

CULTIVATION SYSTEM ARRANGED ON CANAL

FIELD OF THE INVENTION

[0001] The present disclosure relates to a cultivation system arranged on a canal.

BACKGROUND OF THE INVENTION

[0002] Traditional land cultivation, such as cultivation of vegetables, melons or fruits, often requires buying or renting a large area of land for implementation. However, because land resources are very limited, and farming in this way requires a lot of manpower, land and labor costs for the traditional land cultivation of vegetables or fruits are very high. In addition, another shortcoming of the traditional land cultivation of vegetables or fruits is that water discharged after cultivation is not easy to recycle, and it is also prone to pollution problems.

[0003] In addition, although greenhouse vertical planting technology has been developed, it is also necessary to buy or rent basic land to build the planting greenhouse. Moreover, the construction cost required for the special greenhouse and the internal vertical planting structure, as well as the consumption of various resources such as tap water and light sources required in the greenhouse planting process, are also considerable. That is, the cost of growing vegetables or fruits in the greenhouse is actually no less than that of the traditional land cultivation of vegetables or fruits. Therefore, how to make full use of the limited land resources for vegetables or fruits farming, and to have low labor costs, construction costs, and water and electricity costs, etc., has become an urgent issue in this field.

SUMMARY OF THE INVENTION

[0004] The present disclosure provides a cultivation system arranged on a canal to make full use of the limited land resources. Specifically, the

present disclosure provides the cultivation system arranged on the canal, which includes: a conveying module arranged on the canal, the conveying module being configured to support a plurality of planting trays and capable of transporting the planting trays in one direction; and an irrigation module configured to carry water from the canal and/or a backup water supply device to the planting trays.

[0005] In some embodiments, the direction is parallel to an extending direction of the canal.

[0006] In some embodiments, the conveying module includes: a frame structure arranged on the canal along the direction; and at least two roller sets arranged on the frame structure with a minimum spacing, and the at least two roller sets are configured to drive the planting trays to move along the direction.

[0007] In some embodiments, the frame structure is inclined or parallel to the canal.

[0008] In some embodiments, the frame structure includes a plurality of frame units arranged in the direction, and each of the frame units is configured to support one of the planting trays.

[0009] In some embodiments, the frame structure includes a plurality of frame units arranged in the direction, and the at least two roller sets are arranged on two of the frame units, and the minimum spacing between the at least two roller sets is greater than or equal to three times a length of each of the frame units.

[0010] In some embodiments, the frame structure includes a plurality of frame units arranged in the direction, and the at least two roller sets are arranged on two of the frame units, and the minimum spacing between the at least two roller sets is greater than or equal to ten times a length of each

of the frame units and less than or equal to thirteen times the length of each of the frame units.

[0011] In some embodiments, the minimum spacing between the at least two roller sets is between 5 meters and 15 meters.

[0012] In some embodiments, the conveying module further includes: a plurality of ball units arranged on the frame structure, and the ball units being configured to help the planting trays to slide along the direction.

[0013] In some embodiments, the ball units are arranged on at least one surface of the frame structure for contacting each of the planting trays to help each of the planting trays to slide along the direction.

[0014] In some embodiments, the cultivation system further includes: a working walkway arranged on the canal along the direction and adjacent to the frame structure.

[0015] In some embodiments, the irrigation module includes: a sprayer configured to spray the water from the canal and/or the backup water supply device onto the planting trays; and a pump configured to carry the water from the canal and/or the backup water supply device to the sprayer.

[0016] In some embodiments, the backup water supply device includes: a sump adjacent to the planting trays over the conveying module, and the sump being configured to receive water discharged from the planting trays; in which the pump is configured to carry the water from the sump to the sprayer for the sprayer to spray the water onto the planting trays.

[0017] In some embodiments, the backup water supply device includes: a water storage device below the conveying module or installed in the canal, and the water storage device being configured to breed fish or store water; in which the pump is configured to carry the water from the

water storage device to the sprayer for the sprayer to spray the water onto the planting trays.

[0018] In some embodiments, the water storage device is a fish tank or a water storage pipe.

[0019] In some embodiments, the cultivation system further includes: a supporting frame arranged on the canal, and the supporting frame being configured to support the conveying module and the water storage device below the conveying module.

[0020] In some embodiments, the cultivation system further includes: a curtain arranged over the conveying module, and the curtain being configured to block rain or part of light.

