CLAIMS

1) An automatic and modular system for handling trays (32) used for containing plants or the like to be grown through hydroponic, or aeroponic, or aquaponic farming, said system comprising a first module (30) with a quadrangular plan and a vertical arrangement delimited by respective vertical supports (31), said first module (30) comprising two lateral zones, each of which includes a plurality of substantially horizontal and overlapping supporting seats or guides (37, 37') for trays (32), and a central zone in which a vertical tray transfer device (33) operates, slidably along a vertical axis (Z) arranged on movement means activated by motorized assemblies (34) able to translate said vertical transfer device (33) from a lowered position to a raised position in correspondence of each tray (32) and vice versa, said vertical transfer device (33) being provided with a resting shelf (33') for a tray (32) and with a first means running said tray along a first horizontal axis (Y) from and towards a respective seat provided inside one of said lateral zones, the system being wherein said first module (30) further comprises a second means (36) arranged in said central zone in which said vertical tray transfer device (33) operates, taking charge of a tray (32) when the latter is located on the shelf (33') of said vertical tray transfer device (33) and displacing said tray (32) along a second axis (X) horizontal and orthogonal to said first horizontal axis (Y) for performing the direct transfer of said tray (32) towards another shelf (33') of another vertical transfer device (33) of a second module (30) arranged alongside and connected to said first module.

2) The system according to claim 1, wherein it comprises a

plurality of further modules (30) arranged adjacent to each other and interconnected so that at least two of them are aligned along the first (Y) or the second (X) horizontal axis.

3) The system according to one of the preceding claims, wherein each module is square shaped and in that each of said lateral zones and said central zone have substantially the same plan dimensions.

4) The system according to one of the preceding claims, wherein said second means (36) comprises motorised rollers or belts operating on the tray (32) and in that said shelf (33') is provided with openings (35) inside which said motorised rollers operate for taking charge of a tray (32).

5) The system according to one of the preceding claims, wherein it comprises a device (85) cooperating between seats (37, 37') or guides of adjacent modules (30), adapted to translate a tray (32) from a lateral zone of one module (30) to a lateral zone of an adjacent module along said first horizontal axis (Y).

6) The system according to claim 5, wherein said device (85) comprises a pair of motorised belts opposing and parallel to each other arranged between respective lateral zones of adjacent modules (30).

7) The system according to one of the preceding claims, wherein the handling of the movement of said trays (32) is controlled by an electronic control unit that controls the movement of said vertical transfer device (33) pertaining to each module (30) and of the horizontal transfer devices pertaining to each module

and connecting adjacent modules.

8) The system according to one of the preceding claims, wherein at least one of said modules (30) comprises lighting and/or irrigation means and/or elements suitable for the development of the plants.

9) The system according to claim 8, wherein each module (30) can be split into various overlapping areas, each of which deals with different or uniform functions for the development of the plants contained in the trays (32).

10) The system according to claim 9, wherein the trays (32) are positioned inside each module (30) in different zones having different functions, one of which is free from lighting and appropriately shielded for subjecting the crop to a night-time simulation condition, another of which comprises a lighting means used for the simulation of daytime and solar radiation for photosynthesis, and another of which comprises an irrigation means.

11) The system according to one of claims 9 and 10, wherein each module (30) is positioned in the system in different zones having different functions, one of which is free from lighting and appropriately shielded for subjecting the crop to a night-time simulation condition, another of which comprises a lighting means used for the simulation of daytime and solar radiation for photosynthesis, and another of which comprises an irrigation means.

12) The system according to claim 11, wherein it comprises one or more zones used for seeding which can be

diversified based on the different types of crops.

13) The system according to one of the preceding claims wherein the movement of said trays (32) is handled and driven by an electronic control unit and/or by an information system provided with memory means in which the seeding coordinates of the individual plant product and the physical position of the individual plant product are recorded as arranged on an individual tray (32).

14) The system according to claim 13 wherein it comprises one or more cameras, allocated in a suitable zone of one or more modules (30), adapted to record the state of the plants in the trays by sending the data to an information system that processes the state of each plant, compares it with the previous images, with those of the plants with similar characteristics and assesses their state of health to optimise the growth process of the individual plant products.