which is illustrated in Fig. 7. Shorts tubes are placed in the openings 33, as shown in Fig. 4. These short tubes are used for connecting the filling inlets 32 of the breeding containers 30 to the water pipe 20 and for
25 connecting the purging outlets 34 of the breeding containers 30 to the water pipe 24.

During construction of the steel tube 35, an angle grinder cuts out sections 31 from the steel tube 35 to form the openings 33, as shown in Fig. 7.

30 The metal rod 36 is placed inside the steel tube 35 is welded to the openings 33. This rod 36 acts to reinforce the tube 35.

The pipe 20 and the pipe 24 are then placed in the tube 35. Wires 41 are then placed in
35 the openings 33 of the tube 35 to tie the metal rod 36, the pipe 20, and the pipe 24 tightly together, as illustrated in Fig. 5.

After this, the openings 33 are covered and are closed using as a tape. Liquid concrete is later poured into the tube 35.

Fig. 8 shows parts of the control module 16 of the mosquito trap 10.

The control module 16 comprises a camera 100, a purging unit monitor interface 103, a filling unit interface 107, a breeding unit interface 108, a communication interface 109, and a local server 111.

The local server 111 is connected to the camera 100, to the purging unit interface 103, to the filling unit interface 107, to the breeding unit interface 108, and to the communication interface 109.

The camera 100 is pointing or is directed towards the breeding units 26, the purging unit 22, and the filling unit 19, as shown in Figs. 2 and 3.

The breeding unit interface 108 is connected to water level sensors 112, wherein each water level sensor 112 is placed in one breeding container 30, as shown in Figs. 2 and 8. A barrier 90 separates the water level sensor 112 from the coconut husk bait 46, as seen in Fig. 12, preventing them from interfering with each other.

The filling unit interface 107 is connected to an ammeter 113 and to a water level sensor 114, as shown in Figs. 3 and 8. The water level sensor 114 is placed inside the filling container 40. One end of the ammeter 113 is connected electrically to the filling water pump 54 while another end of the ammeter 113 is electrically connected to a power supply timer switch 119 with a time display 122. The power supply timer switch 119 is connected to an electrical power supply 115, which supplies 240 volts of alternating current.

Similarly, the purging unit interface 103 is connected to an ammeter 121 and to a water level sensor 116, as shown in Figs. 2 and 8. The water level sensor 116 is placed inside the purging container 74. One end of the ammeter 121 is connected electrically to the purging water pump 79 while another end of the ammeter 121 is electrically connected to a power supply timer switch 118 with a time display 123. The power supply timer switch 118 is connected to an electrical power supply 117, which supplies 240 volts of alternating current.

The communication interface 109 is connected communicatively to a Wireless Local Area Network (WLAN) router 110 in a wireless manner. The WLAN router 110 is connected communicatively to a computing cloud 120 in a wireless manner. The computing cloud 120 is connected communicatively to a mosquito management web server 125, to

a plurality of user computing terminals 127, and to a plurality of mobile computing devices 106, such as mobile phones with computing capabilities, in a wireless manner.

5 The control module 16 also includes a Global Positioning System (GPS) receiver 102, which is connected to a time display 104 and to the local server 111.

Referring to the power supply timer switch 119 or 118, each includes a power supply timer device with a time display.

10 Fig. 13 shows one embodiment of a power supply timer device 130 with a time display 131. The timer device 130 has two power sources, namely a main power source 132 and a backup power source 134. The timer device 130 also has a programmable clock 136 and a switch 138.

15 The programmable clock 136 and the local server 111 with its connected devices are completely independent from each other and are not interconnected.

The programmable clock 136 can comprise mechanical or electrical clockwork. Programmable clocks or time switches are available from the Omron company, for example
20 type H5S, which has a weekly cycle operation.

One terminal of the switch 138 is connected to the main power supply 132 while another terminal of the switch 138 is connected to a water pump 135. An activation port of the switch 138 is connected to the clock 136. The switch 138 can be implemented as a re-
25 lay.

The main power supply 132 is also connected to a step down transformer 137, which is connected to a power input of the clock 136. The backup power source 134 is also connected to the power input of the clock 136.

30

Referring to the water level sensor 112, 114, or 116, each includes a water level sensor device.

35 Figs. 14 and 15 depict a water level sensor device 140. The water level sensor device 140 includes an elongated floating body 142 with an electrical cable 148. One end of the electrical cable 148 is connected to one end of the floating body 142.

The floating body 142 includes a metal pin 152, an elongated cylindrical plug 155, a movable metal ball 158, a long pin weight 160, and a short plug float 162. The cylindrical plug 155 includes an inner elongated metal cylinder 164.

- 5 The metal ball 158 is placed inside the metal cylinder 164, wherein the metal ball 158 is electrically contacted with the metal cylinder 164 in a constant manner.

- 10 One end of the pin 152 is inserted into a first end of the cylindrical plug 155 such that the pin 152 and the cylindrical plug 155 are not in direct electrical contact. The pin 152 is also inserted into the pin weight 160 such that the pin 152 is connected to the pin weight 160. The pin 152 is also connected to the electrical cable 148.

A second end of the cylindrical plug 155 is inserted into the plug float 162 and it is also connected to the plug float 162.

- 15 The floating body 142 also includes a light emitting diode (LED) 149, which is positioned at an outer part of the second end of the cylindrical plug 155.

- 20 In a general sense, the breeding units 26 can be arranged in different ways. They can be arranged in a straight line or at corners of a rectangle.

In one implementation, the mosquito trap 10 has a length of about 4 meters. The breeding units 26 have a width of about 0.2 meters.

- 25 In use, the mosquito trap 10 is often located in a shelter to attract nearby gravid or pregnant female mosquitoes for depositing or laying their eggs. The mosquito trap 10 then damages or kills these eggs as well as larvae of these eggs.

- 30 The mosquito harvest module 13 serves to attract the gravid female mosquitoes. The control module 16 monitors parts of the mosquito harvest module 13.

- 35 The filling unit 19 is used for filling the breeding units 26 with water. The breeding units 26 act to attract nearby pregnant female mosquitoes to the water in the breeding units 26 in order for these female mosquitoes to lay their eggs in the water. The purging unit 22 serves to remove the water together with any eggs and larvae of the eggs from the breeding units 26, wherein the removal also damages and kills these eggs and larvae. In this manner, the mosquito trap 10 serves to reduce the mosquito population.

Referring to the filling unit 19, the ballcock 57 allows water from the water supply line 64 to fill the water source container 50 until a level or height of the water in the water source container 50 reaches a predetermined water level.

- 5 In particular, the float 67 acts to stay on a top surface of water in the water source container 50. The position of the float 67 acts to adjust an angle or inclination of the rod 70 with respect to a horizontal plane.

The angle of the rod 70 also serves to determine an operating state of the gate 63.

- 10 When the rod angle is below a predetermined value, the state of the gate 63 is open. The open gate 63 then allows the water supply line 64 to supply water to the water source container 50. Similarly, when the rod angle is above the predetermined value, the state of the gate 63 is closed. The closed gate 63 later stops the water supply line 64 from supplying water to the water source container 50.

- 15 Referring to the power supply timer switch 119, it serves to connect the electrical power supply 115 to the filling water pump 54 at predetermined periods and to disconnect the electrical power supply 115 from the filling water pump 54 at other times.

- 20 When the electrical power supply 115 is connected to the filling water pump 54, the electrical power supply 115 provides an electrical current to the filling water pump 54, thereby providing electrical energy from the electrical power supply 115 to the filling water pump 54.

- 25 The energized filling water pump 54 transfers water from the water source container 50 to the water source outlet 60 for filling the filling container 40 with water. Water from the filling container 40 then flows from the filling container 40 to the breeding containers 30 by gravitational forces.

- 30 The time display 122 shows a clock timing of the power supply timer switch 119, thereby allowing a user to check this easily. This is useful as the mosquito trap 10 is intended for deploying outdoors. The accuracy of the clock timing is important as this time is used to regulate the connection of the electrical power supply 115 to the filling water pump 54.

- 35 The ammeter 113 measures an electrical current of the electrical power supply 115.

In one embodiment, the ammeter 113 provides three state electrical current readings of the electrical power supply 115, namely an off-state reading, an on-state reading, and

an overload-state reading of the electrical power supply 115. These state readings allow for easy implement of the ammeter 113 and for reduction of electrical current measurement data for easier transmission of the data.

5 Referring to the filling container 40, the filling outlet 43 allows water to flow from inside of the filling container 40, to the filling outlet 43, and to the horizontal water pipe 20. The water then flows from the horizontal water pipe 20 to the filling inlets 32 and to the inside of the satellite breeding containers 30.

10 In effect, water flows from the filling container 40 to the breeding containers 30. This flow also causes a water level of the filling container 40 and water levels of the breeding containers 30 to the same.

15 The overflow outlet 47 prevents water in the filling container 40 from exceeding the predetermined water level height h . The overflow outlet 47 allows water in the filling container 40 to flow out of the filling container 40 such that the water level does not exceed the predetermined water level height h . In other words, even when a malfunction occurs in that the filling water pump 54 is activated longer than intended, the overflow outlet 47 prevents the breeding containers 30 from having excessive amount of water.

20 The overflow outlet 47 has an advantage in that it prevents overfilling of the filling container without use for electricity or complicated mechanism.

The water level sensor 114 measures the water level of the filling container 40.

25 Referring to the larvae odor lid 27, it allows larvae odor, which acts as a mosquito attractant, to spread from the purging container 74 to around the breeding containers 30. The mosquito openings 28 of the larvae odor lid 27 allow nearby mosquitoes to enter the inside of the breeding containers 30.

30

Referring to the breeding units 26, the breeding containers 30 attract nearby gravid female mosquitoes to breeding containers 30 for the female mosquitoes to lay their eggs in the breeding containers 30.

35

The fastening means 48 allows only a lower part of the coconut husk bait 46 to be submerged in water. The coconut husk bait 46 acts to attract nearby gravid female mosquitoes to the breeding containers 30. An upper part of the coconut husk bait 46, which is not covered by water, provides a place for mosquitoes to rest.

The gravid mosquitoes later lay their eggs in the water of the breeding containers 30. Larvae then hatch from these eggs. The mosquito larvae are mobile within confines of the water. Most mosquito larvae come to the water surface to breath. When the water is
5 disturbed, the larvae dive to the bottom of the water. Most larvae also dive to the bottom to feed.

The inclined bottom surface 44 of the breeding container 30 enables larvae and eggs, which are located near the bottom of the breeding container 30, to flow easier to the
10 purging outlet 34 during purging or removing of the breeding container 30 of water.

The water level sensor 112 measures a water level of the breeding container 30 while the barrier 90 prevents the coconut husk bait 46 from interfering with the water level
15 sensor 112, especially with movement of the water level sensor 112.

Referring to the purging unit 22, it acts to purge or remove water together with any eggs and larvae from the mosquito-breeding units 26.

Referring to the power supply timer switch 118, it connects the electrical power supply
20 117 to the purging water pump 79 at predetermined periods and to disconnect the electrical power supply 117 from the purging water pump 79 at other times.

When the electrical power supply 117 is connected to the purging water pump 79, the electrical power supply 117 provides an electrical current to the purging water pump 79,
25 thereby providing electrical energy from the electrical power supply 117 to the purging water pump 79.

The energized purging water pump 79 acts to transfer water from the purging container 74 to outside of the purging container 74. Water from the breeding containers 30 then
30 flows to the purging container 74 by gravitational forces.

The time display 123 shows a clock timing of the power supply timer switch 118. This enables a user to check the clock timing easily, which is useful as the mosquito trap 10 is intended for deploying outdoors. The accuracy of the clock timing is important as this
35 time is used to regulate the connection of the electrical power supply 117 to the purging water pump 79.

The ammeter 121 measures electrical current of the electrical power supply 117.

In a special embodiment, the ammeter 121 provides three electrical current state readings of the electrical power supply 117, namely an off-state reading, an on-state reading, and an overload-state reading. These readings allow for simple design and easy implementation of the ammeter 121.

5

Referring to the purging container 74, the purging inlet 77 allows water to flow from horizontal water pipe 24 to the inside of the purging container 74.

10

During removal of water from the purging container 74, water flows from inside of the breeding containers 30 to the purging outlets 34. The inclination of the bottom surfaces 44 of the breeding containers 30 advantageously urges any egg or larvae into the water 30 to flow towards the purging outlets 34. The water together with the egg or larvae then flows from the purging outlets 34 of the breeding containers 30 to the horizontal water pipe 24, to the purging inlet 77, and to the inside of the purging container 74.

15

In effect, water flows from the breeding containers 30 to the outside of the purging container 74. This also causes a water level of the purging container 74 as well as water levels of the breeding containers 30 to be essentially the same.

20

The energized centrifugal pump 82 serves to force water from the purging container 74 to the water pump inlet 84.

In detail, the rotating larvae cutting blades 85 act to force water into the purging container 74 together with any eggs and larvae flow to the water pump inlet 84.

25

The larvae cutting blades 85 then cut and damage these eggs and larvae. In other words, the larvae cutting blades 85 kill these eggs and larvae.

30

The cut larvae generate odor, which is allowed to spread from the purging container 74 to around the breeding containers 30. This odor is similar to the odor that occurs when the mosquito pupae skin splits before the mosquito emerges. The larvae odor acts a mosquito attractant to attract mosquitoes to the breeding containers 30.

35

The water with the eggs and larvae then flows from the water pump inlet 84 to the water outlet 81 and to the larvae-return outlet 86.

In particular, a portion of the water with its eggs and larvae in the purging container 74 flows to the water outlet 81, to the water outlet 81, and to the drain.

Another portion of the water with its eggs and larvae in the purging container 74 flows to the larvae-return outlet 86 and then flow back to the purging container 74.

5 This flow back allows the cut larvae are used to generate more larvae odor, which is allowed to spread from the purging container 74 to around the breeding containers 30.

10 In practice, the larvae cutting blades 85 may not cut and damage all eggs and may not cut and damage all larvae, which pass through the centrifugal pump 82, although this is often not the case. This flow back then also enables a portion the larvae to go back to the purging container 74, wherein they are cut again for completeness.

15 The hibernation tap 80 is intended for actuating manually by a user and it allows water to be drained essentially completely from the purging container 74 and from the breeding containers 30 for storage.

20 As can be seen above, the removal of water from the breeding containers 30 is done without use of valves. This is important as this allows the removal of water to work well even in dirty environments, which can easily clog the valves. Furthermore, the filling and the purging of the breeding containers 30 are done with just two pumps.

25 Furthermore, the mosquito trap is efficient, wherein only one water pump is required for filling of the breeding containers and only one pump is required for the purging of the said containers.

30 The water level sensor 116 acts to measure a water level of the purging container 74.

Referring to the power timer device 130, the main power supply 132 provides power to the clock 136. In particular, the main power supply 132 provides 240 volts of alternating current to the step-down transformer 137. The step-down transformer 137 provides a
30 step-down voltage of the main power supply 132, then converts an electrical current of the step-down voltage from alternating current (AC) to direct current (DC), and later provides this converted step-down voltage to the clock 136.

35 The backup power source 134 also provides electrical power to the clock 136.

The dual power sources 132 and 134 allow the clock 136 to function during power stoppage of the main power supply 132 stops, thereby increasing robustness of the power timer device 130.

The main power supply 132 also provides 240 volts of alternating current to a terminal of the switch 138

5 The clock 136 also acts to connect to activate the switch 138 at predetermined timings for connecting the main power supply 132 to the water pump 135. The clock 136 measures clock timing, which is shown on the time display 131 for easy checking by a user.

