CLAIMS

1. A vertically oriented plant growth system comprising:

a first tower adapted for mounting over a ground surface and comprising:

a first central support structure oriented generally perpendicular to the ground surface, the first central support structure supported by either an above ground frame or an extension through the ground surface functioning as a foundation;

a first plurality of hub structures attached to the first central support structure and spaced at intervals along the first central support structure, each hub structure of the first plurality of hub structures including at least one container attached thereto sized for the disposal of soil sufficient to grow a plant;

a first flow control device with output tubes extending to an input valve on each hub structure of the first plurality of hub structures, the first flow control device being positioned above each hub structure of the first plurality of hub structures; and

a first data collection device positioned on the first central support structure above the first flow control device;

a second tower adapted for mounting over a ground surface and comprising:

a second central support structure oriented generally perpendicular to the ground surface, the second central support structure supported by either an above ground frame or an extension through the ground surface functioning as a foundation;

a second plurality of hub structures attached to the second central support structure and spaced at intervals along the second central support structure, each hub structure of the second plurality of hub structures including at least one container attached thereto sized for the disposal of soil sufficient to grow a plant;

a second flow control device positioned above each hub structure of the second plurality of hub structures; and

a second data collection device positioned on the second central support structure above the second flow control device;

an enclosed channel in fluid communication with a source of liquid under pressure and the first and second flow control devices; and

a valve located on the enclosed channel upstream of each of the first tower and the second tower, the valve being independently actuatable to control flow of pressurized liquid into either one or both of the first tower and the second tower,

wherein when the liquid is distributed downstream from the source through the enclosed channel and then into and through at least one of the first and second flow control devices, the liquid dispenses into soil disposed in each container at a predetermined flow rate,

wherein the first flow control device is configured to regulate liquid output to a first flow rate and the second flow control device is configured to regulate liquid output to a second flow rate, and

wherein the first and second data collection devices are adapted to collect data associated with conditions of the soil and plant disposed in each container on an adjacent tower.

2. The system of claim 1, wherein the enclosed channel is directly connected to the first central support structure such that pressurized liquid received in the enclosed channel travels downstream through the first central support structure and into the first flow control device.

3. The system of claim 1, wherein the enclosed channel is directly connected to the first flow control device.

4. The system of claim 3, wherein the first central support structure is rotatable about its axis and rotation of the first central support structure does not transfer forces to the enclosed channel.

5. The system of claim 4, further comprising a rotary union attached to the first flow control device opposite the first central support structure such that the first flow control device separates the rotary union and the first central support structure, the first flow control device and the first central support structure being adapted to rotate in unison.

6. The system of claim 1, wherein the first and second data collection devices further comprise infrared sensors such that the first and second data collection devices are adapted to communicate with each other to establish a position of each.

7. The system of claim 1, wherein the first and second data collection devices further comprise a camera adapted to capture image data of each container on an adjacent tower.

8. A system comprising:

a first tower array including three towers;

a second tower array including three towers;

wherein each of the towers in each tower array includes:

a central support structure;

a plurality of hub structures each centered on the central support structure and spaced apart from one another;

a flow control device positioned above the plurality of hub structures, the flow control device including eight outputs each with distribution tubes attached thereto;

wherein each of the plurality of hub structures includes an input valve connected to one of the eight distribution tubes, and

wherein the flow control device is configured to receive liquid and distribute the liquid to each planter attached to the hub structure on the tower,

wherein the three towers of the first tower array are aligned with one another such that a first axis passes through the central support structure of each;

wherein the three towers of the second tower array are aligned with one another such that a second axis passes through the central support structure of each, the second axis parallel to the first axis;

wherein a third axis perpendicular to the first axis and passing through one of the three towers of the first tower array also passes through one of the three towers of the second tower array, and

wherein each tower of the first and second tower arrays further comprises a data collection device positioned on the central support structure above the flow control device,

each data collection device being positioned at the same elevation so that infrared sensors on any one data collection device are in communication with infrared sensors on another data collection device.

9. The system of claim 8, wherein each data collection device is adapted to run a self calibration protocol so that a location of each tower relative to a reference tower is established.

10. The system of claim 8, wherein each data collection device further comprises six cameras, each camera positioned facing a different direction such that image data on the planters positioned on each tower is retrievable, the image data being associated with conditions of the soil and plant in each container.

11. The system of claim 10, wherein the image data is associated with a direction the camera faces and the tower housing the camera.

12. A vertically oriented plant growth system comprising:

a first tower array including two towers; and

a second tower array including two towers, a single axis through the two towers of the second tower array being parallel to a single axis through the two towers of the first tower array,

wherein each tower of the first and second tower arrays comprises:

a central support structure extending upward from a ground surface;

a plurality of hub structures with one or more planters attached, each hub structure attached to the central support structure and spaced from an adjacent central support structure; and

a data collection device positioned above the plurality of hub structures at a predetermined distance from the ground surface,

wherein the data collection devices are operable to collect location data regarding each tower through communication between sensors on each data collection device, and

wherein the data collection devices are operable to collect data regarding contents of the planters on each tower through image data collected from images captured by an electronic device within the data collection devices.

13. A method of irrigating plants comprising:

providing pressurized liquid to a tower comprising:

a central support structure;

a plurality of hub structures each centered on the central support structure and spaced apart from one another, each of the plurality of hub structures including a plurality of planters attached thereto, at least one of the planters having soil or a hydroponic growth medium disposed therein; and

a flow control device positioned above the plurality of hub structures and connected to the central support structure, the flow control device including a plurality of outputs each with distribution tubes attached thereto;

providing liquid to the first tower, to a second tower, or to both through the control of a valve positioned on the liquid flowpath upstream of the central support structure of at least one tower; and

communicating between the first tower and the second tower to determine a relative position of each tower through a data collection device positioned above respective flow control devices on each tower,

wherein the liquid travels through the central support structure to the flow control device,

wherein the flow control device outputs received liquid to individual hub structures at a predetermined flow rate, and

wherein the liquid received in the hub structures travels into soil within each planter attached to the hub structure.