

## WHAT IS CLAIMED IS:

1. A method of separating a batch of insects from a trap into individual insects comprising:  
pouring said batch of insects into a container having at least one hole, the hole being sized for a single insect;  
moving the container to shake the insects within so that individual insects are caused to exit via said hole onto a collecting surface, thereby providing separated insects onto said collecting surface.
2. The method of claim 1, wherein said container comprises a floor, said motion comprises vibration, and said at least one hole is in said floor.
3. The method of claim 1, wherein said container comprises a circumference, said at least one hole is in said circumference and said motion comprises rotation.
4. The method of claim 3, wherein said motion further comprises vibration.
5. The method of claim 4, wherein said rotation and said vibration are alternated in a cycle.
6. The method of any one of claims 3 to 5, wherein said container comprises an upper cone and a lower cone, said cones meeting at a common base, said base providing a maximal circumference and said at least one hole being at said maximal circumference.
7. The method of any one of the preceding claims, comprising pouring a batch of insects into said container via a funnel.
8. The method of any one of the preceding claims, wherein said collecting surface is a moving surface.
9. Apparatus for separating insects from a batch of insects into individuals, the apparatus comprising a container for said batch of insects, the container being motorized to provide motion to the container, and having at least one hole, the hole sized for an individual

insect thereby to enable an individual insect from said batch to be pushed out of said hole when nudged against said hole by said motion.

10. Apparatus according to claim 9, wherein the container has a floor, said at least one hole is in said floor and said motion is vibrating motion.

11. Apparatus according to claim 9, wherein the container has a circumference, said motion comprises rotation in an axis perpendicular to said circumference and said at least one hole is in said circumference.

12. Apparatus according to claim 11, wherein said motion further comprises vibration in at least one axis.

13. Apparatus according to claim 12, wherein said motion comprises vibration in three axes.

14. Apparatus according to any one of claims 11 to 13, wherein said at least one hole comprises an inner side towards an interior of said container and an outer side towards an exterior of said container, and a diameter which is smaller at said inner side than at said outer side.

15. Apparatus according to any one of claims 9, to 14, wherein said container comprises an upper cone and a lower cone, said cones meeting at a common base, said base providing a maximal circumference and said at least one hole being at said maximal circumference.

16. Apparatus according to any one of claims 9 to 15, having a guide for guiding exiting insects from said at least one hole to a collecting surface.

17. Apparatus according to any one of claims 9 to 16, comprising a funnel for pouring said batch of insects from a trap into said container.

18. Apparatus according to any one of claims 9 to 17, comprising a motor with an eccentric weight to provide vibrations.

19. A method of picking an insect on a first surface and placing said insect, the method comprising:

Imaging said collecting surface from above;

From said imaging determining the presence of said insect on said surface for picking;

From said imaging determining a current location of said insect on said surface as a picking location;

Using a robot arm, moving a picking tool to a position above said picking location;

Lowering said picking tool to said picking location;

Operating suction to pick said insect into said picking tool from said picking location;

Using said robot arm to move said picking tool with said insect to a position above a depositing location; and

Removing said suction to deposit said insect, wherein one of said picking location and said depositing location is an identification location for imaging said insect for identification.

20. The method of claim 19, wherein said identification location is said picking location and an identification made at said identification location defines said depositing location.

21. The method of claim 19 or claim 20, comprising switching from said suction to blowing at said depositing location to deposit said insect.

22. The method of any one of claims 19 to 21, wherein said picking tool comprises a porous surface in a tube leading to a vacuum source, said insect being held at said porous surface by said suction.

23. The method of claim 22 or claim 23, wherein said picking tool has a central air duct and a peripheral air duct, said suction being applied via said central air duct and said blowing being provided by both said central air duct and said peripheral air duct.

