IntenSusVITI Operational Group

Viticulture Sustainable Intensification through Mechanical Pruning

PDR 2020 PROGRAMA DE DESENVOLVIMENTO RURAL 2014-2020

PORTUGAL 2020

UNIÃO EUROPEIA
Fundo Europeu Agrícola de Desenvolvimento Rural
A Europa investe nas Zonas Rurais

Enoforum 2019
INNOVAZIONE ED ECCELLENZA | VICENZA 21-23 MAGGIO

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Universidade de Lisboa

IntenSusVITI Operational Group

Funding: PDR2020 (Medida 1.0.1/2016, parceria nº82, iniciativa 164)

Coordination:

Partners:

Motivation

Hand Labour

- Availability
- Cost

Motivation

Low Yields

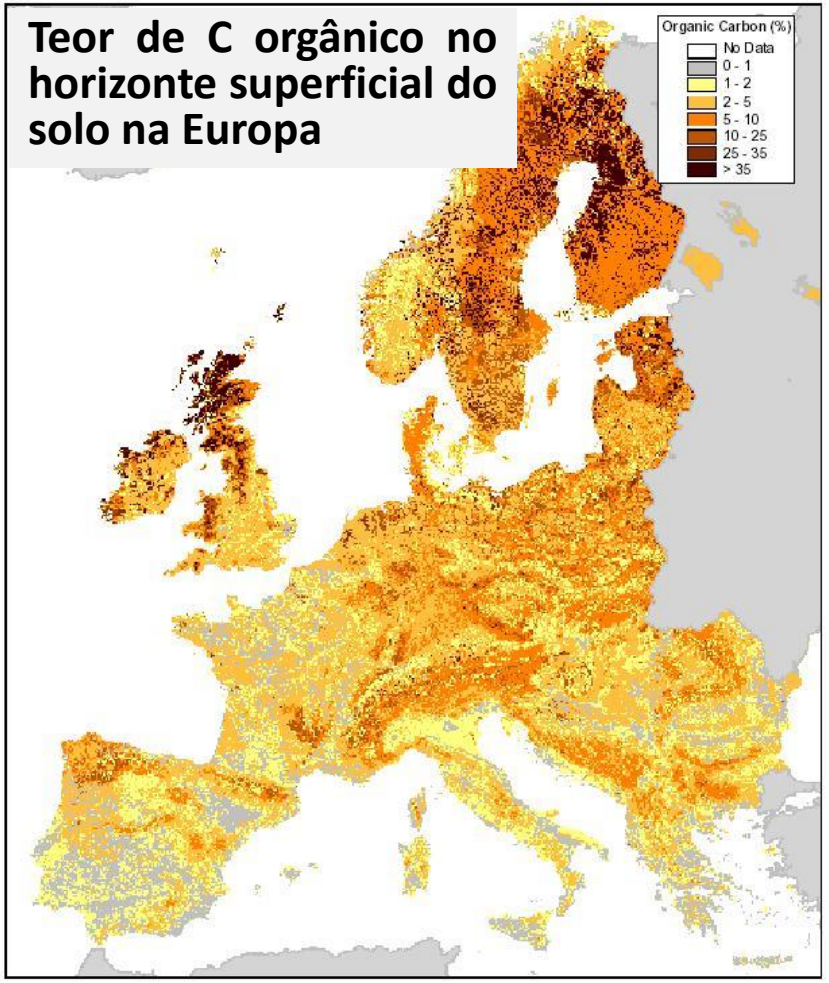
4,68 t/ha

Motivation

Low soil fertility

Portugal is one of the European Union countries that has a **higher percentage of low quality soils**.

One of the major reasons for this situation is the low organic matter content of portuguese soils. (Quelhas dos Santos, 2012)



(European Commission - Joint Research Centre Institute for Environment and Sustainability)

Motivation

New organic amendments

New organic amendments, coming in from human settlements and not from the agricultural and forestry sector, are increasingly available :

