

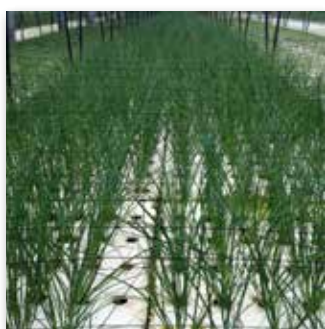
HYDROPONIC SYSTEM

養液栽培システム

Field hydroponic system ・ Strawberry field
N-BOX ・ Hydroponics (Leafy and fruit vegetable)



- Various nutriculture systems suitable for leafy and fruit vegetable
- Stable production of nursery plant using artificial light type raising seedling apparatus
- We propose our own cultivation system such as sustainable and high yield type.



Field hydroponic system

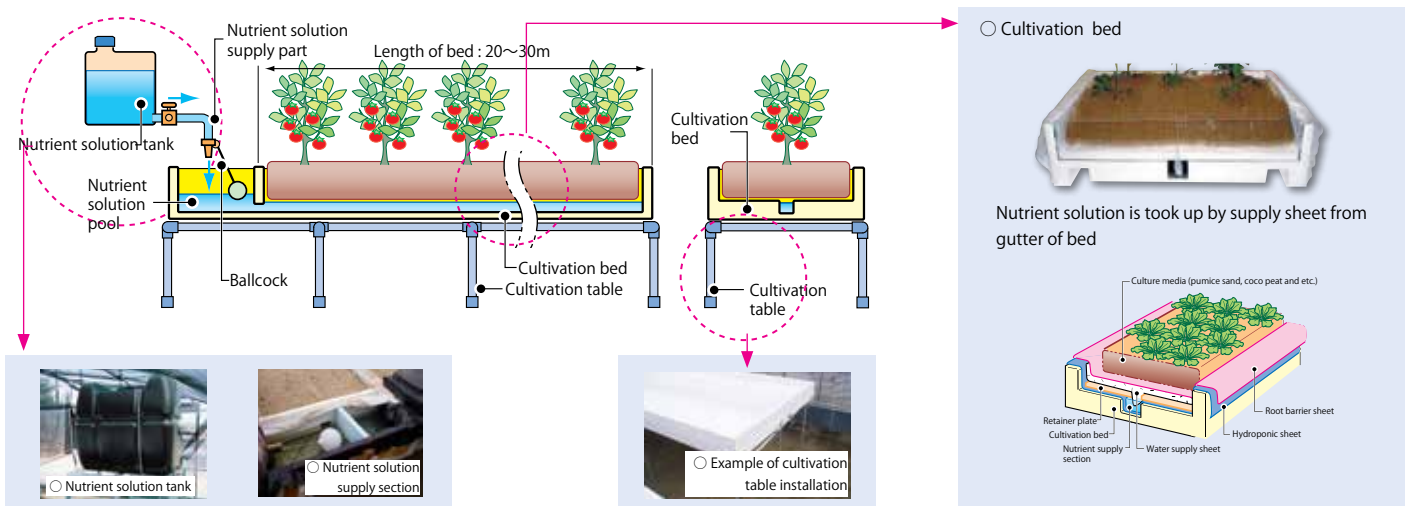
Feature

Our system is electricity needless, no drainage, low cost and environmentally sound product.



Low cost	Because there is no need complex equipment for culture system, cost of introduction and cultivating is inexpensive.
Electricity needless	There is no need electricity for nutrient solution supply. Therefore you can culture anywhere, as long as water is supplied.
No drainage	Nutrient solution is supplied only the quantity needed for cultivation. Therefore, there is no drainage.
Easy to assemble and install	Anyone can easily install. Put styrofoam beds and spread sheet, and fill with culture media.
Easy to cultivate	Anyone can cultivate vegetable with our system. Because, culture media, such as coco peat, is used instead of soil.
Suitable place and vegetable	You can combine culture media freely depending on regional characteristics and vegetables.
Available organic cultivation	You can use as a organic cultivation system with organic soil for culture media
Available to install in existing greenhouse	It is possible to control costs because it is easy to install in the existing green house.

