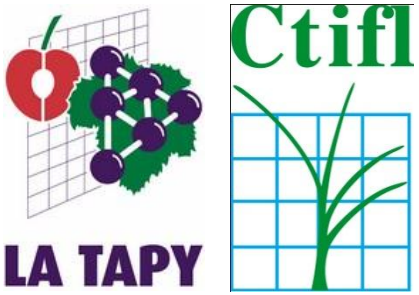
Cherry rootstocks

Sara Pinczon du Sel, La Tapy
Gérard Charlot, Ctifl



Context

- Traditionally, French growers use vase training system with vigourous rootstocks like Sainte-Lucie 64, or semi-dwarfing like Maxma® 14.
- Since several years, a lot of trials have been made on dwarfing and semi-dwarfing rootstocks, which could be interesting :
  - to decrease production cost
  - to reduce time before the first fruiting
  - to allow rain covering or insect-proof nets installation

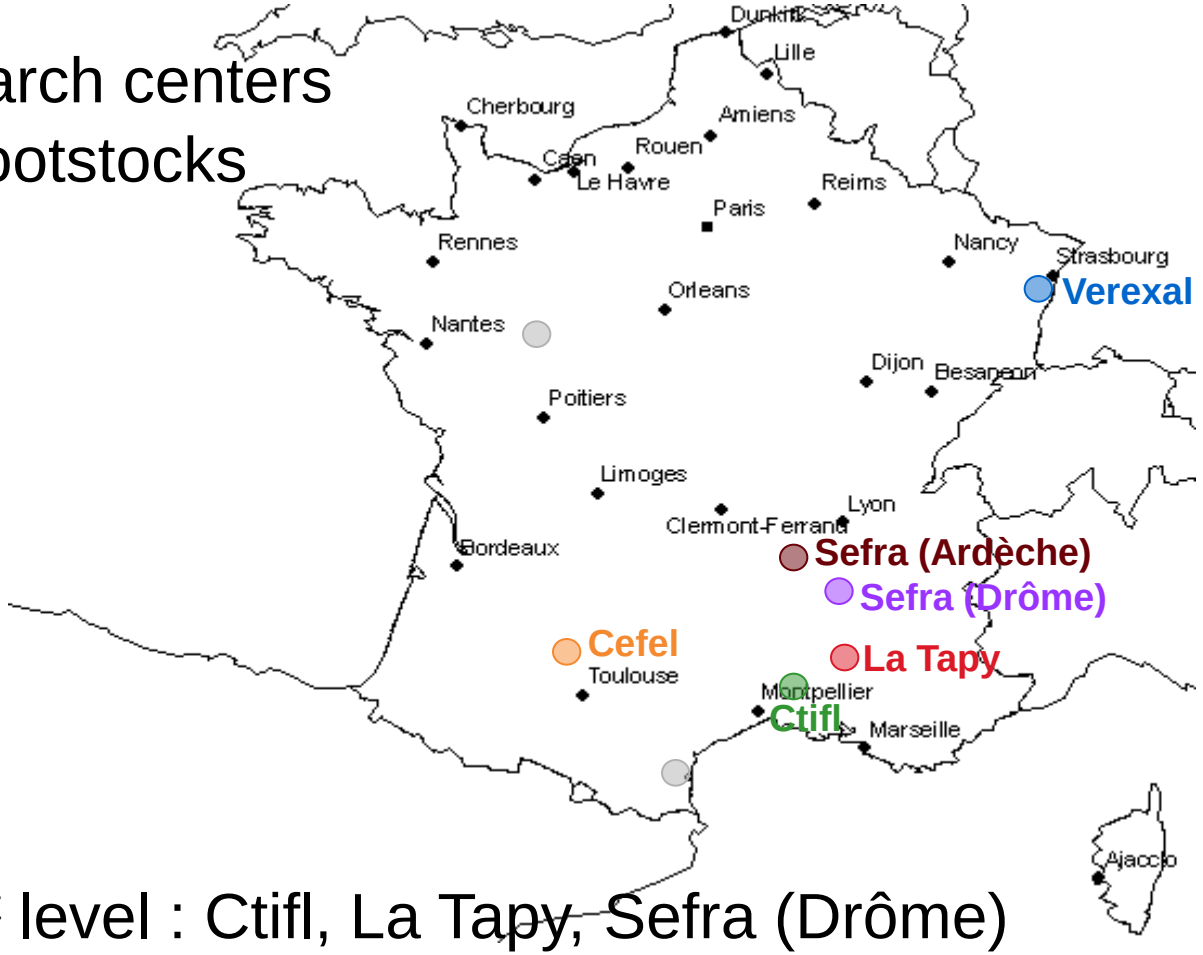

Vase / Sainte-Lucie 64


Rain covering and insect-proof nets

Rootstocks research in France

A network : 6 research centers evaluating cherry rootstocks

- Ctifl
- La Tapy
- Sefra (Drôme)
- Sefra (Ardèche)
- Cefel
- Verexal



2 levels :

- 3 spots in the 1st level : Ctifl, La Tapy, Sefra (Drôme)
- 5 spots in the 2nd level : La Tapy, Sefra (Drôme), Sefra (Ardèche), Cefel, Verexal

Rootstocks research in France

Observations

- Vigor (trunk section area)
- Graft union
- Root suckering
- Anchorage
- Foliage
- Sensibilities
  - Root asphyxia
  - Drought
  - Bacterial canker
  - Armillaria root rot
  - Black cherry aphid
  - Vole
  - and so on…
- Precocity
- Productivity
- Fruit size

Exemple of Gisela 6 : difference between the area of the rootstock and the area of the variety

Measure of the circumference, before to estimate the trunk section area

A vole

Dwarfing rootstock

Tabel® Edabriz*, Piku 1*

Tabel® Edabriz*

Prunus cerasus

Created by Inra/Ctifl, France

Tabel

Dwarfing rootstock

20 to 60% of Maxma® 14
(depending of soils and varieties)

M14

- Low to moderate level of **root suckering** (depending of the variety)
- Moderate level of **anchorage**

SL64

- Very **precocious** (producing crops by the 3rd leaf)
- Very high level of **productivity**
- The **size of the fruit** depends of the level of production. Need to be pruned carefully.

wild cherry

Tabel® Edabriz*

Low level of sensitivity

- Root asphyxia
- Lack of magnesium

Sensitive to…

- Drought : sensitive to very sensitive
- Chlorosis : very sensitive
- PDV virus : very sensitive
- Armillaria root rot
- Black cherry aphid

Low to moderate sensitivity to bacterial canker

- Vole

Foliage

Medium foliage status
(symtoms of chlorosis…)

Tabel® Edabriz*

Known in France since the beginning of the 1980s.

Used as control in dwarfing rootstock trial.

- One of the most dwarfing rootstock in France.
- Very precocious.
- High productivity. Need to be properly pruned in order to maintain fruit size.
- Need good soils and irrigation.
- Sensitive to every kind of stress : drought, vole, aphid…

Piku 1*

Prunus avium x (Prunus canescens L. x Prunus tomentosa L.)

Created by Dresden-Pillnitz station, Germany

Tabel

M14

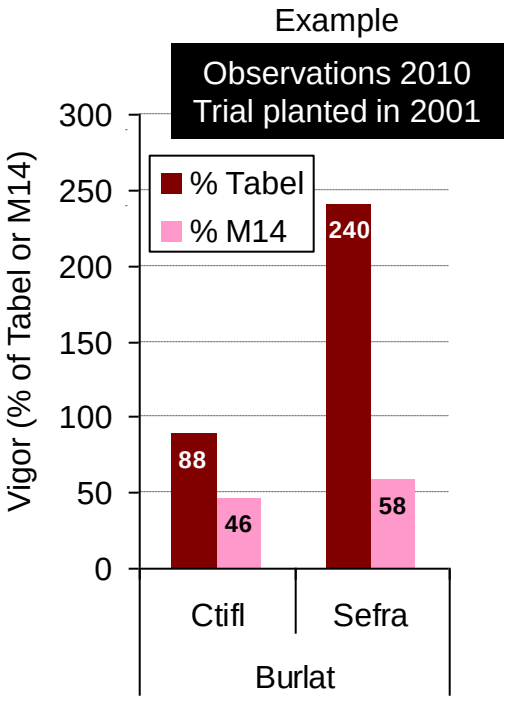
SL64

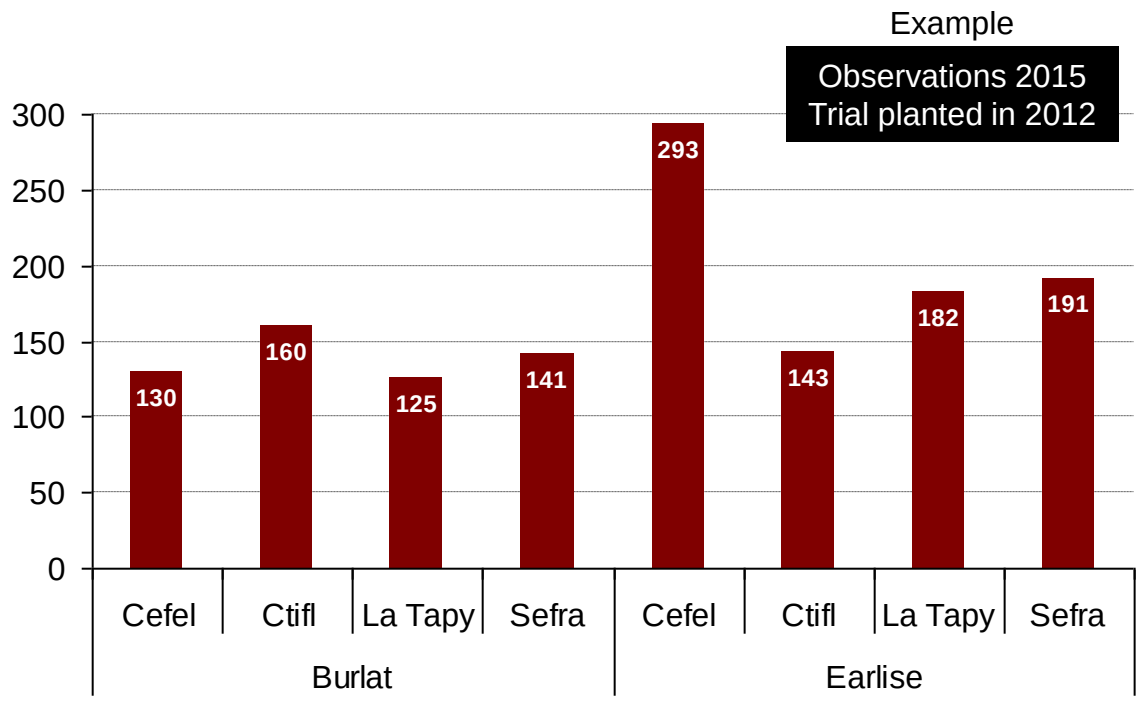
wild cherry

Dwarfing rootstock

80 to 120% of Tabel® Edabriz
(depending of soils and varieties)