10 Referring to the water sensor device 140, it intended for measuring a water level of a container. Specifically, it provides a water level status of the container.

The pin weight 160 urges the pin 152 towards a bottom of the container while the plug float 162 urges the plug 155 to a surface of the water. The inclination of the sensor device 140 is dependent on a water level of the container.

15 When the water level is below a predetermined level, the sensor device 140 is inclined such that the pin 152 is higher than the plug 155. This inclination causes the ball 158 to roll away from the pin 152. This causes the metal ball 158 to be connected electrically with the metal cylinder 164 and be not electrically connected with the pin 152, as illustrated in Fig. 14.

20 When the water level is above the predetermined level, the sensor device 140 is inclined such that the pin 152 is lower than the plug 155. This then causes the metal ball 158 to roll towards the pin 152. This in turn causes the metal ball 158 to be electrically connected with the pin 152 and also be electrically connected with the metal cylinder 164, as illustrated in Fig. 15. In effect, the pin 152 is connected electrically with the metal cylinder 164, via the metal ball 158.

30 In effect, the inclination of the water sensor device 140 provides a low water level state reading or a high water level state reading of the container.

35 In practice, one terminal of an external electrical connectivity measurement device is connected to the pin 152 by the cable 148 while another terminal of the external electrical connectivity measurement device is connected to the metal cylinder 164 by the cable 148. The electrical connectivity measurement device is not shown in the figures.

The connectivity measurement device is used for sending a periodic high voltage pulse to the water sensor device 140, as illustrated in Fig. 16.

The LED 149 provides a blinking light to a user when the voltage pulse shows a connection between the pin 152 and the metal cylinder 164. In effect, the LED 149 provides a visual indication of the water level status of the container.

- 5 Referring to the control module 16, the camera 100 is used for taking pictures or images of the breeding units 26, the purging unit 22, and the filling unit 19. The camera 100 then transfers data of these images to the local server 111.

- 10 The breeding unit interface 108 receives water level measurements of the breeding containers 30 from the water level sensors 112. The breeding unit interface 108 transfers these water level measurements to the local server 111. The word measurement is also called "reading".

- 15 The filling unit interface 107 receives water level measurements of the filling container 40 from the water level sensor 114. The filling unit interface 107 later sends these water level measurements to the local server 111.

- 20 The filling unit interface 107 also receives electrical current measurements of the electrical power supply 115 from the ammeter 113. The filling unit interface 107 sends these electrical current measurements to the local server 111. The electrical current measurements provide an indication of an operational status of the electrical power supply 115.

- 25 Similarly, the purging unit interface 103 receives water level measurements of the purging container 74 from the water level sensor 116. The purging unit interface 103 afterward transmits these water level measurements to the local server 111.

- 30 The purging unit interface 103 also receives electrical current measurements of the electrical power supply 117 from the ammeter 121. The purging unit interface 103 later sends the electrical current measurements to the local server 111. The electrical current measurements provide an indication of an operational status of the electrical power supply 117.

- 35 The communication interface 109 allows transfer of data between the local server 111 and the mosquito management web server 125 via the WLAN router 110 and via the computing cloud 120. The computing cloud 120 refers to an infrastructure that allows transfer of data files over the Internet.

The local server 111 acts to process or treat data from the camera 100, the purging unit interface 103, the filling unit interface 107, the breeding unit interface 108, and the communication interface 109. The local server 111 checks the data against predetermined limits. The local server 111 also sends an alert message when the data falls outside predetermined limits.

In a special embodiment, the local server 111 is also equipped with a Web application for sending data of the mosquito trap 10 to a user via email.

The mosquito management web server 125 acts to process or treat data from the local server 111 and it also acts to store these data.

The user computing terminal 127 serves for displaying data from the mosquito management web server 125 to users and allow the users to provide data to the local server 111 for controlling the mosquito harvest module 13.

The mobile computing device 106 serves to exchange data with the local server 111 with the web server 125 via the computing cloud 120.

The GPS receiver 102 acts to receive positional data from satellites. The GPS receiver 102 uses these positional data to determine a geographical position of the mosquito trap 10. The local server 111 can later send the geographical position to a user for enabling the user to locate the mosquito trap 10 without difficulty.

These GPS receiver 102 also serves to receive time data from the satellites. The time display 104 then shows or displays this time data. A user can then afterward view the display unit and use the displayed time for manually synchronizing other time displays 122 and 123 of the mosquito trap 10 with the time display 104. The synchronized ensures the parts of the mosquito trap 10 operate properly.

In a general sense, different other ways of treating the data are possible.

The purging unit interface 103 can receive electrical current measurements of the electrical power supply 117 and it can also treat these measurements.

Similarly, the filling unit interface 107 can receive electrical current measurements of the electrical power supply 115 from the ammeter 113 and it can also treat these measurements.

The WLAN router 110 receives data from the local server 11 and it can also treat these data.

5 In effect, the local server 111 acts as a control processor for monitoring an electrical current of a filling water pump 54 as well as an electrical current of a purging pump 79. The control processor also monitors water levels of breeding containers 30, of a purging container 74, and of a filling container 40.

10 The local server 111 is able to detect any fault in the purging and the filling pumps 54 and 79 quickly. The local server 111 obtains electrical current readings of the pumps 54 and 79 and then compares patterns of the pump electrical current readings with predetermined patterns. Faults in the purging and the filling pumps 54 and 79 can cause the pump electrical current readings to deviate from the predetermined patterns. Any deviation from the predetermined patterns can trigger automatically an alert message
15 being sent to a supervisor for rectifying the deviation. This process is done electronically and hence is done quickly.

Similarly, the local server 111 is able to detect any abnormality of the water levels of the breeding containers 30, the filling container 40, and the purging container 74 quickly.
20 The local server 111 monitors the water level sensor readings of the breeding containers 30, the filling container 40, and the purging container 74. The local server 111 later compares the monitored sensor readings with predetermined patterns. Water flow choke, water pump failure, power supply failure, communication interruption, or sensor failure can cause the sensor readings to deviate from the predetermined patterns. Any
25 deviation from the predetermined patterns can trigger an alert message being sent to a supervisor for rectifying the deviation. This process is also done electronically and hence is done quickly.

In one embodiment, the time display 104, which is associated with the GPS receiver
30 102, is arranged or provided in the vicinity of the time display 122 and also in the vicinity of the time display 123 for easy synchronization. The time display 122 is associated with the power supply timer switch 119. The time display 123 is associated with the power supply timer switch 118.

35 In a further embodiment, each time display 104, 122, or 123 comprises a display button. The display button is used for activating the respective time display 104, 122, or 123 to show its time data for a period. A user can then view the time data and synchronize the time data of the time displays 104, 122, and 123.

The display button allows the user to activate the time display 104, 122, or 123 to show its time data as and when needed. At other times, the time display 104, 122, or 123 can cease showing its time data to conserve its energy.

- 5 In a general sense, the centrifugal pump 82 can be replaced by other means for cutting and damaging the mosquito eggs and larvae.

Fig. 9 shows a further control module 16a. The control module 16a includes parts of the control module 16.

10

The control module 16a includes wireless interfaces 103a, 107a, and 108a, which replaces the interfaces 103, 107, and 108 respectively.

15

The control module 16a also includes a wireless GPS receiver 102a, which replaces the GPS receiver 102.

20

Each of these wireless interfaces 103a, 107a, and 108a comprises a wireless transmitter for providing a unidirectional data connection from the respective sensor to the local server 111. The wireless transmitter also enables the local server 111 to be placed remotely away from the breeding containers 30.

25

In effect, the wireless transmitter provides a data link between sensors and the local server 111. The sensors include the ammeters 113 and 121 as well as the water level sensors 114 and 116.

30

The wireless GPS receiver 102a includes a pair of wireless transceivers. The wireless transceivers provide a bi-directional data connection between the local server 111 and the time display 104. The wireless transceivers also allow the local server 111 to be placed remotely away from the breeding containers 30.

35

The communication among the filling container 40, the purging container 74, and the breeding containers 30 allows for easy and reliable filling as well as easy and reliable purging of the breeding containers 30 with just two pumps.

In short, this embodiment shows wireless interfaces for providing a data link between the control module 16 and the central or local server 111. In particular, the embodiment also shows wireless interfaces for providing a data link between the sensors and the central or local server 111.

Fig. 17 shows a flow chart 270 of a method for operating the mosquito trap 10.

The flow chart 270 includes a filling step 271 and a purging step 272.

5 The filling step 271 acts to fill the satellite breeding containers 30 with water.

The filling step 271 includes a step of the filling unit power supply timer switch 119 connecting the electrical power supply 115 to the filling water pump 54. An electrical current then flows from the electrical power supply 115 to the filling water pump 54. This flow
10 energizes the filling water pump 54, thereby allowing the filling water pump 54 to fill the filling container 40 with water. Under gravitational force, the water in the filling container 40 then flows to the satellite breeding containers 30.

The filling unit power supply timer switch 119 then disconnects the electrical power supply 115 from the filling water pump 54 and the filling water pump 54 ceases from filling
15 the satellite breeding containers 30 with water.

The coconut husk bait 46 later attracts pregnant female mosquitoes to the satellite breeding containers 30, in a step 274.
20

The mosquitoes then lay their eggs in the water of the breeding containers, in a step 278.

The filling step 271 is followed by the purging step 272.
25

The purging step 272 includes a step of the purging unit power supply timer 118 connecting the electrical power supply 117 to the purging water pump 79. An electrical current then flows from the electrical power supply 117 to the purging water pump 79. This flow acts to energize the purging water pump 79.

30 The purging water pump 79 then removes water from the purging container 74, in a step 282. This is done for allowing, under gravitational force, water in the satellite breeding containers 30 with its eggs and larvae to flow to the purging container 74 and from there to a drain.

35 The inclined bottom surfaces 44 of the satellite breeding containers 30 urge or encourage any remaining eggs and larvae in the water at the bottom of the breeding containers 30 to move to the purging outlets 34 of the satellite breeding containers 30, in a step 284.

The water then flows from the satellite breeding containers 30 with its eggs and larvae, under gravitational force, to the purging container 74

- 5 The blades of the purging container 74 later cuts and kills the eggs and the larvae in the water of the purging container 74, in a step 285.

After this, a portion of the damaged eggs and larvae flows back or returns to the purging container 74 via the larvae-return outlet 86 of the purging water pump 79, in a step 289.

10

The odor of the damaged larvae afterward spreads from the purging container 74 to around the satellite breeding containers 30. The larvae odor at the satellite breeding containers 30 acts for attracting mosquitoes to the satellite breeding containers 30, in a step 292.

15

The purging unit power supply timer 118 later disconnects the electrical power supply 117 from the purging water pump 79. The purging water pump 79 then ceases to remove water from the satellite breeding containers 30.

- 20 Fig. 18 shows a flow chart 220 of a method of operating the filling cycle of the method of operating the mosquito trap 10 of Fig. 17.

The flow chart 220 includes an operation step and a service or maintenance step.

- 25 Referring to the operation step, it includes a step of the filling unit power supply timer switch 119 activating the filling water pump 54 to fill the filling container 40 with water. The water then flows from the filling container 40 to the satellite breeding containers 30.

- 30 The local server 111 then checks that the filling water pump 54 is energized or in other words, working properly. The local server 111 obtains an electrical current reading pattern from the ammeter 113 via the filling unit interface 107. The local server 111 later compares the obtained electrical current reading pattern with a predetermined electrical current pattern, in a step 230.

- 35 The local server 111 afterward checks that the filling container 40 is filled with water. The local server 111 performs this check by obtaining a water level reading pattern from the water level sensor 114 via the filling unit interface 107. The local server 111 then compares the obtained water level reading pattern with a predetermined water level pattern, in a step 235.

The local server 111 later checks that the satellite breeding containers 30 are filled with water. This is done by the local server 111 obtaining water level reading patterns from the water level sensors 112 via the breeding unit interface 108. The local server 111
5 then compares the obtained water level reading patterns with a predetermined water level pattern, in a step 240.

The local server 111 afterward sends a filling status report to the mosquito management web server 125 via the communication interface 109. The status report includes the
10 above comparison data. The local server 111 also sends images from the camera 100 to the mosquito management web server 125.

The mosquito management web server 125 later sends the report with the images, via Short Message Service (SMS) or email, to a user.
15

The service step is activated if any of the above comparisons indicate a deviation, in other words a malfunction or abnormality of the filling cycle.

Referring to the service step, it includes a step of the local server 111 sending an alert message to the mosquito management web server 125 via the communication interface 109, in a step 245. The mosquito management web server 125 then sends an alert
20 message to a user for alerting the user about the malfunction to request for a servicing or maintenance of the mosquito trap 10.

Fig. 19 shows a flow chart 225 of a method of operating the purging cycle of the method of operating the mosquito trap 10 of Fig. 17.
25

The step 225 includes an operation step and may include a service or maintenance step.
30

The operation step includes a step of the purging unit power supply timer switch 118 activating the purging water pump 79 to remove water. The water then flows from the breeding containers 30 to the purging container 74.

The local server 111 then checks that the purging water pump 79 is energized or is working properly. The local server 111 performs this check by obtaining an electrical current reading pattern from the ammeter 121 via the purging unit interface 103. The local server 111 later compares the obtained electrical current reading pattern with a predetermined electrical current pattern, in a step 250.
35

The local server 111 afterward checks that the purging container 74 is purged of water. The local server 111 performs this check by obtaining a water level reading pattern from the water level sensor 116 via the purging unit interface 103. The local server 111 then
5 compares the obtained water level reading with a predetermined water level pattern, in a step 255.

The local server 111 later checks whether the breeding containers 30 are purged of water. This is done by the local server 111 obtaining water level reading patterns from the
10 water level sensors 112 via the breeding unit interface 108. The local server 111 then compares the water level reading patterns with a predetermined water level pattern, in a step 260.

The local server 111 afterward sends a purging status report to the mosquito management web server 125 via the communication interface 109. The status report comprises the above comparison data. The local server 111 also sends images from the camera
15 100 to the mosquito management web server 125.

The mosquito management web server 125 later sends the report together with the images, via Short Message Service (SMS) or email, to a user.
20

The service step is activated if any of the above comparisons show a deviation, which indicates malfunction or abnormality of the purging cycle.

25 In the service step, the local server 111 sends an alert message to the mosquito management web server 125 via the communication interface 109, in a step 265. The mosquito management web server 125 then sends an alert message to a user for alerting the user about the malfunction.

30 In one implementation, the steps of operating the filling cycle and the steps of operating the purging cycle are performed once about every 6 hours, although other periods are also possible.

Different operating cycles of the method of operating the breeding containers 30 are
35 also possible.

Fig. 20 shows a first operating main cycle 165 of the method of operating the mosquito trap 10 of Fig. 17.

The operating main cycle 165 has a period of about 3 days. The first operating main cycle 165 includes a filling micro-cycle 166 and a purging micro-cycle 167.

5 The first operating main cycle 165 begins with a filling micro-cycle 166, which acts to fill the breeding containers 30 with water and it has a period of about 3 hours.

After this, a breeding period occurs, wherein the water in the breeding containers 30 is allowed to rest. In other words, water does not flow in or out of the said containers 30. This period allows mosquitoes to lay their eggs in the water. The breeding period has a
10 period of about 66 hours.

The purging micro-cycle 167 then occurs. The purging micro-cycle 167 acts to remove water from the mosquito-breeding containers 30 and it has a period of about 3 hours.