[0021] In some embodiments, the cultivation system further includes: at least one processing region (harvesting hub) adjacent to the conveying module, and the processing region being configured to receive the planting trays from the conveying module or place the planting trays on the conveying module.

[0022] In some embodiments, the at least one processing region is arranged on the canal.

[0023] In some embodiments, the cultivation system further includes: a movable pesticide spray booth placed in the processing region.

[0024] In some embodiments, the cultivation system further includes: two processing regions (harvesting hubs), the conveying module between the two processing regions, and the two processing regions being configured to receive the planting trays from the conveying module and/or place the planting trays on the conveying module.

[0025] In some embodiments, the cultivation system further includes: a pre-cultivation sprouting region configured to cultivate the planting trays, in which the pre-cultivation sprouting region includes a multi-layer rack

structure and a light unit, and the multi-layer rack structure is configured to accommodate a plurality of trays, and the trays are configured to accommodate cultivation materials and seeds.

[0026] In some embodiments, the cultivation system is used to cultivate vegetables, fruits, melons, ornamental plants, or a combination thereof.

[0027] In some embodiments, the cultivation system further includes: a fish tank below the conveying module, and the fish tank is configured to breed fish.

[0028] The present disclosure also provides a cultivation system arranged on a canal, which includes: a frame structure arranged on the canal, the frame structure being configured to support a plurality of planting trays; and an irrigation module configured to carry water from the canal and/or a backup water supply device to the planting trays.

[0029] In some embodiments, the cultivation system further includes: a processing region (harvesting hub) adjacent to the frame structure, and the processing region being configured to harvest vegetables from the planting trays and pack the vegetables.

[0030] The present disclosure also provides a planting tray for the above-mentioned cultivation system, which includes: a base; and a fixing structure transversely arranged in the base and abutting against two opposite sides of the base, in which the fixing structure includes a plurality of holes.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031] FIG. 1 is a three-dimensional schematic diagram of a cultivation system arranged on a canal according to some embodiments of the present disclosure.

[0032] FIG. 2A is a schematic cross-sectional view of a cultivation system arranged on a canal according to some embodiments of the present disclosure.

[0033] FIG. 2B is a schematic cross-sectional view of a planting tray, a sump and a fish tank according to some embodiments of the present disclosure.

[0034] FIG. 3 is a three-dimensional schematic diagram of a conveying module according to some embodiments of the present disclosure.

[0035] FIG. 4 is an enlarged schematic view of area A in FIG. 3.

[0036] FIG. 5 is an enlarged schematic view of the vicinity of area A in FIG. 3.

[0037] FIG. 6 is a schematic top view of a conveying module according to some embodiments of the present disclosure.

[0038] FIG. 7 is an enlarged schematic view of area B in FIG. 6.

[0039] FIG. 8 is a three-dimensional schematic diagram of processing regions according to some embodiments of the present disclosure.

[0040] FIG. 9 is an enlarged schematic view of area C in FIG. 8.

[0041] FIG. 10 is an enlarged schematic view of area D in FIG. 8.

[0042] FIG. 11 is a three-dimensional schematic diagram of a movable pesticide spray booth according to some embodiments of the present disclosure.

[0043] FIG. 12 is a three-dimensional schematic diagram of a pre-cultivation sprouting region according to some embodiments of the present disclosure.

[0044] FIG. 13 is a three-dimensional schematic diagram of a tray according to some embodiments of the present disclosure.

[0045] FIG. 14 is a three-dimensional schematic diagram of a planting climbing frame according to some embodiments of the present disclosure.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0046] In order to make the description of the present disclosure more detailed and complete, the following provides an illustrative description for the implementation of the present disclosure and specific embodiments; but this is not the only way to implement or use the specific embodiments of the present disclosure. The embodiments disclosed below can be combined or substituted with each other under beneficial circumstances, and other embodiments can also be added to an embodiment without further description.

[0047] In order to solve the issue described in the prior art, the present disclosure provides a cultivation system arranged on a canal to make full use of the limited land resources. It is worth noting that compared with the traditional land cultivation, the cultivation system of the present disclosure has lower labor costs, and the water discharged after cultivation can be recycled by selecting an appropriate cultivation material. Compared with the indoor vertical planting technology, the cultivation system of the present disclosure has lower construction costs and water and electricity costs. In addition, the land suitable for cultivation is usually located in the suburbs, and plants for indoor vertical planting are usually set up in industrial areas. However, the cultivation system of the present disclosure can be set up in urban areas according to the location of the canal. Therefore, it can reduce transportation costs of crops and is more environmentally friendly. Various embodiments of the cultivation system of the present disclosure will be detailed below.