1st level from 2000 to 2010 / 2nd level since 2012





Piku 1*

Burlat / 3 years old

- Low level of **suckering**
- **Anchorage** better than Tabel® Edabriz

Piku 1*

Low level of sensitivity

- Root asphyxia
- Drought
- Chlorosis
- PDV and PNRSV virus
  (Lankes C., 2007)

Light sensitivity to lack of magnesium

Foliage

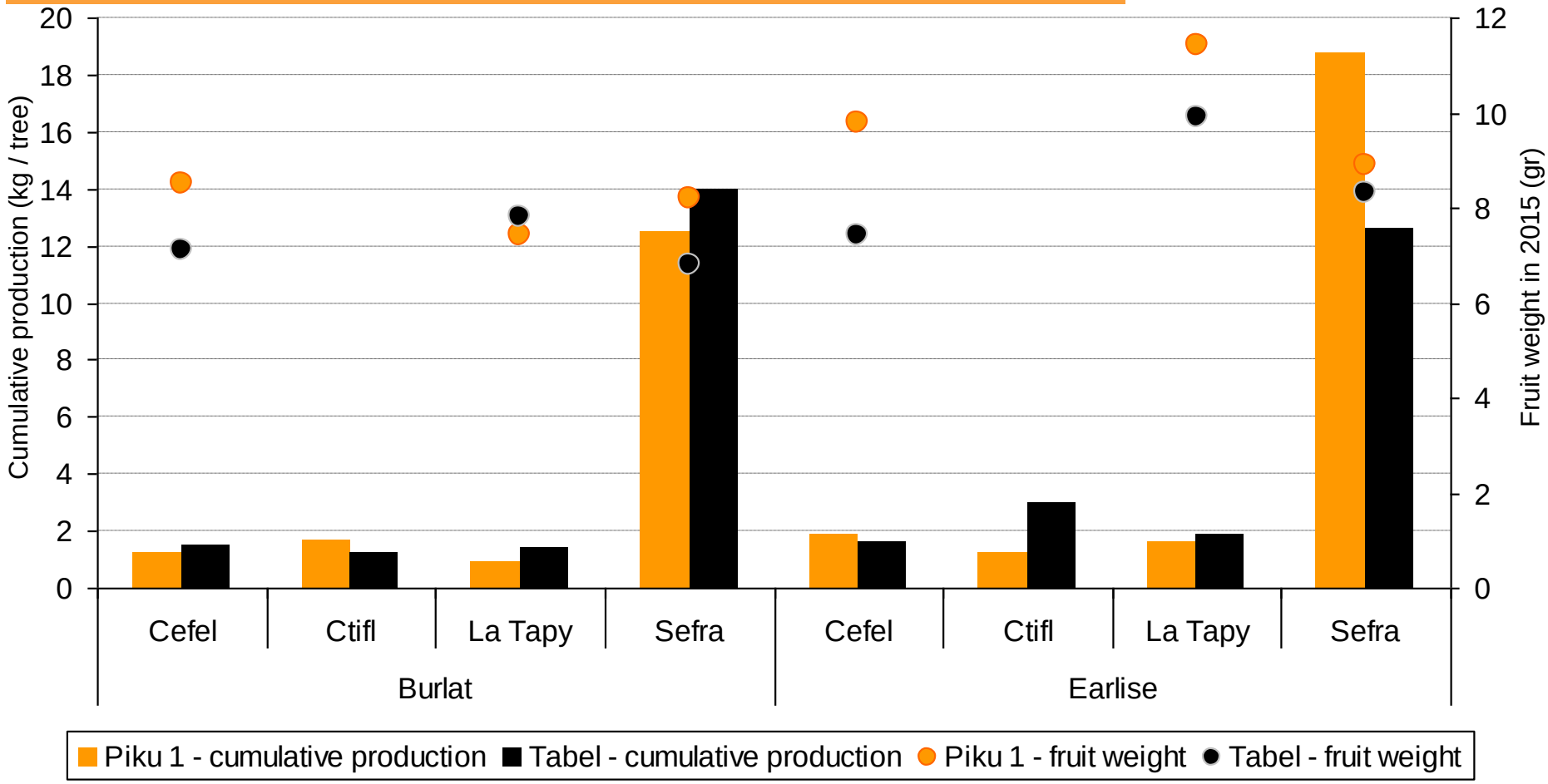
Foliage status better than Tabel® Edabriz

Piku 1*

- Very precocious
- High productivity
- Size of the fruit better or similar to Tabel

Example

Observations 2015
Trial planted in 2012



Piku 1*

Trials are still in progress on this rootstock in France.

- Vigor similar to Tabel® Edabriz.
- Very precocious, similar to Tabel® Edabriz.
- High productivity, similar to Tabel® Edabriz. But the size of the fruit on trees grafted on Piku 1 seems to be better than on trees grafted on Tabel® Edabriz.
- Low level of root suckering (better than Tabel).
- Anchorage better than Tabel® Edabriz.
- Better foliage status than Tabel® Edabriz and seems to be less sensitive than Tabel® Edabriz.

Semi-dwarfing rootstock

Weiroot 158*, Gisela 6*, Ceravium® PHL-A*, Furtos, Krimsk 5*, Krimsk 7*, Maxma Delbard®14 Brokforest*

Weiroot 158*

Prunus cerasus (P. cerasus x P. avium?)

Created by the university Monaco Freising Weihenstephan, Germany

1st level from 1995 to 2005 / 2nd level since 2007

Tabel

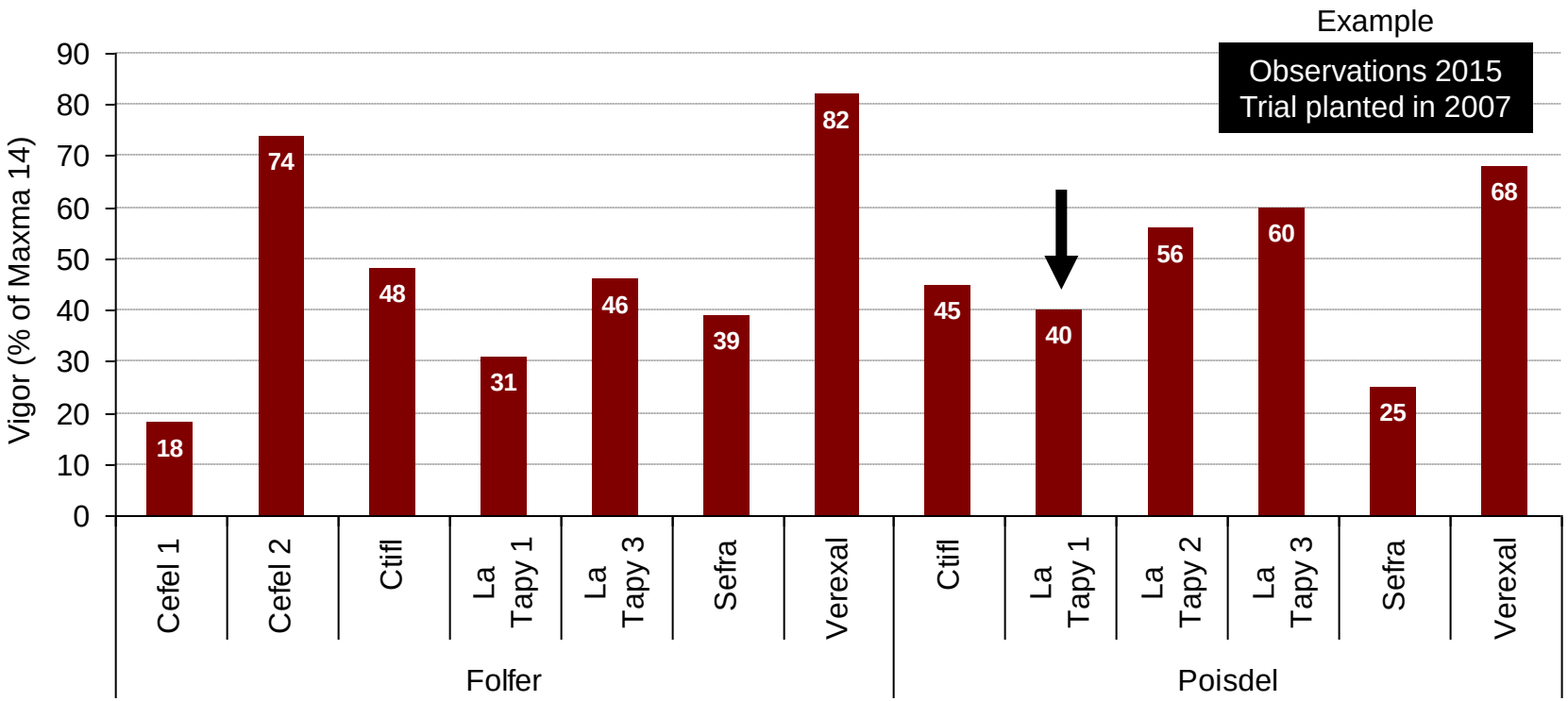
M14

SL64

wild cherry

Semi-dwarfing rootstock

40 to 80% of Maxma® 14
(depending of soils and varieties)