15 Fig. 21 shows steps of the filling micro cycle 166 of the operating main cycle 165 of Fig. 20.

The filling micro-cycle 166 comprises a step 168 of providing power or energy to the filling water pump 54 while the purging water pump 79 is not energized. The energized
20 filling water pump 54 afterward fills the breeding containers 30 with water while the purging water pump 79 is not working. This step 168 has a period of about 15 minutes. The breeding containers 30 are then filled with water.

A step 171 of not energizing both the filling water pump 54 and the purging water pump
25 79 is then performed. Both the filling water pump 54 and the purging water pump 79 cease from working. This step 171 has a period of about 2 hours and 45 minutes.

Fig. 22 shows steps of the purging micro-cycle 167 of the operating main cycle 165 of Fig. 20.

30 The purging micro-cycle 167 commences with a step 172 of not energizing the filling water pump 54 while energizing the purging water pump 79. The filling water pump 54 is then not working while the purging water pump 79 removes water from the breeding containers 30. This step has a period of about 15 minutes. The water is then removed
35 from the breeding containers 30.

After this, a step 173 of not energizing both the filling water pump 54 and the purging water pump 79 is done. Both the filling water pump 54 and the purging water pump 79 cease from functioning. This step has a period of about 2 hours and 45 minutes.

Fig. 23 shows an alternative of the operating main cycle 165 of Fig. 20. Fig. 23 shows a second operating main cycle 175 of the method of operating the mosquito trap 10 of Fig. 17. The second operating main cycle 175 includes a filling micro-cycle 177 and a purging micro-cycle 176.

Fig. 24 shows the filling micro-cycle 177 of the second operating main cycle 175.

The filling micro-cycle 177 begins with a step 179 of energizing the filling water pump 54 and energizing the purging water pump 79. The energized filling water pump 54 then fills the breeding containers 30 with water while the energized purging water pump 79 removes water from the breeding containers 30.

This step enables water to flow through the different parts of the mosquito trap 10. This has a benefit of dislodging any residue eggs and larvae in the mosquito trap 10. This step has a period of about 3 minutes.

After this, a step 181 of not energizing the purging water pump 79 is performed while energizing the filling water pump 54 is done. The filling water pump 54 afterward fills the breeding containers 30 with water while the purging water pump 79 is not working. This step 181 has a period of about 12 minutes. The breeding containers 30 are then filled with water.

Both the filling water pump 54 and the purging water pump 79 are not energized for a period of about 2 hours and 45 minutes, in a step 183.

Fig. 25 shows steps of the purging micro-cycle 176 of the second operating main cycle 175 of the method of operating the mosquito trap 10 of Fig. 17.

The purging micro-cycle 176 commences with a step 185 of not energizing the filling water pump 54 while energizing the purging water pump 79. The filling water pump 54 ceases from working while the purging water pump 79 removes water the breeding container 30. This step 185 has a period of about 6 minutes. The breeding containers 30 are then empty or almost empty at the end of this step 185.

After this, the filling water pump 54 and the purging water pump 79 are both energized in a step 187. The energized filling water pump 54 then fills the breeding containers 30 with additional water while the energized purging water pump 79 removes the water from the breeding containers 30.

Some larvae may have dived to the filling inlet 32 after the completion of the previous step 185. The additional water from the filling water pump 54 in this step 187 advantageously acts to push the water in the filling inlet 32 with any larvae to the breeding containers 30, where this water with the larvae can be purged from the breeding containers 30.

The purging water pump 79 may also not be able to remove all water from the purging outlet 34 and all water from the pipe 24 once the water level reaches a predetermined low level. Some water with larvae may remain in the purging outlet 34 and in the pipe 24 at the end of the previous step 185.

The step 187 advantageously acts to add more water to the breeding containers 30 in order to raise the water level above the predetermined low level. This allows the purging water pump 79 to remove the remaining water with any larvae in the purging outlet 34 and in the pipe 24 to the purging container 74 and from there to the drain.

A step 188 of not energizing the filling water pump 54 and energizing the purging water pump 79 is then performed. The filling water pump 54 stops working while the purging water pump 79 removes the water from the breeding containers 30. This step 185 has a period of about 7 minutes. The larvae in the water are then essentially removed from the breeding containers 30.

Both the filling water pump 54 and the purging water pump 79 then cease working for a period of about 2 hour and 45 minutes, in a step 189.

Fig. 26 shows an alternative of the operating main cycle 175 of Fig. 23. Fig. 26 show a third operating main cycle 200 of the method of operating the mosquito trap 10 of Fig. 17.

The main cycle 200 begins with a filling micro-cycle 201 that has a period of about 3 hours. The filling micro-cycle 201 includes steps of the filling micro-cycle 177 and is intended for filling the breeding containers 30 with water.

The filling micro-cycle 201 is following by a main cleaning cycle 202 for removing any mosquito eggs and larvae from the mosquito trap 10. The main cleaning cycle 202 includes three consecutive micro-cleaning cycles 206, 208, and 210. Each of the micro-cleaning cycles 206, 208, and 210 includes a filling micro-cycle, which is followed by a purging micro-cycle. The said filling micro-cycle includes steps of the filling micro-cycle

177 and it has a period of about 3 hours. The said purging micro-cycle includes steps of the purging micro-cycle 176 and it has a period of about 3 hours.

5 The cleaning cycle 202 is followed a breeding period 214. The water in the breeding containers 30 are then allowed to rest. In other words, the water in the breeding containers 30 is still and not moving. The breeding step 214 also enables chlorine in the water to be released. Larvae odor is also allowed to spread to around the breeding containers 30. These actions encourage the mosquitoes to lay their eggs in the breeding containers 30.

10 The water in breeding containers 30 are later removed, in a purging step 216, which has a period of about 3 hour.

15 Fig. 27 shows a frequency 300 of measurements of the main cycle 200 of Fig. 26. The frequency 300 is selected such that sensor readings and pump current readings measure and capture every change of state of the mosquito trap 10 and can even tolerate a small of inaccuracy of the measurement time.

20 The mosquito trap 10 also provides several operating modes, namely a diagnostic mode, a talking mode, and a supervisor mode with various levels of detail.

25 In the diagnostic mode, the local server 111 sends an SMS that comprises the sensor readings and the pump current readings with time stamp after each change of state of the mosquito trap 10.

In the talking mode, the local server 111 sends an SMS that comprises the sensor readings and the pump readings with time stamp after completion of each micro-cycle of the mosquito trap 10.

30 In the supervisor mode, the local server 111 sends an SMS that comprises the sensor readings and the pump current readings with time stamp after each completion of main cycle of the mosquito trap 10.

Fig. 28 shows a display 310 of the local server 111 of the mosquito trap 10 of Fig. 1.

35 The display 310 shows a serial number 312 of the mosquito trap 10, current time 314, a state 316 of the filling water pump 54 with a state 318 of the purging pump 79, as well as measured water levels 320 of the breeding containers 30, of the filling container 40, and of the purging container 74. The display 310 also shows a selected mode 322 of the mosquito trap 10.

Fig. 29 shows a report 330 of the local server 111 of the mosquito trap 10 of Fig. 1. The local server 111 sends the report 330 to a user. The local server 111 also sends the report 330 to the mosquito management web server 125, which stores the report 330.

Similarly, the current detector acts a three state sensor to provide an electrical current state reading of a water pump, namely an off state reading, an on state reading, and an overload state reading. These state readings enable the local server to detect changes of state of the water pump.

Fig. 30 shows a mosquito trap with a light source for disturbing larvae in a mosquito-breeding container.

Fig. 30 depicts a mosquito trap 10a that includes parts of the mosquito trap 10. The mosquito trap 10a also includes a plurality of Light Emitting Diode (LED) 335. Each LED 335 is placed in one breeding container 30.

Functionally, the LEDs 335 are activated to emit light rays in an "on and off" manner during purging of the breeding containers 30. In other words, the LEDs 335 blink during said purging.

The blinking of the LEDs 335 is intended for disturbing any larvae in water of the breeding containers 30. When disturbed, larvae usually intuitively dive or move quickly to the bottom of the breeding containers.

This LED blinking advantageous enables easy gathering and directing of the larvae to the purging outlet 34, and from there to the water pipe 24 and from there to the purging container 74.

Fig. 31 depicts a mosquito trap that has breeding containers with security light sensors.

Fig. 31 shows a mosquito trap 10' that includes parts of the mosquito trap 10 of Fig. 1. The mosquito trap 10' also includes a plurality of breeding container 30, wherein the breeding container 30 includes a light sensor 337 that is connected to a surveillance controller. The surveillance controller is not shown in Fig. 31.

In use, the breeding container 30 is covered such that the covering acts to block light rays from entering the inside of the breeding container 30. The inside of the breeding

container 30 is hence dark or has less light rays than the surrounding of the breeding container 30.

5 The light sensor 337 serves to measure light rays inside the breeding container 30 and sends the light ray measurement to the surveillance controller

10 The surveillance controller acts to detect unauthorized intrusion of the breeding container 30 based on the received light ray measurement. The surveillance controller then sends an alert message when the authorized intrusion is detected.

Fig. 32 shows a mosquito trap with a water pump that has a predetermined low water operating level.

15 Fig. 32 depicts a mosquito trap 10b that includes parts of the mosquito trap 10. The mosquito trap 10b also includes an improved purging water pump 79a. The purging water pump 79a comprises a water inlet 340.

20 The purging water pump 79a rests here on a lowered platform such that the water inlet 340 is placed below the purging inlet 77 by a length l . In short, the water inlet 340 is positioned below an inner tube of the water pipe 24.

25 In use, the purging water pump 79a serves to move in the purging container 74 to its water inlet 340, to the water outlet 81, to the outside of the purging container 74, and from there to the drain.

The water inlet 340 allows water in the purging container 74 to enter the purging water pump 79a.

30 The position of the water inlet 340 then advantageously enables water in the pipe 24 to flow to the purging container 74, then enables water in the purging outlet 34 to flow to the pipe 24, and then enables water in the breeding containers 30 to flow to the purging outlet 34.

35 The purging water pump 79a is unable to transfer water from the purging container 74 when the water level in the purging container 74 falls below a predetermined minimum operating water level. In this case, the predetermined low level is determined by the position of the water inlet 340.

The water inlet 340 is positioned below the purging inlet 77 and below the water pipe 24. In effect, the predetermined low level is placed below the purging inlet 77 and below the water pipe 24. This thereby allows the purging water pump 79a to remove all water from the water pipe 24 and all water from the purging outlet 34.

5

In a general sense, the purging water pump 79a is positioned such that its predetermined minimum operating water level is placed below the purging inlet 77 and below the water pipe 24.

10 Fig. 33 shows an embodiment of the mosquito management web server 125 of Fig. 8.

The web server 125 is connected communicatively to a plurality of mosquito traps 10.

15 The web server 125 includes a cloud computing system 345, which comprises a load balancer unit 350 and several computer servers 352. The load balancer unit 350 is connected communicatively to the computer servers 352.

In use, the load balancer unit 350 receives computing requests from users and from the local servers 111 of the mosquito traps 10.

20

The load-balancer unit 350 then determines a required number of instances of software applications.

25 After this, the load balancer unit 350 allocates computing tasks, in the form of instances of applications, to the computer servers 352. In other words, the load balancer unit 350 starts or stops instances on the computer servers 352. The allocation of computing tasks is done such that loads of the computer servers 352 are essentially balanced or even.

30 This structure advantageously enables the web server 125 to scale up or down for handling or responding to requests of the users and the local servers 111.

Fig. 34 depicts a mosquito-breeding container 30c of a mosquito trap 10c, which is a variant of the breeding container 30 of the mosquito trap 10. The breeding container 30c prevents any larvae in the breeding container 30 from reaching its water inlet.

35

The breeding container 30c includes a water inlet 32 with a cover 360. The water inlet 32 is positioned essentially in the horizontal plane.

The cover 360 includes a hollow cylinder 363 and a cap 365.

The cylinder 363 has a vertical axis. A lower end of the hollow cylinder 363 is attached to the water inlet 32 while an upper end of the cylinder 363 is inserted into the cap 365.

- 5 The cylinder 363 has a cross-section area that is smaller than a cross-sectional area of the water inlet 32.

- 10 Referring to the cap 365, it has a vertical cylindrical sidewall that includes a plurality of small openings or channels 370. The channels 370 have cross-section areas, which are smaller than the cross-sectional area of the cylinder 363. The channels 370 also extend in a radial direction of the cover 360.

- 15 During an activation of the filling water pump 54, water flows upward through the water inlet 32 into the breed container 30. In detail, water flows vertically from the water inlet 32 to the inside of the cylinder 363. The water then flows from the inside of the cylinder 363 to the channels 370 of the cap 365 and to the inside of the breeding container 30.

- 20 Because of the different areas of cross-sections, the flow rate of water through the water inlet 32 is slower than the flow rate of the water through the hollow cylinder 363. Similarly, the flow rate of water through the cylinder 363 is slower than the flow rate of water through the channels 370.

- 25 In use, the cover 360 allows water to flow from the water inlet 32 to the breeding container 30 while the cover 360 encloses the water inlet 32 in a manner that prevents any larvae in the breeding container 30 from reaching the water inlet 32.

- In particular, the cylinder 363 and the cap 365 enclose the water inlet 32 to prevent any larvae in the breeding container 30 from reaching the water inlet 32.

- 30 The cylinder 363 acts a vertical throughput channel for allowing water in the water inlet 32 to flow to the channels 370, and to the breeding container 30.

- The channels 370 act as radial throughput channels for allowing water inside the cylinder 363 to flow to the inside of the breeding container 30.

- 35 The sizes of the channels 370 are adapted such that the channels 370 hinder any larvae in the breeding container 30 from entering the inside of the cylinder 363.

Furthermore, during the activation of the filling water pump 54, the fast rate flow of the water through the channels 370 also acts to keep any larvae in the breeding container 30 from reaching the channels 370. In effect, the small cross-sections of the channels 370 act as a throughput cross-section for increasing speed of water through the
5 throughput cross-section in order to prevent any larvae in the breeding container 30 from swimming to the water inlet 32.

Fig. 35 shows a flow chart 410 of an intelligent method of operating the mosquito trap 10.

10 The flow chart 410 includes a self-identification process 420, a time synchronization process 430, a registration process 440 and a data compilation process 450.

15 The self-identification process 420 is performed during a setup or a powering up of the mosquito trap 10. This self-identification process 420 includes a step of the local server 111 sending a notification email to the mosquito management web server 125. The email contains a unique serial number, geographical positional data, a short description of its location, and sensor status of the mosquito trap 10. The email also contains a
20 name with a corresponding mobile phone number of a person responsible for the setup of the mosquito trap 10.

In effect, this self-identification process 420 enables a decentralized set-up of the mosquito traps 10. Each mosquito trap 10 can then be set-up and its configuration can be
25 reported back individually to the mosquito management web server 125.

Referring to the time synchronization process 430, it comprises a step of arranging the time display 104 in the vicinity of the time displays 122 and 123. After this, the GPS receiver 102 obtains time data from a satellite, wherein the time display 104 shows this
30 time data. A user then synchronized the time data of the time displays 122 and 123 with the displayed time data of the time display 104. The user afterward takes a photograph of the time display 104 together with the time displays 122 and 123. The photograph is then stored for future reference. The photograph provides quality control and increases security of the set-up of the mosquito trap 10.

35 The registration process 440 comprises a step of providing data of a person, who is responsible for service of the mosquito trap 10, to the local server 111. After this, the service person receives messages regarding status of the mosquito trap 10 via SMS (Short Message Service) from the local server 111 or from the mosquito management web

server 125. This person then acknowledges receipt of the SMS message by sending an acknowledgement SMS message to the respective local server 111 or the mosquito management web server 125. The person later reacts or responds appropriately to the received messages. In a general sense, the SMS can be replaced by an email or by other types of messages.

