Claims

1. An air mixture and air movement system for plant cultivation, the system comprising:

   A crop rail configured for holding plants;

   An air conditioning system for the cooling of incoming air and producing cooled outgoing air, the outgoing air routed to an air emission point (048);

   A mixing arrangement for introducing stored gases into the incoming air;

   An air movement device for creating a flow of air movement of the outgoing air, further configured to direct the air movement from the air emission point (048) to flow over an area of plants and arranged so that the flow of air movement traverses an essentially linear path from the air emission point (048) to an air intake (049);

   At least one air velocity retention device (AVRD) attached to the crop rail, the AVRD comprising an air intake for drawing in air and an air output for expelling air at a velocity associated with the operation of the AVRD;

   Wherein the path is arranged to traverse surfaces of at least one plant held in the plant rail, and

   Wherein the at least one AVRD is oriented and arranged to assist the air flow on the path from the air emission point (048) to the air intake (049).

2. The system of claim 1 wherein a plurality of AVRDs are attached to the crop rail, the plurality of AVRDs configured in a consecutive sequence so that air expelled from one of the AVRDs is directed towards the air intake of the next AVRD in the consecutive sequence.

3. The system of claim 2 wherein the AVRDs are spatially arranged in a consecutive sequence, and wherein the distance between consecutive AVRDs in the sequence is separated by a distance within a range of 15 to 300 centimeters.

4. The system of claim 2 wherein the crop rail is arranged to be able to hold at least one plant between a consecutive pair of AVRDs.

5. Air movement control and air source device for cultivation in accordance with claim 1, the system configured to implement an air movement control process comprising:

Retrieving at least one gas from a gas storage tank (201), the gas capable of affecting the growth of plants;

Transferring the gas through a nozzle (311) to inject the gas into the airflow of an air inlet (045) to an air conditioner (100), the air conditioner for regulating the air temperature to be suitable for growing plants;

Directing the flow from an air outlet of the air conditioner (046) through the air inlet accelerator (325), wherein the air enters the air collector tube (328) for distribution air into the discharge pipe (047), which releases the moving air though at least one emission point (048) into a spatial volume comprising living plants;

Passing the moving air from the at least one emission point (048) to a first AVRD (110), then through a region configured to comprise at least one plant (001) and into a second AVRD (111), then through a region configured to comprise at least plant (002), the AVRDs configured to maintain directed air movement;

Drawing the flow through the air intake (049) and into the pipe (050) which is conveyed to the collecting pipe (329);

Separating the flow into gas product and liquid product;

Directing the liquid product into a solution tank (354);

Directing the gas product into an air accelerator device (326) and subsequently to an excess moisture trap (320) for removing moisture from the gas product, and is then directed to the air conditioner,

Wherein the liquid product directed the storage tank (354) is available for use in plant nutrient processing.

6. The system of claim 5 wherein the gas storage tank (201) is arranged to comprise at least carbon dioxide gas.

7. The system of claim 1 wherein the concentration of gases that affected plant growth can be measured.

8. The system of claim 5 wherein the solution storage tank (354) is a closed container comprising at least one passage and an outlet.

9. The system of claim 5 wherein the air inlet accelerator (325) comprises at least one of a centrifugal pump or an axial flow fan.

10. The system of claim 5 wherein at least one of the air discharge tube (047), air collector tube (328), air compilation pipe (329), and pipe (050) comprise at least one of aluminum, plastic, stainless steel, foil, or equivalent.

11. The system of claim 5 wherein the surface area of the air collector tube (328) is within a range of 19 to 6360 square centimeters.

12. The system of claim 5 wherein the air compilation pipe (329) can be shaped to suit a specific application area.

13. The system of claim 1 wherein the crop rail (931) has an exterior surface color comprising a photosynthetic photon flux density (PPFD) within the range of 100 - 1000 microns per square meter per second (micron mol/sqr.m. sec).

14. The system of claim 1 wherein the surface of the crop rail (931) comprises a textured surface.

15. The system of claim 1 wherein the crop rail (931) can be vertically positioned to support a plurality of plants in a vertical stack or horizontally positioned as a shelf to support a plurality of plants in horizontal array.

16. The system of claim 5 wherein the air conditioner (100) is arranged to be able to provide an air temperature within the range 5 to 50 degrees Celsius.

17. The system of claim 5 wherein the excess moisture trap (320) comprises at least one of a desiccant dehumidifier, an air filter, and a humidity control unit.

18. The system of claim 1 wherein add any device that work to remove the air from the air intake (049) and flow through the air collector tube (328), and new device counted as one of the parts of the air acceleration device (326) by setting any side of the system.

19. The system of claim 1 wherein externally-sourced wind can be used to reduce the number of AVRDs.

20. The system of claim 5 wherein the air accelerator device (326) comprises at least one of a centrifugal pump or an axial flow fan.

21. The system of claim 1 wherein the air movement velocity is essentially within a range of 0.1 — 5 meters per second.

22. The system of claim 1 wherein the carbon dioxide concentration in the outgoing air is in a range of 450 to 1600 parts per million (ppm).

23. The system of claim 5 wherein the surface area of the air complication pipe (329) is within a range of 19 to 6360 square centimeters.

24. The system of claim 1 wherein the crop rail (931) comprises at least one of Polyvinyl Chloride, Polyethylene, Polypropylene, 316L stainless steel, 304 stainless steel, 308 stainless steel, or equivalent.