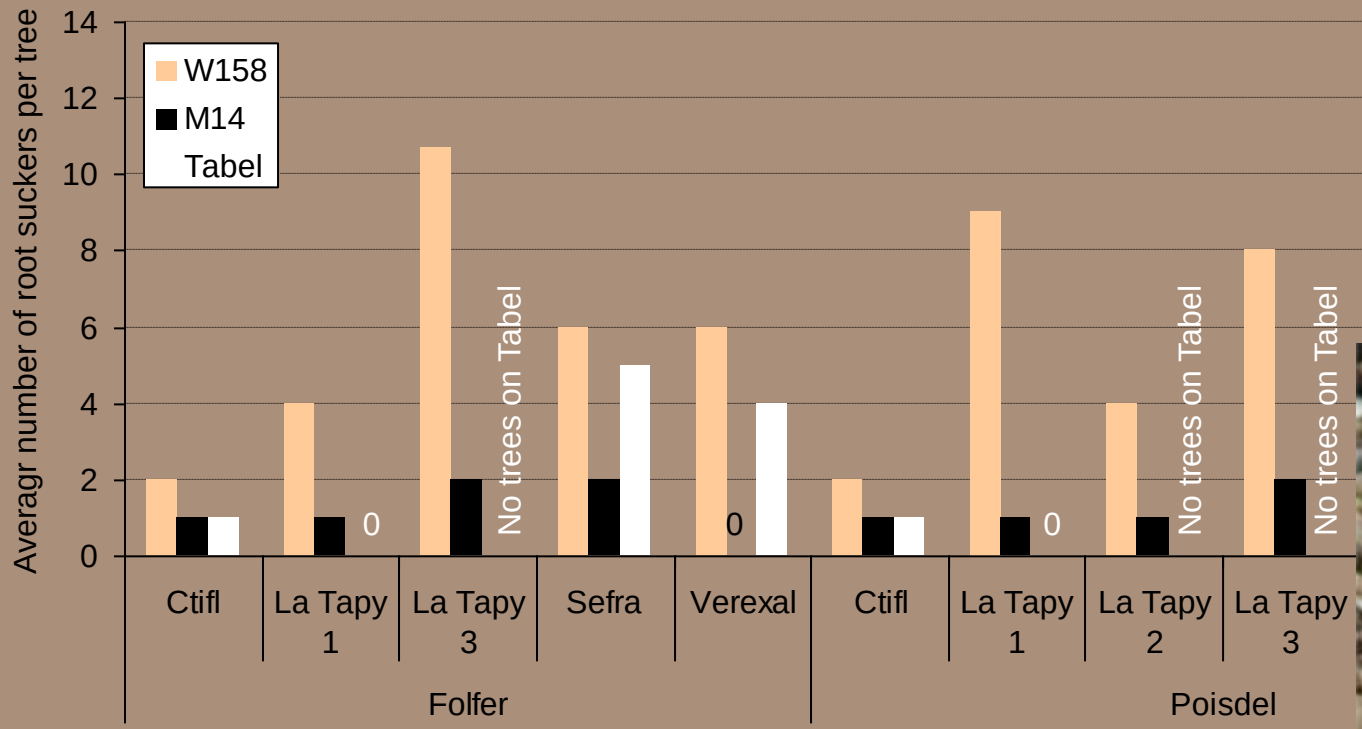


Weiroot 158 **Maxma 14**

Example

Weiroot 158*

- Low to moderate level of **root suckering**. Seems to be more sensitive to root suckering than Tabel® Edabriz.



- **Anchorage** better than Tabel® Edabriz but worse than Maxma® 14.
- Good **graft union**.

Weiroot 158*

- Variable **foliage status** : medium to good.

- High **death rate** have been observed in a plot in Vaucluse (60 to 80% death), probably caused by root asphyxia.

Low level of sensitivity

- Bacterial canker
- Lack of magnesium

Sensitive to…

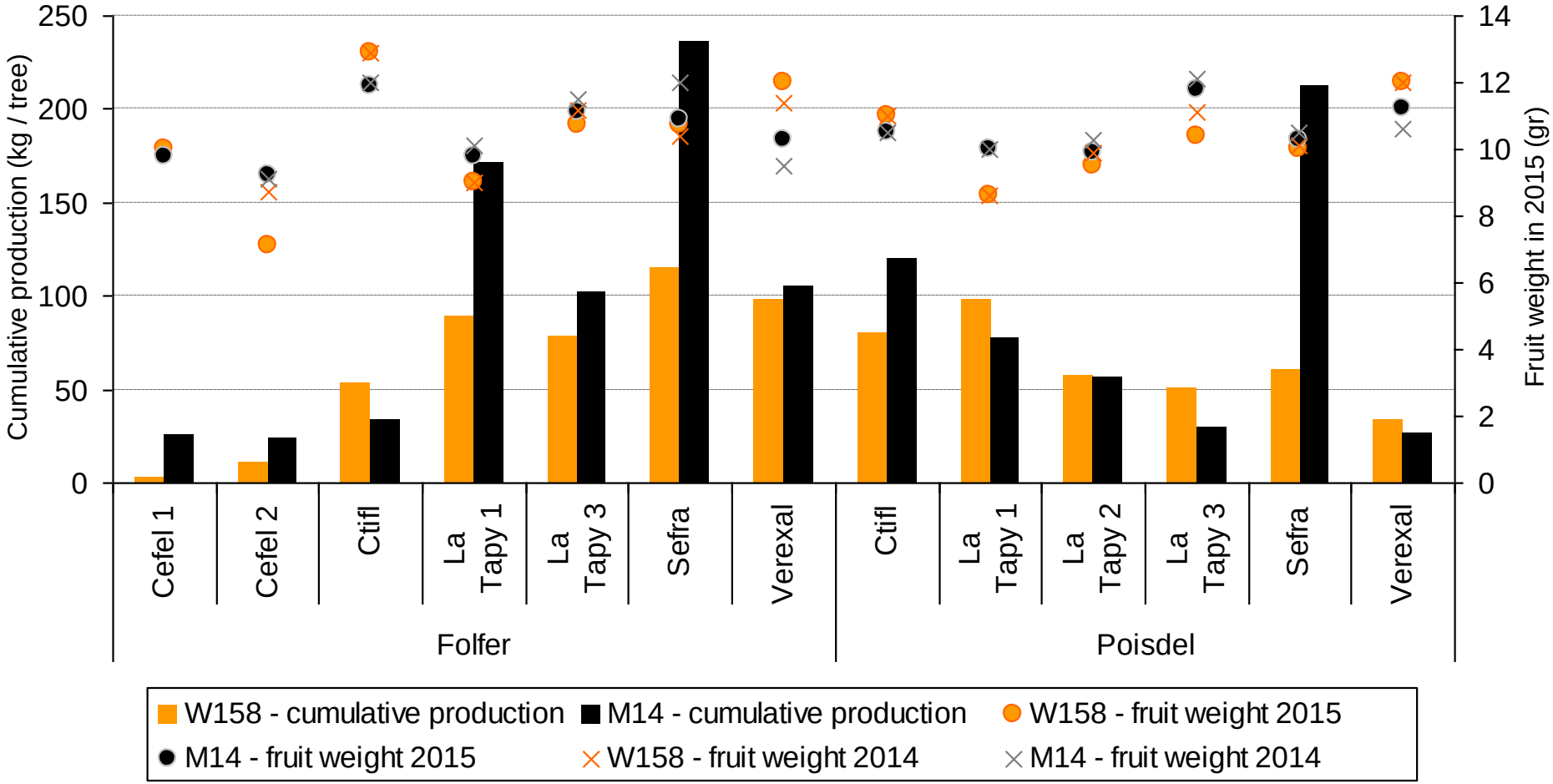
- Root asphyxia : very sensitive
- Drought : sensitive
- Vole : sensitive to very sensitive

Weiroot 158*

- Precocious.
- Good productivity.
- Good fruit size.

Example

Observations 2015
Trial planted in 2007



Weiroot 158*

Trials are still in progress in France.

- Vigor between Tabel® Edabriz and Maxma 14.
- Good behaviour in good soil without root asphyxia : good balance between the production and the size of the fruit…
- But seems to be very sensitive to root asphyxia, vole…

Be careful
with this rootstock

Good behaviour in good soil, but need to avoid root asphyxia, vole…

Gisela 6*

Prunus cerasus « Schattenmorelle » x Prunus canescens
Created by the university Justus Liebig of Giessen, Germany
1st level from 1999 to 2010 / 2nd level since 2007

Tabel

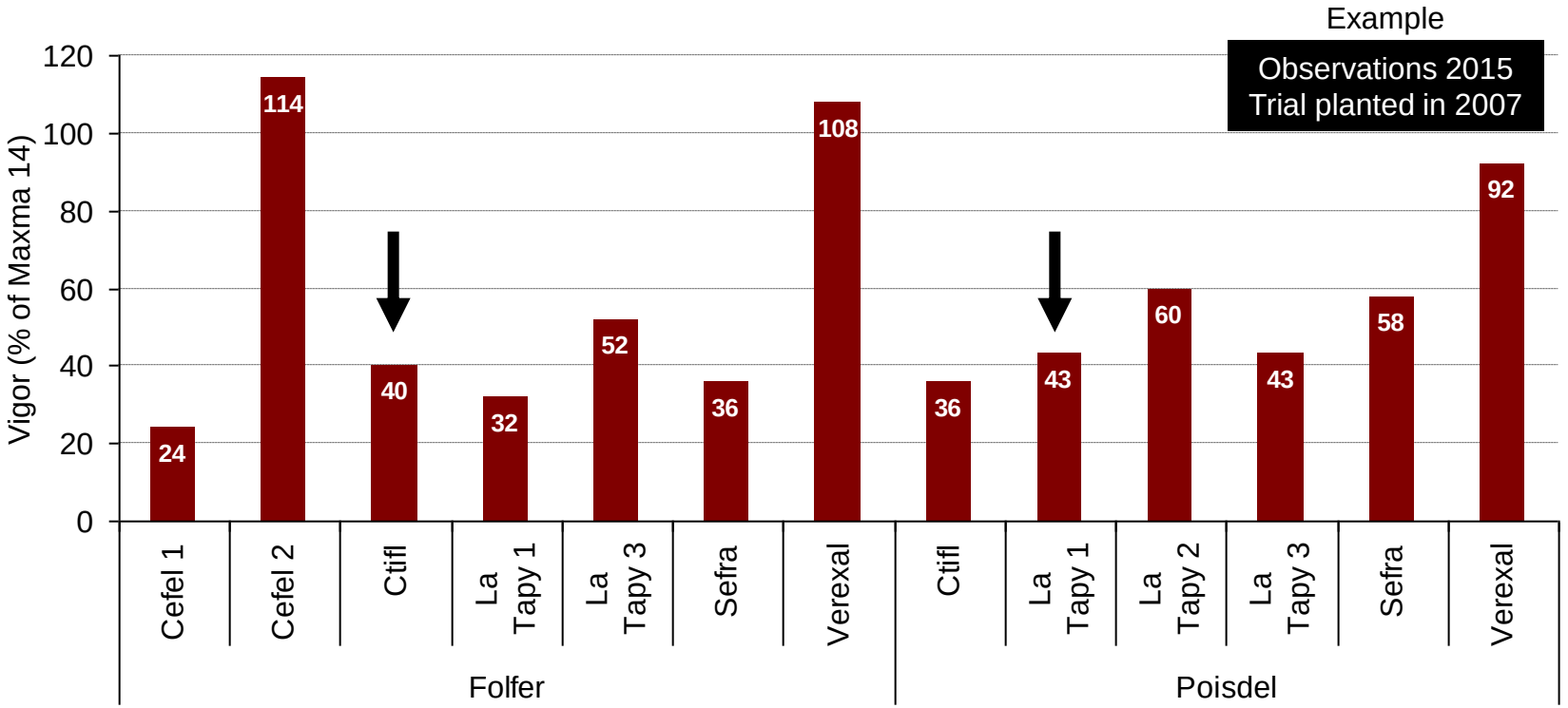
M14

SL64

wild cherry

Semi-dwarfing rootstock

50 to 80% of Maxma® 14
(depending of soils and varieties)