[0048] FIG. 1 is a three-dimensional schematic diagram of a cultivation system 10 arranged on a canal 20 according to some

embodiments of the present disclosure. FIG. 2A is a schematic cross-sectional view of a cultivation system 10 arranged on a canal 20 according to some embodiments of the present disclosure. Referring to FIGS. 1 and 2A, the cultivation system 10 is arranged on the canal 20. The canal 20 may be, for example, a rainwater canal or a sea water canal. The cultivation system 10 includes a conveying module 100 and an irrigation module 200. In some embodiments, the cultivation system 10 is used to cultivate vegetables, fruits, melons, ornamental plants, or a combination thereof. In some embodiments, the cultivation system 10 can also be used to breed fish.

[0049] In some preferred embodiments, the original function of the canal 20 may be an infrastructure to regulate rain and flood. In some preferred embodiments, the original function of the canal 20 can be a basic canal facility for the drainage function of urban residents, and its installation location can be located in at least one of the urban area and the suburban area, or a basic canal facility for the water supply/drainage function of agricultural irrigation, but not limited thereto.

[0050] Referring to FIGS. 1 and 2A, the conveying module 100 is arranged on the canal 20 and extends toward the direction D1. The conveying module 100 is configured to support a plurality of planting trays 30. In some embodiments, referring to FIGS. 1 and 2A, the conveying module 100 includes a frame structure 102 configured to support the plurality of planting trays 30. The planting tray 30 can plant any plant, including vegetables, fruits, melons, ornamental plants or a combination thereof, such as eggplant, okra, tomatoes, chili, shallots, leeks, spice plants, succulents, flowers, etc., but not limited thereto.

[0051] Referring to FIG. 1, the conveying module 100 is capable of transporting the planting trays 30 in the direction D1. The direction D1 is

parallel to an extending direction of the canal 20. In some embodiments, the conveying module 100 can also transport the planting trays 30 in a direction D2, which is also parallel to the extending direction of the canal 20, but the direction D2 and the direction D1 are opposite to each other.

[0052] Referring to FIG. 2A, the irrigation module 200 is connected to the canal 20. The irrigation module 200 is configured to carry water from the canal 20 and/or a backup water supply device to the planting trays 30 so that the plants can obtain water. In some embodiments, the irrigation module 200 includes a sprayer 202 configured to spray the water from the canal 20 and/or the backup water supply device (as detailed later) onto the planting trays 30; and a pump 204 configured to carry the water from the canal 20 and/or the backup water supply device to the sprayer 202. In some embodiments, the irrigation module 200 further includes pipelines connected between the canal 20 and/or the backup water supply device and the pump 204 and between the pump 204 and the sprayer 202. In some embodiments, fertilizer may be mixed with the water obtained from the canal and/or the backup water supply device and then sprayed onto the planting trays 30 through the sprayer 202. However, the irrigation module 200 is not limited to the above embodiments, and any device that can achieve the purpose of irrigation can be used in the present disclosure.

[0053] In some embodiments, referring to FIG. 1, the cultivation system 10 further includes: at least one processing region (harvesting hub) 300 adjacent to the conveying module 100. The processing region 300 is configured to process the planting trays 30, for example, to receive the planting trays 30 from the conveying module 100, or to place the planting trays 30 on the conveying module 100. The foregoing processing can be achieved in an automatic, semi-automatic or manual manner. In some embodiments, the processing region 300 is arranged on the canal 20, but it

is not limited thereto. In other embodiments, the processing region is not arranged on the canal, but is arranged in other areas adjacent to the conveying module.

[0054] In some embodiments, referring to FIG. 1, the cultivation system 10 further includes: two processing regions (harvesting hubs) 300. The conveying module 100 is between the two processing regions 300, and the two processing regions 300 are configured to receive the planting trays 30 from the conveying module 100 and/or place the planting trays 30 on the conveying module 100. For example, the two processing regions 300 can be configured to receive the planting trays 30 from the conveying module 100 and place the planting trays 30 on the conveying module 100, respectively, but it is not limited thereto.

[0055] In some embodiments, referring to FIG. 2A, the backup water supply device includes: a sump 400 adjacent to the planting trays 30 over the conveying module 100 (e.g., the frame structure 102). The sump 400 is configured to receive water discharged from the planting trays 30. The water discharged from the planting trays 30 can be recycled and reused or used for other purposes. In some embodiments, the pump 204 is configured to carry the water from the sump 400 to the sprayer 202 for the sprayer 202 to spray onto the planting trays 30. In some embodiments, the irrigation module 200 further includes pipelines connected between the sump 400 and the pump 204 and between the pump 204 and the sprayer 202.