Regarding the data compilation process 450, it includes a step of the local server 111 receiving raw data from several sensors, namely the water level sensors 112, 114, and 116 and the ammeters 113 and 121.

The raw data comprises state measurements of the sensors. The state measurements act to reduce amount of data being transferred. In detail, the water level sensors 112, 114, and 116 send low or high water level state data to the local server 111 while the ammeters 113 and 121 send off, on, or overload current state data to the local server 111.

The local server 111 then compiles a report from the raw data of the several sensors for sending to the mosquito management web server 125. The compiled report provides an overall status of the mosquito trap 10 and not just a status of one part of the mosquito trap 10.

Furthermore, the compiled report comprises relevant sensor data that is extracted from the sensor raw data for reduced the amount of data being transferred. The relevant data includes sensor state data or time points of changes of sensor state data. The changes of sensor state data is illustrated in Fig. 36 that shows a state diagram 460 with arrows that mark changes of sensor state data of the method of operating the mosquito trap 10 of Fig. 35.

The compiled report with a reduced file size provides several advantages. The reduced file size allows for quicker transmission of data. A smaller bandwidth is thus needed to support the data transmission. The reduced file size also reduces data package collisions. The package collisions act to increase transmission time of the report.

The mosquito management web server 125 is intended for receiving data from a plurality of local servers, which numbered up to several hundred or thousands for a full implementation of the mosquito traps. The effect of type of data provided by each local server is thus magnified many times for the mosquito management web server 125.

The sensors include water level detectors and electrical current detectors.

The water level detector acts a two state sensor to provide a state reading of a water level, namely a high water level state reading and a low water level state reading. These state readings allow the local server to detect changes of state of the water level.

5

In short, the embodiment shows an intelligent control module, which evaluates, converts, and compiles data stream from sensors into data packets to reduce bandwidth and reduce collision of data packets.

10 Fig. 37 shows a drain 500, which is intended for collecting water from the mosquito trap 10, specifically water from the purging container 74 of Fig. 2.

The drain 500 comprises a round earth hole 502, a cover 504, and a vertical pipe 506. The earth hole 502 is filled with gravel 508, wherein soil or earth 510 surrounds the
15 gravel 508.

The cover 504 is placed on the top of the earth hole 502, wherein the cover 504 essentially covers the earth hole 502.

20 The pipe 506 is connected to the water outlet 81 of the mosquito trap 10 of Figs. 1 to 3 and it passes through the cover 504 such that one end of the pipe 506 is placed in the middle of the earth hole 502.

In use, the drain 500 receives purged water with any larvae and mosquito eggs from the
25 mosquito trap 10 and discharges the water into the earth 510 that surrounds the drain 500, without allowing the eggs or larvae to grow and develop into mosquitoes.

The pipe 506 receives water from the water outlet 81 and channels the water into the earth hole 502.

30

The gravel 508 has spaces for receiving water from the water outlet 81 without overflowing. Specifically, the gravel 508 is adapted such that the spaces are large enough to receive water from the water outlet 81, wherein the received water does not completely fill the earth hole 502.

35

The earth hole 502 allows water in the earth hole to seep into the ground.

The cover 504 prevents external water from flowing into the earth hole 502.

During purging, water with any eggs or larvae flows from the purging container of the mosquito trap 10 to the water outlet 81, which in turn flows into the drain 500. After this, the water in the earth hole 502 seeps away into the earth 510. This is done such that the drain 500 prevents any eggs in the water from hatching into mosquitoes.

5

Fig. 38 shows a placement of time displays of the mosquito trap 10 for easy time data adjustment of these time displays 104.

10

Fig. 38 shows a maintenance staff member 512 standing in front of a plurality of time displays of the mosquito trap 10.

15

The time displays includes a time display 104 with a plurality of buttons 104a for the local server 111, a time display 122 with a plurality of buttons 122a for the filling water pump 54, and a time display 123 with a plurality of buttons 123a for the purging pump 79 of the mosquito trap 10.

20

Functionally, the buttons 104a are used for changing dates and time information, which are displayed by the time display 104. Similarly, the buttons 122a are used for changing dates and time information, which are displayed by the time display 122. The buttons 123a are used for changing dates and time information, which are displayed by the time display 123.

25

The three time displays 104, 122, and 123 are placed together such that the maintenance staff member 512 can view or see these time displays 104, 122, and 123 at the same time to enable easy synchronization of dates and times of the time displays 104, 122, and 123. This feature is useful for the maintenance staff member 512, as it allows the adjustment of the said time and time of the time displays 104, 122, and 123 by himself without help from others.

30

The buttons 104a, 122a, and 123a provide an advantage in that they provide a robust means of altering the dates or times of operating times of purging and the filling pumps 54 and 70, which is not costly and is durable even in outdoor conditions that can be harsh.

35

Fig. 39 shows an embodiment the time display 123 for adjusting time data of the time display 123.

The time display 123 comprises of a display screen 520 and a plurality of buttons. The buttons comprise a display button 522, a first date adjustment button 524, a second

date adjustment button 526, a first time-adjustment button 528, and a second time-adjustment button 530.

In use, the display button 522 receives an actuation from a user, wherein the actuation causes an electrical signal to be sent to the display screen 520 for activating the display screen 520. The activated display screen 520 shows a row 536 of a table 534, as illustrated in Fig. 40. The row 536 includes a purging step number, a purging pump status data, a date data, and a time data.

Upon receiving another signal from the display button 522, the display screen 520 then shows another row 538 of the table 534. The row 538 is shown next to the row 536.

When a user actuates the date adjustment button 524 or 526, the respective actuated date adjustment button 524 or 526 then sends signals for changing a date data, which is shown by the display screen 520. Similarly, a user actuates the time-adjustment button 528 or 530, the associated time-adjustment button 528 or 530 then sends signals for changing a time data that is shown by the display screen 520.

The time displays 104 and 122 have parts that are similar to the parts of the time display 123. The description for time display 123 also applies to the time displays 104 and 122.

Figs. 41 to 45 show various processors for treating data from sensors, namely water level sensors and water pump ammeters.

Data from the sensors are transmitted to interfaces, to a local server, to a WLAN router, to a mosquito management web server.

Each processor treats or processes the data, in that the processor compares the data with pre-determined patterns. When a deviation of the data from a corresponding pre-determined pattern is detected, an alert message is sent to a mosquito trap maintenance staff.

Fig. 41 shows an embodiment of the mosquito trap 10 of Fig. 1, which includes a control module 16-1. The control module 16-1 comprises water level sensors 114-P and 116-P and ammeters 113-P0 and 121-P, wherein each of the water level sensors 114-P and 116-P and each of the ammeters 113-P and 121-P include a computing processor for treating data.

Fig. 42 shows an embodiment of the mosquito trap 10 of Fig. 1, which includes a control module 16-2. The control module 16-2 comprises interfaces 103-P and 107-P, wherein each of the interfaces 103-P and 107-P includes a computing processor for treating data.

5

Fig. 43 shows an embodiment of the mosquito trap 10 of Fig. 1, which includes a control module 16-3. The control module 16-3 comprises a local server 111-P, wherein the local server 111-P includes a computing processor for treating data.

10 Fig. 44 shows an embodiment of the mosquito trap 10 of Fig. 1, which includes a control module 16-4. The control module 16-4 comprises a Wireless Local Area Network (WLAN) router 110-P, wherein the WLAN router 110-P includes a computing processor for treating data.

15 Fig. 45 shows an embodiment of the mosquito trap 10 of Fig. 1, which includes a control module 16-5. The control module 16-5 comprises a mosquito management web server 125-P, wherein the web server 125-P includes a computing processor for treating data.

Fig. 46 depicts a plurality of mosquito traps with only one local server or controller.

20

Fig. 46 shows a mosquito trap cluster 540 that includes a local server 111-1 and several mosquito traps 10-1, 10-2, 10-3, 10-4, and 10-5, wherein the mosquito traps 10-1, 10-2, 10-3, 10-4, and 10-5 comprises various corresponding sensors 544-1, 544-2, 544-3, 544-4, and 544-5, which are connected communicatively to the local server 111-1 via a

25

wireless means. The local server 111-1 is also connected to the Internet 548.

The sensors 544-1, 544-2, 544-3, 544-4, and 544-5 include ammeters of water pumps, namely filling and purging pumps, of the respective mosquito traps 10-1, 10-2, 10-3, 10-4, and 10-5. The sensors 544-1, 544-2, 544-3, 544-4, and 544-5 also comprise water

30

level sensors of containers, namely breeding containers, purging containers, and filling containers, of the respective mosquito traps 10-1, 10-2, 10-3, 10-4, and 10-5.

In one implementation of the mosquito trap cluster 540, one local server is connected with 400 traps that have 3000 sensors. The traps are located within 1 kilometre (km)

35

radius of the local server.

In use, the sensors 544-1, 544-2, 544-3, 544-4, and 544-5 sent sensor readings to the local server 111-1 via the wireless means.

The local server 111-1 acts as a control processor with logic or instructions for pattern recognition. The instructions act to receive patterns of the sensor readings and to compare the received sensor reading patterns with corresponding predetermined patterns.

5 If the instructions detect a deviation of the received sensor reading patterns from the respective predetermined patterns, the logic transmits alert email, via the Internet 548, to a user, such as a maintenance team, regarding the deviation. The user then provides appropriate responses to the reported deviation.

10 It should be noted that the above embodiments go beyond equipping an existing mosquito trap with a remote surveillance system. The embodiments provides a design and a method of operating a mosquito trap with selected sensor types in such a way that allows not only trap failures are detected, but also sensor failures of an electronic surveillance system of the mosquito trap can reliably be detected.

15 Among others, this provides an advantage of eliminating potential dangers that might arise from sensors, which provide erroneous measurements, thereby feigning a faultless device.

20 As mentioned above, an automated mosquito trap can become a dangerous mosquito-breeding spot if it is not working properly. The embodiments avoid this by providing a set of features that are outlined below. The embodiments rely on the remote electronic measurement values for determining whether the mosquito trap is working properly or whether it needs maintenance.

25 The controller can either observe a deviation of the actual sensor reading patterns from the respective predetermined patterns or not observe said deviation.

30 When a deviation is observed, this observation can be valid in that the mosquito trap is not working properly. The observation can also be invalid in that the mosquito trap is actually working properly, wherein the invalid observation is caused by sensor malfunction. In either case, the situation is not critical since the maintenance team is alerted to check the mosquito trap and to take appropriate action, such as rectification of a fault of the mosquito trap.

35 When no deviation is observed, the observation can be valid, wherein the mosquito trap is working properly. This is the normal situation and is not critical. The observation can be invalid, wherein the mosquito trap is not working properly, which is highly unlikely.

This is because a faulty sensor would have to produce multiple readings that are consistent with the pre-determined schedule in order to appear working properly.

5 For example, as the water levels in all containers change at the same time and also change according to a predetermined schedules pattern, the predetermined schedule pattern is used to check the validity of the sensor readings. A distinct change occurs when the water level changes.

10 Manipulation by persons or animals cannot result in feigning a correct operation of the trap. This manipulation would need to occur at all sensors at the same time and according to the predetermined time schedule pattern of the specific automated mosquito trap in order for the feigning to be work.

15 Hence, the chances of the mosquito trap not working properly and no showing any deviation of the actual state pattern from the predetermined state pattern is highly unlikely.

Moreover, these scheduled changes of state of the sensors can also be kept secret. The scheduled changes can also be changed from time to time and be changed from trap to trap, so that no person would be able to predict what manipulation has to occur in order to sabotage the trap, thereby making it look like a working mosquito trap, although it is not.

25 In a special embodiment, the controller uses an email to transmit the sensor readings, via the Internet 548, to a service person for analysis of the readings.

This embodiment has an advantage in that only one Internet connection is needed to connect the multiple mosquito traps of this cluster to the Internet. In other words, one Subscriber Identity Module (SIM) card with a data line connection can be used to connect various parts of the cluster to the Internet 548.

30 Fig. 47 shows a mosquito trap cluster that comprises a main server with a plurality of mosquito traps and with a plurality of local servers or controllers.

Fig. 47 depicts another mosquito trap cluster 550 that includes a main server 552 with several mosquito traps 10-6, 10-7, 10-8, 10-9, and 10-10.

Each mosquito trap 10-6, 10-7, 10-8, 10-9, or 10-10 has a local server 554-6, 554-7, 554-8, 554-9, or 554-10 being equipped with logic or instructions for pattern recognition. Each local server 554-6, 554-7, 554-8, 554-9, or 554-10 is connected communicatively

to several sensors 556-6, 556-7, 556-8, 556-9, and 556-10 in a wireless way and is also connected communicatively to the main server 552.

5 The pattern recognition logic compares sensor-reading patterns with corresponding predetermined patterns. The logic then sends an alert message to a user when the comparison indicates a deviation of the sensor reading patterns from the associated predetermined patterns.

10 The embodiment has a benefit of relieving the main server 552 from the task of monitoring the multiple sensors 556-6, 556-7, 556-8, 556-9, 556-10, which can be large. The local server is tasked with monitoring its sensors while the main server 552 needs to only manage data from the local servers 554-6, 554-7, 554-8, 554-9, and 554-10.

15 In another embodiment, the mosquito trap cluster 550 provides a means to handle temporary transmission breakdown. The means allows a sender unit, such a local server, to transmit a message again to a receiver unit, such a main server, when the sender unit does not receive an acknowledgement of the message from the receiver unit.

20 Each local server 554-6, 554-7, 554-8, 554-9, or 554-10 is equipped with a memory unit for storing messages or data, which are intended for transmitting to the main server 552.

25 The messages are stored in the respective memory unit and are transmitted again to the main server 552 until the respective local server 554-6, 554-7, 554-8, 554-9, or 554-10 receives an acknowledgement of receipt of the transmission from the main server 552.

30 Fig. 48 shows a mosquito trap cluster 550a, which is a special embodiment of the mosquito trap cluster 550 of Fig. 47.

The mosquito trap cluster 550a includes local server 554-6, 554-7, 554-8, 554-9, and 554-10, wherein each local server 554-6, 554-7, 554-8, 554-9, and 554-10 is equipped with two communication modules, namely a first communication module and a second communication module.

35 The first communication module includes a Subscriber Identity Module (SIM) card that has a slower data communication speed and is more expensive to operate. The first communication module provides a communication channel is often available.

On the other hand, the second communication module includes a Wi-Fi Module that has a faster data communication speed and is cheaper to use. The second communication module provides a communication channel is not often available.

- 5 A method of operating the mosquito trap cluster 550a is provided below.

During set-up of the mosquito trap 10-6, 10-7, 10-8, 10-9, or 10-10, the main server 552 automatically connects and logs in the mosquito trap 10-6, 10-7, 10-8, 10-9, or 10-10 via the first communication module that uses a first communication channel 515, since
10 the first communication channel 515 is often available.

The main server 552 then sets up or configure the connected mosquito trap 10-6, 10-7, 10-8, 10-9, or 10-10.

- 15 After this, the configured mosquito trap 10-6, 10-7, 10-8, 10-9, or 10-10 performs a search for communication with the main server 552 via the second communication module using a second communication channel 516 in order to reduce cost.

This is done by the configured mosquito trap 10-6, 10-7, 10-8, 10-9, or 10-10, wherein
20 the configured mosquito trap 10-6, 10-7, 10-8, 10-9, or 10-10 searches and determines available second communication channels 516.

The mosquito trap 10-6, 10-7, 10-8, 10-9, or 10-10 later sends list of available second communication channels 516 via the first communication channel 515 to ask for a selec-
25 tion of the available second communication channels 516 and to request for corresponding password.