24. A picking tool for insects comprising a hollow tube having a first end and a second end, the tube being connected to an air pressure source at said first end and having a porous surface proximal to said second end, the tool further having a robot arm for positioning the tool in three dimensions, the tool being configured to work with an imaging system to position itself above coordinates supplied by said imaging system as the position of an insect on a

surface, the tool being configured to lower itself over said coordinates and to apply suction to suck said insect against said porous surface thereby to pick said insect.

25. The picking tool of claim 24, wherein said net is distanced from said second end by the thickness of an insect.

26. The picking tool of claim 24 or claim 25, having a central air duct and a peripheral air duct, said suction being applied through said central air duct, thereby to position said picked insect centrally on said net.

27. The picking tool of claim 26, configured to switch off said suction when reaching a destination, thereby to deposit said insect at a placing location.

28. The picking tool of claim 26, configured to switch off said suction when reaching a destination, and to replace said suction with blowing, said blowing being applied via said central air duct and said peripheral air duct, thereby to deposit said insect at said placing location.

29. A method of identifying and counting images obtained in batches from field traps, the method comprising:

Receiving a batch of insects from a trap;

Placing said batch into a separator, the separator ejecting insects from the batch one by one;

Collecting said insects being ejected on a moving surface; and

For each said insect on said moving surface taking at least one image; and

For each individual insect found in respective images, incrementing a count.

30. The method of claim 29, comprising, taking a series of images from different angles for each insect on said moving surface and providing said images to a neural network to identify said insect.

31. The method of claim 30, comprising using said identification to define a destination to place said insect.

32. The method of claim 31, comprising using a first camera to locate said insect and a second camera to take images from different angles around said insect.

33. The method of claim 32, comprising rotating said insect on a rotating disc to obtain said images from different angles.

34. The method of claim 32, comprising placing said second camera on a robot arm and moving said second camera around said insect to obtain said images.

35. The method of any one of claims 32 to 34, comprising illuminating said insect with an excitation wavelength to elicit fluorescence.

36. The method of any one of claims 32 to 35, comprising obtaining images at different focal depths.

37. The method of any one of claims 31 to 36, comprising identifying an attitude of said insect and obtaining images of body parts according to locations defined by said attitude.

38. The method of any one of claims 32 to 37, comprising using a decision tree to define species defining features and positioning said second camera to image body parts according to said decision tree.

39. The method of any one of claims 29 to 38, comprising operating said separator to eject separated insects onto a length of conveyor, then stopping said separator and identifying insects on said conveyor, and repeating said operating and identifying.

40. The method of any one of claims 29 to 39, wherein said separator is the apparatus of any one of claims 9 to 18.

41. The method of any one of claims 29 to 40, comprising picking said insects and placing said insects using the picking tool of any one of claims 24 to 28.

42. The method of claim 42 comprising using said identification to define a destination for placing a respective insect.

43. The method of any one of claims 29 to 42, comprising obtaining a plurality of batches from a plurality of traps, each trap having a different location, the method comprising using insect numbers from respective traps to generate or update a report or a geographical map of insect distribution.

44. The method of any one of claims 30 to 43, wherein said identifying is based on an insect database of insects expected in a region of said trap.

45. The method of any one of claims 30 – 44, wherein said identifying comprises leaving some insects uncategorized due to being unidentified, or identified to below a threshold level of certainty, the method comprising forwarding images of said uncategorized insects for manual identification by an operator.

46. A method of automatically identifying an insect at an imaging location for genus, species or sex, the method comprising:

Taking a first image of the insect from above to identify an orientation of said insects; and

Using said first image to find at least one location from which a first given body part may be imaged, and sending a camera to said location to take a second image; and

Continuing with further locations and further body parts until sufficient images are available to enable identification of said insect.

47. The method of claim 46, wherein said first image is taken using a first camera located overhead and said second image is taken from a second camera on a robot arm.

48. The method of claim 46, wherein said first image is taken using a camera located overhead and said second image is taken from a camera on a rail.

49. The method of claim 46, wherein said first image is taken using a camera located overhead and said second image is taken either from said camera located overhead or a camera located at the side.