Example

- Folfer
- 4 years old

Gisela 6

Maxma 14

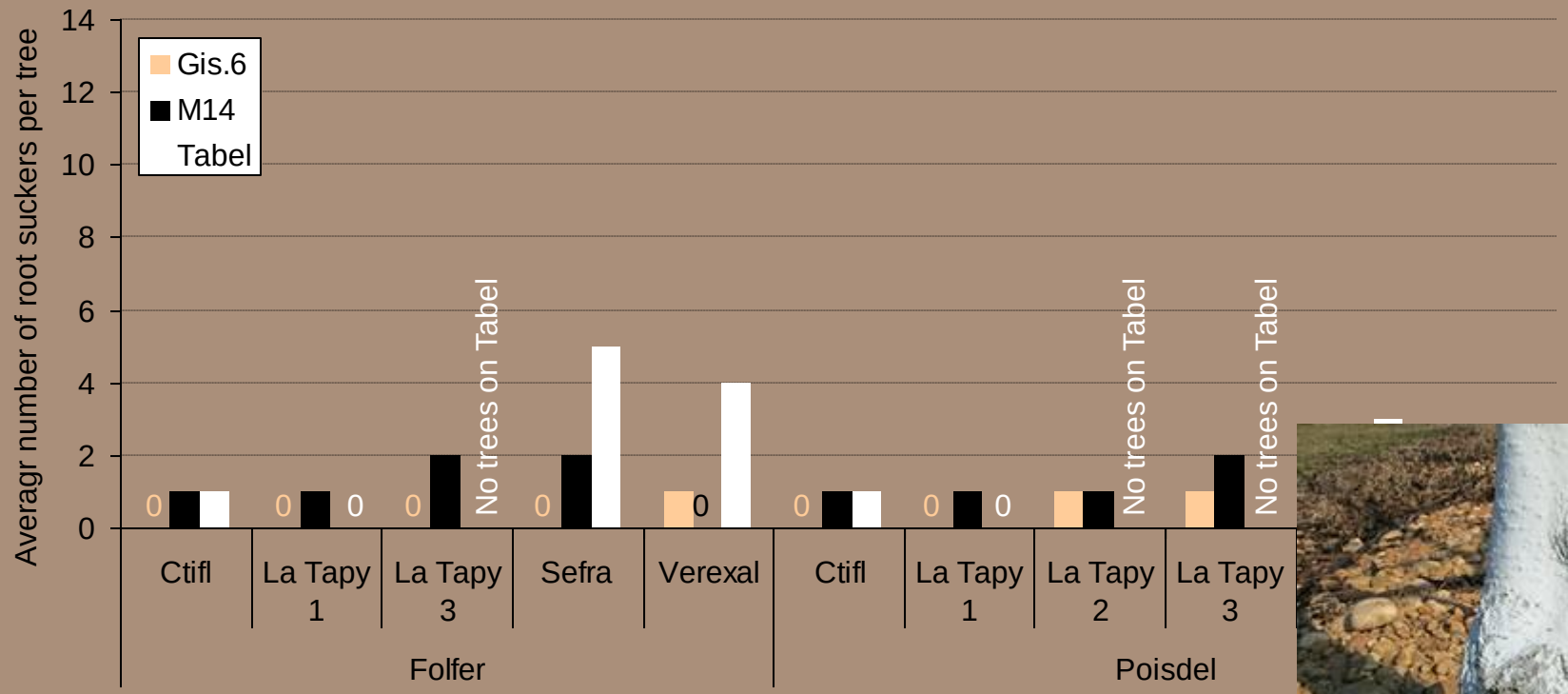
Example

- Poisdel
- 6 years old

Gisela 6 **Maxma 14**

Gisela 6*

- No **root suckering**.



- Gisela 6 don’t have a good **anchorage**.
- **Graft union** with a difference between the diameter of the rootstock and the diameter of the variety.

Gisela 6*

- Medium to poor **foliage status** : the worst one in the study.

Sensitive to…

- Bacterial canker : sentitive to very sensitive
- Armillaria Root rot
- High temperatures in summer time
- Double fruit

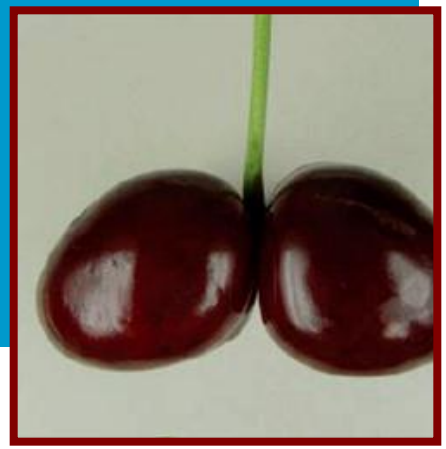
Low level of sensitivity

- PDV and PNRSV virus
  (Howell, W.E., Lang, G.A., 2001)

Low sensitive to chlorosis

Moderate sensitivity to

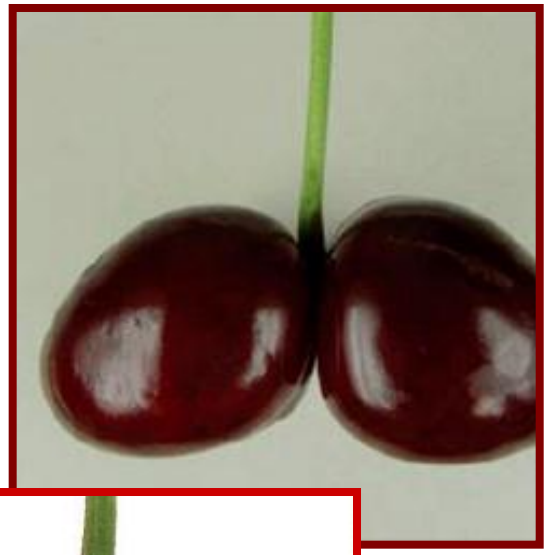
- Root asphyxia
- Lack of magnesium
- Vole

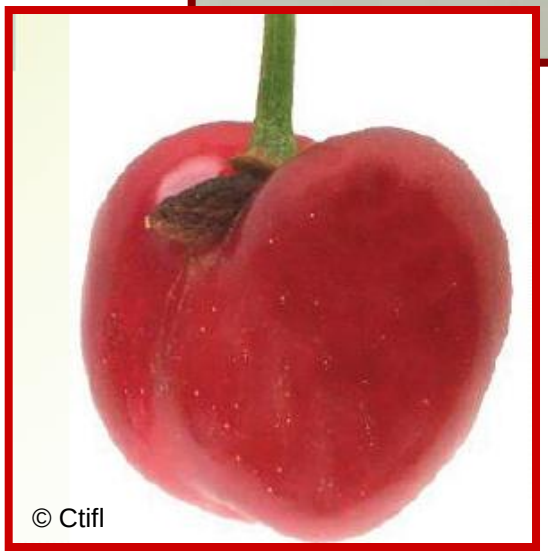


Gisela 6*

Gisela 6 seems to induce a higher sensitivity to double fruit.

Percentage of double fruit on Folfer in La Tapy in 2013	
	% of double fruit
Maxma® 14	3.5%
Gisela 6	**25.3%**
Furtos	0.3%
Weïroot 158	13.5%
PHL-A	0.5%
Tabel® Edabriz	15.8%



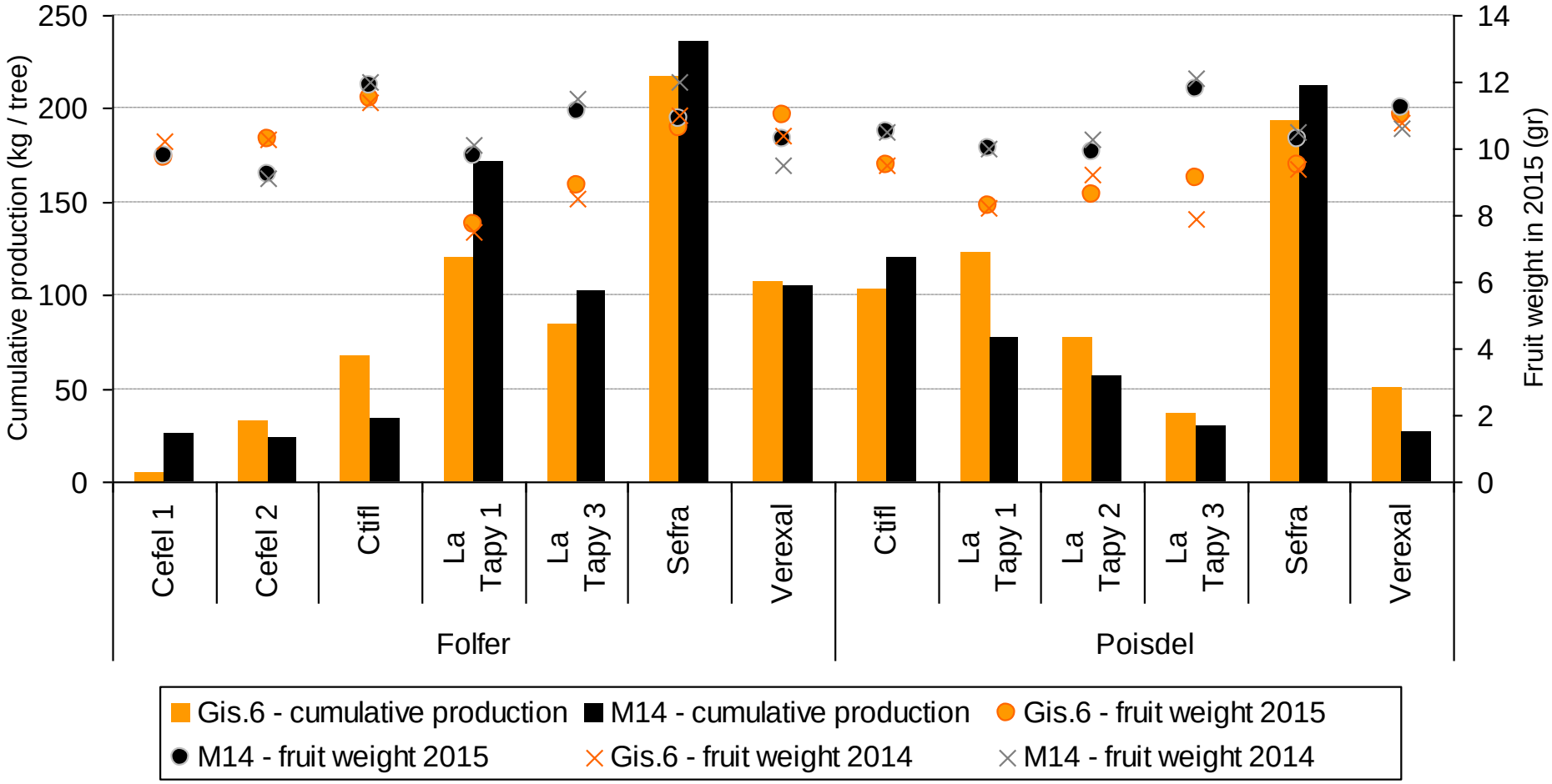


Gisela 6*

- Very precocious.
- High productivity, similar to Tabel® Edabriz.
- Need to be prune carefully.

