

PCFruit – Applied scientific research
Pomology department

Current research items :

Mechanical thinning on pear

Irrigation on pear

Fire blight *Erwinia amylovora* on pear

Xanthomonas fragariae on strawberry

PCFruit – Applied scientific research

Pomology department

Current scientific projects :

- Induction of systemic defense mechanisms against fire blight (*Erwinia amylovora*) in pear by application of abiotic stress
Coordinator Prof. Valcke - U Hasselt
- Mechatronic systems for optimal thinning of pear trees : study of the possibility for imaging the blossoms and the fruits and for a mechanical thinning system on pear trees
Coordination T. Deckers Pcfruit in collaboration with Prof. Josse Debaerdemaeker and Niels Wouters of the KU Leuven

PCFruit – Applied scientific research

Pomology department

Current scientific projects :

- Development of a strategy for sustainable water application by irrigation on pear. Pwaro project: results of research project to the growers
Joint project with group of Prof. Vandendriesche KULeuven
- Remote sensing as an instrument for steering of irrigation in apple and pear orchards taking into account the spatial variability
Joint project with Prof. Vandendriesche and Prof. Copin from the KULeuven
- Diagnosis and prevention of *Xanthomonas fragariae* in the plant production fields of strawberry
Ilvo (coordinator), PCFruit applied research and demonstration garden Tongeren, UGent, Proeftuin Meerle

PCFruit – Applied scientific research

Pomology department

Other projects:

- Warning system
 - for frost : use of GA3 and or GA4/7
 - for fire blight
- Frost protection trials with hot air blowing machines :
- Follow up of the phenological evolution of the apple, pear and sweet cherry trees : climate change results in an earlier blossom time and increasing irregularity in pluviometrie
- Participation in a VLIR-IUC project between 5 flemish universities and the university of Mekelle in Ethiopia : production of apple under tropical conditions

PCFruit – Applied scientific research

Pomology department

Product development projects :

- in collaboration with the phytopharmaceutical companies : growth regulators, fire blight, herbicides
 - Gibberellines : GA3, GA4/7 and parthenocarpic fruitset
 - Auxines: NAD or NAA for fruit thinning and late fruit fall
 - Ethylene inhibitor : AVG before harvest, smart fresh after harvest
 - fruit thinning agents : Benzyladenine = cytokinin, metmitron = photosynthesis inhibitor in development : Brevis
 - Growth reduction : Prohexadione Calcium
 - Herbicides for fruit growing in orchard and in fruit tree nurseries: contact herbicides(aramo=tepraloxym) and soil herbicides (diflufenican)

Pruning and training systems for intensive fruit growing

Fruit wall system : le mur fruitier

- 1 year old feathered trees with short feathers \neq knip tree with long feathers
- Yearly pruning in period about 6 weeks after flowering
- Pruning on both sides of the rows and on the top of the row
- Pruning two rows together, when possible
- Fruit colour development on bicoloured varieties like Jonagold, Braeburn
- Increased risk for sunburn
- Why not developing a tractor driving over the tree rows ?

Need for a new concept for intensive fruit growing system

- 1) Mechanical thinning during bloom or chemical fruit thinning after bloom bringing the majority of the flowerclusters to 1 fruit/cluster
- Light hand thinning for correction, when necessary
- 2) Mechanical pruning during season or during dormant season
- Correction pruning necessary during dormant season ; removal of weak fruit bearing wood
- 3) Mechanical harvesting : crops technology

Low cost production system of apple production

Mechanical blossom thinning for intensive fruit growing in Germany (M. Blanke Euftrin 2011)



Mechanical blossom thinning for intensive fruit growing in Spain (S. Alegre Eufirin 2011)

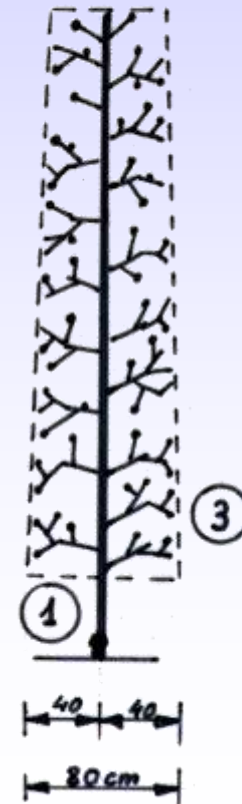
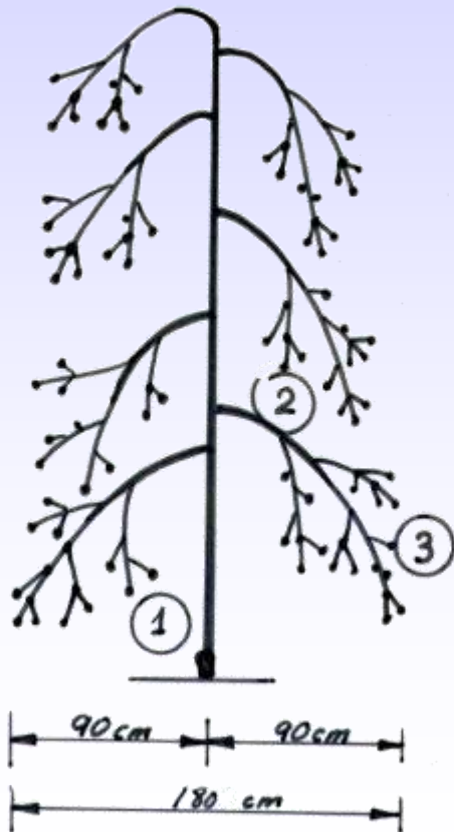