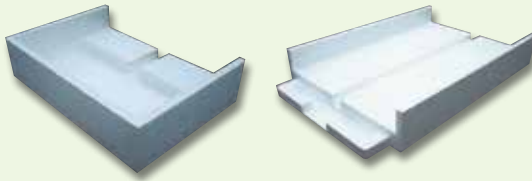

Structure



Examples of installation



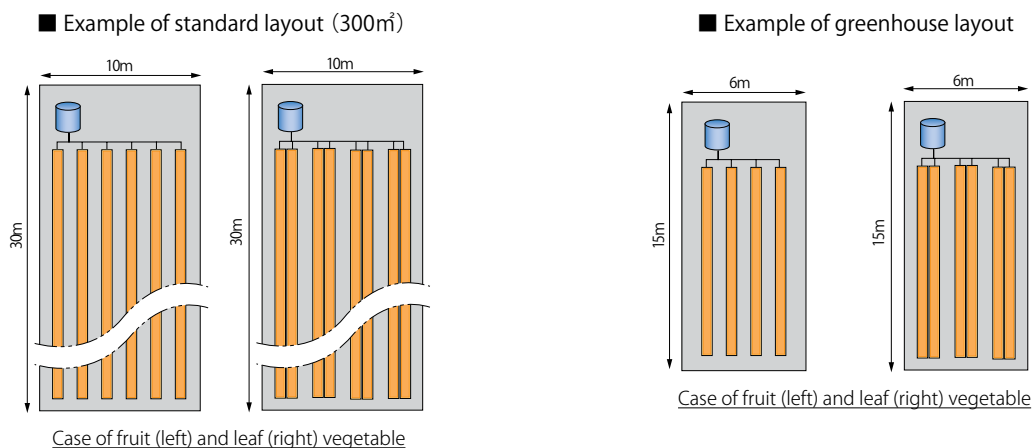
Specification

	Field hydroponic system for 「Leafy vegetable」	Field hydroponic system for 「Fruit vegetable」
Bed section	W650 × L900 × H175mm	W350 × L630 × H220mm
Pool section	W650 × L450 × H175mm	W350 × L350 × H220mm
Supplying method	Sub-irrigation type (natural supplying from tank and supplying sheet)	
Sheet	Hydroponic sheet, supplying sheet, root barrier sheet	
Usable culture media	Pumice sand, coco peat and ceramic organic soil are selectable.	
Figure	 <p>Pool section Bed section</p>	 <p>Bed section Pool section</p>

※ Optimum length of bed : 20~30m/ 1 line

Design proposal of total system

- Optimal design proposals are available depending on facility scale and type.



Case of cultivable vegetables

- Our system can be used for various purpose such as cultivation of seedling, leaf and fruit vegetables, root crops and flowers.



○ Spinach



○ Strawberry



○ Saltwort



○ Bell pepper



○ Radish



○ Lettuce



○ Komatsuna (brassica rapa)



○ Tomato

Strawberry field

High yield strawberry cultivation system

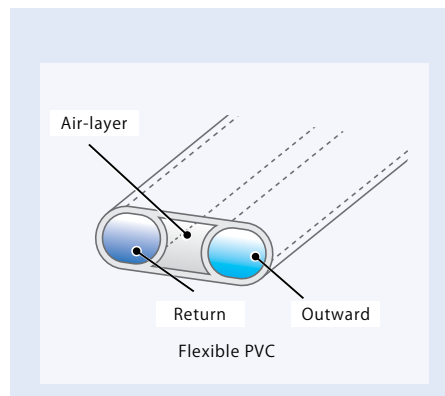
Our techniques which are crown-temperature control for stable growth and slide type moving bench for high space use make stable and high production of strawberry

- Strawberry field high production system for strawberry which it product 10t/10a of strawberry. It is 2.5 times more higher production than conventional system.
- Combination of two core technologies, which are sliding moving cultivation bench uses space efficiently and crown temperature control stabilizes growth of strawberry, makes high yield production possible.
- Strawberry field can be installed in the existing greenhouse. When ground water is available, it is possible to reduce the cost because chiller for crown-temperature control is not needed.
- We can supply various types and kinds of seedlings for cultivation in the system.



	Conventional system	Strawberry field	Ratio
Number of planting head	8,000 head/10a	15,000 head/10a	1.8
Harvest period	Late November ~ mid May (6 months)	Late November ~ August (9~10 months)	1.6
Target yield	4t/10a	10t/10a	2.5
Temperature of culture media	Only warming using hot-water pipe	Warming and cooling using crown-temperature control	—

Crown-temperature control



- Crown-temperature control with double line tube makes growing to be stable and extend harvest period to 1.6 times. Moreover fallow period is dissolvable.
- Heating cost can be reduce to 1/2~1/3 during winter season

Slide type cultivation bench

- When greenhouse worker passes the aisle, widens it, and when does not in use, narrow the aisle.
- Yield amount per area can be increased because of high cultivation space use through widening and narrowing the aisle.



