



New training systems to improve the profitability of cherry orchards

Gérard Charlot, Ctifl (France)

New training systems : Why ?

- Earlier full Bearing
- Reduce labour costs
- New varieties available
- New rootstocks available
- Protect the trees from rain and insects
- No universal training system

Training system : choice of the varieties

- * Vegetative habit of the varieties
 - * Vigour : medium (Regina), strong (Ferdiva)
 - * Growth habit : upright, semi-spreading, spreading, willowy
 - * Ramification
 - Intensity
 - Crotch angle
 - * Axis and fruiting wall : select varieties with spreading habit with a good ramification and wide crotch angle (Regina, Rubin, Ferdiva, Ferdouce) avoid varieties with upright growth and poor ramification (Summit, Satin®, Lapins, ...)
 - * to improve the ramification it may be possible to spray plant growth regulator like promalin (if this product is allowed)
- * Production
 - * First fruit set
 - * Full bearing
 - Level
 - Regularity

Training system : choice of the rootstocks

* Rootstock

* Dwarfing :

* Gisela 5 < Tabel® < Piku 1

* Semi-dwarfing

○ Weiroot 158 < Gisela 6 < Furtos = PHL-A < Maxma 14 = Krymsk 5

* Vigourous

○ SL 64 = Maxma 60 = GF 8,1/Adara < Mazzard = Piku 3

• Growth habit

* Upright : Furtos, PHL-A

* Spreading : Gisela 6, Gisela 12, Weiroot 158

• Soil

- Fertility

- Calcareous : very sensitive : Tabel

- Waterlogging : very sensitive : SL 64, Weiroot 158

- Water stress

Training system and protection from rain and insects



Fully protected orchard



Row-by-row protection from rain and insects

Training system : axis



Axis : Balrine*/ Piku 1*, 3rd leaf
4 m x 1.5 m (1666 trees/ ha)



Axis : Balrine*/ Tabel®*, 9th leaf
4 m x 1.5 m (1666 trees/ ha)

Training system : bi-axis



Bi-axis not well-balanced, Bellise-Gisela 6, 18 april 2nd leaf-13

Most vigourous one : put it with an angle
Less vigourous one : put it vertically



Bi-axis well-balanced, Bellise-Gisela 6, 18 april 2nd leaf-13

Training system : palmette



Balrine*/ Gisela 6*, early 4th leaf



Early Red*/ Gisela 6*, early 4th leaf



Rosie*/ Maxma 14* : end of 5th leaf

Distances : 4,5 m x 3 m
Height : 2,70 m

Training system : palmette



Early Red* / Gisela 6*, early 4th leaf



Rosie* / Maxma 14*, early 6th leaf



Babelle* / Gisela 6*, early 4th leaf



Burlat / Gisela 6*, early 4^e leaf

Training system : palmette



Rainier/ Gisela 6*, early 6th leaf



Summit/ PHL-A*, early 4th leaf

Fruiting wall



Regina/ Tabel®, harvest from the ground (without a ladder)



Regina/ Maxma 14 in axis : 2.50 m within the row ,
height : 3.70-4.0 m – harvest with a picking platform

Fruiting wall: trials in progress

La Tapy 2005

Variety : Folfer*

Rootstocks : Tabel®, Maxma 14*

Ctifl 2009

Varieties : Bellise®, Folfer*

Rootstock : Gisela 6*

Ctifl 2011

Varieties : Bellise®, Folfer

Rootstocks : Gisela 6*, Weiroot 158*

La Tapy 2013

Variety : Regina

Rootstock : Gisela 6*

Fruiting wall

Choice of the varieties

Very productive varieties

Good ramification and spreading to willowy growth habit

Good results with : Bellise®, Ferdouce*, Folfer*, Hedelfingen, Regina, Rubin, Staccato®*

Medium results : Belge-Ferrovia, Kordia

Bad results : Fertard*

Choice of the rootstocks

Productive and very productive

Dependant on soil fertility

Vigour of the variety

Shape of the trees (axis, biaxis, palmette)

Good results: Tabel® with fertile soils, Maxma 14 with medium soil, Gisela 6* depends on soil, climate and variety.