[0056] In some embodiments, referring to FIGS. 1 and 2A, the backup water supply device includes: a water storage device 500 below the conveying module 100 (e.g., the frame structure 102) or installed in the canal 20. The water storage device 500 is configured to breed fish or store water. In some embodiments, the water storage device 500 is a fish tank or a water storage pipe. For example, the fish tank can be arranged between

the canal 20 and the conveying module 100 (e.g., the frame structure 102), and the water storage pipe can be below the conveying module 100 (e.g., the frame structure 102) or installed in the canal 20. Inside. In some embodiments, the fish tank can be used to breed freshwater fish, marine fish or shrimps. The freshwater fish may be Marble Goby, red tilapia, Chinese mandarin or perch. The marine fish may be grouper, Lates calcarifer, golden pomfret or red snapper, but not limited thereto. The water storage pipe can be used to keep enough irrigation water in dry weather. In some embodiments, the pump 204 is configured to carry the water from the water storage device 500 to the sprayer 202 for the sprayer 202 to spray onto the planting trays 30. In some embodiments, the irrigation module 200 further includes pipelines connected between the water storage device 500 and the pump 204 and between the pump 204 and the sprayer 202.

[0057] It can be seen from the above that both the sump 400 and the water storage device 500 can be regarded as the backup water supply device, but it is not limited thereto.

[0058] FIG. 2B is a schematic cross-sectional view of a planting tray 30, a sump 400 and a fish tank 500 according to some embodiments of the present disclosure. In some embodiments, referring to FIG. 2B, the planting tray 30 includes seeds (or seedlings) 32, a cultivation material 34 and a tray 36. In some embodiments, the tray 36 is made of plastic or other suitable materials. In some embodiments, the cultivation material 34 includes coconut fiber, but it is not limited thereto. The coconut fiber will not harden after adding water, so there is no need to loosen. In addition, the coconut fiber is highly absorbent, so it can retain water for a long time. In particular, the water discharged through the coconut fiber can be recycled and reused.

[0059] In some embodiments, referring to FIG. 2B, the cultivation system 10 further includes an element for carrying the water in the sump

400 to the planting tray 30. In some embodiments, the irrigation module 200 further includes: a sprayer 402 configured to spray the water in the sump 400 onto the planting tray 30; and a pump 404 configured to carry the water from the sump 400 to the sprayer 402. In some embodiments, the cultivation system 10 further includes pipelines connected between the tray 36 and the sump 400, between the sump 400 and the pump 404, and between the pump 404 and the sprayer 402. The sprayer 402 and the pump 404 described herein and the aforementioned sprayer 202 and the pump 204 may be the same components or different components, and can be designed according to actual application requirements. In some embodiments, a liquid level indicator 406 and a pH value sensor 408 are connected to the sump 400 to monitor the liquid volume and pH value of the liquid, and to further determine whether the water in the sump 400 should be carried to the planting tray 30, or subject the water in the sump 400 to other treatments, such as adjusting the pH value.

[0060] Of course, in some preferred embodiments, the sump 400 may also be connected to at least one of the canal 20 and the water storage device 500, and a fully automatic/semi-automatic/manual communication switching device (not shown in the figure) may be provided therebetween; alternatively, the canal 20 and/or the water storage device 500 can be used to replace the sump 400, but the present disclosure is not limited thereto.

[0061] In some embodiments, referring to FIG. 2A, the cultivation system 10 further includes: a supporting frame 600 arranged on the canal 20. The supporting frame 600 is configured to support the conveying module 100 (e.g., the frame structure 102) and the water storage device 500 below the conveying module 100 (e.g., the frame structure 102). In some embodiments, the supporting frame 600 is made of steel, but not limited

thereto, and the supporting frame 600 may also be made of other suitable materials.

[0062] In some embodiments, referring to FIGS. 1 and 2A, the cultivation system 10 further includes: a curtain 700 arranged over the conveying module 100. The curtain 700 is configured to block rain or part of light. In some embodiments, the curtain 700 may be a mesh structure or a sheet structure. In some embodiments, the curtain 700 may completely cover all the planting trays 30, or may cover part of the planting trays 30, or may be folded so that all the planting trays 30 are exposed to ambient sunlight. The aforementioned functions can be achieved in a fully automatic, semi-automatic or manual manner. In practical applications, the state of the curtain 700 can be adjusted according to the environment and weather required for plant growth.

