Clonal variation in susceptibility to *Leptoglossus occidentalis* in Stone pine grafted plantations
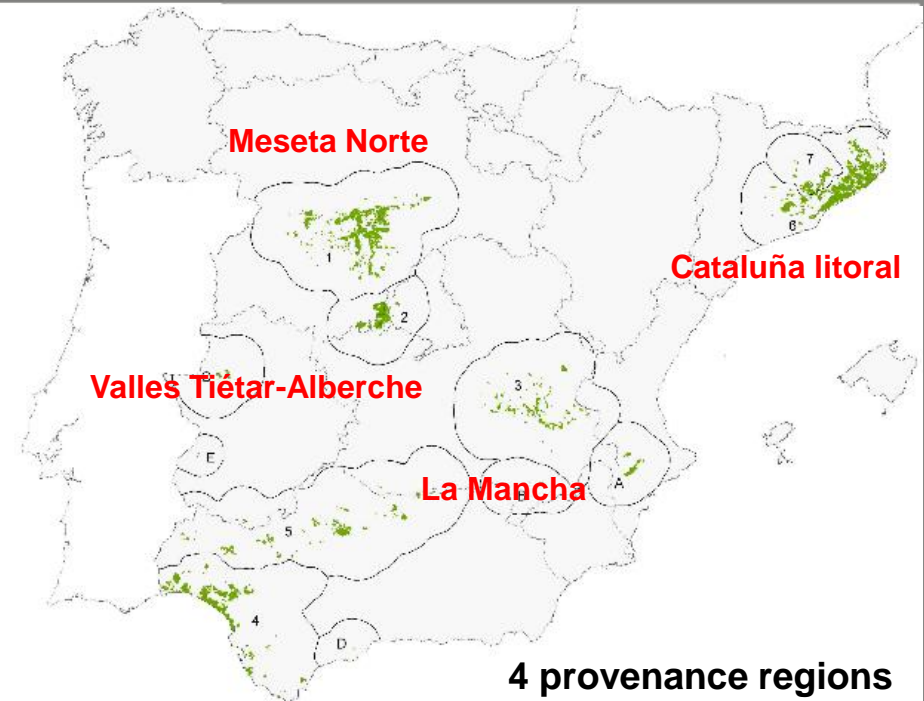
R. de la Mata, A. Teixidó & N. Aletà

incredible
Innovation Networks for Cork, Resins & Edibles

IRTA
RESEARCH | & | TECHNOLOGY
FOOD | & | AGRICULTURE

Caldes de Montbui clonal trail

Meseta Norte

Cataluña litoral

Valles Tietar-Alberche

La Mancha

4 provenance regions

National network of G × E trials:

Tordesillas (Valladolid)	2007
Serranillo (Guadalajara)	2007
Aranda del Rey (Madrid)	2007
C. Montbui (Barcelona)	**2009**

Spacing: 6 × 6 m
Area: 13.824 m^2
Plant material: 64 clones of *P. pinea* grafted on *P. pinea rootstocks* → *CIFOR-INIA* selections (**16 clones/provenance**)
Design: 3 repetitions & 6 ramets/clone
Management: No watering / Pruning

Cone counts:

