› **Joint Bachelor Course on Organic Agriculture 2014**

Lecture 8: Organic Plant Production II: Grassland, fruits, and viticulture

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SNF/SCOPES

Importance of permanent grassland

- Species rich
- Species originated from local flora
- Species are higly flexible
- Greater ecological amplitude
- Significat role in natural biodiversity
  - Landscape formation and protection

4 types of pasture-crop management

- Grazing pasture
- Pasture for fodder
- Meadow, fallow pasture, and degraded pasture
- Natural permanent pasture

Plant species of the pasture

- Grasses and herbaceous (annual and perennial)
- Pastures of agricultural utilisation
  - Grass species, leguminous and other herbaceous species
  - Different utilisation result in different plant associations (zonation)
  - Differ with given territory, flowering time, stage of development related to given plant association (aspects)

Grass species (utilisation and cultivation categories)

1.Class
- Harvestable crops in vegetation season.
- High quality/quantity of crops and breed (good nutrition and water supply)

2. Class
- No agricultural modification nor quality.

3. Class
- Weeds, competition with valuable grass
- Vegetation season is short (ripe seed early)
- Sometimes note eatable or for grazing

Pasture

Grazing pasture

- Grazing during whole vegetation season
- Crop of pasture depends on grazing season and grazing animal
- Quality of grasses
  - Pasture as second-rate short grasses suitable for sheep
  - First-rate tall grasses with fine leaves for milking cow pasture
  - Rough leaved grasses are composing beef pasture

Fodder pasture and meadow

- Utilised by cuttings (fresh, wet, and soggy wetland)
- Tall type of grasses
- Meadows utilised partly for grazing and partly cutting.
  - Most species rich condition
  - Meadows characterised by amount of cut territory (influenced by number of grazing animals)
  - Hay quanitity is depending on nutrition and fertilisation conditions of soil, nutrient supply and year effect.

Pasture

Fallow pasture (agricultural area)

- Cultivation stopped
  - neglected weedy pasture area with scattered bushes
- Crop of pasture not usable for cutting or grazing.

Degraded-pasture

- First class grass species decrease gradually
- Natural succession processes are developing

Over-grazing

- cause of degradation, species disappear
- Restoration by replanting

Components of pasture

Leguminous species (important fodder plants)

- White clover (Trifolium repens), and Birsfoot trefoil (Lotus corniculatus) are the most often planted species.
- In ecological farming white clower (Trifolium repens) is often used, to fix Nitrogen into soil

Weed flora

- Constant/absolute weed plants
- Harmful groups
  - Poisoning weeds harmful in green and in dry environment
  - E.g. Creeping buttercup, Meadow buttercup, Reed sweet grass
  - Poisoning in green/row only (fodder after dry), as hay fodder such as common horse tail, Meadow saffron, Deadly nightshade, Spring Adonis,
  - Spiky weeds prevent proper utilisation of the pasture

Grazing animals can learn to recognise the poisoning species during grazing

Pasture Composition

- Local ecology, cultivation, utilisation, grazing animals
  - Grazing field: short grass: tall grass : leguminous species (60:30:10 %)
  - Hay pasture: short grass: tall grass : leguminous species (20: 60 : 20%) (Collect first cut as hay, rest for grazing)

- Milk cows
  - 5-7 species, 4 growths in 160 - 180 days of grazing season.
  - Perennial rye grass, Creeping festuce, Smooth stalked meadow grass, Forage bomes, Meadow festuce, White clover, Birsfoot trefoil

- Beef pasture
  - 1 or 2-3 species of grasses (with excellent cropping capacity) grazing of beef or 200-240 days
  - Tall feccue, Forage bromes, Reed canary grass

Organic Fruits

Berries, stone fruits,pome fruits

Ecological demand of berries

- Moderate temperature are red currant, black currant, blueberry and raspberry
- Light demanding species (raspberry)
- Shade tolerant species (red currant, strawberry, blueberry)
- High water demand 700-800mm annually (strawberry, raspberry, blueberry, black currant)
- Moderate water demand 600mm/year (red-currant, gooseberry)