Example

Observations 2015
Trial planted in 2007



Gisela 6*

Trials are still in progress in France.

- Vigor between Tabel® Edabriz and Maxma 14.
- Very precocious.
- High productivity. Need to be properly pruned in order to maintain fruit size.
- Be careful of the conditions before to plant it :
  - Sensitive to bacterial canker
  - It can induce a bad foliage status in bad soil, wtih productive varieties
  - Seems to be sensitive to high temperature in summer

Interesting only in good soil, and not with varieties with a high level of productivity

Ceravium® PHL-A*

Prunus avium x Prunus cerasus
Created by Holovousy station, Czech Republic
1st level from 1996 to 2010 / 2nd level since 2007

Tabel

M14

SL64

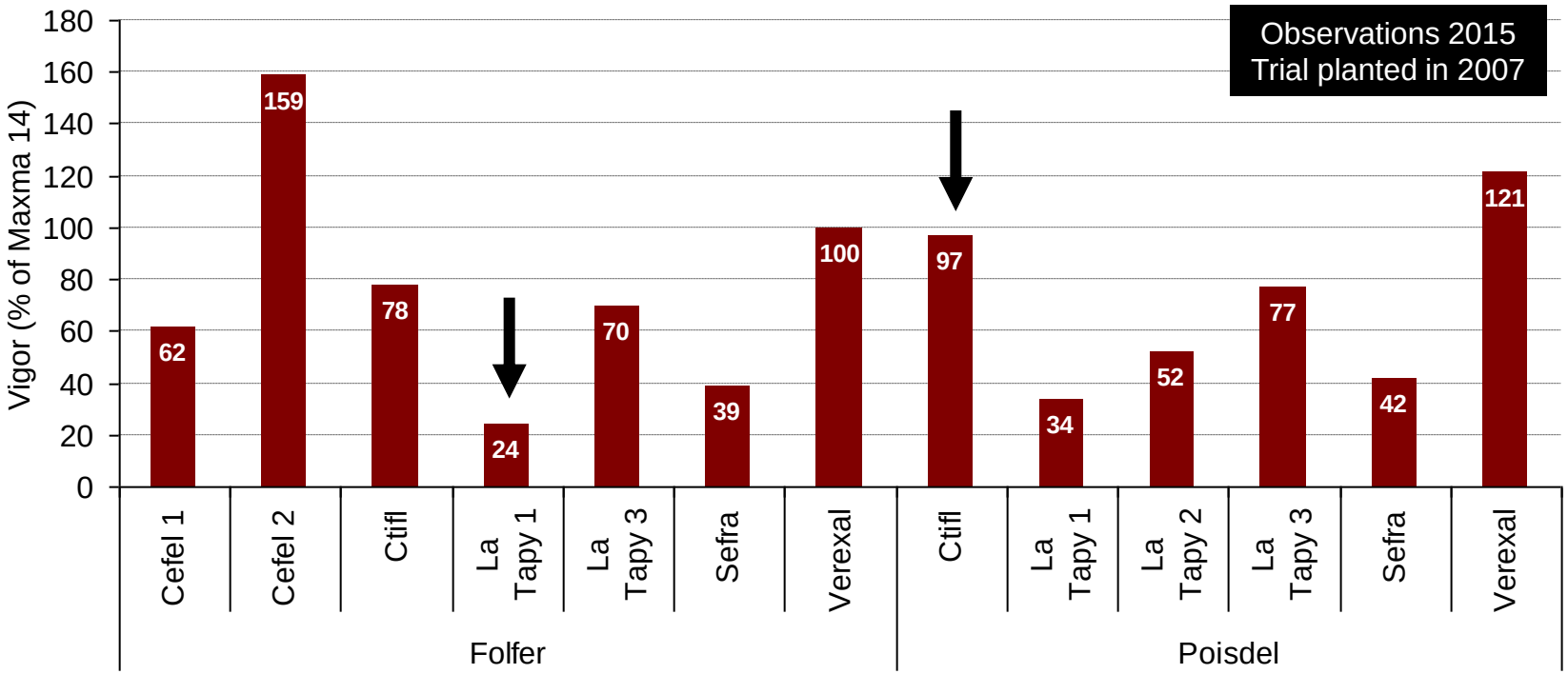
wild cherry

Semi-dwarfing rootstock

60 to 90% of Maxma® 14
(depending of soils and varieties)

Example

Observations 2015
Trial planted in 2007



Example

- Folfer
- 6 years old

Maxma 14 **PHL-A**

Example

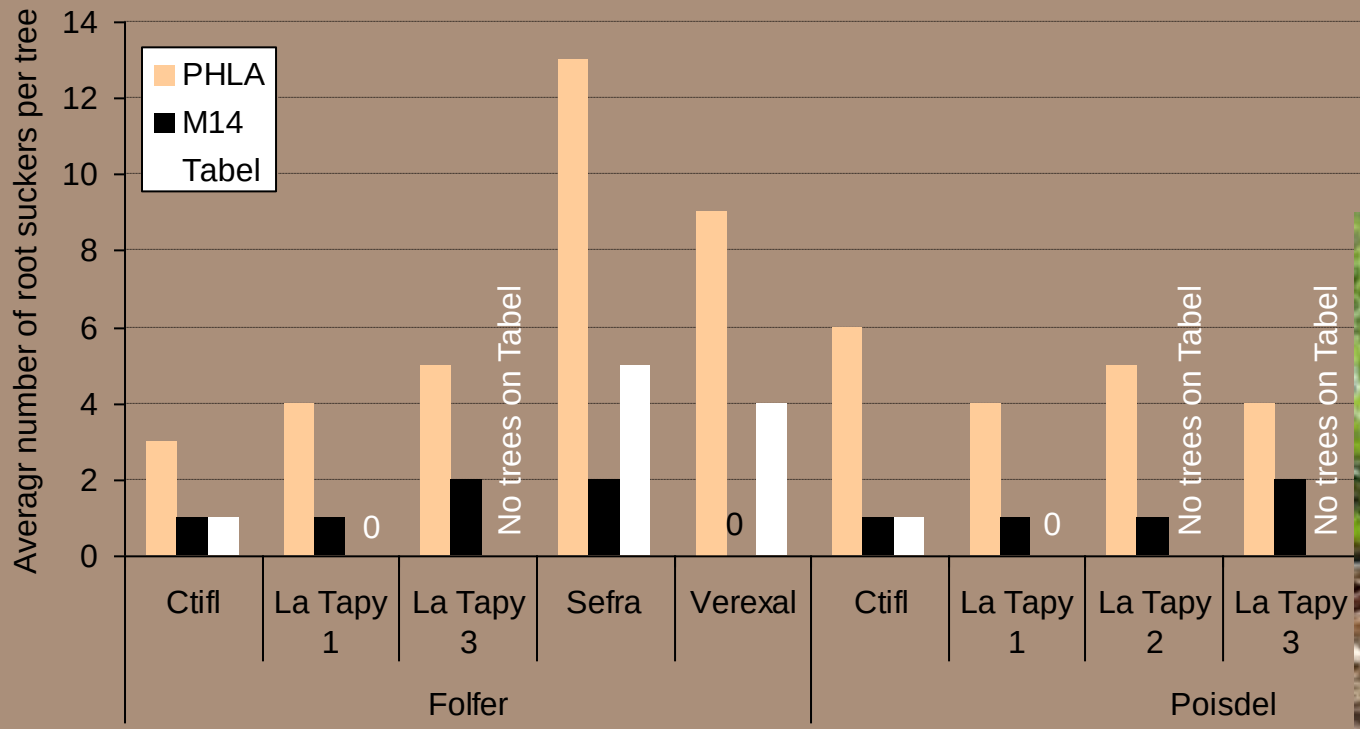
- Poisdel
- 7 years old

PHL-A **Maxma 14**

Tabel **PHL-A**

Ceravium® PHL-A*

- Low to moderate level of **root suckering**. More sensitive to root suckering than Tabel® Edabriz.



- Average to good **anchorage**.