1ˢᵗ year

2ⁿᵈ year

3ʳᵈ year

Harvest & drying individual cones

Drying on stove at 45ºC

Cone dry weight

Cone & seed opening

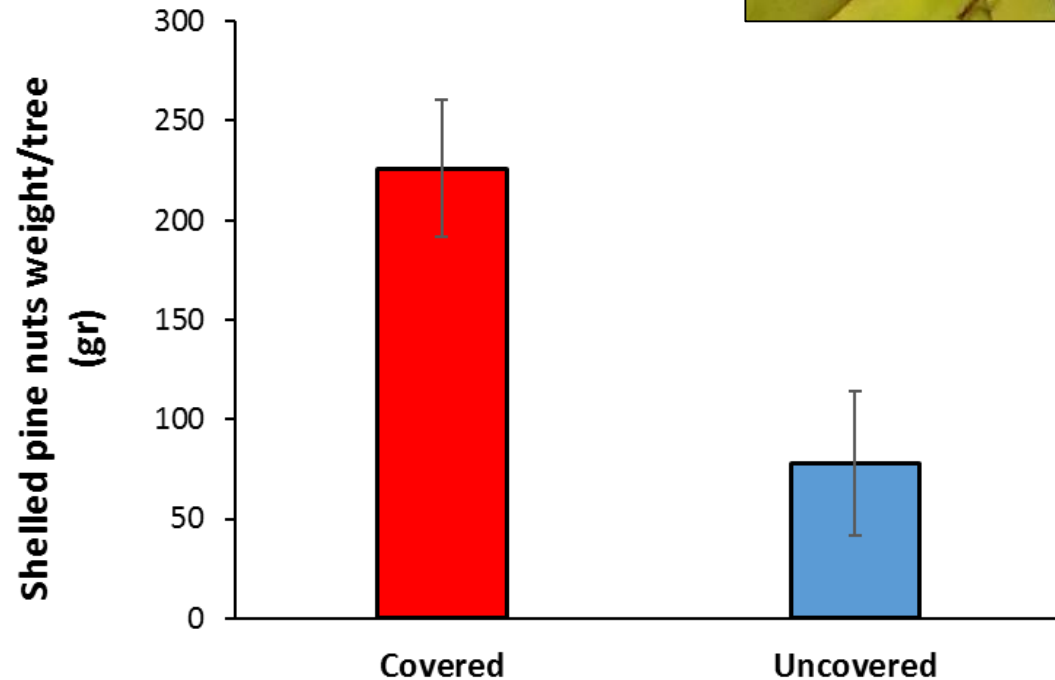2010   2011   2012   2013   2014   2015   2016   2017   2018
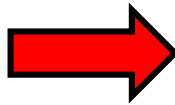
2009

