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Research Institute of Organic Agriculture Switzerland

Joint Bachelor Course on Organic Agriculture 2014 Lecture 8: Organic Plant Production II Vegetable Growing

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Organic vegetables: Growth of the organically managed land 2004-2011



Source: FiBL, IFOAM & SOEL Surveys 2006-2013

SNF/SCOPES

FiBL www.fibl.org

Organic vegetables: The ten countries/areas with the highest shares 2011







Source: FiBL-IFOAM Survey 2013, based on national data; shares calculated with FAOSTAT data

SNF/SCOPES

Organic vegetable growing

- Species and variety selection
 - Soil, climate, resistance to pests and diseases, yield
- > Propagation material should be
 - > Uniform bred
 - Self- produced (preferred)
 - Organically produced
 - > Seed treatments: hot water, tea



Vegetable groups

Brassicas

- > High nutrient and water demand
- > Autumn manuring suggested, first plant of crop rotation
- > Root and tuber crops
 - > Requires good soil structure and potassium
 - > Green manuring suggested, second plant of crop rotation
- Bulb and stem vegetables (carrots, onions)
 - > Plant protecting effect due to volatile oils
 - > Low weed supressing ability
- > Fruit vegetables (tomato, pepper)
 - > High nutrient, heat, water, and light demand
- > Leguminous vegetables
 - > Low nutrient demand due to root bacteria symbiosis
 - > Nutrient exploring role in the crop rotation

SNF/SCOPES

- > Crop rotation
 - > Utilization of plant interactions over time
- > Mixed culture
 - > Enriched plant diversity within a field
- > Raised bed
 - > Utilization of organic waste for production
 - > Easier to manage for elderly people
 - > Relative independence from genuine soil

> Crop rotation

- > Order of plants determined in time and place
- Utilization of soil nutrients by shifting plants with different nutrient demands
- > Preserving soil nutrients with leguminous plants
- Protection against pests and diseases by breaking their life cycle
- Weed supression ability of pre-crops

Intercropping

- > Production of two or more species parallel withi
- Direct chemical or mechanical support of plants
- > Obligatory in organic farming
 - > Using plant interactions
 - Preserving soil productivity
 - > Using nutrients
 - > Protection against pests and diseases



Mixed Cultures

- > Advantages
 - > Better area utilization
 - > Higher yields
 - > Soil coverage
- > Disadvantages
 - > Higher environmental demands
 - > Requires knowledge
- > Role of plant interactions
 - > Influence to germination, development
 - > Effect on pests and diseases



Mixed cultivation in organic farming

- > Alternate row cultivation
 - > Small- scale method
 - > Mechanization is challenging
- Stripe cultivation
 - > Plant interactions in space
- > Crop rotation
 - > Plant interactions in time







Mixed cultivation in organic farming

Big-scale, organic farms

- > Location of farm, area
- > 7-10 rows of plants
 alternating stripes.

Crop rotation

- > Suitable crop order
- Effect of fore- and following crop
- Problems of nutrition
- Plant protection
- > Harvest
- Soil cultivation



Organic vegetable growing

Plant interactions in space

Advantageous combinations

- > Radish + lettuce = protection from flea beetles
- Autumn planting of strawberry + lamb's lettuce = better development
- > Cucumber + pole bean = wind protection, higher yield
- Peas + white mustard, phacelia = protection against pea thrips, pea weevil, higher carotene content

Disadvantageous combinations

- > tomato + cucumber = fruit setting inhibited
- > peas + bean, potato + tomato = same family
- > radish + cucumber = fruit setting inhibited
- > potato + cucumber = susceptibility to Phytophtora







- Area covering plants
- Inappropriate conditions for weed development
- Combating soil moisture losses through hampering evapotranspiration
 - Mustard
 - > High drought tolerance, wears compacetd soils well
 - > early sowing, cutting to 25-30cm
 - > Surface composting
 - > Horse bean
 - > Explores nitrogen in the soil leguminous
 - > Develops high green mass
 - early sowing, cutting to 30-40cm to soil surface, remains as mulch
 - > Covering interrows
 - > spinach (50cm distance), New Zealand spinach
 - > Fast development, favors shade, short life length





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Protecting plants

> Plants with certain abilities which support the development of the cultivated crop

Vegetable combinations

- > Tomato or celery repelling cabbage flies
- > Parsley repellents pests of tomato and onion

Vegetable – medicinal plant combinations

- > Dill ensuring healthy development of carrot, cucumber and cabbages
- > Borage pest repellent (cabbages), roots loosen soil
- > Tropaeolum pest repellent
- > Valerian supporting fruit growth of bean, pea, tomato, cucumber
- > Common tansy effective against fungal diseases of strawberry and raspberry
- > Lavender, sage repellent
- > Hyssop, thyme repellent, especially of snails

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Plant interactions

Phytoncides: antimicrobial allelochemic organic compounds produced by plants

Ethylene – Dandelion (*Taraxacum off.*)

Allicin – garlic

Volatile oils – spice plants

Neighbouring- effect

Medicinal and spice plants (companion or margin plants) Vegetables The smell repells or confuse pests depending

on year and soil, no constant outstanding effect





Organic vegetable cultivation techniques Raised beds

Great amount of organic matter produce heat when decomposing – earlier to harvest

Hill-beds for vegetables

- > Aeration, more moisture, stagnant water
- > 1,4-2,2x 3-8 m N-S direction
- > min. 4 years (5-7 years)

Framed raised beds

- > Organic waste utilization
- > Makes production possible if soil is contaminated
- > Optimal for city/community gardens
- > Easier to maintain
- Better access by elderly or disabled people
 SNF/SCOPES





Organic vegetable cultivation techniques Greenhouses

- Permanent vegetable supply through controllable environmental conditions
 - > Wind protection
 - Water-efficient irrigation
 - Pest and disease control
 - > Higher efficiency of biological agents, self-reproduction
- > Plastic tunnels without heating
- Production on genuine soil
 - Soil disinfection (if not moving houses)
- Climatization geothermal energy, biomass
- Variety selection
- > Crop rotation
 - > Harder to design due to effective area utilization



Organic vegetable market risk and production

- > Higher potential income with higher risks
 - Diseases, pests, and weeds management without chemicals
 - > Unexpected weather conditions
 - > Market demands changeable
- > Lower yields with higher product value
- > Diversity could be a soultion
 - > Species and variety level

Contact

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