Ecological demand of Stone fruits

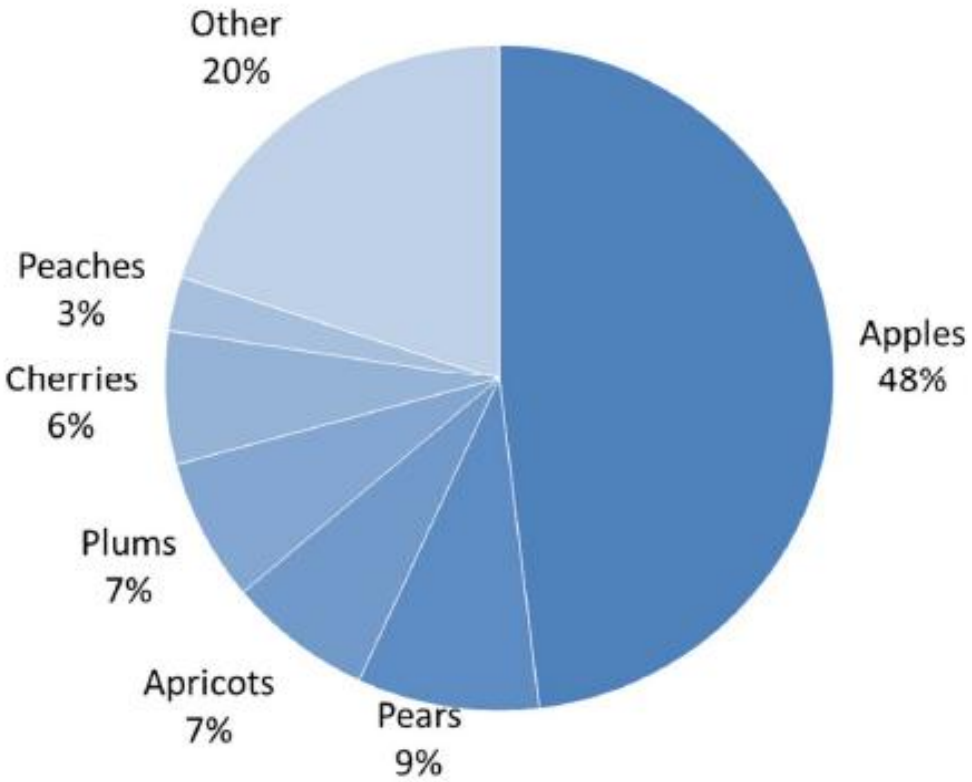
Stone Fruits: high heat and light demand

- Light demanding species (peach, apricot)
- Less light demanding (plum)
- Warm weather (peach, almond, apricot)
- Moderate warm weather (sweet cherry, sour cherry)
- Frost sensitivity varies among species

Pome fruits

- Less light demanding (pear, apple)
- Winter frost sensitive (pear, apple)
- Warm weather (apple)
- Moderate warm (pear, quince)
- High water demand 700-800mm/a (apple, pear, quince)

