

Optimal root environment for an optimal yield

Wageningen UR Greenhouse Horticulture

A good root environment is the basis of a healthy crop. Wageningen UR Greenhouse Horticulture has delivered many crucial innovations in this field, including substrate cultivation. Together with our partners, we identify and develop the best root environments for new cultivation systems and design improvements to existing ones.

Substrate

Wageningen UR has extensive knowledge and experience in the development, optimisation and deployment of many different types of substrate. This facilitates the effective creation of appropriate substrate types for new cultivation systems. New and innovative substrates are studied for key characteristics such as moisture absorption, air to water ratio, durability, and phytotoxicity. The optimal application of substrates is determined for every desired crop and we offer customers and partners a platform for the exchange of knowledge and experience in the use of substrates.

Water

adequate water supply is crucial for the control of the growth and development of the crop as well as for product quality. However, in addition to nutrients, water also carries a number of pesticides, which can be discharged into the environment.

Wageningen UR Greenhouse Horticulture delivers know-how and techniques that reduce the release of harmful materials as much as

possible via control of the water flow. We work with research and industry partners on the design of completely closed water chains in glasshouse horticulture.

Nutrients

It is crucial to anticipate developments in cultivation systems and in legislation regarding substrates in the management of nutrient flows. Wageningen UR Greenhouse Horticulture has delivered the basic knowledge underlying all the customary fertilisation charts. New findings in our research allow these charts to be regularly updated and improved.

Researchers from Wageningen UR Greenhouse Horticulture provide entrepreneurs with advice on persistent problems surrounding fertilisation. Thanks to the combination of knowledge gained from research and practical application, they are able to quickly and adequately analyse almost all situations.

Control

Good control of water and nutrient supply allows for optimal yields while minimising the impact on the environment. Our pioneering work in this field includes close cooperation with the business community on online measuring and regulation systems for water and nutrient supply. Within these systems, the latest data is supplied to computer models, which in turn provide analyses to support decision-making, or control the processes directly.

Organic cultivation

The nitrogen dynamics of the soil is a complex system that largely determines the yield of organic cultivation. Wageningen UR has developed computer models that describe the processes of nitrogen turnover in the soil, complete with databases featuring the important characteristics of fertilisers. This helps sustain a systematic supply of organic fertilisers and allows organic growers to reach optimal production and quality via equilibrated fertilisation and a healthy soil.



For more information:

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Decreasing the dissipation of nutrients

In order to decrease the effects of nutrients on surface and groundwater, Wageningen UR Greenhouse Horticulture has, together with partners, developed cultivation concepts and systems for both soil-bound and substrate cultures. The approach aims to attune nutrient supply to crop demand.

- The fertigation model for greenhouse cultivation
- Development and application of humidity measuring in greenhouse soil by means of WET sensors
- Flow-aid, optimisation of water management in horticulture in semi-arid regions
- Reduction of mineral concentrations in the growing of roses, tomatoes, cucumbers, and potted and bedding plants
- Practical networks on how to deal with minerals

Partners: The EU, the Dutch Product Board for Horticulture, and the Dutch Ministry of Agriculture's programme for system innovation in covered cultivation



Online measuring and regulation systems for nutrients

An integrated monitoring and control system for nutrients and water is being developed in the framework of a partnership project between Wageningen UR and its partners in the business community. The research aims to achieve systematic production and a completely contained water chain.

The project encompasses the following initiatives:

- An ion concentration monitor
- A nutrient intake monitor
- A model-controlled regulator for water and nutrient dosage
- Software for predicting water and EC dynamics in the root environment
- Measuring evaporation and water intake

Partners: Hydrión B.V., Hortimax, PRIVA, Alterra, the Ecology and Technology department (EET) of the Dutch Ministry of Economic Affairs, the Dutch Ministry of Agriculture, Nature Management and Fisheries, the Dutch Product Board for Horticulture

Research into the quality of new substrates

Wageningen UR Greenhouse Horticulture carries out substrate analyses for producers of new substrates. Customised studies in specially equipped facilities provide a quick and effective way for substrate manufacturers to gain insight into the qualities of their new products.

One of the crucial characteristics of a good substrate is a lack of phytotoxicity. We test new substrates with the so-called Phytotoxkit, a method that excludes the structural effects of substrates.

Partners: Producers of substrates and raw materials for substrates, suppliers

