Claims

1. A mosquito sorter for segregating mosquitoes, the sorter comprising:

at least one separator unit, the separator unit comprises:

an input channel having a wall forming the input channel, a first end and a second end, wherein the wall having at least one air vent with a plurality of openings to allow air flow into the input channel when a negative pressure is created within the mosquito sorter;

a first release channel extending from the second end of the input channel;

a second release channel extending from the second end of the input channel; wherein the input channel, the first release channel and the second release channel are configured to form a three-way pathway;

at least one separation valve coupled to the three-way pathway;

a detector coupled proximate to the first end of the input channel for detecting one or more characteristics of mosquito passing by the detector; and

at least one trap door valve arranged within the input channel and positioned before the detector or between the detector and the second end of the input channel, proximate the detector;

wherein the at least one trap door valve is operable between an open position and a closed position for directing mosquito through the input channel towards the at least one separation valve; and

wherein the at least one separation valve is configured to operate between an open position and a closed position to permit and restrict passageway between the input channel and the first release channel or between the input channel and the second release channel for sorting mosquito according to the characteristics of the mosquito; and

a first release container removably attached to the first release channel for receiving mosquitoes of a first type; and

a second release container removably attached to the second release channel for receiving mosquitoes of a second type, wherein the second release container comprises:

an inlet in air communication with the second release channel;

a gate pivotally mounted to the inlet, wherein the gate is operable between a closed positioned to seal the second release container and an open position to provide a passageway for air flow and mosquitoes into the second release container; and

an air flow control valve operative to controllably release air from within the mosquito sorter to create negative pressure within the mosquito sorter to direct mosquito into the second release container.

2. The mosquito sorter according to claim 1, wherein the separator unit comprises two trap door valves arranged in a space-apart manner between the detector and the second end of the input channel, wherein the two trap door valves are being configured to operate between a closed position and an open position independently or in combination for releasing one mosquito at a time.

3. The mosquito sorter according to claim 2, wherein the space between the two valves defines an isolation chamber for isolating one mosquito within the isolation chamber.

4. The mosquito sorter according to claim 1, wherein the separator unit comprises one separation valve, the separation valve comprises a plate pivotally coupled to a junction of the three-way pathway, wherein the plate is configured to pivotally operate between a first position wherein the plate is inclined at an angle relative to the vertical axis of the plate to provide a passageway between the input channel and the first release channel, and a second position wherein the plate is inclined at an angle relative to the vertical axis of the plate to provide a passageway between the input channel and the second release channel.

5. The mosquito sorter according to claim 1, wherein the separator unit comprises one separation valve, the separation valve comprises a plate pivotally coupled to a point joining the first release channel and the second release channel, wherein the plate is configured to pivotally operate between a first position wherein the plate restricts a passageway between the input channel and the second release channel to provide a passageway between the input channel and the first release channel, and a second position wherein the plate restricts the passageway between the input channel and the first release channel to provide the passageway between the input channel and the second release channel.

6. The mosquito sorter according to claim 1, wherein the separator unit comprises at least two separation valves, each of the separation valves comprises a plate pivotally coupled to the first release channel and the second release channel, wherein each plate is operable between an open position and a closed position to permit and restrict passageway between the input channel and the first release channel, and between the input channel and the second release channel.

7. The mosquito sorter according to claim 4, wherein the first release channel and the second release channel are arranged substantially perpendicular to the input channel.

8. The mosquito sorter according to claim 5 or 6, wherein the first release channel and the second release channel are arranged in a substantially L-shaped configuration with the first release channel being arranged in the same axis as the input channel.

9. The mosquito sorter according to claim 1, wherein the plurality of openings of the air vent having a size of less than 2 mm.

10. The mosquito sorter according to claim 9, wherein the air vent comprises an air permeable vent material providing the plurality of openings for the air vent.

11. The mosquito sorter according to claim 1, wherein the air vent comprises an air permeable vent material having perforations of a size of less than 2mm spanning the plurality of openings.

12. The mosquito sorter according to claim 1, wherein the separator unit further comprises:

a vibration device positioned at outer wall of the input channel for providing periodical vibrations to the input channel.

13. The mosquito sorter according to claim 1, wherein the separator unit further comprises:

a mosquito counter positioned on outer wall of the first release channel, proximate the separation valve.