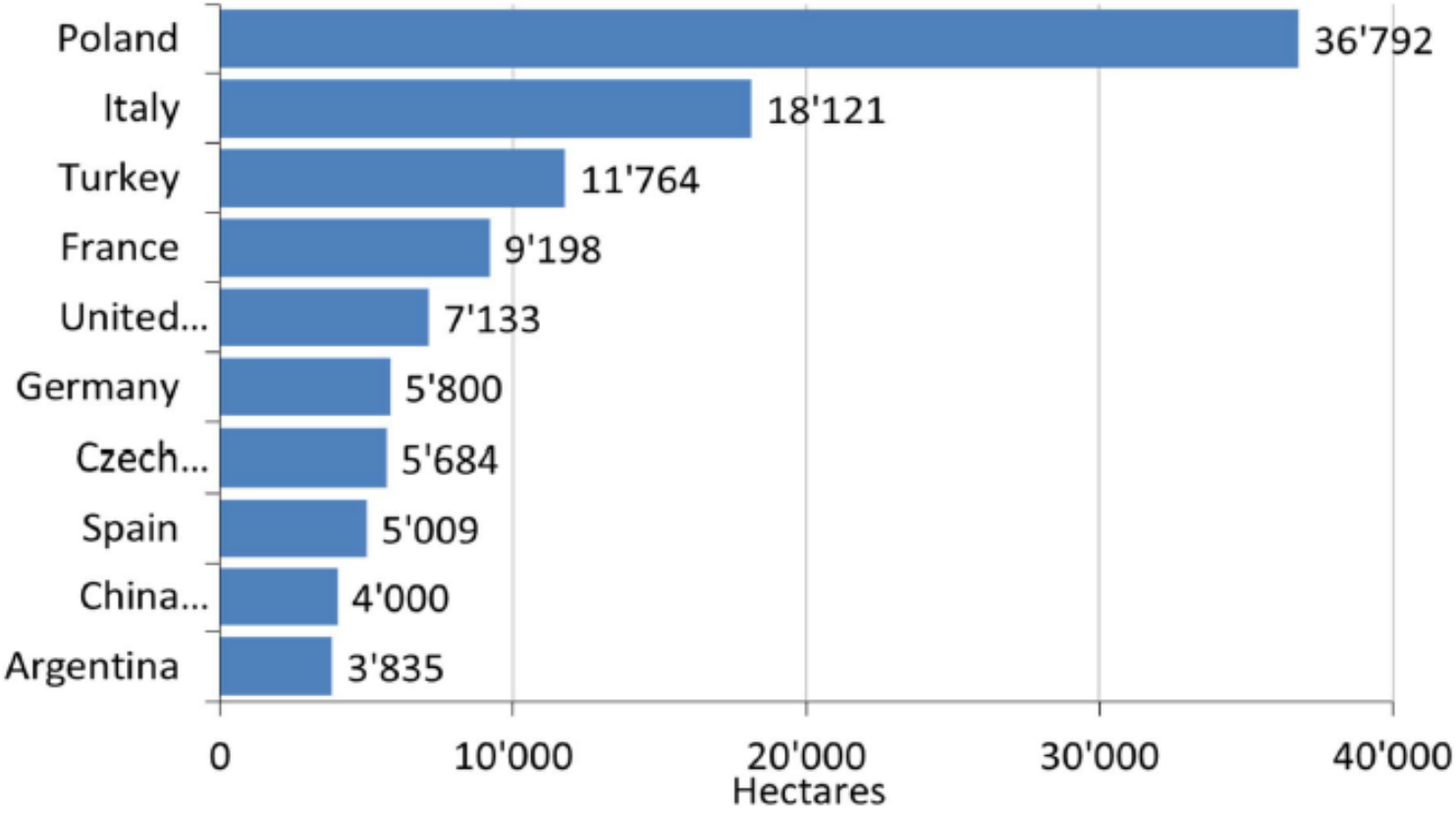
Organic temperate fruit land worldwide by key fruit types 2011