PLANTING
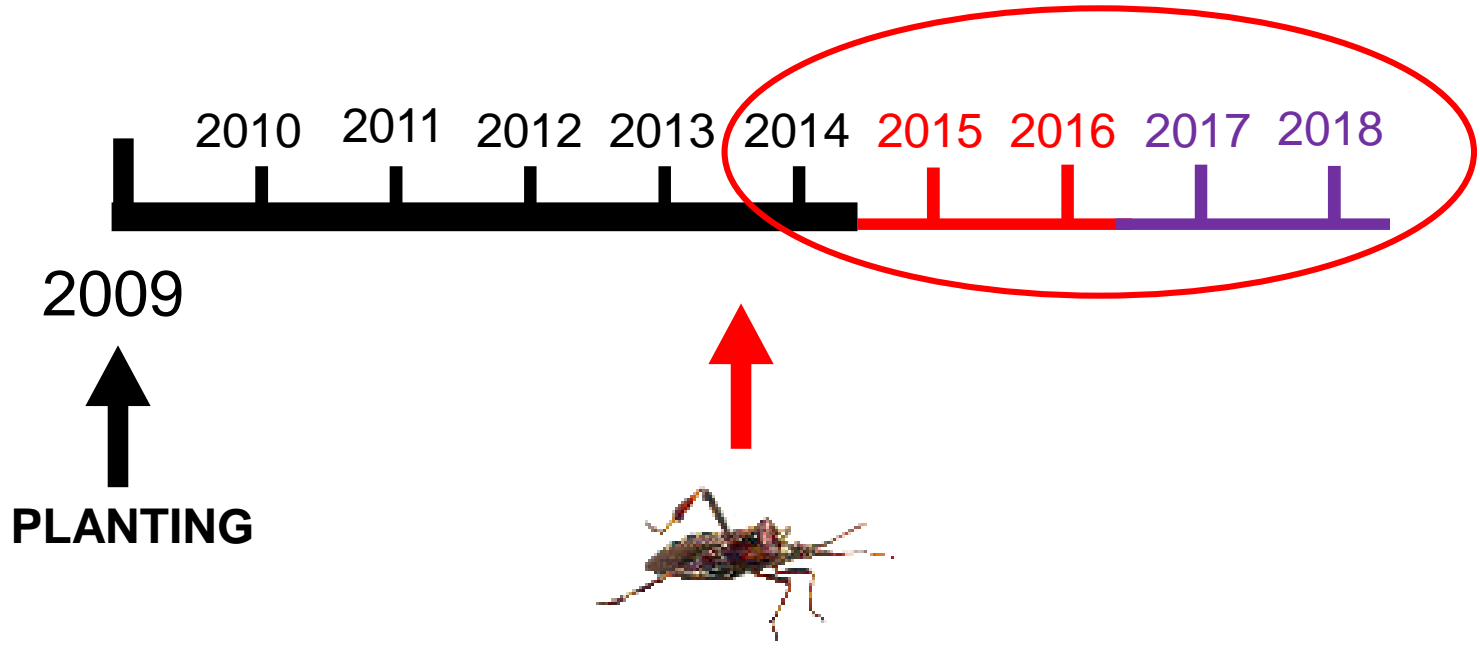
5 INSECT-PROOF JAILS

Harvest losses due to the bug

Covered → **2.9 times more shelled pine nuts** → **65% shelled pine nuts loss**
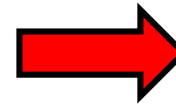
1. Pine nuts predation (3ʳᵈ year)
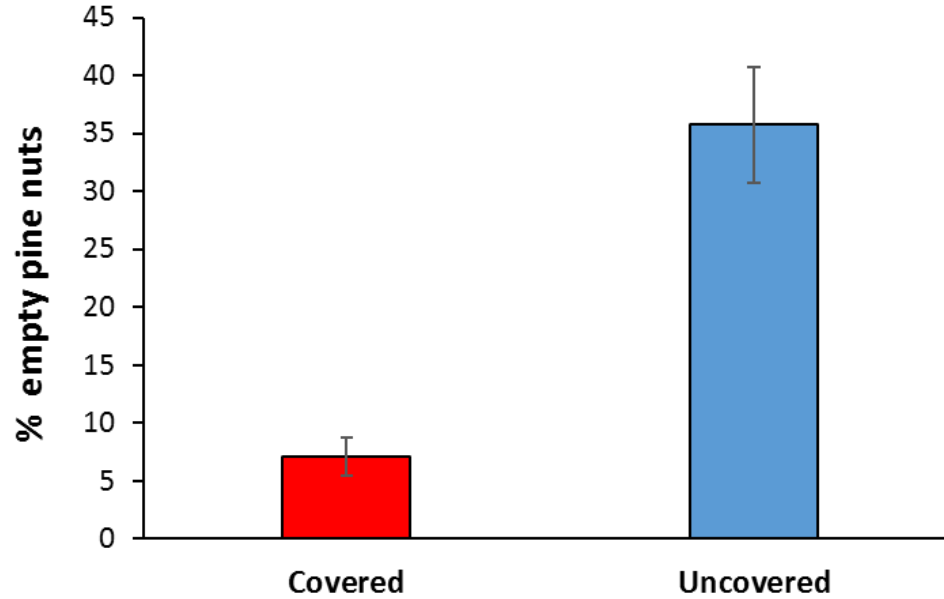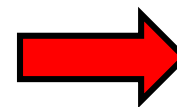
Uncovered ➡ **29% more empty pine nuts**
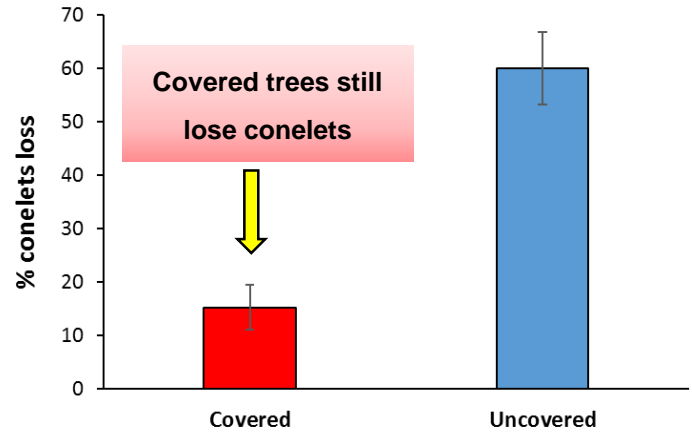
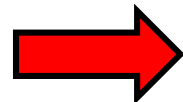## 2. Conelets losses
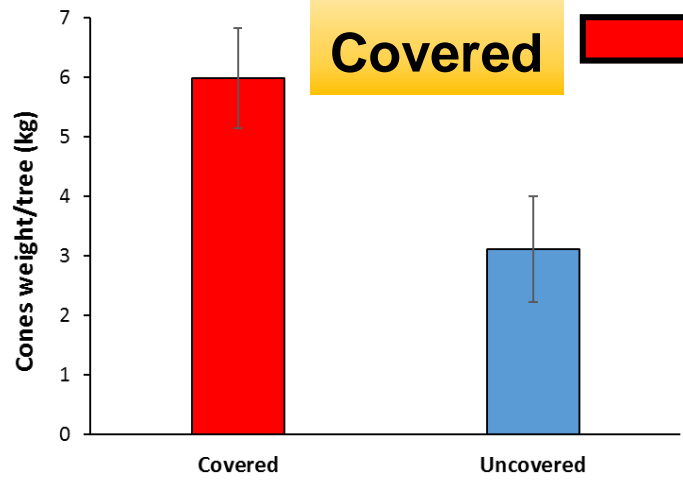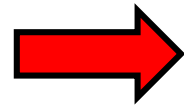
Covered → **1.9 times more cones** → **48% cone weight loss**