A user then selects one available second communication channels 516 and sends the selection with associated password back to the mosquito trap 10-6, 10-7, 10-8, 10-9, or
30 10-10.

The mosquito trap 10-6, 10-7, 10-8, 10-9, or 10-10 afterward connects communicatively to the main server 552 on the selected second communication channel 516, and sends a confirmation regarding the selection over both or one of the channels.

35 In the event that the mosquito trap 10-6, 10-7, 10-8, 10-9, or 10-10 is unable to communicate with the main server 552 via the second communication channel 516, the mosquito trap 10-6, 10-7, 10-8, 10-9, or 10-10 automatically switches to use the first

communication channel 515 for communicating with the main server 552. This is done for improving robustness of communication.

5 The mosquito trap 10-6, 10-7, 10-8, 10-9, or 10-10 also sends out an error message regarding the inability to communicate via the second communication channel 516 for service personnel to address this.

Fig. 49 shows a wireless ad hoc network 560.

10 The wireless ad hoc network 560 includes several mosquito traps 10-v, 10-w, 10-x, 10-y, and 10-z of which one mosquito trap 10-z that is designated as an end mosquito trap is connected to the Internet 566.

15 Each mosquito trap 10-v, 10-w, 10-x, 10-y, or 10-z includes a local controller 562-v, 562-w, 562-x, 562-y, or 562-z with a corresponding antenna 564-v, 564-w, 564-x, 564-y, or 564-z. Each mosquito trap 10-v, 10-w, 10-x, 10-y, or 10-z also has sensors, which are not shown in Fig. 49.

20 In use, the mosquito traps 10-v, 10-w, 10-x, 10-y, and 10-z have equal communication status. Specifically, each mosquito trap 10-v, 10-w, 10-x, 10-y, or 10-z is free to associate dynamically with any other mosquito trap 10-v, 10-w, 10-x, 10-y, or 10-z, which is positioned within its antenna operating range. The associated mosquito trap 10-v, 10-w, 10-x, 10-y, or 10-z is selected on the basis of network connectivity.

25 In particular, the sensors of the mosquito trap 10-v, 10-w, 10-x, 10-y, or 10-z send its readings to its corresponding local controller 562-v, 562-w, 562-x, 562-y, or 562-z. The local controller 562-v, 562-w, 562-x, 562-y, or 562-z then transmits the sensor readings to its associated antenna 564-v, 564-w, 564-x, 564-y, or 564-z.

30 The antenna 564-v, 564-w, 564-x, 564-y, or 564-z later sends the sensor readings to one associated antenna 564-v, 564-w, 564-x, 564-y, or 564-z for forwarding the sensor readings to the end mosquito trap 10-z.

35 The sensor readings may be forwarded to a few antennas 564-v, 564-w, 564-x, 564-y, and 564-z before the sensor readings reaches the end mosquito trap 10-z.

The local controller 562-z of the end mosquito trap 10-z then sends the received sensor readings to the Internet 566.

This network 560 has an advantage in that only one Internet connection is needed for transmitting data from all mosquito traps 10-v, 10-w, 10-x, 10-y, and 10-z to the Internet 566. This network 560 also provides a decentralised structure such that it does not need a dedicated main server. Any mosquito trap can also join or leave the network easily.

5

Fig. 50 depicts an improved lethal ovitrap with a container detector. Fig. 50 shows an improved ovitrap 600.

10

The ovitrap 600 includes a mosquito-breeding container 603 with mosquito bait 606 and a container detector 609. The container detector 609 includes a reed relay 613 and a magnet 615.

15

In use, the magnet 615 is attached to a bottom plate 617 of the breeding container 603 while the reed relay 613 is embedded in a concrete slab 611.

20

The reed relay 613 includes a pair of ferrous metal reeds 620 and 622, namely two thin ferrous metal strips, which are placed close to each other and not in contact with each other. The metal reeds 602 and 622 are also connected to a surveillance logic circuit 625.

25

The concrete slab 611 is fixed with screws 630 to a stationary platform or structure. The top surface of the concrete slab 611 is adapted for receiving the bottom plate 611 of the container 603. The top surface of the concrete slab 611 is also adapted such that, when the container bottom plate 617 is placed on the top surface of the concrete slab 611, the magnet 615 is positioned in the vicinity of the reed relay 613.

Functionally, the ovitrap 600 is used for determining the population of mosquitos in an area where the ovitrap 600 is located.

30

The breeding container 603 is used for receiving water.

The mosquito bait 606 is intended for placing in the water of the container 603 in order for attracting pregnant mosquitos to lay their eggs in the water.

35

The reed relay 613, which acts as a switch, has an open state and a closed state.

In the open state, the metal reeds 620 and 622 are placed away from each other and they are not in electrical contact with each other. In the closed state, the metal reeds

620 and 622 are placed next to each other and they are in electrical contact with each other.

When the reed relay 613 is placed in the vicinity of the magnet 615, the magnet 615 acts to attract the metal reeds 620 and 622 toward each other such that the reed relay 613 is placed in the closed state. Conversely, when the reed relay 613 is placed away from the magnet 615, the metal reeds 620 and 622 are not in contact with each other such that the reed relay 613 is placed in the open state.

The surveillance logic circuit 625 acts to determine the state of the reed relay 613, wherein the said state provides an indication of the position of the container 603 with respect to the position of the concrete slab 611.

In a general sense, the ovitrap 600 is a form of a mosquito trap.

Fig. 51 shows states of the reed relay 613, which are detected by the surveillance logic circuit 625. The detected states of the reed relay 613 are then compared with a pre-determined pattern.

A method of using the ovitrap 600 is described below.

The ovitrap 600 provides two modes, namely a mosquito egg-collecting mode and a mosquito egg-counting mode.

In the mosquito egg-collecting mode, a user places the container 603 on the concrete slab 611, which is placed in a desired area for mosquito population study.

The magnet 615 is then placed in the vicinity of the reed relay 613, wherein the magnet 615 attracts the metal reeds 620 and 622 toward each other such that the reed relay 613 is the closed state.

After this, the surveillance logic circuit 625 detects the closed state of the reed relay 613, which indicates that the container 603 is placed on the concrete slab 611 for collecting mosquito eggs.

The user then fills the container 603 with water 612. The mosquito bait 606 is later placed in the container 603 in order to attract pregnant mosquitos to the water 612 to lay eggs.

In the mosquito egg-counting mode, the user removes the container 603 from the concrete slab 611.

5 The magnet 615 is then placed away from the reed relay 613, wherein the metal reeds 620 and 622 are not attracted to each other and the reed relay 613 is in the open state.

The surveillance logic circuit 625 later detects the open state of the reed relay 613, which indicates that the container 603 is placed away from concrete slab 611.

10 The user then counts the total number of mosquito eggs or larvae in the container 603 in order to determine the mosquito population in the desired area of study.

Fig. 52 shows a predetermined state pattern of the reed relay 613.

15 The predetermined state pattern is used for comparing with an actual reed relay state pattern.

When the comparison detects a deviation of the actual reed relay state pattern from the predetermined state pattern is detected, an alert message is transmitted to a supervisor
20 or a maintenance team for responding to the deviation.

Fig. 53 shows a communication network 632 for the ovitrap 600 of Fig. 50.

25 The network 632 comprises a local server 633 being connected communicatively to a plurality of ovitraps 600 via a wireless interface 634 in a wireless manner and connected communicatively to a computing cloud 636 via a communication interface 635.

30 The computing cloud 636 is connected communicatively to an ovitrap management web server 637, to a plurality of user computing terminals 638, and to a plurality of mobile computing devices 639, such as mobile phones with computing capabilities, in a wireless manner.

The computing cloud 636 refers to an infrastructure that allows transfer of data files over the Internet.

35

In use, the wireless interface 634 provides a wireless data connection between the various ovitraps 600 and the local server 633.

The local server 633 acts to obtain state data patterns from the ovitraps 600 and to generate an alert email to users when a deviation of the state data patterns from the corresponding predetermined patterns is detected.

- 5 The communication interface 635 provides a wireless data connection between the local server 633 and the computing cloud 636.

The computing cloud 636 allows transfer of data files among the management web server 637, the communication interface 635, the computing terminals 638, and the mobile computing devices 639.

10

The management web server 637 acts to store and process or data from the local server 633.

- 15 The user computing terminals 638 and the mobile computing devices 639 serve for displaying data from the management web server 637 to users.

Fig. 54 depicts an improved lethal ovitrap with a solar container detector. Fig. 54 shows another improved ovitrap 600a, which is a variant of the ovitrap 600 of Fig. 50. Both ovitraps 600 and 600a have similar parts.

20

The ovitrap 600 includes a mosquito-breeding container 603 with mosquito bait 606 and a solar container detector. The detector includes a concrete slab 611 with a solar cell 640 that is placed on a top surface of the concrete slab 611. The solar cell 640 is connected to a surveillance logic circuit 625.

25

In use, when the ovitrap 600a is collected mosquito eggs, the container 603 is placed on the top surface of the concrete slab 611, this thereby covers or shields the solar cell 640 from ambient light rays.

30

When a user is counting the mosquito eggs in the ovitrap 600a, the container is placed away from the concrete slab 611, thereby exposing the solar cell 640 to ambient light rays.

- 35 The solar cell 640 has an active state and a passive state.

In the active state, the solar cell 640 receives light rays, wherein the solar cell 640 generates an electrical potential difference from the received light rays.

In the passive state, the solar cell 640 is blocked from receiving light rays. The solar cell 640 does not generate any electrical potential difference.

5 The surveillance logic circuit 625 acts to measure the potential difference of the solar cell 640. The measured potential difference provides an indication of the position of the container 603 with respect to the concrete slab 611.

10 Fig. 55 shows an improved lethal ovitrap with a water level detector. Fig. 55 depicts an ovitrap 650. The ovitrap 650 includes a container 653 that holds water 655 and a water level detector 658 that is placed in the container 653.

The water level detector 658 includes a reed relay 660 with a support structure 662 and a float structure 664 with a magnet 666.

15 A top part of the support structure 662 is attached to the reed relay 660 while a bottom part of the support structure 662 is attached to a base 670 of the container 653. Terminals of the reed relay 660 are attached to a computing processor 665 with a surveillance logic circuit.

20 The float structure 664 includes a tube element 673 and a float plate element 676 with a central opening 678. The tube element 673 is inserted in the central opening 678. A top part of the tube element 673 is attached to the reed relay 660 while a bottom part of the tube element 673 is attached to the base 670 of the container 653. The magnet 666 is attached to the plate element 676.

25 In use, the ovitrap 650 is intended for attracting pregnant mosquitoes to lay their eggs in the water 655.

The water level detector 658 serves to determine the water level of the container 653.

30 The support structure 662 acts to fix the reed relay 660 to a predetermined position with respect to the container 653.

The float structure 664 acts to keep the magnet 666 near to a surface of the water 655.

35 The arrangement of the tube element 673 and the float plate element 676 acts to move the magnetic 660 towards the reed relay 660 when the water level rises. The arrangement also acts to move the magnetic 660 away from the reed relay 660 when the water level falls.

The reed relay 660 acts as a switch with an open state and a closed state.

5 In the open state, metal reeds of the reed relay 660 are placed away from each other and they are not in electrical contact with each other. This state occurs when the container water level is above a pre-determined level, wherein the magnet is separated from the metal reeds by more than a pre-determined distance.

10 In the closed state, the metal reeds are placed next to each other and they are in electrical contact with each other. This state occurs when the container water level falls below the pre-determined level, wherein the magnet is separated from the metal reeds by less than the pre-determined distance.

15 The surveillance logic circuit of the processor 665 acts to determine the state of the reed relay 660, which provides an indication of the water level of the container 653.

The surveillance logic circuit also compares the water level data with a predetermined pattern and sending an alert message to a user when the status data deviates from the predetermined pattern.

20 In a general sense, this water level detector can also be placed in a mosquito trap.

Fig. 56 shows an improved lethal ovitrap 690 with a remote-controlled switch 700. The remote-controlled switch 700 is connected electrically to a power supply 702 and to the ovitrap 690. The remote-controlled switch 700 is also connected communicatively to a control unit 704.

30 In use, a user activates the control unit 704 to turn the switch 700 to either a closed position or an open position. In the closed position, the power supply 702 is connected to the ovitrap 690. In the open position, the power supply 702 is disconnected from the ovitrap 690. In effect, this allows the user to reset the ovitrap 690, say once a day, to ensure that it does not hang.

35 In a special embodiment, the control unit 704 includes a global Internet Protocol (IP) address. An Internet access device write or store data at the IP address for instructing the control unit 704 to change or to set the state of the switch 700. In this manner, the Internet access device controls the control unit 704.

Fig. 57 shows an improved lethal ovitrap 705 with an accelerator sensor 710 for protecting the mosquito trap 10 against manipulation or theft.

5 In use, the accelerator sensor 710 detects movement of the ovitrap 705. The detection acts an alert for sending to a user for taking appropriate actions.

Fig. 58 shows an improved lethal ovitrap 715 with a computer 720 that has a loud-speaker 722.

10 In use, the ovitrap 715 is intended for placing in a public area, such a park.

The computer 720 stores selected audio messages while the loudspeaker 722 is used for producing sounds of the audio messages.

15 The audio messages relate to the public area, such as fire alarm, audio message to leave the park when the park is closing, and animal sounds for creating or simulating a more authentic environment in public parks.

20 Fig. 59 shows an improved lethal ovitrap 725 with an irrigation system 730 that has a rain sensor 732. The irrigation system 730 is placed next to the ovitrap 725.

The irrigation system 730 is used for watering plants while the rain sensor 732 is used for controlling the irrigation system 730 for saving water. The irrigation system 730 is used only if there is no rain for a pre-determined period. The irrigation system 730 helps
25 to maintain plants that attract mosquito to the ovitrap 725 for increasing efficiency of the ovitrap 725.

Fig. 60 depicts an improved lethal ovitrap with a larvicide dispenser.

30 Fig. 60 shows an apparatus 735 that includes an improved lethal ovitrap 740, a larvicide dispenser 745, and a rain sensor 750. The larvicide dispenser 745 and the rain sensor 750 are connected to a surveillance controller 755. The rain sensor 750 is placed near the ovitrap 740 while the larvicide dispenser 745 is placed near an open standing water area, such as a pond.

35

In use, the rain sensor 750 is used for detecting the presence of rain.

The larvicide dispenser 745 is used for releasing larvicide, which an agent for killing mosquito larvae, into the standing water.

The surveillance controller 755 acts to activate the dispenser 745 for releasing larvicide into the standing water when rain has not been detected for a predetermined period.

- 5 This configuration has benefit in the dispenser 745 controls the birth of mosquitoes while the ovitrap 740 acts to prevent mosquito larvae growing into mosquitoes.

10 The embodiments can also be described with the following lists of features or elements being organized into an item list. The respective combinations of features, which are disclosed in the item list, are regarded as independent subject matter, respectively, that can also be combined with other features of the application.

(The following item shows a mosquito-attracting apparatus that includes a controller for monitoring a water level pattern of a mosquito-breeding container.)

15

(The water level pattern can comprise water levels and duration of these levels.)

1. An apparatus for attracting mosquitoes, the apparatus comprising
at least one mosquito-breeding container,
20 wherein the breeding container comprises a water level sensor,
wherein the apparatus further comprises a (computing) processor being provided
- for obtaining a water level measurement pattern from the water level sensor,
 - for comparing the water level measurement pattern with a predetermined breeding container water level pattern, and
 - 25 - for sending an alert message (to a user) when the breeding container water level measurement pattern deviates from the predetermined breeding container water level pattern (by a predetermined amount).