- Municipal Solid Waste Composts
- Sewage Sludge Composts

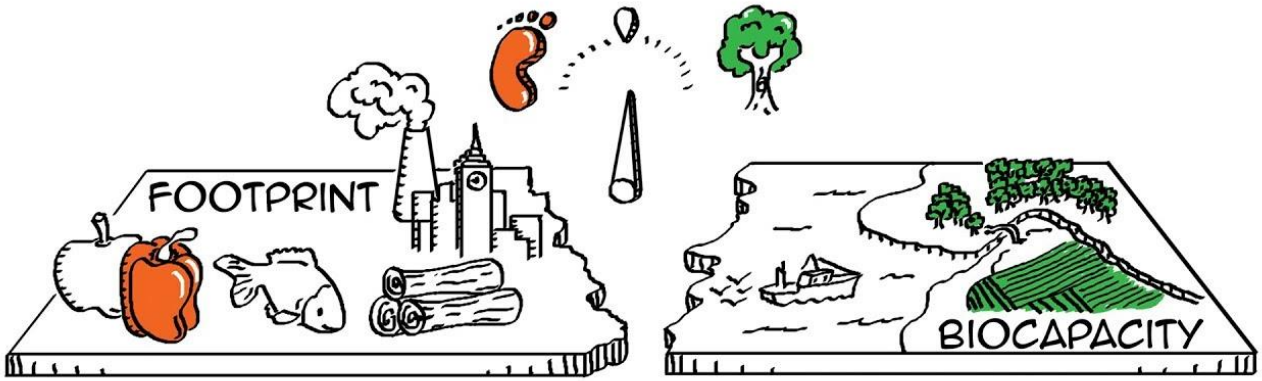
Motivation

Increasing importance of some pests

Mealybugs

Empoasca vitis

Goals



"Biocapacity represents the biosphere's ability to meet human demand for material consumption and waste disposal."

(Global Footprint Network, 2010)

Goals

Increase Biocapacity
Improve Ecological Footprint

Increase soil organic matter content

↓

Reduction of vineyard carbon footprint

Increase Yield

↓

Reduction of carbon and ecological footprints per kg of grape

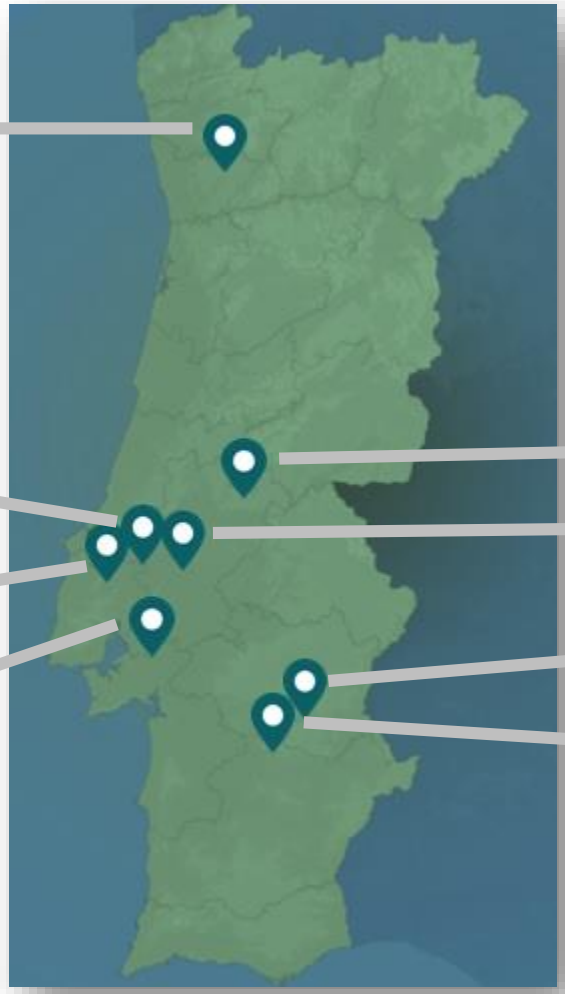
Goals

Increase Biocapacity
Improve Ecological Footprint

Reduction of sprayings for diseases control – *Botrytis cinerea* and pests

Reduction of support materials – stakes and wires

Trial Fields



Variables

Hand Pruning

≈ 60.000 buds/ha

Box Pruning

≈ 200.000 buds/ha

Variables

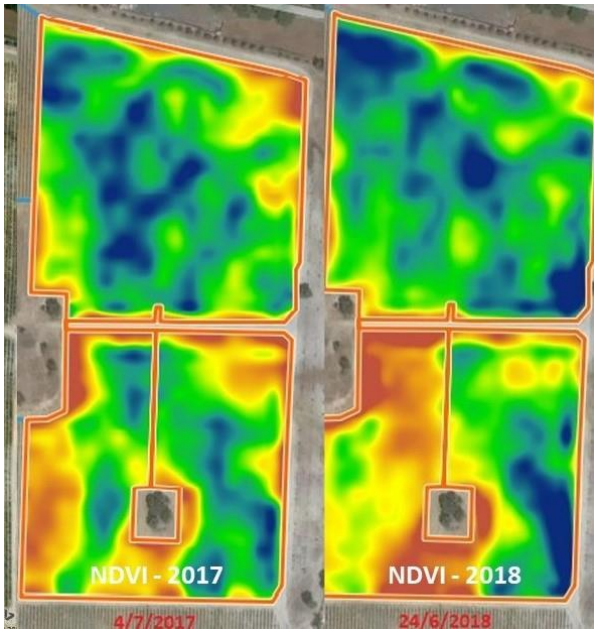
New Organic Amendments

Variables

Soil Tillage

Variables

Sexual Confusion (mealybugs)