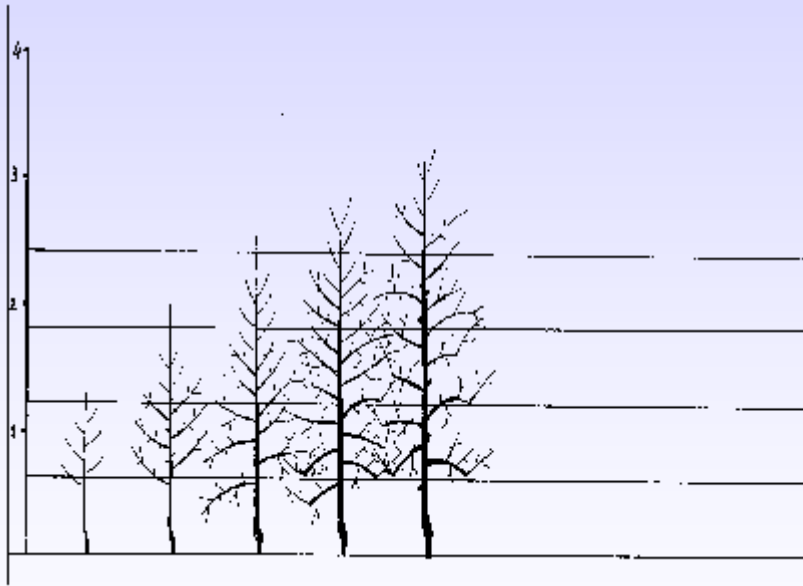
Different training systems
for intensive fruit growing : slender spindle
versus fruit wall (S. Alegre, 2011)



Different types of fruit bearing wood within slender spindle versus fruit wall system (S. Alegre,2011)



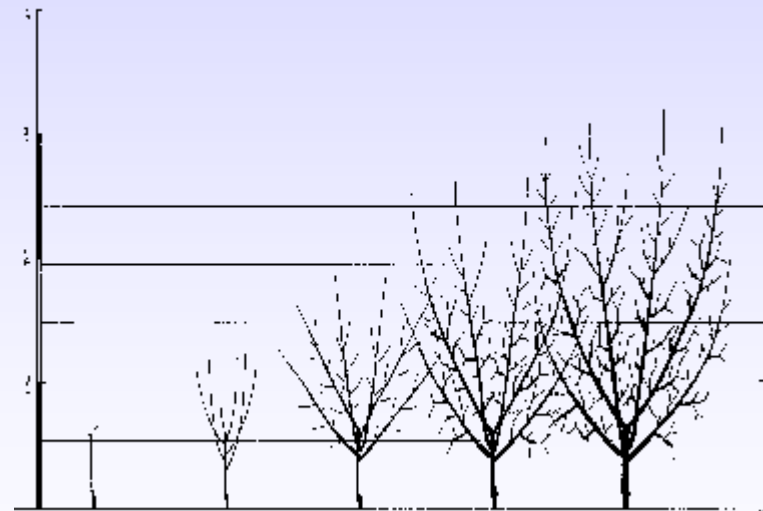
Different training systems for intensive fruit growing : central leader versus fruit wall (S. Alegre,2011)



Central leader

2200 trees/ha

3.5 x 1.25



Fruit wall

3.5 x 1.25





Thinning trials on apple 2011



Rubens control



Rubens : thinned

Rubens : red colour formation at harvest



untreated



thinned

PCFruit – Disease spread

- Risk for disease spread during mechanical intervention
 - Bacterial disease : fire blight *Erwinia Amylovora*
 - Fungal disease : canker *Nectria galligena*

Fire blight : infection risk during primary bloom and during secondary bloom : risk for disease transmission



Blossom infection Conference



Blossom infection on Gloster



Secondary blossom infection on Durondeau

Low cost apple production system could be a type of a fruit wall system

- With Mechanical thinning
- Followed by Mechanical pruning during season
- Followed by Mechanical harvesting : crops technology

With adaptations in

- Fruit tree quality in nursery
- In training system
- Productivity :
 - fresh consumption
 - Industry: juice or apple sauce
 - cider