30

(The following item shows a network that includes a mosquito trap with a local controller for monitoring sensor measurement patterns.)

2. A network of mosquito traps comprising
35 a plurality of apparatus for attracting mosquitoes, and
a computer server being connected communicatively to the plurality of apparatus,
wherein
- the apparatus comprises

a sensor for providing a sensor measurement pattern of the apparatus and

a (computing) processor being connected to the sensor, the processor adapted for obtaining the sensor measurement pattern, for comparing the sensor measurement pattern with a predetermined pattern, and for sending a server alert message to the computer server when the sensor measurement pattern deviates from the predetermined pattern (by a predetermined amount), and

- the computer server is adapted for sending a user alert message to a user in accordance with the (received) server alert message.

(The sensor measurement pattern can relate to a water level, to an electrical current of a water pump, or to an electrical voltage of the water.)

(The following item shows a network that includes a computer server for monitoring sensor measurement patterns of a plurality of mosquito traps.)

3. A network of mosquito traps comprising

a plurality of apparatus for attracting mosquitoes, and

a computer server being connected communicatively to the plurality of apparatus wherein

- the apparatus comprises

a sensor for providing a measurement pattern of the apparatus and a (computing) processor is connected to the sensor, the processor is adapted for obtaining the sensor measurement pattern from the sensor and for sending the sensor measurement pattern to the computer server, and

- the computer server is adapted for comparing the sensor measurement pattern with a predetermined pattern and for sending a user alert message to a user when the sensor measurement pattern deviates from the predetermined pattern (by a predetermined amount).

4. The network according to item 2 or 3, wherein

the processor is further adapted for transmitting the sensor measurement pattern to an intermediate apparatus for transmitting to the computer server.

(The following item shows a mosquito attracting apparatus with a fail-safe means of communication.)

(The following item shows a mosquito attracting apparatus with a device that provides positional information of the apparatus.)

- 5 5. An apparatus for attracting mosquitoes, the apparatus comprising
 a mosquito-breeding container,
 a sensor for providing a sensor positional status pattern of the breeding
 container, and
 a (computing) processor being connected to the sensor, the processor is
10 adapted for receiving the sensor positional status pattern (from the sensor),
 comparing the sensor positional status pattern with a predetermined positional
 pattern, and sending an alert message (to a user) when the sensor positional sta-
 tus pattern deviates from the predetermined positional pattern.
- 15 6. The apparatus according to item 5,
 wherein the sensor comprises a magnetic and a reed relay, the reed relay is
 connected to the processor (and
 wherein the reed relay is placed in a pre-determined state when the mosquito-
 breeding container is provided at a corresponding pre-determined operating posi-
20 tion).
7. The apparatus according to item 5,
 wherein the sensor comprises a solar cell being connected to the processor (and
 the solar cell is blocked when the mosquito-breeding container is provided at a
25 pre-determined operating position).

(The following item shows a mosquito-attracting apparatus that includes a water pump with a water operating level that is provided below a purging tube.)

- 30 8. An apparatus for attracting mosquitoes, the apparatus comprising
 at least one mosquito-breeding container, the breeding container compris-
 ing a water outlet being provided at a bottom of the breeding container,
 a purging container with a purging pump, the purging pump being provid-
 ed for transferring water out of the purging container, and
35 a purging tube being connected to the purging container and to the at
 least one breeding container, wherein the breeding container water outlet is con-
 nected to the purging tube, the purging tube is provided for allowing water with
 any egg or larvae to flow, by gravitational force, from the breeding container to
 the purging tube, and to the purging container,

wherein

- the purging pump is provided with a predetermined low water operating level, which is positioned below the purging tube (for allowing the purging pump to transfer essentially all water out of the at least one breeding container).

(The following item shows a mosquito-attracting apparatus that includes a mosquito-breeding container with an inclined bottom surface for urging water with mosquito larvae or eggs towards a water outlet of the breeding container.)

9. An apparatus for attracting mosquitoes, the apparatus comprising
- at least one mosquito-breeding container, the breeding container comprising a water outlet being provided at a bottom of the breeding container,
 - a purging container with a purging pump, the purging pump being provided for transferring water out of the purging container, and
 - a purging tube being connected to the purging container and to the at least one breeding container, wherein the breeding container water outlet is connected to the purging tube, the purging tube is provided for allowing water with any egg or larvae to flow, by gravitational force, from the breeding container to the purging tube, and to the purging container,
- wherein
- the breeding container further comprises
- an inclined inner bottom surface (with respect to the horizontal plane), the inclined inner bottom surface is connected to the breeding container water outlet, and the inclined inner bottom surface is provided for urging water with any egg and larvae of mosquitoes in the breeding container towards the breeding container water outlet (during transferring of water from the at least one breeding container to the purging container).

(The following item shows a mosquito-attracting apparatus that includes a purging water pump with blades for purging water from a mosquito-breeding container and for cutting larvae in the water that is being purged by the purging pump.)

10. An apparatus for attracting mosquitoes, the apparatus comprising
- at least one mosquito-breeding container, the breeding container comprising a water outlet being provided at a bottom of the breeding container,
 - a purging container with a purging pump, the purging pump being provided for transferring water out of the purging container, and

a purging tube being connected to the purging container and to the at least one breeding container, wherein the breeding container water outlet is connected to the purging tube, the purging tube is provided for allowing water with any egg or larvae to flow, by gravitational force, from the breeding container to the purging tube, and to the purging container,

wherein the purging pump comprises

- at least one blade for cutting the eggs or larvae in the water being transferred out of the purging container and
- a water-return outlet for channeling at least a portion of the (cut) eggs or larvae in the water (, being transferred out of the purging container,) back to the purging container.

11. The apparatus according to item 10 further comprising a cover being provided over the at least one breeding container and over the purging container for channeling odor of the (cut) larvae from the purging container to around the breeding container.

(The following item shows a mosquito-attracting apparatus that includes a means to direct the larvae towards a water outlet of a mosquito-breeding container.)

12. An apparatus for attracting mosquitoes, the apparatus comprising at least one mosquito-breeding container, the breeding container comprising a water outlet being provided at a bottom of the breeding container, a purging container with a purging pump, the purging pump being provided for transferring water out of the purging container, and a purging tube being connected to the purging container and to the at least one breeding container, wherein the breeding container water outlet is connected to the purging tube, the purging tube is provided for allowing water with any egg or larvae to flow, by gravitational force, from the breeding container to the purging tube, and to the purging container, wherein the breeding container further comprises
- an operable (blinking) light source for disturbing any larvae in the breeding container (before and/or during purging of the breeding container) in order to direct the larvae toward the breeding container water outlet.

13. The apparatus according to one of items 8 to 12 further comprising

- a filling container with a filling pump, the filling pump being provided for transferring water to the filling container, and
- a filling tube being connected to the filling container and to a water inlet of the breeding container, wherein water flows, by gravitational force, from the filling container, to the filling tube, and to the at least one breeding container.

14. The apparatus according to one of items 8 to 13 further comprising a filling pump power supply timer switch being connected to the filling pump for activating the filling pump at a predetermined time.

15. The apparatus according to one of items 8 to 14 further comprising a purging pump power supply timer switch being connected to the purging pump for activating the purging pump at a predetermined time.

16. The apparatus according to one of items 8 to 15, wherein the breeding container comprises mosquito bait(, such as a coconut husk,) for attracting mosquitoes to the breeding container (for depositing their eggs).

17. The apparatus according to one of items 8 to 16 further comprising a hibernation valve being placed at a bottom part of the purging container for releasing water from the purging container during hibernation of the apparatus.

(The following item shows a mosquito-attracting apparatus that includes a lid for deterring or preventing any larvae in water of a mosquito-breeding container from entering a water inlet of the breeding container.)

18. An apparatus for attracting mosquitoes, the apparatus comprising at least one mosquito-breeding container with a water inlet, wherein the mosquito-breeding container further comprising a lid for covering the water inlet in a vertical direction in order to deter any larvae in water of the breeding container from entering the water inlet.

19. The apparatus according to item 18, wherein the lid comprises a (water flow) lid throughput cross-section, which is smaller than a (water flow) water inlet throughput cross-section of the water inlet (such that speed of water through the lid throughput cross-section is faster than speed of water through the water inlet throughput cross-section) in order to deter any larvae from entering the water inlet.

20. The apparatus according to item 18 or 19, wherein the lid comprises a plurality of throughput channels, wherein the throughput channel extends outward in a radial direction.

5

21. The apparatus according to one of items 18 to 20, wherein the lid comprises a plurality of a further throughput channel, wherein the further throughput channel extends downwardly in the vertical direction.

10 (The following item shows a mosquito-attracting apparatus that includes a controller, which comprises a computing processor for monitoring an electrical current pattern of a filling pump.)

15 (The above pattern can comprise electrical current levels and duration of these levels. In a general sense, instead of monitoring the electrical current pattern, the processor can also monitor an electrical voltage pattern of the filling pump.)

22. An apparatus for attracting mosquitoes, the apparatus comprising
 at least one mosquito-breeding container and
 20 a filling container with a filling pump,
 wherein the filling pump is provided for transferring water to the filling container, the filling container is provided for transferring water to the at least one mosquito-breeding container by gravitational force (during a filling cycle), and wherein the apparatus further comprises
 25 - an ammeter for measuring an electrical current of the filling pump and
 - a (computing) processor is provided
 - for obtaining an electrical current measurement pattern from the ammeter,
 - for comparing the electrical current measurement pattern with a
 30 predetermined filling pump electrical current pattern, and
 - for sending an alert message (to a user) when the electrical current measurement pattern deviates from the predetermined filling pump electrical current pattern (by a predetermined amount).

35 (The following item shows a mosquito-attracting apparatus that includes a controller for monitoring an electrical current pattern of a purging pump.)

23. An apparatus for attracting mosquitoes, the apparatus comprising
 at least one mosquito-breeding container and

a purging container with a purging pump,
wherein the purging pump is provided for transferring water out of the filling container, the purging container is provided for receiving water from the at least one breeding container by gravitational force (during a purging cycle),

5 wherein the apparatus further comprises

- an ammeter for measuring an electrical current of the purging pump,
- a (computing) processor is provided
 - for obtaining an electrical current measurement pattern from the ammeter,
 - 10 - for comparing the electrical current measurement pattern with a predetermined purging pump electrical current pattern, and
 - for sending an alert message (to a user) when the electrical current measurement pattern deviates from the predetermined purging pump electrical current pattern (by a predetermined amount).

15 (The following item shows a mosquito-attracting apparatus that includes a controller for monitoring a water level pattern of a filling container.)

(The water level pattern can comprise water levels and duration of these levels.)

- 20 24. An apparatus for attracting mosquitoes, the apparatus comprising
at least one mosquito-breeding container and
a filling container for providing water to the at least one mosquito-breeding container (during a filling cycle),
25 wherein the filling container comprises a water level sensor,
wherein the apparatus further comprises a (computing) processor being provided
- for obtaining a water level measurement pattern from the water level sensor,
 - for comparing the water level measurement pattern with a predetermined filling container water level pattern, and
 - 30 - for sending an alert message (to a user) when the water level measurement pattern deviates from the predetermined filling container water level pattern (by a predetermined amount).

35 (The following item shows a mosquito-attracting apparatus that includes a controller for monitoring a water level pattern of a purging container.)

25. An apparatus for attracting mosquitoes, the apparatus comprising
at least one mosquito-breeding container and

a purging container for receiving water from the at least one mosquito-breeding container (during a purging cycle),
wherein the purging container comprises a water level sensor,
wherein the apparatus further comprises a (computing) processor being provided

- 5 - for obtaining a water level measurement pattern from the water level sensor,
 - for comparing the water level measurement pattern with a predetermined purging container water level pattern, and
10 - for sending an alert message (to a user) when the water level measurement pattern deviates from the predetermined purging container water level pattern (by a predetermined amount).

(The following item shows a mosquito-attracting apparatus that includes pump time displays being provided in the vicinity of a local server time display for easier synchronization of clock data of pump time displays.)

- 15 26. An apparatus for attracting mosquitoes, the apparatus comprising
 at least one mosquito-breeding container,
 a filling container with a filling pump, the filling pump is provided for transferring water to the filling container (during a filling cycle), the filling container is
20 provided for transferring water to the at least one mosquito-breeding container by gravitational force,
 a filling pump power supply with a filling pump timer switch, the filling pump timer switch is provided for connecting the filling pump power supply to the
25 filling pump, the filling pump timer switch comprises a filling pump time display for displaying an operating timing of the filling pump timer switch,
 a purging container with a purging pump, the purging pump is provided for transferring water out of the purging container (during a purging cycle), the purging container is provided for receiving water from the at least one mosquito-
30 breeding container by gravitational force,
 a purging pump power supply with a purging pump timer switch, the purging pump timer switch is provided for connecting the purging pump power supply to the purging pump, the purging pump timer switch comprises a purging pump time display for displaying an operating timing of the purging pump timer switch,
35 and
 a (local computing) processor comprising a processor time display for displaying time information of the processor,

wherein the filling pump time display, the purging pump time display, and the processor time display are provided in the vicinity of each other to facilitate verification of timing of the filling pump and timing of the purging pump.

- 5 27. The apparatus according to item 26, wherein
the computer server receives timing information from a satellite.

(The following item shows a mosquito attracting apparatus with a means to detect a water level of the apparatus.)

10

28. An apparatus for attracting mosquitoes, the apparatus comprising
a mosquito-breeding container,
a water level detector that comprises
- a magnet with a float being provided in the mosquito-breeding container, wherein
the magnet and the float moves towards the reed relay when a water level of the mosquito-breeding container rises and wherein
the magnet and the float moves away from the reed relay when the water level of the mosquito-breeding container falls and
 - a reed relay being fixed to the mosquito-breeding container, wherein
the reed relay with the magnet provide a water level pattern of the mosquito-breeding container, and
a (computing) processor being connected to the reed relay,
- wherein the processor is adapted for receiving the water level pattern (from the reed relay), for comparing the water level pattern with a predetermined pattern, and for sending an alert message (to a user) when the water level pattern deviates from the predetermined pattern.

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(The following item shows a mosquito-attracting apparatus that includes a means to reset a mosquito attracting apparatus.)

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29. An apparatus for attracting mosquitoes, the apparatus comprising
a power supply with a switch and
a control unit, wherein the control unit comprises a port with an Internet Protocol (IP) address for changing state of the switch.

(The following item shows a mosquito-attracting apparatus that includes a device for detecting movement of a mosquito-breeding container.)

30. An apparatus for attracting mosquitoes, the apparatus comprising
a mosquito-breeding container and
an accelerator sensor being attached to the mosquito-breeding container,
5 wherein the accelerator sensor transmits a predetermined signal (to a controller)
when the accelerator sensor detects a movement of the breeding container.

(The following item shows a mosquito trap that includes an irrigation system for provid-
ing water to mosquito-attracting plants, which are placed in the vicinity of a mosquito
10 attracting apparatus.)

31. A mosquito trap comprising
an apparatus for attracting mosquitoes and
an irrigation system with a rain sensor,
15 wherein the rain sensor is provided for activating a pump to transfer water from
the irrigation system to water mosquito-attracting plants, which are provided in
the vicinity of the apparatus.

(The following item shows a mosquito trap that includes a loudspeaker for providing
20 messages or announcements to people near a mosquito trap apparatus.)

32. A mosquito trap comprising
an apparatus for attracting mosquitoes and
a loudspeaker being provided in the vicinity of the apparatus for providing
25 audio messages (to people nearby).