FiBL www.fibl.org IFOAM

FiBL-IFOAM Survey 2013, based on national sources

Organic temperate fruit: The ten countries with the largest areas 2011



FiBL www.fibl.org IFOAM

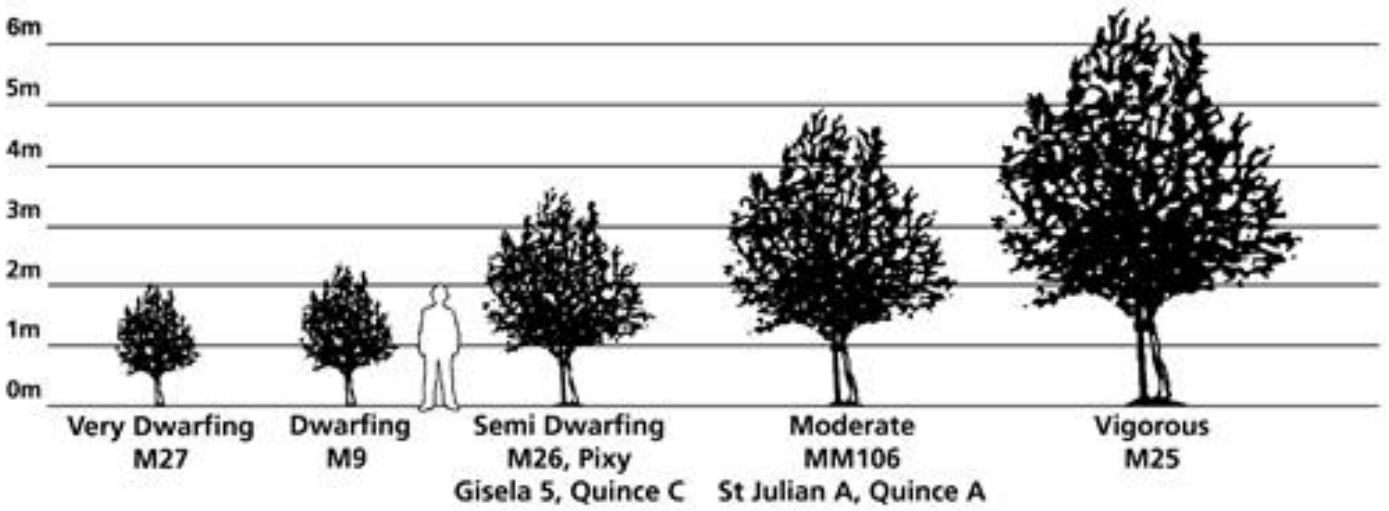
FiBL-IFOAM Survey 2013, based on national sources

