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THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL, AND ENVIRONMENTAL SCIENCES

Nutrient delivery: DWC

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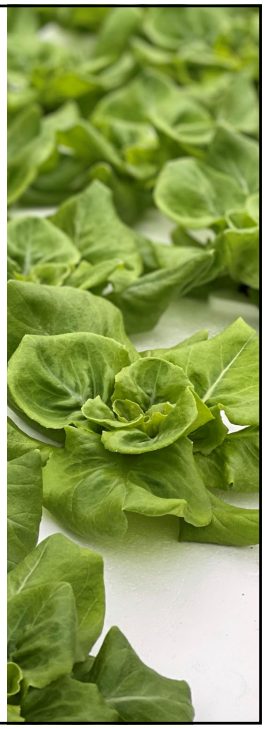


1

What is DWC?

- Deep Water Culture – a hydroponic system
- Synonyms – Deep Flow Technique (DFT), Shallow Water Culture (SWC), pond system, floating raft system, etc.
- Developed in 1970s (Dr. Merle Jensen, University of Arizona)
- Floating raft (polystyrene)
- Large buffering capacity for better temperature and nutrient management
- Large system volume and weight (> 4 L per plant)
- Aeration for dissolved oxygen (> 5 ppm)
- Continuous use of nutrient solution without total exchange
- Plants can move to workers
- Suitable for leafy greens

2

Deep water culture hydroponics tested in 1984 (photo by Merle Jensen)

3

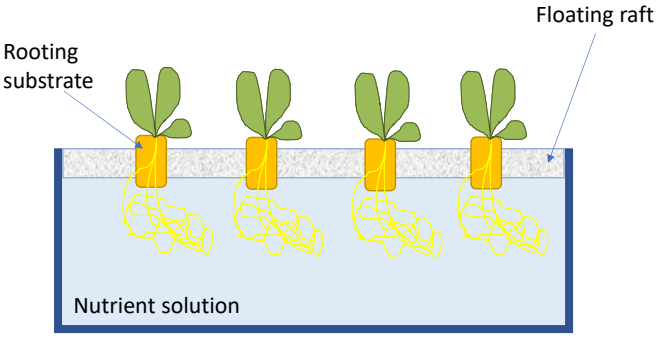
DWC – Deep water culture

DWC based commercial-scale lettuce production (Cleveland, OH)

4

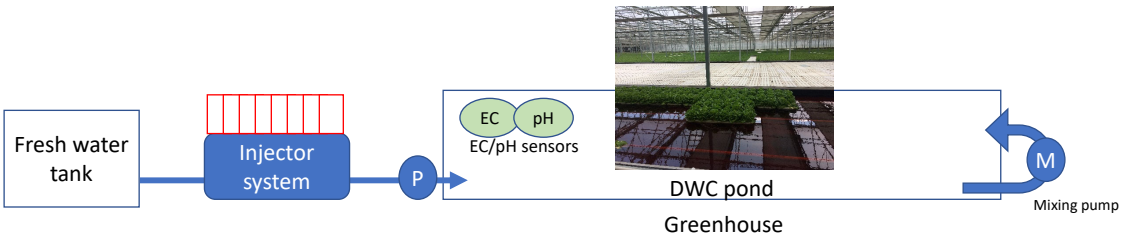
Components of DWC

- Custom designed
- Floating raft (polystyrene)
- Pond with a large volume of nutrient solution (> 4 L per plant)
  - ~30 cm in depth for DWC
- Mixing pump for aeration for uniformity and maintaining dissolved oxygen (>5 ppm)
- Chiller unit for solution temperature control
- EC, pH, and water level sensors



5

DWC system setup



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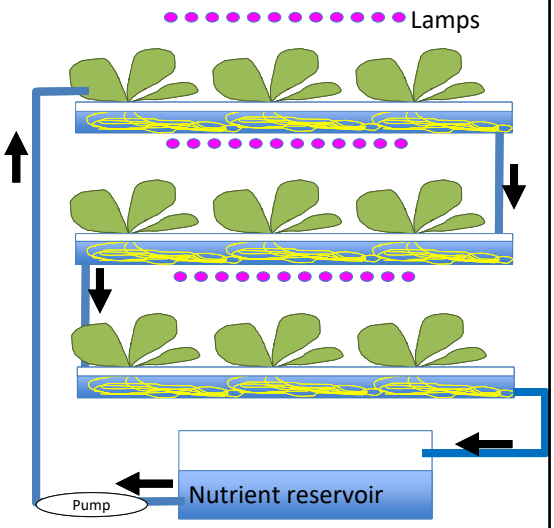
Shallow water culture

- Widely used in totally controlled environment in indoor farming
- Nutrient solution depth: ~5 cm
- Continuous gravitational circulation (minimum use of pump)



A shallow water culture system

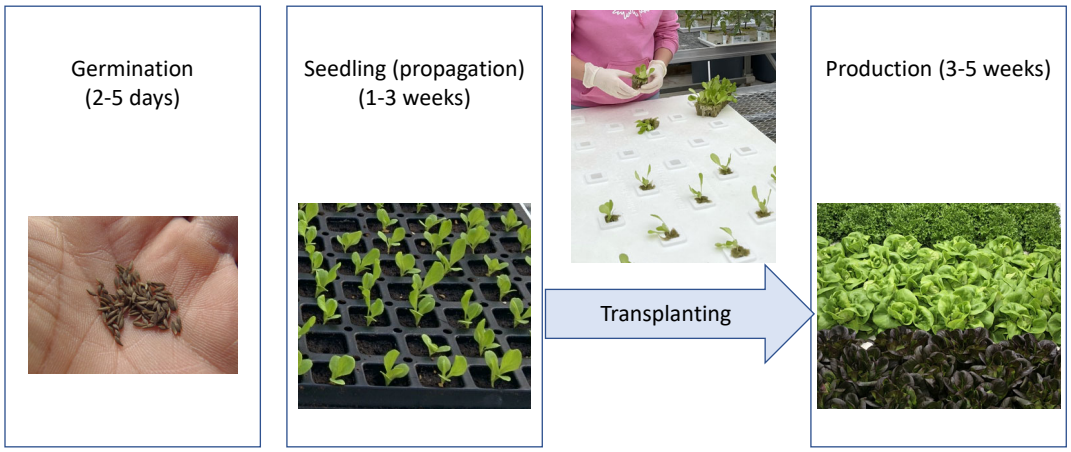
7

Water chiller system for nutrient solutions

- Works for DWC (deep water culture)
- Limited effect for NFT (nutrient film technique)
- Keep the solution temperature below 20 ℃
- High electric power consumption

8

Leafy green production stages



9

Respacing in DWC

- Respacing increases light use efficiency and the production capacity (annual yield).

Kubota (2016)

10

Thank you!

For questions, please contact:
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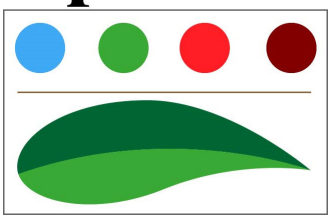

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11