Ceravium® PHL-A*

- Medium to good **foliage status**

Sensitive to…

- Lack of magnesium : more sensitive than Maxma 14

Low level of sensitivity

- PDV and PNRSV virus
  (Howell, W.E., Lang, G.A., 2001)

Moderate sensitivity to

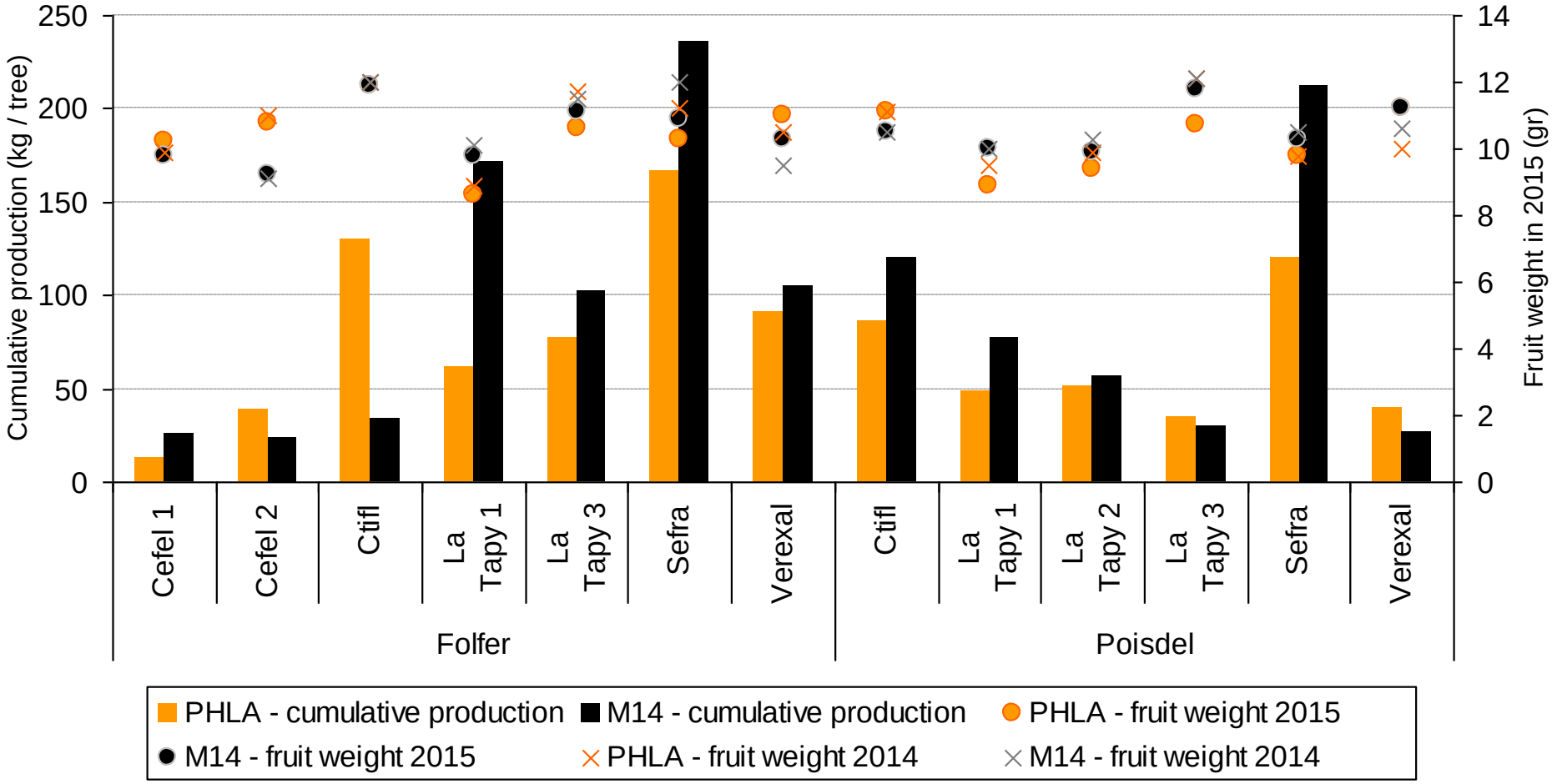
- Chlorosis

Ceravium® PHL-A*

- Precocious.
- Good productivity.
- Good fruit size.

Example

Observations 2015
Trial planted in 2007



Ceravium® PHL-A*

Trials are still in progress in France.

- Vigor between Tabel® Edabriz and Maxma 14.
- Precicity near to Maxma 14
- Productivity and fruit size near to Maxma 14.
- Compared to Tabel® Edabriz, can be planted in medium quality soil and less sensitive to virus and black cherry aphid…

Better than Gisela 6 in medium quality soil

Furtos

Prunus cerasus

Sour cherry variety named Ujfehertoi Fürtös, identified by Ujfeherto station, Hungary

1st level from 1991 to 2003 / 2nd level since 2003

Tabel

M14

SL64

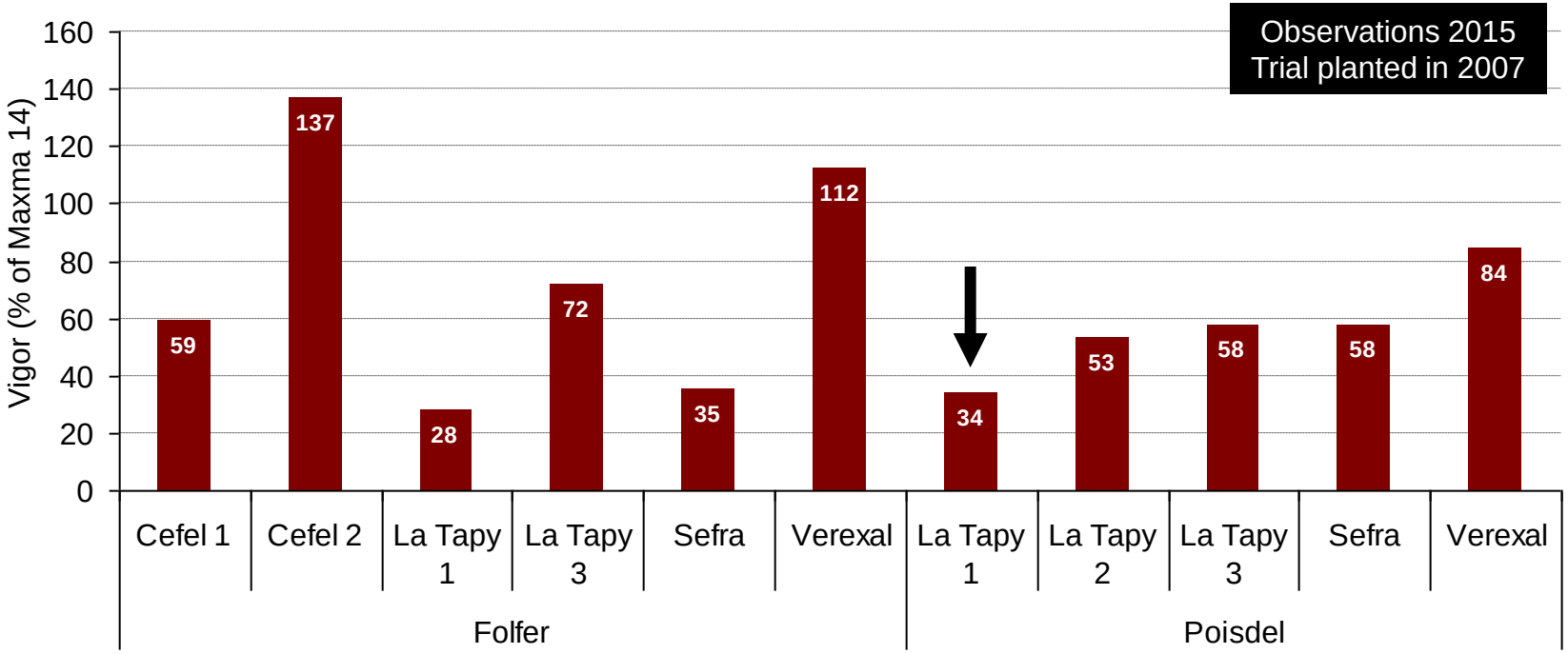
wild cherry

Semi-dwarfing rootstock

50 to 100% of Maxma® 14
(depending of soils and varieties)

Example

Observations 2015
Trial planted in 2007



Example

- Poisdel
- 6 years old

Maxma 14 **Furtos**

Example

- Burlat
- 8 years old
- rich soil

Furtos **Maxma 14**

Example

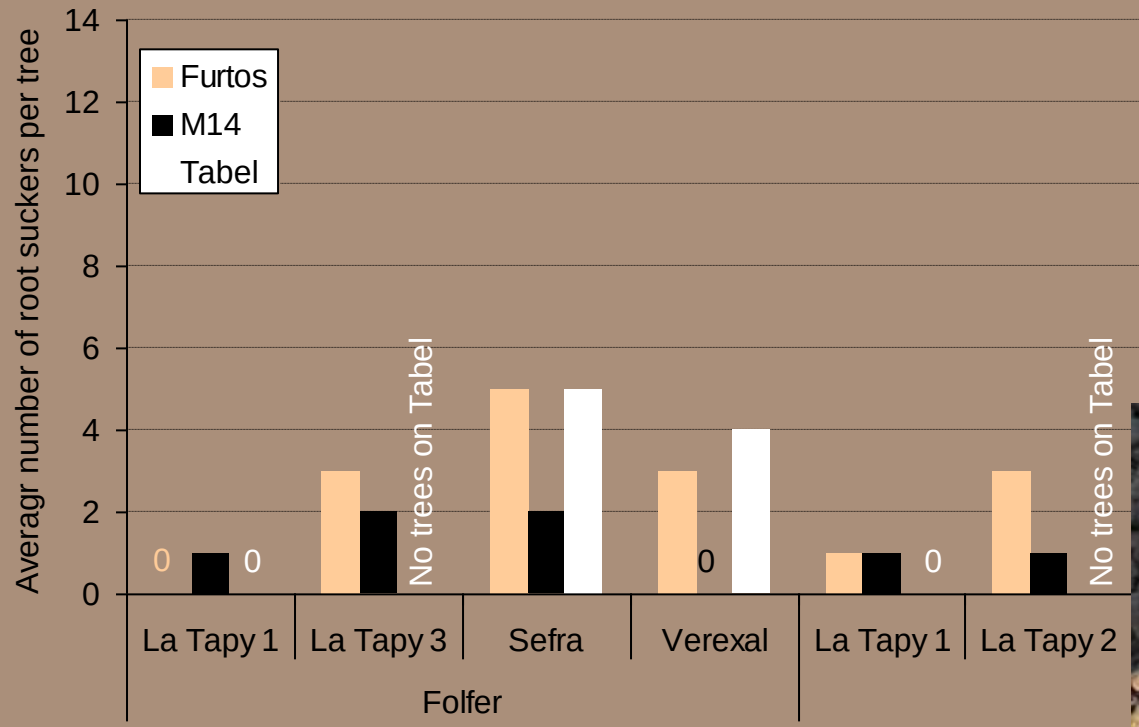
- Burlat
- 10 years old
- poor soil

Maxma 14

Furtos

Furtos

- Low to moderate level of **root suckering**. Less sensitive than Gisela 6 and PHL-A, but more than Gisela 6.



- Good **anchorage**.
- Good **graft union**.

Furtos

- Always an **healthy vegetation**, similar to Maxma® 14. The best vegetation in bad soil : Furtos always have an healvy vegetation, even if it allow to reduce the vigor in bad soil.