Fruiting wall

Two errors to avoid : not enough or too much vigour

Not enough vigour

- No pruning during growth
- Pruning in winter

Too much vigour

- Mechanical pruning during growth just before harvest
- Manual pruning to allow the light go through the hedge
- Notching on trunk during flowering
- Cutting the roots, only one side of the row the same year
- Paclobutrazol if allowed

KGB system

Trials in progress

Ctifl Balandran (Nîmes)

2011

- Varieties : Grace Star, Belge, Ferdiva
 - Rootstocks : Maxma 14, Krysmk 5, Krymsk 7

2014

- Varieties : Folfer, Ferdiva, Regina
 - Rootstocks : Piku 1, Weiroot 158, Furtos, Maxma 14, Maxma 60, SL 64

2015

- Variety : Burlat
 - Rootstocks : Piku 1, Weiroot 158, Furtos, Maxma 14, Maxma 60, SL 64

La Tapy (Carpentras)

2012

Six different training systems (including KGB with Regina on Maxma 60)

KGB system



Grace Star/ MM14 : 1st leaf, 12 July, 2 months after pruning the limbs at 10-15 cm



Grace Star/ MM14 : early 3rd leaf,
Full bearing expected in 2015 (5th leaf) or 2016 (6th leaf)

KGB system



Belge/ Maxma 14 : full bloom early 4th leaf



Grace Star/ MM 14, Krymsk 5 and 7 :
August 4th leaf after pruning uprights at
2,7 m

KGB system

Choice of the variety

Productive (it's less important than for fruiting wall)

but able to produce on uprights

Upright and semi-spreading habit and few or average ramification

For example : Sabrina®, Folfer, Satin®, Summit, Lapins, Sweetheart®, Staccato®

Varieties with semi-spreading, spreading habit with good ramification :
Ferdouce, Ferdiva, Regina, Rubin : these varieties will need more labour (removing laterals) and some difficulties to obtain enough uprights

KGB system

Choice of the rootstocks

Depend on varieties and soil fertility

Dwarfing : Piku 1

Semi-vigorous, vigorous

- Weirroot 158, Gisela 6, Gisela 12, PHL-A, Furtos, Maxma 14, Maxma 60, SL 64 ?, GF 8,1-Adara ?, Monrepos ?

Planting distances

- Dwarfing : 3.5 m x 2 m
- Semi-dwarfing : 3.5 m to 4 m x 2 m
- Vigorous : 4 m x 2 m to 2.5 m

KGB system

Important points to note

To control vigour and uprights growth

- Pruning the first 2 years : **No less than 3 prunings the 1st and 2nd leaf**
 - 1st leaf : (prune the trees at 60 cm from the ground)
 - first pruning : in may-june
 - 2nd leaf :
 - second pruning : in winter
 - third pruning: in may-june

It's important to **obtain at least 25 uprights**, more if the rootstock is vigourous. **Don't hesitate to remove the most vigourous uprights**

-Choose the right density

The UFO system

Upright fruiting offshoot

Trial in progress at Balandran

Objectives :

- faisability with Maxma 14, the most common rootstock used in France
- study varieties with different vegetative characteristics (vigour, growth habit, ramification, ...)

Year of planting : 2014

- Rootstock : Maxma 14
- Varieties
 - Early : Burlat
 - Mid-Early : Early Star®, Folfer, Ferdouce
 - Mid-Season : Samba®, Satin®, Summit, Van, Rainier
 - Mid-late : Kordia, Belge, Lapins
 - Late : Skeena, Rubin, Ferdiva, Regina
- Distances : 3.5 m x 2 m (1428 trees/ha)
- Angle 30° from soil
- Uprights every 15-20 cm

The UFO system



UFO : Samba®*/ Maxma 14*, early 1st leaf



UFO : Lapins/ Maxma 14*, early 1st leaf



Lapins/ Maxma 14 : 22 july, 1st leaf

Cherry varieties and rootstocks information on the Ctifl web site

<http://www.ctifl.fr/Pages/EspacePro/DetailApplication.aspx?id=172>

After registration, free access

Projects 2015-2016

2015 : survey on training system trials carried out by the COST cherry partners

Objectives : knowledge of the trials in progress or recently finished, be able to use the results of these trials, contact concerned people

Create a database

The way to achieve this : choice of the best way to collect the informations

- Excel
- Software R
- Software Sphinx
- Software Agrosyst
- Other softwares

2016 : training course at Ctifl Balandran in February

Subject : training systems and rootstocks



Thank you for your attention