Precision Viticulture (*Empoasca vitis* detection)

Assessments

Soil analysis

Gas exchanges

Predawn leaf water potential

Petiole analysis

Canopy structure

Pests monitorization

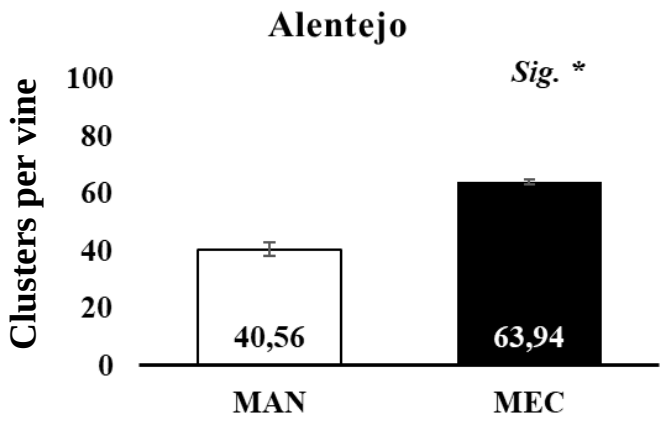
Productivity

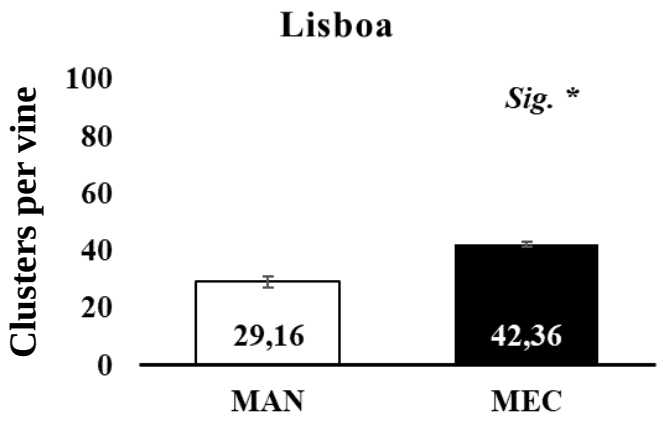
Vigour and vegetative growth

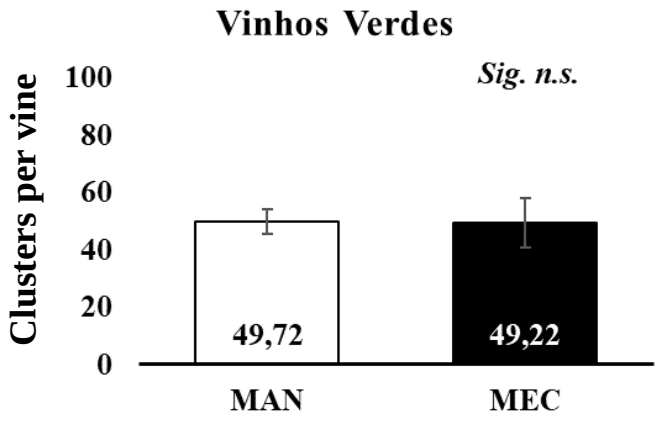
Grape composition

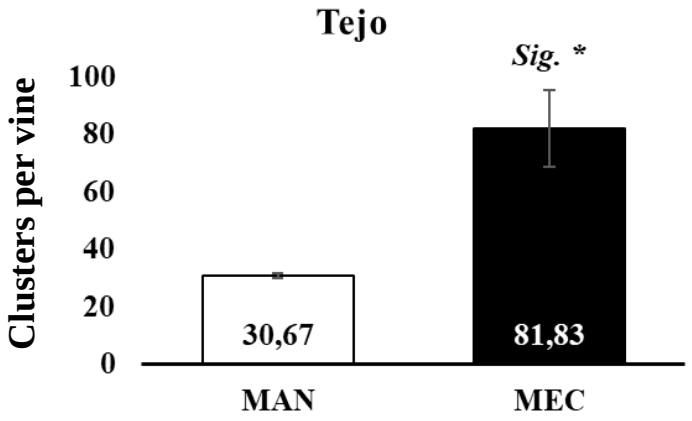
Wine quality

Results