Low level of sensitivity

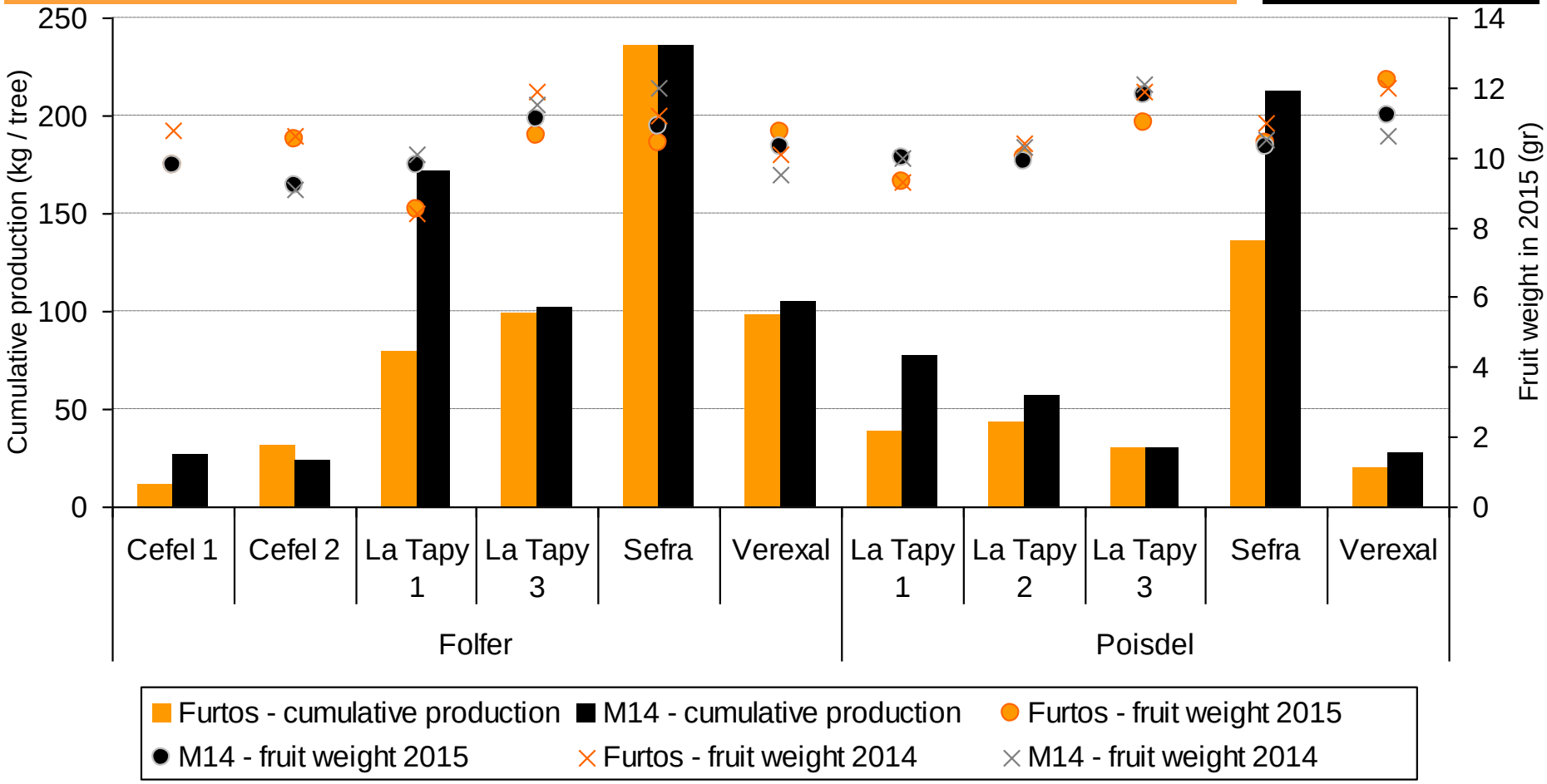
- Root asphyxia
- Chlorosis

Furtos

- Precocious.
- Good productivity.
- Good fruit size.

Example

Observations 2015
Trial planted in 2007



Furtos

Well known in France (trials since 1991).

- Vigor between Tabel® Edabriz and Maxma 14 : more vigorous in good soils (near to Maxma 14), less vigourous in bad soil.
- Even when Furtos is less vigorous, its vegetation remains very healthy.
- Most of the time, the productivity is higher than Maxma14 (7 times out of 14), and the average fruit weight is the same or higher than Maxma 14.

Interresting in bad soil condition, in order to reduce vigor and keep an healphy vegetation

Semi-dwarfing rootstocks

Trials planted in 2007	Furtos	Gisela 6	PHL-A	Weiroot 158
Vigor	between Tabel and M14 50 to 100% of M14	between Tabel and M14 50 to 80% of M14	between Tabel and M14 60 to 90% of M14	between Tabel and M14 40 to 80% of M14
Sensitivity		sensitive to double fruit?		sensitive to root asphyxia (Gordes) and voles (Marsillargues)
Foliage	healthy vegetation, similar to M14	medium to poor foliage status	medium to good foliage status	medium to good foliage status
Graft union		diameter of the variety larger than diameter of the rootstock		
Root suckeers	average sensitvity to root suckers	low sensitivity to root suckers	more sensitive than Maxma 14 to root suckers	more sensitive than Maxma 14 to root suckers
First fruiting		early first fruiting		
Cumulative productivity	pretty low productivity (like M14 or a little better)	high productivity (like Tabel® Edabriz)	pretty low productivity (like M14 or a little better)	pretty high productivity (better than M14)
Fruit size	from average to good size of the fruit	small fruit (need to be prune carrefully)	from average to good size of the fruit	from average to good size of the fruit

Krimsk 5*

Prunus fruiticosa x P. lannesiana

Origin : Russia

Tabel

M14

SL64

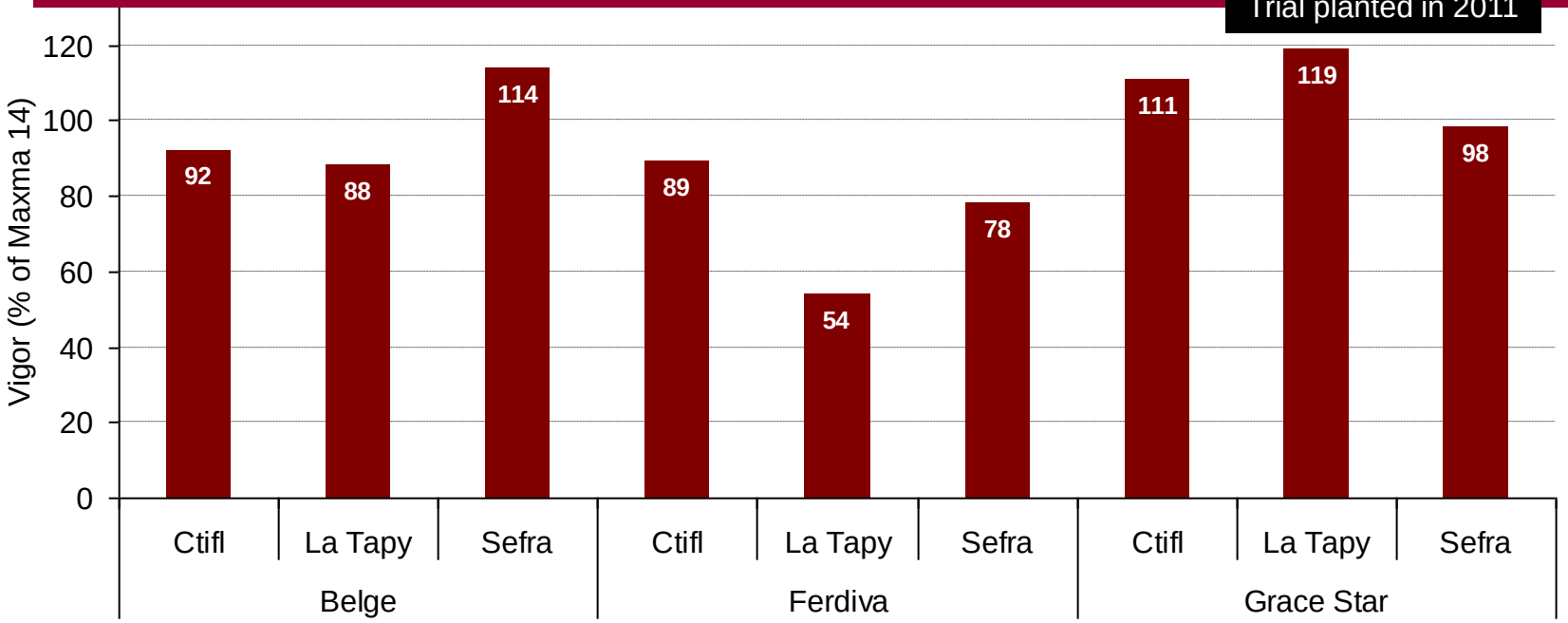
wild cherry

Semi-dwarfing rootstock

seems to be similar to Maxma® 14 (depending of soils and varieties)

Example

Observations 2014
Trial planted in 2011

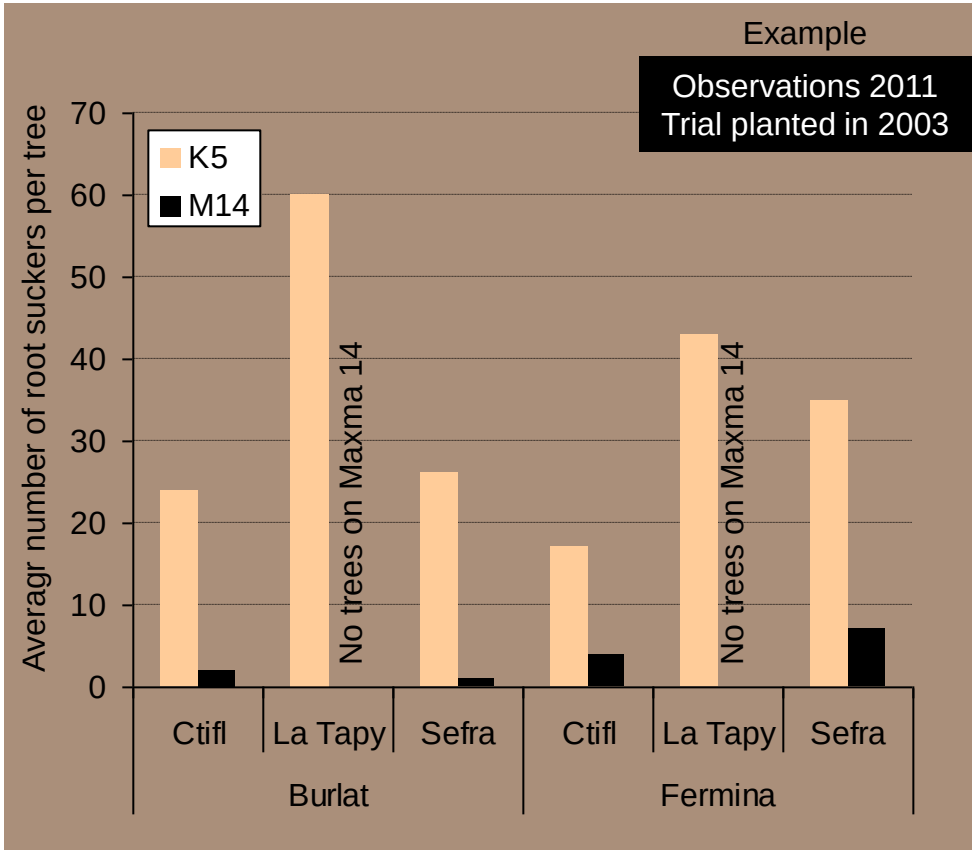


Krimsk 5*

Studied in France since 2003 (1st level of research) : a first trial was planted in 2003 and a second in 2011.