Covered trees still lose conelets

Uncovered → **7.6 times more conelets losses**

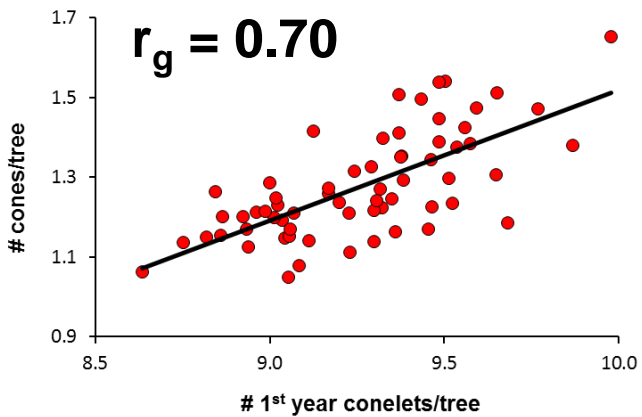# Clonal variation

$r_g = 0.41$
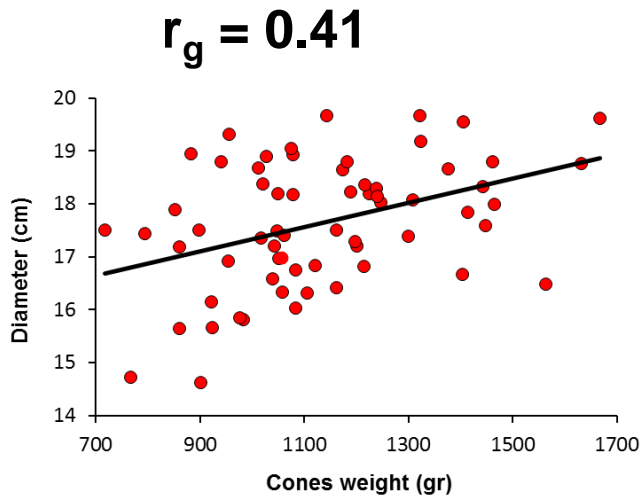
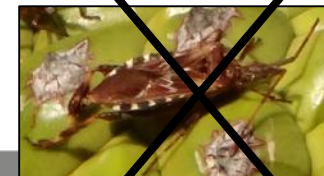+ vigorous clones → Clones + cone production