[0063] Various embodiments of the conveying module capable of transporting the planting trays of the present disclosure will be described in detail below. FIG. 3 is a three-dimensional schematic diagram of a conveying module 100 according to some embodiments of the present disclosure. FIG. 4 is an enlarged schematic view of area A in FIG. 3. FIG. 5 is an enlarged schematic view of the vicinity of area A in FIG. 3. FIG. 6 is a schematic top view of a conveying module 100 according to some embodiments of the present disclosure. FIG. 7 is an enlarged schematic view of area B in FIG. 6. In some embodiments, as shown in FIGS. 3 to 7, the conveying module 100 includes a frame structure 102 and at least two roller sets 104.

[0064] In other embodiments, the conveying module may also include a conveyor belt (not shown), and the planting trays are transported by the conveyor belt in a fully automatic/semi-automatic manner.

[0065] In some embodiments, as shown in FIGS. 1, 3, and 6, the frame structure 102 is arranged on the canal 20 along the direction D1 or D2. In some embodiments, as shown in FIGS. 2A, 2B, 3, and 4, the frame structure 102 is inclined or parallel to the canal 20 (e.g., an upper edge or a bottom surface of the canal 20 is used as a reference). In some embodiments, an inclination angle of the frame structure 102 is between 10 degrees and 45 degrees, but it is not limited thereto. In some embodiments, the inclination angle of the frame structure 102 is 15 degrees, 20 degrees, 25 degrees, 30 degrees, or 35 degrees. In some embodiments, in practical applications, the inclination angle of the frame structure 102 can be adjusted according to the sun direction or planting habits. In some embodiments, as shown in FIG. 2A, the frame structure 102 includes a bearing 102h configured to adjust the inclination angle of the frame structure 102. In some embodiments, as shown in FIG. 2A, the frame structure 102 includes a support column 102s configured to maintain the frame structure 102 in a horizontal state. In some embodiments, as shown in FIG. 2A, the frame structure 102 is inclined (e.g., inclined at 15 degrees, 20 degrees, 25 degrees, 30 degrees, or 35 degrees), so that the planting tray 30 thereon is also inclined. Compared with transporting the flat planting trays 30, the conveying module 100 (e.g., roller sets 104 described later) can transport the inclined planting tray 30 with less force, and thus can save construction costs of the conveying module 100 and electricity costs for operation. In some embodiments, as shown in FIG. 2A, the frame structure 102 is arranged obliquely, which can help the residual water in the planting trays 30 to flow down into the sump 400. In some embodiments, as shown in FIG. 2A, the frame structure 102 is parallel to the canal 20, so that the planting tray 30 thereon is in a flat state, and it is convenient to put feed into the fish tank or take out fish from the fish tank.

[0066] In some embodiments, as shown in FIG. 6, at least two roller sets 104 are arranged on the frame structure 102 with a minimum spacing S1. The “minimum spacing S1” mentioned herein refers to a distance between a center axis of one roller set 104 and a center axis of another roller set 104 closest thereto. The at least two roller sets 104 are configured to drive the planting trays 30 to move along the direction D1 or D2. The roller sets 104 may be arranged continuously or discontinuously. In some embodiments, as shown in FIG. 6, the at least two roller sets 104 are arranged discontinuously, which can reduce construction costs of the conveying module 100 and electricity costs for operation.

[0067] In some embodiments, as shown in FIGS. 4 to 7, the frame structure 102 includes a plurality of frame units 102u arranged in the direction D1 or D2, and each of the frame units 102u is configured to support one of the planting trays 30. In some embodiments, as shown in FIGS. 6 and 7, the at least two roller sets 104 are arranged on two of the frame units 102u.

[0068] In some embodiments, as shown in FIG. 6, the minimum spacing S1 of the at least two roller sets 104 is greater than or equal to three times a length L1 of each of the frame units 102u. For example, the minimum spacing S1 is four times, five times, six times, seven times, eight times, nine times or more times the length L1.