Diversification of the plantation

Source: Creating Dwarf Tree Orchard OACC 2005 FIBL

Planning an organic orchard

› Rootstock and tree density

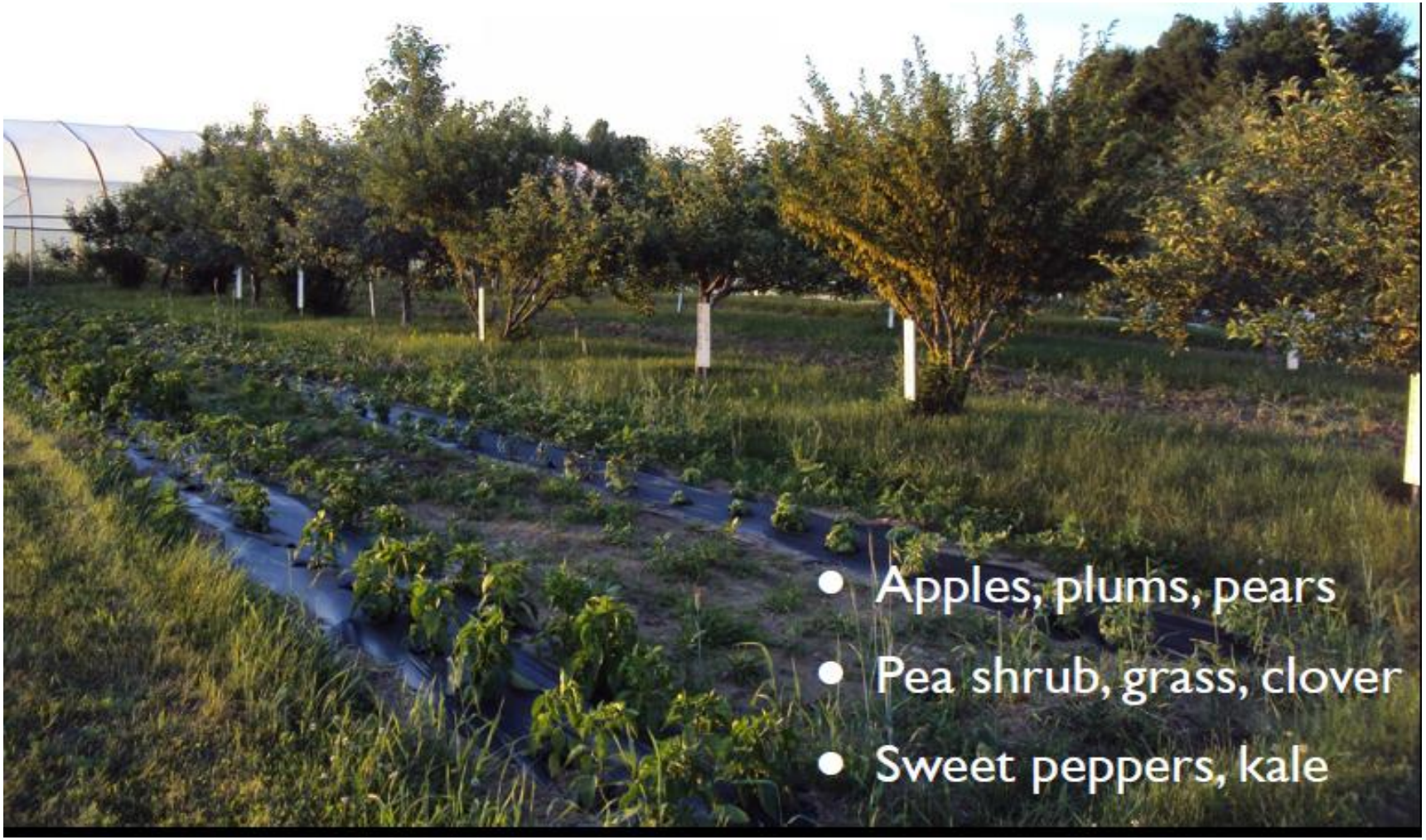


size of the tree, hardiness, susceptibility to diseases

Diversification of the plantation

- Artificial shelters (birds nesting)
- Sandwich system (for covering the treeline and interrow)
- Hedges (isolation, protection, habitat for wilde life)
  - Species in hedges must not be host of pests and diseases of orchard fruits species
- Wilde flowers (host beneficial insects as pollen and nectar supplier, increase the biodiversity)
- Extensive grassland (dwelling Hymenoptera species)
- Ruderal space (habitat for different beneficials)
- Species rich interrow vegetation
- Different grasses with leguminose species (perennials)
- Farmscaping (Harbouring beneficials)

Diversification of the plantation: Fruit - vegetable intercropping



Management approaches

- Permanent grass cover crops orchard's interro
- Species with low nutrient and water demand
- Flowering strips as habitat for natural enemies
- Limitation of grass size in space and time if precipiation <300mm, and humus content is H<1,5-2%
- Covering every second row
- Loosening sub soil – allowing precipitation into soil
- Straw mulch on tree line – preserve moisture, reduce weeds
- Cover crops (weed regulation, nutrient management)
- Inter-row cultivation, green, mulch
- Hedges - green corridor - biodiversity
- Predator/prey population balances are influenced by the timing of availability of nectar, pollen and alternative prey/hosts for the beneficials.