$r_g = 0.70$

Clones + 1st year conelets → Clones + cone production

1st year conelets production → Harvest estimation 3 seasons later

Clonal variation

$r_g = -0.46$

Scatter plot: x-axis labeled "% conelets loss" (55 to 75), y-axis labeled "# cones/tree" (1.0 to 1.7)
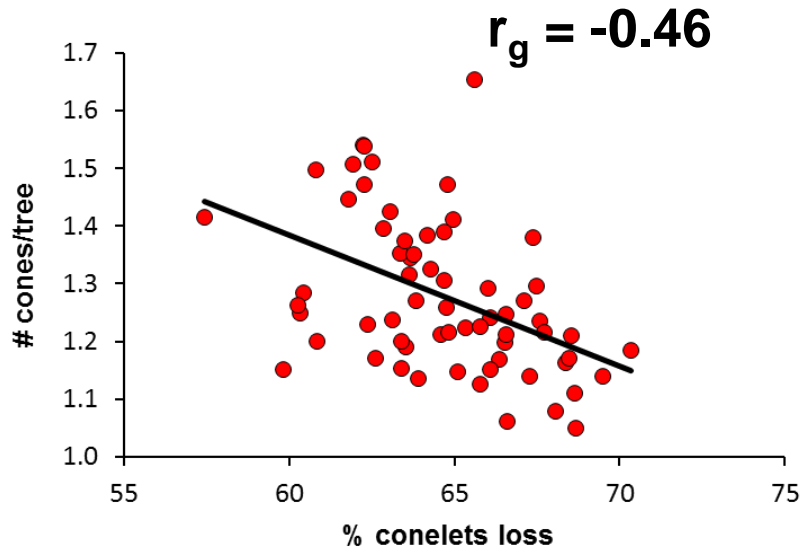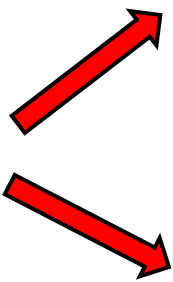
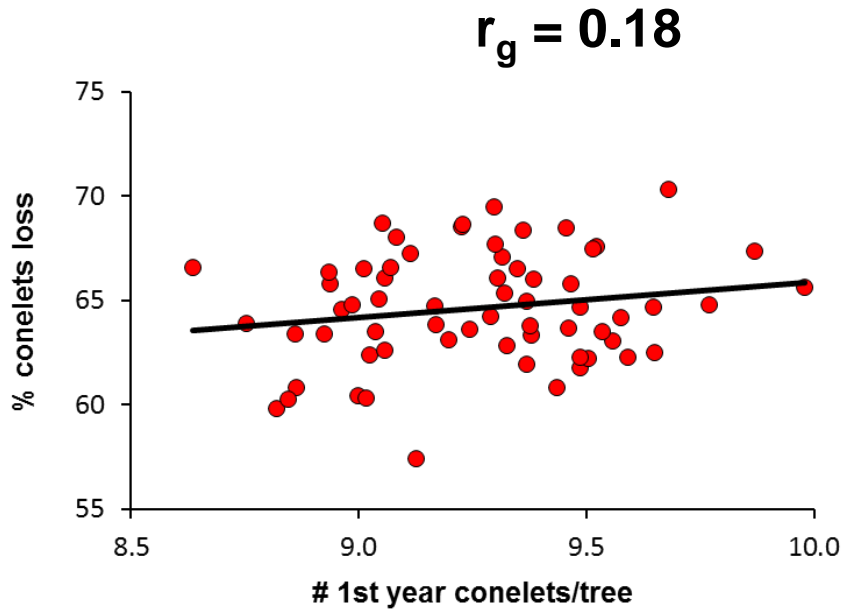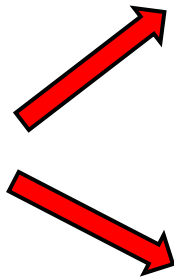**Clones – conelets losses**

↓

Clones + cone production

Cone production

→ **Maximizing production of 1st year conelets**

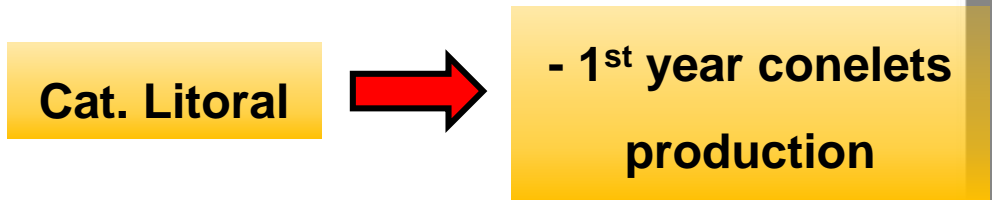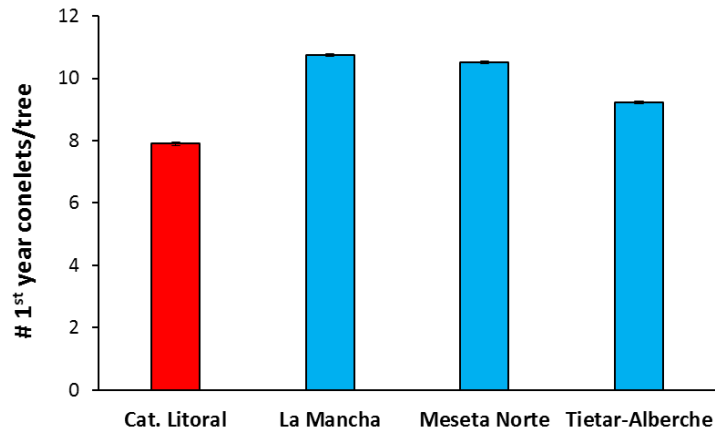→ **Minimizing conelets losses over the 3 seasons of development**