[0069] In some embodiments, the minimum spacing S1 of the at least two roller sets 104 is greater than or equal to ten times the length L1 of each of the frame units 102u and less than or equal to thirteen times the length L1 of each of the frame units 102u. For example, the minimum spacing S1 is eleven or twelve times the length L1. In some embodiments, the minimum spacing S1 of the at least two roller sets 104 is between 5 meters and 15 meters, but it is not limited thereto. In some embodiments,

the minimum spacing S1 of the at least two roller sets 104 is 6 meters, 6.5 meters, 7 meters, 7.5 meters, 8 meters, 8.5 meters, 9 meters, 9.5 meters, 10 meters, 10.5 meters, 11 meters, 11.5 meters, 12 meters, 12.5 meters, 13 meters, 13.5 meters, 14 meters or 14.5 meters.

[0070] In some embodiments, as shown in FIGS. 4, 5 and 7, the conveying module 100 further includes: a plurality of ball units 106 arranged on the frame structure 102, and the ball units 106 are configured to help the planting trays 30 to slide along the direction D1 or D2. In some embodiments, as shown in FIGS. 3, 4, and 7, the ball units 106 are arranged on at least one surface of the frame structure 102 for contacting each of the planting trays. The surface may be an upper surface or an inner surface of the frame structure 102. Specifically, the ball units 106 are used to help reduce the friction generated when the planting trays 30 moves on the frame structure 102. As such, after one of the roller sets 104 drives the planting tray 30 to move in the direction D1 or D2, the ball units 106 can help the planting tray 30 continue to slide along the direction D1 or D2, and thus the planting tray 30 can reach the next roller set 104, and the planting tray 30 is then driven by the roller set 104 to continue to move in the direction D1 or D2. Compared with the conveying module including the conveyor belt, the conveying module 100 including the at least two roller sets 104 and the ball units 106 has lower construction costs and electricity costs.

[0071] In some embodiments, as shown in FIGS. 2A, 6 and 7, the cultivation system 10 further includes: a working walkway 800 arranged on the canal 20 along the direction D1 or D2 and adjacent to the frame structure 102. Personnel can walk around the working walkway 800 to repair or maintain the conveying module 10. In some embodiments, as shown in FIG. 6, the frame units 102u are arranged in five frame rows

along the direction D1 or D2, in which two adjacent of the frame rows are connected to each other or separated by the working walkway 800. In practical applications, the frame structure (including the frame units and the frame rows) and the working walkway(s) can be appropriately designed according to the canal width or other parameters, and it is not limited to this embodiment.

[0072] FIG. 8 is a three-dimensional schematic diagram of processing regions 300 according to some embodiments of the present disclosure. FIG. 9 is an enlarged schematic view of area C in FIG. 8. FIG. 10 is an enlarged schematic view of area D in FIG. 8. In some embodiments, as shown in FIG. 9, plants (e.g., vegetables, fruits, melons or ornamental plants) can be harvested from the planting trays 30 and then packed and transferred to a truck and will be delivered to customers. In some embodiments, as shown in FIGS. 9 and 10, the cultivation system 10 further includes: a ball transport structure 108, which is provided at an end of the conveying module 100, and is configured to help the planting trays 30 slide in the processing region 300.

[0073] In some embodiments, as shown in FIG. 10, sprouted planting trays 30' may be transported back to the farm for subsequent processing. In some embodiments, a conveyor belt may be used to move the planting trays 30'.

[0074] In some embodiments, as shown in FIG. 10, seeds are added to the empty trays 30' and then transferred to a pre-cultivation sprouting region.

[0075] FIG. 11 is a three-dimensional schematic diagram of a movable pesticide spray booth 900 according to some embodiments of the present disclosure. In some embodiments, as shown in FIGS. 9 to 11, the cultivation system 10 further includes: a movable pesticide spray booth 900

placed in the processing region 300. In some embodiments, as shown in FIG. 11, the movable pesticide spray booth 900 includes an outer cover 902, a pesticide containing box 904, and a sprayer 906 connected to the pesticide containing box 904. The planting tray 30 that needs to be sprayed with pesticides may be moved into the outer cover 902 of the movable pesticide spray booth 900 for processing. The movable pesticide spray booth 900 can prevent pesticides from entering the canal 20 or staying near the canal 20, thus avoiding environmental pollution.