14. The mosquito sorter according to claim 1, wherein the separator unit further comprises:

a gate actuation unit positioned on outer wall of the first release channel, proximate a distal end of the first release channel.

15. The mosquito sorter according to claim 1, 7 or 8, wherein the first end of the input channel extends outwardly to form a funnel shape.

16. The mosquito sorter according to claim 1, wherein the detector is an opto-bio signature detector for capturing images of mosquito passing by the detector.

17. The mosquito sorter according to claim 1, wherein the detector is an audio sensor for detection of audio frequencies of mosquito passing by the detector.

18. The mosquito sorter according to claim 1, wherein the input channel has an internal diameter narrow enough for one mosquito to pass through.

19. The mosquito sorter according to anyone of the preceding claims, further comprising:

a container for receiving water containing pupae and/or a plurality of mosquitoes, wherein the container is removably attached to the first end of the input channel.

20. The mosquito sorter according to claim 19, wherein the container comprises at least one inlet for receiving air or water from outside the container.

21. The mosquito sorter according to claim 19, wherein the container further comprises an inlet fan positioned at one of the inlets for directing air into the container to encourage movements of mosquitoes towards the first end of the input channel.

22. The mosquito sorter according to claim 21, wherein the container further comprises a filter disposed at the inlet where the inlet fan is positioned, for preventing escape of mosquito from within the container.

23. The mosquito sorter according to claim 1, 19 or 22, wherein the first release container comprises a release inlet arranged on one side of the first release container, wherein the release inlet comprises a hinged hatch operable between an open position for allowing mosquitoes to travel into the first release container and a closed position for sealing the first release container.

24. The mosquito sorter according to claim 23, wherein the first release container comprises a release barrier configured to operate between an open position and a closed position.

25. The mosquito sorter according to claim 23, wherein the first release container is removably attached to the first release channel via the release inlet.

26. The mosquito sorter according to claim 1, 19, 22 or 24, wherein the first release container further comprises an aperture in air communication with the first release channel and a gate pivotally mounted to the aperture, wherein the gate is operable between a closed position to seal the first release container and an open

position to provide a passageway for air flow and mosquitoes into the first release container.

27. The mosquito sorter according to claim 1, wherein the second release container comprises an exterminator arranged within the second release container.

28. The mosquito sorter according to claim 1, wherein the second release container comprises a plurality of inlets.

29. The mosquito sorter according to claim 28, wherein the mosquito sorter further comprises a second separator unit in air communication with a second first release container and the container, wherein the second separator unit is removably attached to one of the plurality of inlets of the second release channel.

30. The mosquito sorter according to anyone of the preceding claims, wherein the mosquito sorter is made of transparent material.

31. The mosquito sorter according to anyone of the preceding claims, wherein the sorter is configured for sorting mosquitoes based on gender.

32. An apparatus for segregating mosquitoes, the apparatus comprising:

a plurality of separator units, each of the plurality of separator units comprises:

an input channel having a wall forming the input channel, a first end and a second end, wherein the wall having at least one air vent with a plurality of openings to allow air flow into the input channel when a negative pressure is created within the apparatus;

a first release channel extending from the second end of the input channel;

a second release channel extending from the second end of the input channel; wherein the input channel, the first release channel and the second release channel are configured to form a three-way pathway;

at least one separation valve coupled to the three-way pathway;

a detector coupled proximate to the first end of the input channel for detecting one or more characteristics of mosquito passing by the detector; and

at least one trap door valve arranged within the input channel and positioned before the detector or between the detector and the second end of the input channel, proximate the detector;

wherein the at least one trap door valve is operable between an open position and a closed position for directing mosquito through the input channel towards the at least one separation valve; and

wherein the at least one separation valve is configured to operate between an open position and a closed position to permit and restrict passageway between the input channel and the first release channel or between the input channel and the second release channel for sorting mosquito according to the characteristics of the mosquito;

a container removably attached to the plurality of separator units via the first end of the input channel of each of the plurality of the separator units for receiving water containing pupae and/or a plurality of mosquitoes;

a plurality of first release containers, each of the plurality of first release containers removably attached to the first release channel of each of the plurality of separator units for receiving mosquitoes of a first type; and

a second release container having a plurality of inlets in air communication with the second release channel of each of the plurality of separator units for receiving mosquitoes of a second type from each of the separator units, wherein the second release container further comprises:

a plurality of gates, each of the gates is pivotally mounted to a respective inlet of the second release channel, wherein each of the gates is operable between a closed positioned to seal the respective inlet and an open position to provide a passageway for air flow and mosquitoes into the second release container from the respective separator unit; and

an air flow control valve operative to controllably release air from within the apparatus to create negative pressure within the apparatus to direct mosquito into the second release container.