33. A network of mosquito traps comprising
a plurality of apparatus for attracting mosquitoes, and
a computer server being connected communicatively to the plurality of ap-
30 paratus,
wherein the apparatus comprises a communication module being adapted for
sending a message repeatedly to the computer server until the computer server
acknowledges receipt of the message.

(The following item shows a network that includes a mosquito attracting apparatus with
35 two different means of communication for improving robustness of communication.)

34. A network of mosquito traps comprising
a plurality of apparatus for attracting mosquitoes, and

a computer server being connected communicatively to the plurality of apparatus,
wherein the apparatus comprises a slow data communication channel and a fast data communication channel, wherein the slow data communication channel and the fast data communication channel are provided for exchanges messages with the computer server.

(The slow data communication channel is often more expensive to use and is available more often. The fast data communication channel is less expensive to use and is not often available.)

(The following item shows a way of urging water with any larvae or eggs out of a mosquito-breeding container of a mosquito trap.)

35. A method of operating a mosquito trap, the method comprising
transferring water from a filling container to a mosquito-breeding container, by gravitational force, for attracting mosquitoes to lay their eggs, and
transferring the water in the breeding container to a water outlet of the breeding container, wherein an inclined bottom surface of the breeding container urges the water with any eggs or larvae to the breeding container water outlet.

(The following item shows a way of attracting mosquitoes to a mosquito-breeding container of a mosquito trap.)

36. A method of operating a mosquito trap, the method comprising
transferring water with any larvae from a mosquito-breeding container to a purging container by gravitational force,
transferring the water with the larvae from the purging container to outside of the purging container by a purging pump, wherein at least one blade of the purging pump cut the larvae,
returning at least a portion of the water with the (cut) larvae to the purging container, and
spreading of an odor of the (cut) larvae from the purging container to around the mosquito-breeding container for attracting mosquitoes to the mosquito-breeding container.

(The following item shows a way of directing larvae inside a mosquito-breeding container out of the breeding container.)

37. A method of operating a mosquito trap, the method comprising
transferring water to a mosquito-breeding container,
providing blinking light rays to disturb any larvae in the breed-
ing container in order to direct the larvae towards a water outlet at the bottom of
the breeding container, and
transferring the water with the larvae (to the breeding container water out-
let and) out of the breeding container.

(The following item shows a way of monitoring an electrical parameter pattern of a filling
pump of a mosquito trap.)

38. A method of operating a mosquito trap, the method comprising
obtaining an electrical current measurement pattern of a filling pump by a
(computing) processor, wherein the filling pump is provided for transferring water
to a filling container and the filling container is provided such that water in the fill-
ing container flows to at least one mosquito-breeding container by gravitational
force,
comparing the filling pump electrical current measurement pattern with a
predetermined filling pump electrical current pattern by the processor, and
sending an alert message (to a user) by the processor, when a deviation
of the filling pump electrical current measurement pattern from the predetermined
filling pump electrical current pattern (by a predetermined amount) is detected by
the processor.

(The following item shows a way of monitoring an electrical parameter pattern of a purg-
ing pump of a mosquito trap.)

39. A method of operating a mosquito trap, the method comprising
obtaining an electrical current measurement pattern of a purging pump by
a (computing) processor, wherein the purging pump is provided for transferring
water out of a purging container and the purging container is provided such that
the purging container receives water from at least one mosquito-breeding con-
tainer by gravitational force, during purging of water from the breeding container,
comparing the purging pump electrical current measurement pattern with
a predetermined purging pump electrical current pattern by the processor, and
sending an alert message (to a user) when a deviation of the purging
pump electrical current measurement from the predetermined purging pump
electrical current pattern (by a predetermined amount) is detected by the proces-
sor.

(The following item shows a way of monitoring a water level pattern of a mosquito-breeding container of a mosquito trap.)

- 5 40. A method of operating a mosquito trap, the method comprising
 obtaining a water level measurement pattern of a mosquito-breeding con-
 tainer by a (computing) processor,
 comparing the breeding container water level measurement pattern with a
 predetermined breeding container water level pattern by the processor, and
10 sending an alert message (to a user) by the processor when a deviation of
 the breeding container water level measurement pattern from the predetermined
 breeding container water level pattern (by a predetermined amount) is detected
 by the processor.

15 (The following item shows a way of monitoring a water level pattern of a filling container
 of a mosquito trap.)

41. A method of operating a mosquito trap, the method comprising
 obtaining a water level measurement pattern of a filling container by a
20 (computing) processor, the filling container is provided for transferring water to at
 least one mosquito-breeding container by gravitational force,
 comparing the filling container water level measurement pattern with a
 predetermined filling container water level pattern by the processor, and
 sending an alert message (to a user) by the processor when a deviation of
25 the filling container water level measurement pattern from the predetermined fill-
 ing container water level pattern (by a predetermined amount) is detected by the
 processor.

 (The following item shows a way of monitoring a water level pattern of a purging con-
30 tainer of a mosquito trap.)

42. A method of operating a mosquito trap, the method comprising
 obtaining a water level measurement pattern of a purging container at a
 predetermined time by a (computing) processor, the purging container is provid-
35 ed for receiving water from at least one mosquito-breeding container by gravita-
 tional force,
 comparing the purging container water level measurement pattern with a
 predetermined purging container water level pattern by the processor, and

sending an alert message (to a user) by the processor when a deviation of the purging container water level measurement pattern from the predetermined purging container water level pattern (by a predetermined amount) is detected by the processor.

5

Although the above description contains much specificity, this should not be construed as limiting the scope of the embodiments but merely providing illustration of the foreseeable embodiments. The above stated advantages of the embodiments should not be construed especially as limiting the scope of the embodiments but merely to explain possible achievements if the described embodiments are put into practice. Thus, the scope of the embodiments should be determined by the claims and their equivalents, rather than by the examples given.

10

REFERENCE LIST

	10	mosquito trap
	10'	mosquito trap
	10a	mosquito trap
5	10b	mosquito trap
	10c	mosquito trap
	10-1	mosquito trap
	10-2	mosquito trap
	10-3	mosquito trap
10	10-4	mosquito trap
	10-5	mosquito trap
	10-6	mosquito trap
	10-7	mosquito trap
	10-8	mosquito trap
15	10-9	mosquito trap
	10-10	mosquito trap
	10-v	mosquito trap
	10-w	mosquito trap
	10-x	mosquito trap
20	10-y	mosquito trap
	10-z	mosquito trap
	13	mosquito harvest module
	16	control module
	16-1	control module
25	16-2	control module
	16-3	control module
	16-4	control module
	16-5	control module
	19	filling unit
30	20	water pipe
	22	purgings unit
	24	water pipe
	26	mosquito-breeding unit
	27	larvae odor lid
35	28	mosquito opening
	30	breeding container
	30c	breeding container
	31	cut-out section
	32	filling inlet

	33	opening
	34	purging outlet
	35	tube
	36	rod
5	37	water source
	38	concrete
	39	metal strip
	40	filling container
	41	wire
10	43	filling outlet
	44	inclined bottom surface
	45	water
	46	coconut husk bait
	47	overflow outlet
15	48	fastening means
	49	female mosquito
	51	eggs
	50	water source container
	54	filling water pump
20	57	ballcock
	60	water source outlet
	63	gate
	64	water supply line
	67	hollow float
25	70	rod
	74	purging container
	77	purging inlet
	79	purging water pump
	79a	purging water pump
30	80	tap
	81	outlet
	82	centrifugal pump
	83	pipe
	84	water pump inlet
35	85	larvae cutting blade
	86	larvae-return outlet
	90	barrier
	100	camera
	102	GPS receiver

	102	wireless GPS receiver
	103	purging unit interface
	103a	wireless purging unit interface
	103-P	purging unit interface
5	104	time display
	104a	plurality of buttons
	106	mobile computing device
	107	filling unit interface
	107a	wireless filling unit interface
10	107-P	filling unit interface
	108	breeding unit interface
	108a	wireless breeding unit interface
	109	communication interface
	110	WLAN router
15	110-P	WLAN router
	111	local server
	111-1	local server
	111-P	local server
	112	water level sensor
20	113	ammeter
	113-P	ammeter
	114	water level sensor
	114-P	water level sensor
	115	electrical power supply
25	116	water level sensor
	116-P	water level sensor
	117	electrical power supply
	118	power supply timer switch
	119	power supply timer switch
30	120	computing cloud
	121	ammeter
	121-P	ammeter
	122	time display
	122a	plurality of buttons
35	123	time display
	123a	plurality of buttons
	125	mosquito management web server
	125-P	mosquito management web server
	127	user computing terminal

	130	timer device
	131	time display
	132	main power source
	134	backup power source
5	135	water pump
	136	clock
	137	step down transformer
	138	switch
	140	water level sensor device
10	142	floating body
	148	electrical cable
	149	LED
	152	metal pin
	155	elongated cylindrical plug
15	158	movable metal ball
	160	pin weight
	162	plug float
	164	elongated metal cylinder
	165	operating main cycle
20	166	filling micro-cycle
	167	purgings micro-cycle
	168	step
	171	step
	172	step
25	173	step
	175	operating main cycle
	176	purgings micro-cycle
	177	filling micro-cycle
	179	step
30	181	step
	183	step
	185	step
	187	step
	188	step
35	189	step
	200	main cycle
	202	cleaning cycle
	204	operating cycle
	206	cleaning micro-cycle

	208	cleaning micro-cycle
	210	cleaning micro-cycle
	212	filling step
	214	breeding step
5	216	purging step
	220	flow chart
	225	flow chart
	235	step
	240	step
10	245	step
	250	step
	255	step
	260	step
	265	step
15	270	flow chart
	271	filling step
	272	purging step
	274	step
	282	step
20	284	step
	285	step
	289	step
	292	step
	300	frequency
25	310	local server display
	312	serial number
	314	time
	316	state
	318	state
30	320	measured water levels
	322	mode
	330	report
	335	LED
	337	light sensor
35	340	water inlet
	345	cloud computing system
	350	load balancer unit
	352	computer server
	360	cover

	363	cylinder
	365	cap
	370	channel
	410	flow chart
5	420	process
	430	process
	440	process
	450	process
	460	diagram
10	d	outlet height difference
	h	predetermined water level height
	l	length
	500	drain
	502	earth hole
15	504	cover
	506	pipe
	508	gravel
	510	earth
	512	maintenance staff member
20	515	communication channel
	516	communication channel
	520	display screen
	522	display button
	524	date adjustment button
25	526	date adjustment button
	528	time-adjustment button
	530	time-adjustment button
	534	table
	536	row
30	538	row
	540	mosquito trap cluster
	544-1	sensors
	544-2	sensors
	544-3	sensors
35	544-4	sensors
	544-5	sensors
	548	Internet
	550	mosquito trap cluster
	552	main server

	554-6	local controller
	554-7	local controller
	554-8	local controller
	554-9	local controller
5	554-10	local controller
	556-6	sensors
	556-7	sensors
	556-8	sensors
	556-9	sensors
10	556-10	sensors
	560	wireless ad hoc network
	562-v	local controller
	562-w	local controller
	562-x	local controller
15	562-y	local controller
	562-z	local controller
	564-v	antenna
	564-w	antenna
	564-x	antenna
20	564-y	antenna
	564-z	antenna
	566	Internet
	600	ovitrapping
	600a	ovitrapping
25	603	container
	606	mosquito bait
	609	container detector
	611	concrete slab
	613	reed relay
30	615	magnet
	617	bottom plate
	620	metal reed
	622	metal reed
	625	surveillance logic circuit
35	630	screw
	632	network 632
	633	local server 633
	634	wireless interface 634
	635	communication interface 635

	636	computing cloud 636
	637	ovitrapping management web server 637
	638	computing terminals 638
	639	mobile computing devices 639
5	640	solar cell
	650	ovitrapping
	653	container
	655	water
	658	water level detector
10	660	reed relay
	662	support structure
	664	float structure
	665	processor
	666	magnet
15	670	base
	673	tube element
	676	float plate element
	678	central opening
	690	ovitrapping
20	700	remote-controlled switch
	702	power supply
	704	control unit
	705	ovitrapping
	710	accelerator sensor
25	715	ovitrapping
	720	computer
	722	loudspeaker
	725	ovitrapping
	730	irrigation system
30	732	rain sensor
	735	apparatus
	740	ovitrapping
	745	dispenser
	750	rain sensor
35	755	controller

CLAIMS

1. An apparatus for attracting mosquitoes, the apparatus comprising
at least one mosquito-breeding container,
5 wherein the breeding container comprises a water level sensor,
wherein the apparatus further comprises a processor being provided
- for obtaining a water level measurement pattern from the water level sensor,
 - for comparing the water level measurement pattern with a predetermined breeding container water level pattern, and
 - for sending an alert message when the breeding container water level measurement pattern deviates from the predetermined breeding container water level pattern.
- 10
- 15 2. A network of mosquito traps comprising
a plurality of apparatus for attracting mosquitoes, and
a computer server being connected communicatively to the plurality of apparatus,
wherein
- the apparatus comprises
a sensor for providing a sensor measurement pattern of the apparatus and
a processor being connected to the sensor, the processor adapted for obtaining the sensor measurement pattern, for comparing the sensor measurement pattern with a predetermined pattern, and for sending a server alert message to the computer server when the sensor measurement pattern deviates from the predetermined pattern, and
 - the computer server is adapted for sending a user alert message to a user in accordance with the server alert message.
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- 30
3. A network of mosquito traps comprising
a plurality of apparatus for attracting mosquitoes, and
a computer server being connected communicatively to the plurality of apparatus
wherein
- the apparatus comprises
a sensor for providing a measurement pattern of the apparatus and
- 35

a processor is connected to the sensor, the processor is adapted for obtaining the sensor measurement pattern from the sensor and for sending the sensor measurement pattern to the computer server, and

- the computer server is adapted for comparing the sensor measurement pattern with a predetermined pattern and for sending a user alert message to a user when the sensor measurement pattern deviates from the predetermined pattern.

4. The network according to claim 3, wherein the processor is further adapted for transmitting the sensor measurement pattern to an intermediate apparatus for transmitting to the computer server.

5. An apparatus for attracting mosquitoes, the apparatus comprising a mosquito-breeding container, a sensor for providing a sensor positional status pattern of the breeding container, and a processor being connected to the sensor, the processor is adapted for receiving the sensor positional status pattern, comparing the sensor positional status pattern with a predetermined positional pattern, and sending an alert message when the sensor positional status pattern deviates from the predetermined positional pattern.

6. The apparatus according to claim 5, wherein the sensor comprises a magnetic and a reed relay, the reed relay is connected to the processor

7. The apparatus according to claim 5, wherein the sensor comprises a solar cell being connected to the processor.

8. An apparatus for attracting mosquitoes, the apparatus comprising at least one mosquito-breeding container, the breeding container comprising a water outlet being provided at a bottom of the breeding container, a purging container with a purging pump, the purging pump being provided for transferring water out of the purging container, and a purging tube being connected to the purging container and to the at least one breeding container, wherein the breeding container water outlet is connected to the purging tube, the purging tube is provided for allowing water with any egg or larvae to flow, by gravitational force, from the breeding container to the purging tube, and to the purging container,

wherein

- the purging pump is provided with a predetermined low water operating level, which is positioned below the purging tube.

5 9. The apparatus according to claim 8 further comprising

- a filling container with a filling pump, the filling pump being provided for transferring water to the filling container, and
- a filling tube being connected to the filling container and to a water inlet of the breeding container, wherein water flows, by gravitational force, from the filling container, to the filling tube, and to the at least one breeding container.

