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Crop Rotation and Biodiversity in Organic Greenhouses – experiences from Norway

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New EU regulation requires among other things adaption to cultivation directly in the soil below organic greenhouses. This is the most demanding and challenging requirement for organic growers in Scandinavia. New growers need to customize starting out their production while, growers certified before mid-2018 may adapt in a 10-year period. Derogations are only if the plant is sold growing in a demarcated bed e.g. in a pot.

In Norway around 60 organic growers have a greenhouse for certified organic growing. Majority is part of farm complexity, and few are intensive production. Tomato and cucumber production are the most common cultures. The responses to the new regulations are eighter to adapt to them or concentrate on transplants, flowers or herbs sold in pots, some may possibly also choose to retire when the dispensation period is over; consequently, one will see more importation from abroad or conversion to conventional production.

For adaption to the new regulation most challenging is to create a crop rotation and to secure soil health. The most grown cultures all belong to the same botanically families: *Solanaceae* and *Cucurbitaceae*. A swift from mono- to polyculture could as well imply companion planting and transfer mulching. Cultivation in greenhouse during wintertime could include some new species for which it is important to create a market.

Case studies and examples of ways to innovate organic greenhouse production is given during the presentation. These originates from Norway, Denmark, and France.

For growers in Norway, it is an issue to get growing media inclusive healthy soil for their greenhouse. Soil health is a complexity of functions and indicators; different assessments suggest several approaches which have a broader perspective than for soil in greenhouse. Common holistic approach is to divide soil quality into physical, chemical, and biological criteria. Soil biota is part of biological criteria and healthy soil biota is emphasized as crucial for soil in greenhouse.

In an ongoing Norwegian project, consortium between Norwegian Institute of Bioeconomy (NIBIO), Norwegian Agricultural Advisory Service (NLR) and Norwegian Centre for Organic Agriculture (NORSØK) we make an exposition about soil improvement in greenhouse; experiment with three soil mix; and have chosen to assess and measure biological activity in the soil. Soil biota respiration is measured by Solvita® test (unit CO₂), to distinguish fungi from bacteria soil micro biometric measuring is used (colour indication) and bait lamina sticks is used to detect soil biota consumption of organic matter. These methods together with field manual for "License to soil" are chosen in order to provide growers access to comprehensive methods easily available. Some provisional results from the project are presented.