○ When the aisle is not used (aisle is narrowed)



○ When the aisle is used (aisle is widened)

Nutriculture

Leafy and fruit vegetable / raising seedling

Leafy vegetable (DFT • NFT)

● DFT

Hold nutrient solution (5cm depth) in beads of styrene foam, and circulate the nutrient solution by a pump.



○ DFT : Leaf lettuce

● NFT

Pour nutrient solution thinly in beads of styrene foam that arranged in slopping, and circulate the nutrient solution by a pump.



○ NFT : Salad spinach

Fruit vegetable (Rock wool and peat moss)

● A method that add nutrient solution by sprinkler tube in culture medium like Rock Wool , Coco Peat, etc. nutrient solution is used by circulate it.



○ Rock wool : bell pepper



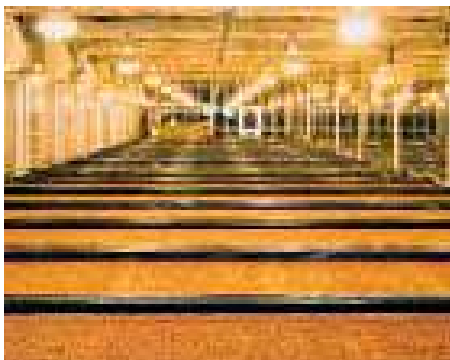
○ Coco peat : Tomata



○ Hanging gutter :bell pepper

Raising seedling (Ebb and flow)

● In our system which uses principle of siphon action, nutrient solution is supplied to cultivation tray and water level is adjusted automatically.



○ Raising seedling using moving bench



○ Raising seedling using cultivation tray



○ Siphon part

N-BOX

TAN artificial light type raising seedling apparatus, care of grafted nursery plant, acclimatization and reserve unit for nursery plant

- TAN is a prefab nursery chamber and offers a broad range of using such as germination and nursing seedling, care of grafted nursery plant, acclimatization and reserve of nursery plant.
- Multistage nursery shelves are equipped and light source is selectable in fluorescent lamp, LED and CCFL.
- It is possible to fan uniform breeze to shelves due to blowing system from whole area of both flanks.
- We have various sizes (type 3 to 12) of TAN and also can provide larger size.

Model		TAN
Performance	Temperature range	+5 ~ +35°C ※ 1
	Humidity range	60 ~ 95%RH (humidifying control) ※1
	CO ₂	~ 2000ppm
	Lighting intensity	2,000 ~ 20,000lx (0.2m under the lamp) ※1
	Wind velocity	up to 0.2m/s (each area of stages)
Structure	Exterior	Colored steel plate
	Interior	Stainless pored plate
	Insulator material	Rigid urethane foam
Air-conditioning	Freezing process	Single stage freezing syste (air cooling)
	Thermal process	Heater
	Humidifying process	Supersonic humidifier
Light source	Selectable from three band fluorescent lamp, LED and etc.	
Electric power supply	AC200V 3 φ 50/60Hz	
Equipments	Nusery shelf, cable holes and socket	

■ Standard size

Model	Outside (W × D × Hmm)	Inside (W × D × Hmm)	Floor space
Type 3	1800 × 1800 × 2360	1700 × 1700 × 2000	2.9㎡
Type 5	2700 × 1800 × 2360	2600 × 1700 × 2000	4.5㎡
Type 6	3600 × 1800 × 2360	3500 × 1700 × 2000	6.0㎡
Type 9	3600 × 2700 × 2360	3500 × 2600 × 2000	9.1㎡
Type 12	3600 × 3600 × 2360	3500 × 3500 × 2000	12.3㎡

※ 1 Range of temperature and humidity, and lighting intensity can vary according to intended use.

Examples of cultivation

○ Lettuce



○ Tomato



○ Eggplant



○ Butter lettuce



○ Artificial light type raising seedling apparatus (Type 6)



○ Nursery shelf



ESPEC MIC Corp.

<http://www.especmic.co.jp>

AGRI-BIO Dept.

3-5-6, Tenjinbashi, Kita-Ku, Osaka 530-8550 Japan

Tel : +81-6-6358-4855 Fax : +81-6-6358-4856