Trials are still in progress in France.

- Vigor similar to M14
- Very sensitive to **root suckering**
- Most of the time, an healphy vegetation have been observed.
- Krimsk 5 had produce more than Krimsk 7 in 2015.



Krimsk 7*

Origin : Russia

Tabel

M14

SL64

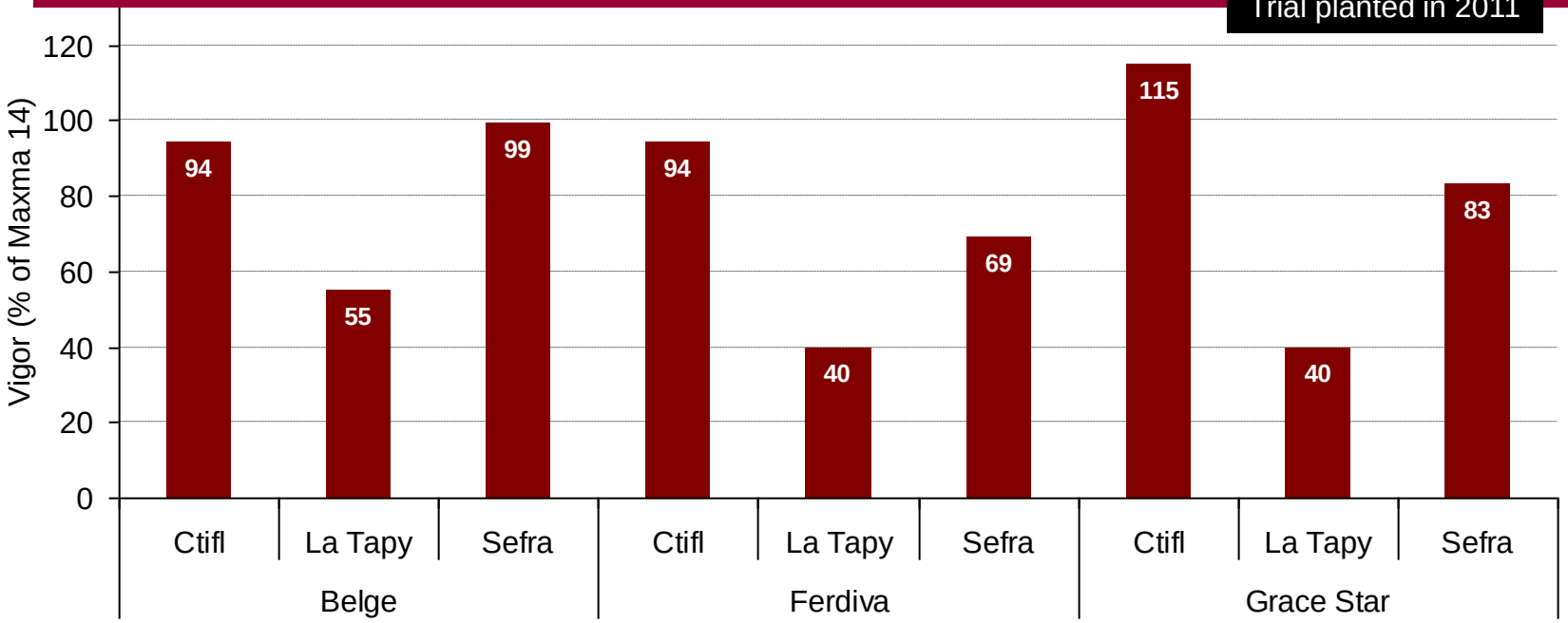
wild cherry

Semi-dwarfing rootstock

seems to be less vigorous than Maxma® 14 (depending of soils and varieties)

Example

Observations 2014
Trial planted in 2011



Krimsk 7*

Studied in France since 2011 (1st level of research) : first fruits have just been observed!

Trials are still in progress in France.

- Seems to be a little less vigorous than Maxma® 14.
- Seems to be less sensitive to root suckering than Krimsk 5.
- Most of the time, an healphy vegetation have been observed.
- Krimsk 7 had produce less than Krimsk 5 and Maxma® 14 in 2015.

Maxma Delbard®14 Brokforest*

Prunus mahaleb x Prunus avium

Created by Lyle Brooks, Oregon, USA

Tabel

Rootstock planted in France since 20 years :

30 to 40% of new plantation are made with this rootstock.

M14

Semi-vigorous rootstock

60 to 90% of Sainte-Lucie 64

(depending of soils and varieties)

SL64

- No to low level of **root suckering**.
- Very good **anchorage**.

- More **precocious** than Sainte-Lucie 64.
- **Produce** more than Sainte-Lucie 64.
- **Fruit weight** similar to Sainte-Lucie 64.

wild cherry

Maxma Delbard®14 Brokforest*

Low level of sensitivity

- Chlorosis
- PDV and PNRSV virus
  (Howell, W.E., Lang, G.A., 2001)

Sensitive to…

- Lack of magnesium : sensitive to very sensitive

Moderate sensitivity to

- Root asphyxia : less sensitive than SL64
- Phytophtora

Pretty sensitive to…

- Vole
- Bacterial canker

Vigorous rootstock

Sainte-Lucie 64, Maxma Delbard®60
Broksec*, Adara*, GF8-1 + Adara*,
Avima® Argot, Piku® 3*, Monrepos

Sainte-Lucie 64

Prunus mahaleb

Created by Inra, France

Tabel

M14

SL64

wild cherry

Well-known rootstock.

One of the most planted in France.

Vigorous rootstock

80% of wild cherry

(depending of soils and varieties)

Sainte-Lucie 64

- No **root suckering**.
- Very good **anchorage**.

- Average **precocity** : first fruits after 5 to 6 years.
- Pretty good to good **productivity**.
- Good **fruit size**.

Low level of sensitivity

- Chlorosis
- Lack of magnesium
- Bacterial canker
- PDV and PNRSV virus

Pretty tolerant to…

- Drought

Sensitive to…

- Phytophtora

Very sensitive to…

- Root asphyxia
- Vole
- Amillaria root rot

Maxma Delbard®60 Broksec*

Prunus mahaleb x Prunus avium

Created by Lyle Brooks, Oregon, USA

Tabel

M14

SL64

wild cherry

Vigorous rootstock

90 to 120% of Sainte-Lucie 64
(depending of soils and varieties)

Maxma Delbard®60 Broksec*

- No to low level of **root suckering**.
- Very good **anchorage**.

- Average **precocity**.
- Pretty good to good **productivity**.
- Good **fruit size**.

Low level of sensitivity

- Drought
- Chlorosis
- Phytophtora
- PDV and PNRSV virus
  (G.Lang, W. Howell, 1998)

Pretty tolerant to…

- Root asphyxia
- Armillaria root rot

Adara*

Also used between the variety and GF8-1 in plot contaminated by Armillaria root rot.

Prunus cerasifera Her. (Myrobolan)
de Investigaciones Cientificas, Spain

Plum rootstock which can be used for cherry.

- Low level of **root suckering**.
- Very good **anchorage**.

- Average to pretty good **precocity**, similar to SL64.
- Pretty good **productivity**, better than SL64.
- Good **fruit size**, similar or better than SL64.

- **Tolerant to** root asphyxia, chlorosis, bacterial canker, vole.

M14

SL64

Vigorous rootstock

100 to 130% of Sainte-Lucie 64
(depending of soils and varieties)

wild
cherry

GF8-1 + Adara*

GF8-1

P. Cerasifera x P. munsoniana

Created by INRA, France

Adara

Prunus cerasifera Her. (Myrobolan)

Spain

Tabel

- High level of **root suckering**.
- Average **anchorage**.

M14

- Pretty good **precocity**.
- Pretty good **productivity**.
- Good **fruit size**.

SL64

- Low **sensitivity** to Armillaria root rot and bacterial canker.

wild cherry

Vigorous rootstock

Similar to Sainte-Lucie 64

(depending of soils and varieties)

Avima® Argot

Prunus mahaleb x Prunus Avium

Created by Pierre Argot, France

Tabel

M14

SL64

wild cherry

Trials are still in progress in France.

This rootstocks seems to be interesting when vigor is needed.

- Very low to moderate level of **root suckering**.
- Very good **anchorage**.

- **Precocity** sometimes better than SL64.
- Good **productivity** (better than SL64).
- Good **fruit size**.

- Pretty tolerant to root asphyxia?

Vigorous rootstock

100 to 130% of Sainte-Lucie 64
(depending of soils and varieties)

Piku® 3*

Prunus pseudocerasus x (Prunus canescens L. X Prunus Incisa L.)

Created by Station of Dresden-Pillnitz, Germany

Tabel

M14

SL64

wild cherry

Trials are still in progress in France.

This rootstocks seems to be interesting when vigor is needed.

- Very low level of **root suckering**.
- Very good **anchorage**.

- Average **precocity**, similar to SL64.
- Average **productivity** , similar to SL64.
- Good **fruit size**.

- Tolerant to drought.

Very vigorous rootstock

100 to 120% of wild cherry
(depending of soils and varieties)

Monrepos

Prunus cerasifera Ehr. (Myrobolan)

Tabel

M14

SL64

wild cherry

Trials planted in 2014 in France.

Vigorous rootstock
(depending of soils and varieties)

Thanks
for your attention

LA TAPY

Ctifl