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Ecological interrow cultivation

- Hillside plantations
  - Rows directed along slope (erosion)
- Purpose of interrow soil covering
  - Weed regulation
  - Nutrition
  - Pest and disease control
  - Increase biodiversity
  - Stop erosion
- Cover crops, green manure
  - Regular cutting
- Wheel tracks
  - Loosening tracks (compacted by maschines)
  - Low pressure

Weed regulation

- **Inter-row** grassing – suitable mixtures
- Covering of the **tree line** - Living and dead **mulches**
- Mulches: straw, cut grass, bark pieces
- compost, stable manure
- **Mechanical cultivation** of **tree line** with special machines
- Thermal weed control **Weed flaming**
- **Biological: weeder geese, chickens**

Mechanical weed control of tree line

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Organic viticulture

Organic wine is from grapes grown without any added sulfites and no chemicals, fertilizers or pesticides are used

Soil cultivation and interrow grassing

Soil

- Avoid compaction and nutrient leaking
- Mechanical cultivation between rows
- Erosion mitigation (slope)

Cover crops and interrow grassing

- Soil cover for 9 months in organic vineries
- Composting process of humus
- Combat soil erosion (soil structure) and nutrients leakage
  - avoid soil compaction improve the soil porosity
  - enables work with machines in bad weather
- Support soil life – biological activity
  - rain water can better infiltrate into the soil
- E.g. saintfoin, buckwheat, white clower, alfalfa, crimson clower, vicia pannonica, phacelia, mustard, carrot

Interrow management

- Suitable grass mixture
- Flowering strips for natural enemies
- Apply species with low nutrient and water demand
- Limitation of grass size in space and time
- Covering every second row
- Loosening sub soil – allowing precipitation into soil
- Permanent grass cover crops are often grown in established vineyards for worker and tractor traction
- Straw mulch from round bales is often applied to alternate row middles to conserve moisture and add organic matter to soil

Seeding interrow plant mixture (small seeding machine)

Grass and green manure as covercrop in vineyard

Crimson clover, an annual legume, grown in vineyard alleys to enhance vineyard nutrition

Alternate planted middles with mustard, radish, clovers

Plant protection

- Basic principle
  - Propagation material virus free (heat treatment), resistant
- Ecological balance of useful organisms and pests
- Continuous monitoring and forecasting
- Appropriate condition of the plants
- Functional biodiversity (e.g. Interrow management)
- Forecasting of fungal dieases and insect pest populations
- Inoculation and inundation with useful organisms

Plant protection

- Plant breeding
- Winter and summer pruning
- Biological plant protection
  - Attracting beneficials, eg. predatory mite
  - Flowering strips – feeding the predators

Insect attack

- Bird nests
- Frost protection (irrigation)
- use resistant Vitis species
- Pheromon traps

- Fungus diseases
  - sulphur / powdery-mildew / Erysiphe necator
  - copper / downy mildew / Plasmopara viticola
  - plant conditioners
  - plant extracts - nettle, equiset

Viticulture - beneficials

Predator mites (*Typhlodromus pyri)* against leaf mit

Earwigs (*Forficula auricularia)* against caterpillars (chew tender leaf part)

Viticulture - beneficials

Predator bedbugs (Nabidae, Anthocoridae) against aphides, mites

Lacewing and Chrysopidae against aphids, thrips

Viticulture - beneficials

Ladybirds (Coccinelidae) against aphids, scale-insect

Trichogramma wasp against Lobesia sp., Eupoecelia sp.

Viticulture - parasitic wasp

Ichneumonidae against caterpillars and pupas

Oenological rules

European Commission Regulation

- new rules on organic wine processing (1st August 2012)
- consistent with organic principles of EC 834/2007 on organic production
- identifies oenological techniques and substances authorized for producing organic wine

Based on Reg. 606/2009 for oenological practices

Restrictions

- Heat treatment < 70° C
- Filtration > 0.2µm

Forbidden

- Electrodialyses
- Cryo-concentration
- Cation exchangers
- Physical elimination of SO_2
- Partial dealcoholisation

Revision clause – 2015: Reverse osmosis, ion exchange resin, heat treatment

Varieties

Nero (resistent)

Palatina

Cserszegi Fűszeres

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References and further information

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