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10. The apparatus according to claim 8 further comprising a filling pump power supply timer switch being connected to the filling pump for activating the filling pump at a predetermined time.

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11. The apparatus according to claim 8 further comprising a purging pump power supply timer switch being connected to the purging pump for activating the purging pump at a predetermined time.

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12. The apparatus according to claim 8, wherein the breeding container comprises mosquito bait for attracting mosquitoes to the breeding container.

25 13. The apparatus according to claim 8 further comprising a hibernation valve being placed at a bottom part of the purging container for releasing water from the purging container during hibernation of the apparatus.

30 14. An apparatus for attracting mosquitoes, the apparatus comprising at least one mosquito-breeding container, the breeding container comprising a water outlet being provided at a bottom of the breeding container, a purging container with a purging pump, the purging pump being provided for transferring water out of the purging container, and a purging tube being connected to the purging container and to the at least one breeding container, wherein the breeding container water outlet is connected to the purging tube, the purging tube is provided for allowing water with any egg or larvae to flow, by gravitational force, from the breeding container to the purging tube, and to the purging container, wherein

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the breeding container further comprises

- an inclined inner bottom surface,
the inclined inner bottom surface is connected to the breeding container
water outlet, and the inclined inner bottom surface is provided for urging
water with any egg and larvae of mosquitoes in the breeding container to-
wards the breeding container water outlet.

15. The apparatus according to claim 14 further comprising

- a filling container with a filling pump, the filling pump being provided for
transferring water to the filling container, and
- a filling tube being connected to the filling container and to a water inlet of
the breeding container, wherein water flows, by gravitational force, from
the filling container, to the filling tube, and to the at least one breeding
container.

16. The apparatus according to claim 14 further comprising

a filling pump power supply timer switch being connected to the filling pump for
activating the filling pump at a predetermined time.

17. The apparatus according to claim 14 further comprising

a purging pump power supply timer switch being connected to the purging pump
for activating the purging pump at a predetermined time.

18. The apparatus according to claim 14, wherein

the breeding container comprises mosquito bait for attracting mosquitoes to the
breeding container.

19. The apparatus according to claim 14 further comprising

a hibernation valve being placed at a bottom part of the purging container for re-
leasing water from the purging container during hibernation of the apparatus.

20. An apparatus for attracting mosquitoes, the apparatus comprising

at least one mosquito-breeding container, the breeding container compris-
ing a water outlet being provided at a bottom of the breeding container,

a purging container with a purging pump, the purging pump being provid-
ed for transferring water out of the purging container, and

a purging tube being connected to the purging container and to the at
least one breeding container, wherein the breeding container water outlet is con-
nected to the purging tube, the purging tube is provided for allowing water with

any egg or larvae to flow, by gravitational force, from the breeding container to the purging tube, and to the purging container, wherein

the purging pump comprises

- 5 - at least one blade for cutting the eggs or larvae in the water being transferred out of the purging container and
- a water-return outlet for channeling at least a portion of the eggs or larvae in the water back to the purging container.

10 21. The apparatus according to claim 20 further comprising a cover being provided over the at least one breeding container and over the purging container for channeling odor of the larvae from the purging container to around the breeding container.

15 22. The apparatus according to claim 20 further comprising

- a filling container with a filling pump, the filling pump being provided for transferring water to the filling container, and
- a filling tube being connected to the filling container and to a water inlet of the breeding container, wherein water flows, by gravitational force, from

20 the filling container, to the filling tube, and to the at least one breeding container.

23. The apparatus according to claim 20 further comprising a filling pump power supply timer switch being connected to the filling pump for activating the filling pump at a predetermined time.

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24. The apparatus according to claim 20 further comprising a purging pump power supply timer switch being connected to the purging pump for activating the purging pump at a predetermined time.

30 25. The apparatus according to claim 20, wherein the breeding container comprises mosquito bait for attracting mosquitoes to the breeding container.

35 26. The apparatus according to claim 20 further comprising a hibernation valve being placed at a bottom part of the purging container for releasing water from the purging container during hibernation of the apparatus.

27. An apparatus for attracting mosquitoes, the apparatus comprising

at least one mosquito-breeding container, the breeding container comprising a water outlet being provided at a bottom of the breeding container,

a purging container with a purging pump, the purging pump being provided for transferring water out of the purging container, and

5 a purging tube being connected to the purging container and to the at least one breeding container, wherein the breeding container water outlet is connected to the purging tube, the purging tube is provided for allowing water with any egg or larvae to flow, by gravitational force, from the breeding container to the purging tube, and to the purging container,

10 wherein

the breeding container further comprises

- an operable light source for disturbing any larvae in the breeding container in order to direct the larvae toward the breeding container water outlet.

15 28. The apparatus according to claim 27 further comprising

- a filling container with a filling pump, the filling pump being provided for transferring water to the filling container, and
- a filling tube being connected to the filling container and to a water inlet of the breeding container, wherein water flows, by gravitational force, from the filling container, to the filling tube, and to the at least one breeding container.

20

29. The apparatus according to claim 27 further comprising

a filling pump power supply timer switch being connected to the filling pump for activating the filling pump at a predetermined time.

25

30. The apparatus according to claim 27 further comprising

a purging pump power supply timer switch being connected to the purging pump for activating the purging pump at a predetermined time.

30

31. The apparatus according to claim 27, wherein

the breeding container comprises mosquito bait for attracting mosquitoes to the breeding container.

35 32. The apparatus according to claim 27 further comprising

a hibernation valve being placed at a bottom part of the purging container for releasing water from the purging container during hibernation of the apparatus.

33. An apparatus for attracting mosquitoes, the apparatus comprising
at least one mosquito-breeding container with a water inlet, wherein
the mosquito-breeding container further comprising a lid for covering the water
inlet in a vertical direction in order to deter any larvae in water of the breeding
container from entering the water inlet.
34. The apparatus according to claim 33, wherein
the lid comprises a lid throughput cross-section, which is smaller than a water in-
let throughput cross-section of the water inlet in order to deter any larvae from
entering the water inlet.
35. The apparatus according to claim 33, wherein
the lid comprises a plurality of throughput channels, wherein the throughput
channel extends outward in a radical direction.
36. The apparatus according to claim 33, wherein
the lid comprises a plurality of a further throughput channel, wherein the further
throughput channel extends downwardly in the vertical direction.
37. An apparatus for attracting mosquitoes, the apparatus comprising
at least one mosquito-breeding container and
a filling container with a filling pump,
wherein the filling pump is provided for transferring water to the filling container,
the filling container is provided for transferring water to the at least one mosquito-
breeding container by gravitational force, and
wherein the apparatus further comprises
- an ammeter for measuring an electrical current of the filling pump and
 - a processor is provided
 - for obtaining an electrical current measurement pattern from the
ammeter,
 - for comparing the electrical current measurement pattern with a
predetermined filling pump electrical current pattern, and
 - for sending an alert message when the electrical current measure-
ment pattern deviates from the predetermined filling pump electrical
current pattern.
38. An apparatus for attracting mosquitoes, the apparatus comprising
at least one mosquito-breeding container and
a purging container with a purging pump,

wherein the purging pump is provided for transferring water out of the filling container, the purging container is provided for receiving water from the at least one breeding container by gravitational force,

wherein the apparatus further comprises

- 5 - an ammeter for measuring an electrical current of the purging pump,
- a processor is provided
 - for obtaining an electrical current measurement pattern from the ammeter,
 - for comparing the electrical current measurement pattern with a
 - 10 predetermined purging pump electrical current pattern, and
 - for sending an alert message when the electrical current measurement pattern deviates from the predetermined purging pump electrical current pattern.

- 15 39. An apparatus for attracting mosquitoes, the apparatus comprising
 at least one mosquito-breeding container and
 a filling container for providing water to the at least one mosquito-breeding container,
 wherein the filling container comprises a water level sensor,
 wherein the apparatus further comprises a processor being provided
- 20 - for obtaining a water level measurement pattern from the water level sensor,
 - for comparing the water level measurement pattern with a predetermined filling container water level pattern, and
 - 25 - for sending an alert message when the water level measurement pattern deviates from the predetermined filling container water level pattern.

40. An apparatus for attracting mosquitoes, the apparatus comprising
- 30 at least one mosquito-breeding container and
 a purging container for receiving water from the at least one mosquito-breeding container,
 wherein the purging container comprises a water level sensor,
 wherein the apparatus further comprises a processor being provided
 - 35 - for obtaining a water level measurement pattern from the water level sensor,
 - for comparing the water level measurement pattern with a predetermined purging container water level pattern, and

- for sending an alert message when the water level measurement pattern deviates from the predetermined purging container water level pattern.

5 41. An apparatus for attracting mosquitoes, the apparatus comprising
at least one mosquito-breeding container,
a filling container with a filling pump, the filling pump is provided for trans-
ferring water to the filling container, the filling container is provided for transfer-
ring water to the at least one mosquito-breeding container by gravitational force,
10 a filling pump power supply with a filling pump timer switch, the filling
pump timer switch is provided for connecting the filling pump power supply to the
filling pump, the filling pump timer switch comprises a filling pump time display for
displaying an operating timing of the filling pump timer switch,
a purging container with a purging pump, the purging pump is provided for
15 transferring water out of the purging container, the purging container is provided
for receiving water from the at least one mosquito-breeding container by gravita-
tional force,
a purging pump power supply with a purging pump timer switch, the purg-
ing pump timer switch is provided for connecting the purging pump power supply
20 to the purging pump, the purging pump timer switch comprises a purging pump
time display for displaying an operating timing of the purging pump timer switch,
and
a processor comprising a processor time display for displaying time infor-
mation of the processor,
25 wherein the filling pump time display, the purging pump time display, and the
processor time display are provided in the vicinity of each other to facilitate veri-
fication of timing of the filling pump and timing of the purging pump.

30 42. The apparatus according to claim 41, wherein
the computer server receives timing information from a satellite.

43. An apparatus for attracting mosquitoes, the apparatus comprising
a mosquito-breeding container,
a water level detector that comprises
35 - a magnet with a float being provided in the mosquito-breeding con-
tainer, wherein
the magnet and the float moves towards the reed relay when a wa-
ter level of the mosquito-breeding container rises and wherein

- the magnet and the float moves away from the reed relay when the water level of the mosquito-breeding container falls and
- a reed relay being fixed to the mosquito-breeding container, wherein
- 5 the reed relay with the magnet provide a water level pattern of the mosquito-breeding container, and
- a processor being connected to the reed relay,
- wherein the processor is adapted for receiving the water level pattern, for comparing the water level pattern with a predetermined pattern, and for sending an
- 10 alert message when the water level pattern deviates from the predetermined pattern.
44. An apparatus for attracting mosquitoes, the apparatus comprising
- a power supply with a switch and
- 15 a control unit, wherein the control unit comprises a port with an Internet Protocol (IP) address for changing state of the switch.
45. An apparatus for attracting mosquitoes, the apparatus comprising
- a mosquito-breeding container and
- 20 an accelerator sensor being attached to the mosquito-breeding container, wherein the accelerator sensor transmits a predetermined signal when the accelerator sensor detects a movement of the breeding container.
46. A mosquito trap comprising
- 25 an apparatus for attracting mosquitoes and
- an irrigation system with a rain sensor,
- wherein the rain sensor is provided for activating a pump to transfer water from the irrigation system to water mosquito-attracting plants, which are provided in the vicinity of the apparatus.
- 30
47. A mosquito trap comprising
- an apparatus for attracting mosquitoes and
- a loudspeaker being provided in the vicinity of the apparatus for providing audio messages.
- 35
48. A network of mosquito traps comprising
- a plurality of apparatus for attracting mosquitoes, and
- a computer server being connected communicatively to the plurality of apparatus,

wherein the apparatus comprises a communication module being adapted for sending a message repeatedly to the computer server until the computer server acknowledges receipt of the message.

- 5 49. A network of mosquito traps comprising
 a plurality of apparatus for attracting mosquitoes, and
 a computer server being connected communicatively to the plurality of ap-
 paratus,

10 wherein the apparatus comprises a slow data communication channel and a fast
data communication channel, wherein the slow data communication channel and
the fast data communication channel are provided for exchanges messages with
the computer server.

- 15 50. A method of operating a mosquito trap, the method comprising
transferring water from a filling container to a mosquito-breeding contain-
er, by gravitational force, for attracting mosquitoes to lay their eggs, and
transferring the water in the breeding container to a water outlet of the
breeding container, wherein an inclined bottom surface of the breeding container
urges the water with any eggs or larvae to the breeding container water outlet.

- 20 51. A method of operating a mosquito trap, the method comprising
transferring water with any larvae from a mosquito-breeding container to a
purging container by gravitational force,
transferring the water with the larvae from the purging container to outside
25 of the purging container by a purging pump, wherein at least one blade of the
purging pump cut the larvae,
returning at least a portion of the water with the larvae to the purging con-
tainer, and
spreading of an odor of the larvae from the purging container to around
30 the mosquito-breeding container for attracting mosquitoes to the mosquito-
breeding container.

52. A method of operating a mosquito trap, the method comprising
transferring water to a mosquito-breeding container,
35 providing blinking light rays to disturb any larvae in the water of the breed-
ing container in order to direct the larvae towards a water outlet at the bottom of
the breeding container, and
transferring the water with the larvae out of the breeding container.

53. A method of operating a mosquito trap, the method comprising
obtaining an electrical current measurement pattern of a filling pump by a
processor, wherein the filling pump is provided for transferring water to a filling
container and the filling container is provided such that water in the filling con-
5 tainer flows to at least one mosquito-breeding container by gravitational force,
comparing the filling pump electrical current measurement pattern with a
predetermined filling pump electrical current pattern by the processor, and
sending an alert message by the processor, when a deviation of the filling
pump electrical current measurement pattern from the predetermined filling pump
10 electrical current pattern is detected by the processor.
54. A method of operating a mosquito trap, the method comprising
obtaining an electrical current measurement pattern of a purging pump by
a processor, wherein the purging pump is provided for transferring water out of a
15 purging container and the purging container is provided such that the purging
container receives water from at least one mosquito-breeding container by gravi-
tational force, during purging of water from the breeding container,
comparing the purging pump electrical current measurement pattern with
a predetermined purging pump electrical current pattern by the processor, and
20 sending an alert message when a deviation of the purging pump electrical
current measurement from the predetermined purging pump electrical current
pattern is detected by the processor.
55. A method of operating a mosquito trap, the method comprising
25 obtaining a water level measurement pattern of a mosquito-breeding con-
tainer by a processor,
comparing the breeding container water level measurement pattern with a
predetermined breeding container water level pattern by the processor, and
sending an alert message by the processor when a deviation of the breed-
30 ing container water level measurement pattern from the predetermined breeding
container water level pattern is detected by the processor.
56. A method of operating a mosquito trap, the method comprising
obtaining a water level measurement pattern of a filling container by a
35 processor, the filling container is provided for transferring water to at least one
mosquito-breeding container by gravitational force,
comparing the filling container water level measurement pattern with a
predetermined filling container water level pattern by the processor, and

sending an alert message by the processor when a deviation of the filling container water level measurement pattern from the predetermined filling container water level pattern is detected by the processor.

- 5 57. A method of operating a mosquito trap, the method comprising
 obtaining a water level measurement pattern of a purging container at a
 predetermined time by a processor, the purging container is provided for receiv-
 ing water from at least one mosquito-breeding container by gravitational force,
 comparing the purging container water level measurement pattern with a
10 predetermined purging container water level pattern by the processor, and
 sending an alert message by the processor when a deviation of the purg-
 ing container water level measurement pattern from the predetermined purging
 container water level pattern is detected by the processor.