[0076] FIG. 12 is a three-dimensional schematic diagram of a pre-cultivation sprouting region 1000 according to some embodiments of the present disclosure. In some embodiments, as shown in FIG. 12, the cultivation system 10 further includes: a pre-cultivation sprouting region 1000 configured to cultivate the planting trays 30, so as to reduce the cultivation time of plants on the canal 20. In some embodiments, the temperature of the pre-cultivation sprouting region 1000 is ambient temperature and ambient humidity. In some embodiments, the pre-cultivation sprouting region 1000 is adjacent to or over the cultivation system 10. In some embodiments, the pre-cultivation sprouting region 1000 is a closed structure. The pre-cultivation sprouting region 1000 includes a multi-layer rack structure 1002 and a light unit 1004. The multi-layer rack structure 1002 is configured to accommodate a plurality of trays 36, and the trays 36 are configured to accommodate cultivation materials and seeds. In some embodiments, the light unit 1004 includes a light emitting diode, which can emit light in a light wavelength range suitable for plant growth.

[0077] It is worth noting that compared to flat planting, the trays 36 of the present disclosure can be vertically arranged in the multi-layer rack structure 1002, which can reduce the area occupied by sprouting. In some embodiments, the multi-layer rack structure 1002 may include at least ten

layers, and at least ten planting trays 30 may be placed in the multi-layer rack structure 1002. In some embodiments, each of the planting trays 30 may be equipped with a barcode (e.g., a two-dimensional barcode) to facilitate production monitoring at various stages. In some embodiments, each of the planting trays 30 may be equipped with a camera or a monitor to facilitate production monitoring at various stages or for customers to order.

[0078] FIG. 13 is a three-dimensional schematic diagram of a tray according to some embodiments of the present disclosure. In some embodiments, as shown in FIG. 13, the tray 36 includes a base 362 for accommodating cultivation materials and seeds. In some embodiments, the base 362 further includes an opening 362a to make it easy for personnel to take the tray 36. In some embodiments, the base 362 is made of plastic, such as polypropylene (PP) or other suitable materials. In some embodiments, the base 362 is bendable, so the tray 36 further includes a fixing structure 364 (e.g., a sheet structure or other suitable structure) transversely arranged in the base 362 and abutting against two opposite sides of the base 362 to avoid deformation of the base 362. In some embodiments, the tray 36 has two fixing structures 364 arranged to cross each other, and each of the fixing structures 364 is in contact with two corners of the base 362. In some embodiments, the fixing structure 364 has holes 364a to help water in various areas to flow out through the drain hole 366. In some embodiments, the tray 36 further includes a drain hole 366, and excess water in the cultivation materials can be drained through the drain hole 366. In some embodiments, the tray 36 further includes a baffle 368 so that the plurality of trays 36 will not be overlapped with each other when stacked vertically.

[0079] FIG. 14 is a three-dimensional schematic diagram of a planting climbing frame according to some embodiments of the present disclosure. As shown in Fig. 14, the planting climbing frame 38 can be used for climbing plants. In some embodiments, the planting climbing frame 38 may be arranged on the base 362 of the planting tray 36. In some embodiments, the base 362 includes at least one fixed post 362b protruding from the base 362, and a column of the plant climbing frame 38 can be inserted into the fixed post 362b to fix the plant climbing frame 38 on the base 362.

[0080] The present disclosure also provides a cultivation system arranged on a canal. As shown in FIG. 2A, the cultivation system 10 includes a frame structure 102 and an irrigation module 200. The cultivation system 10 may have a transportation function or may not have a transportation function. The frame structure 102 is arranged on the canal 20. The frame structure 102 is configured to support a plurality of planting trays 30. The irrigation module 200 is connected to the canal 20. The irrigation module 200 is configured to carry water from the canal 20 to the planting trays 30. In some embodiments, as shown in FIGS. 3 and 8, the cultivation system 10 further includes a processing region (harvesting hub) 300 adjacent to the frame structure 102, and the processing region 300 is configured to harvest plants (e.g., vegetables) from the planting trays 30 and pack the plants (e.g., vegetables). The embodiments of the frame structure 102, the irrigation module 200 and the processing region 300 can be the same as described above, and will not be repeated here.

[0081] The above-mentioned embodiments are only illustrative of the principles and effects of the present disclosure, as well as explaining the technical features of the present disclosure, rather than limiting the scope of protection of the present disclosure. Anyone who is familiar with the

technology can easily complete changes or equal arrangements without violating the technical principles and spirit of the present disclosure. All of them belong to the scope of the present disclosure.