33. A method of sorting mosquitoes, the method comprising:

providing a mosquito sorter comprising:

a separator unit, the separator unit comprises:

an input channel having a wall forming the input channel, a first end and a second end, wherein the wall having at least one air vent with a plurality of openings to allow air flow into the input channel when a negative pressure is created within the mosquito sorter;

a first release channel extending from the second end of the input channel;

a second release channel extending from the second end of the input channel; wherein the input channel, the first release channel and the second release channel are configured to form a three-way pathway,

at least one separation valve coupled to the three-way pathway;

a detector coupled proximate to the first end of the input channel for detecting one or more characteristics of mosquito passing by the detector; and

at least one trap door valve arranged within the input channel and positioned before the detector or between the detector and the second end of the input channel, proximate the detector;

wherein the at least one trap door valve is operable between an open position and a closed position for directing mosquito through the input channel towards the at least one separation valve; and

wherein the at least one separation valve is configured to operate between an open position and a closed position to permit and restrict passageway between the input channel and the first release channel or between the input channel and the second release channel for sorting mosquito according to the characteristics of the mosquito;

a first release container removably attached to the first release channel for receiving mosquitoes of a first type; and

a second release container removably attached to the second release channel for receiving mosquitoes of a second type, wherein the second release container comprises:

an inlet in air communication with the second release channel;

a gate pivotally mounted to the inlet, wherein the gate is operable between a closed positioned to seal the second release container and an open position to provide a passageway for air flow and mosquitoes into the second release container; and

an air flow control valve operative to controllably release air from within the mosquito sorter to create negative pressure within the mosquito sorter to direct mosquito into the second release container;

attaching a container containing water and pupae and/or mosquitoes to the first end of the input channel;

operating an inlet fan to direct one or more mosquitoes within the container towards the input channel;

identifying by a detector one or more characteristics of the mosquito passing by the detector one at a time;

transmitting to a control unit a signal on the one or more characteristics of the mosquito identified by the detector;

controlling the at least one trap door valve in response to the signal received by the control unit to direct the mosquito to the separation valve;

controlling the separation valve to direct the mosquito into the first or second release channel in response to the one or more characteristics of the mosquito determined by the detector.

34. The method according to claim 33, further comprising:

releasing air within the second release container using the air flow control valve to create negative pressure within the second release container to direct the mosquito of the second type into the second release container.

35. The method according to claim 33, wherein the step of identification comprises:

capturing an image of the mosquito and transmitting the image to the control unit;

comparing the image with a list of predetermined images stored in the control unit; and

allowing the control unit to direct the separation valve to open to the first release channel or the second release channel in accordance to a match between the captured image and the stored images.

36. The method according to claim 33, wherein the step of identification comprises:

capturing an image of the mosquito and transmitting the image to the control unit;

measuring the width of the antennal flagellum from the captured image; and

allowing the control unit to direct the separation valve to open to the first release channel or the second release channel in accordance to the width of the antennal flagellum.

37. The method according to claim 33, wherein the step of identification comprises:

capturing the audio frequencies and transmitting the captured frequencies to the control unit;

comparing the captured audio frequencies with a list of audio signatures stored in the control unit; and

allowing the control unit to direct the separation valve to open to the first release channel or the second release channel in accordance to a match between the captured audio frequencies and audio signatures stored in the control unit.

38. The method according to claim 33, when a mosquito of a second type is determined, the method comprises:

closing the trap door valve;

directing the separation valve to close a passageway between the input channel and the first release channel, causing a passageway between the input channel and the second release channel to open; and

releasing air within the second release container using the air flow control valve to create negative pressure within the second release container to direct the mosquito of the second type into the second release container.