Clonal variation

IRTA

$r_g = 0.18$

% conelets loss (y-axis, 55 to 75)
# 1st year conelets/tree (x-axis, 8.5 to 10.0)
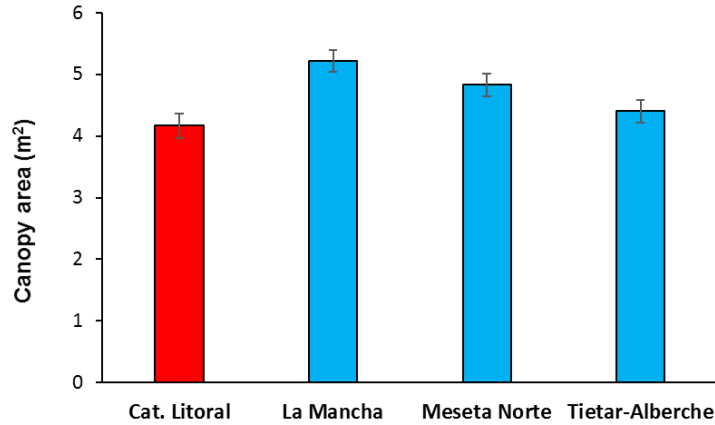
Clones + 1ˢᵗ year conelets

Clones + conelets loss

Clone selection

→ Maximizing production of 1ˢᵗ year conelets

→ Minimizing conelets losses

Provenance variation

Provenance variation

CONCLUSSIONS
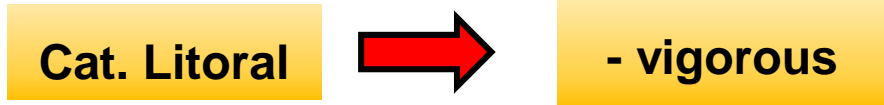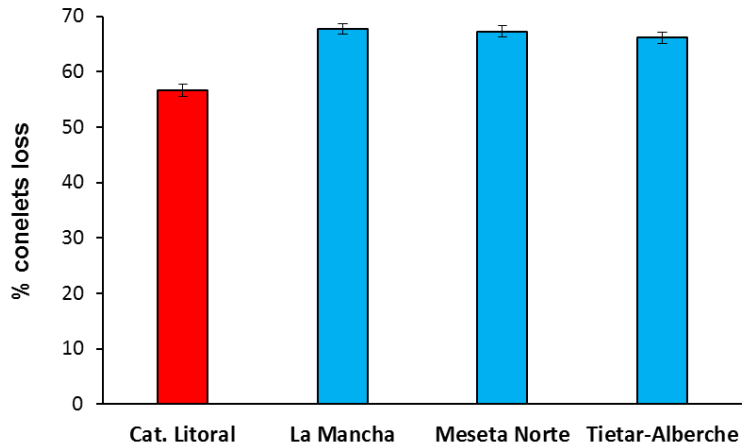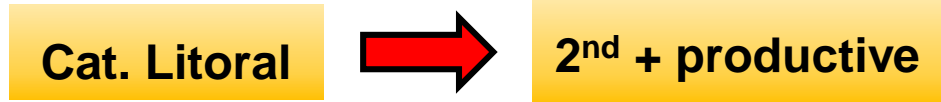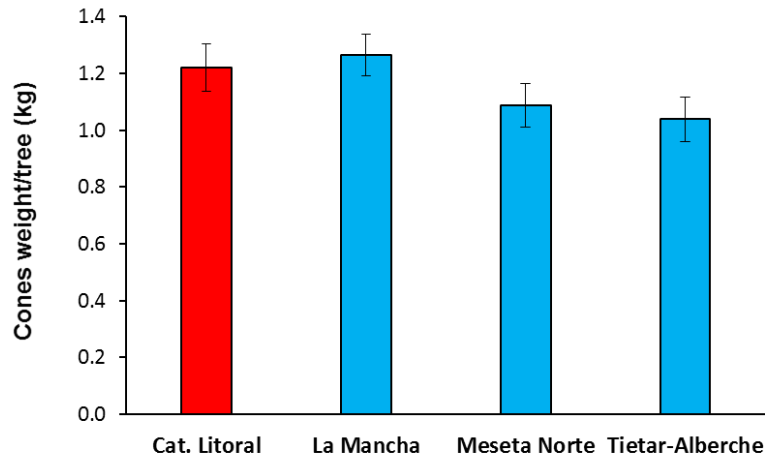
1st year conelets production is a good estimation of future cone harvesting

Conelets losses over development significantly determines final cone harvesting

Final cone harvesting depends on both 1st year conelets production and conelets losses over development

It is recommended selection for clones combining increased conelets production and decreased conelets losses

'Cat. Litoral' provenance showed decreased vigor and 1st year conelets production

However, 'Cat. Litoral' was the 2nd more productive provenance given that it lost less conelets than other provenances

Joan Abel

Francisco Pérez

Eduard Pastor

Thank you!