WHAT IS CLAIMED IS:

1. A cultivation system arranged on a canal, comprising:
 - a conveying module arranged on the canal, the conveying module being configured to support a plurality of planting trays and capable of transporting the planting trays in one direction, wherein the conveying module comprises:
 - a frame structure arranged on the canal along the direction; and
 - at least two roller sets arranged on the frame structure with a minimum spacing, and the at least two roller sets being configured to drive the planting trays to move along the direction, wherein the minimum spacing between the at least two roller sets is greater than a length of one of the planting trays;
 - an irrigation module configured to carry water from the canal and/or a backup water supply device to the planting trays; and
 - a water storage device below the conveying module or installed in the canal, and the water storage device being configured to breed fish or store water.
2. The cultivation system of claim 1, wherein the direction is parallel to an extending direction of the canal.
3. The cultivation system of claim 1, wherein the frame structure is inclined or parallel to the canal.
4. The cultivation system of claim 1, wherein the frame structure comprises a plurality of frame units arranged in the direction, and each of the frame units is configured to support one of the planting trays.

5. The cultivation system of claim 1, wherein the frame structure comprises a plurality of frame units arranged in the direction, and the at least two roller sets are arranged on two of the frame units, and the minimum spacing between the at least two roller sets is greater than or equal to three times a length of each of the frame units.

6. The cultivation system of claim 1, wherein the frame structure comprises a plurality of frame units arranged in the direction, and the at least two roller sets are arranged on two of the frame units, and the minimum spacing between the at least two roller sets is greater than or equal to ten times a length of each of the frame units and less than or equal to thirteen times the length of each of the frame units.

7. The cultivation system of claim 1, wherein the minimum spacing between the at least two roller sets is between 5 meters and 15 meters.

8. The cultivation system of claim 1, wherein the conveying module further comprises:

a plurality of ball units arranged on the frame structure, and the ball units being configured to help the planting trays to slide along the direction.

9. The cultivation system of claim 8, wherein the ball units are arranged on at least one surface of the frame structure for contacting each of the planting trays to help each of the planting trays to slide along the direction.

10. The cultivation system of claim 1, further comprises:

a working walkway arranged on the canal along the direction and adjacent to the frame structure.

11. The cultivation system of claim 1, wherein the irrigation module comprises:

a sprayer configured to spray the water from the canal and/or the backup water supply device onto the planting trays; and

a pump configured to carry the water from the canal and/or the backup water supply device to the sprayer.

12. The cultivation system of claim 11, wherein the backup water supply device comprises:

a sump adjacent to the planting trays over the conveying module, and the sump being configured to receive water discharged from the planting trays; wherein the pump is configured to carry the water from the sump to the sprayer for the sprayer to spray the water onto the planting trays.

13. The cultivation system of claim 11, wherein the pump is further configured to carry the water from the water storage device to the sprayer for the sprayer to spray the water onto the planting trays.

14. The cultivation system of claim 1, wherein the water storage device is a fish tank or a water storage pipe.

15. The cultivation system of claim 1, further comprising:

a supporting frame arranged on the canal, and the supporting frame being configured to support the conveying module and the water storage device below the conveying module.

16. The cultivation system of claim 1, further comprising:

a curtain arranged over the conveying module, and the curtain being configured to block rain or part of light.

17. The cultivation system of claim 1, further comprising:

at least one processing region adjacent to the conveying module, and the processing region being configured to receive the planting trays from the conveying module or place the planting trays on the conveying module.

18. The cultivation system of claim 17, wherein the at least one processing region is arranged on the canal.

19. The cultivation system of claim 17 further comprises:

a movable pesticide spray booth placed in the processing region.

20. The cultivation system of claim 1, further comprising:

two processing regions, the conveying module between the two processing regions, and the two processing regions being configured to receive the planting trays from the conveying module and/or place the planting trays on the conveying module.

21. The cultivation system of claim 1, further comprising:

a pre-cultivation sprouting region configured to cultivate the planting trays, wherein the pre-cultivation sprouting region comprises a multi-layer rack structure and a light unit, and the multi-layer rack structure is configured to accommodate a plurality of trays, and the trays are configured to accommodate cultivation materials and seeds.

22. The cultivation system of claim 1, wherein the cultivation system is

used to cultivate vegetables, fruits, melons, ornamental plants, or a combination thereof.

23. The cultivation system of claim 1, further comprising: a fish tank below the conveying module, and the fish tank is configured to breed fish.

24. The cultivation system of claim 1 further comprising:
a processing region adjacent to the frame structure, and the processing region being configured to harvest vegetables from the planting trays and pack the vegetables.

25. The cultivation system of claim 1, wherein each of the planting trays comprises:

a base; and

a fixing structure transversely arranged in the base and abutting against two opposite sides of the base, wherein the fixing structure comprises a plurality of holes.