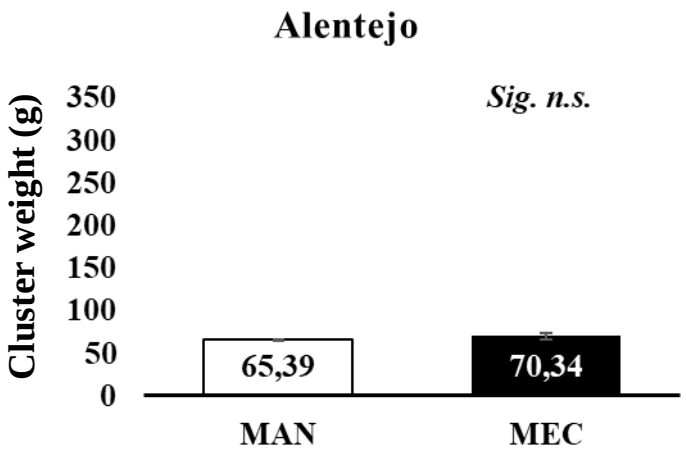

Alentejo
Clusters per vine
100
80
60
40
20
0
Sig. *
40,56
63,94
MAN
MEC

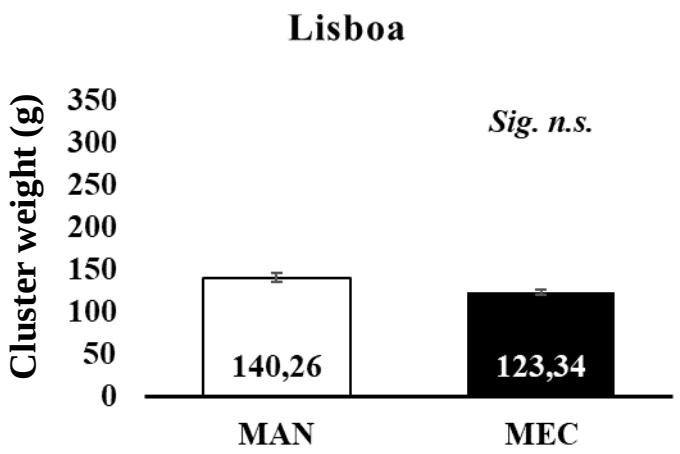

Lisboa
Clusters per vine
100
80
60
40
20
0
Sig. *
29,16
42,36
MAN
MEC

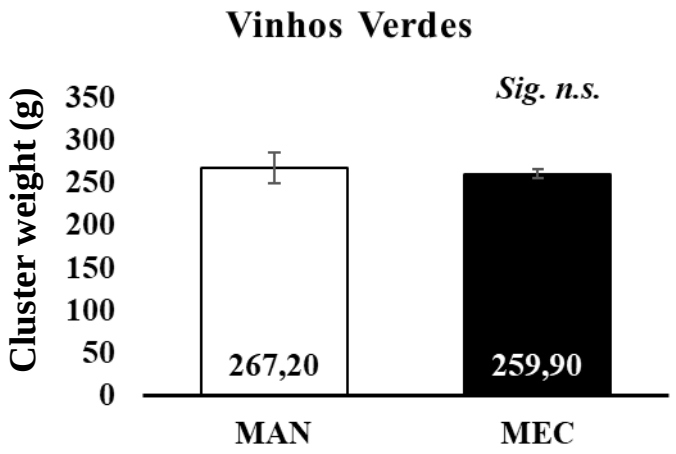

Vinhos Verdes
Clusters per vine
100
80
60
40
20
0
Sig. n.s.
49,72
49,22
MAN
MEC

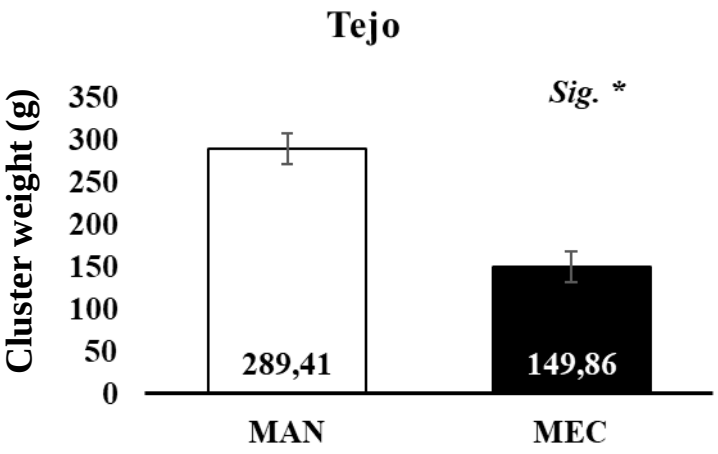

Tejo
Clusters per vine
100
80
60
40
20
0
Sig. *
30,67
81,83
MAN
MEC

Results

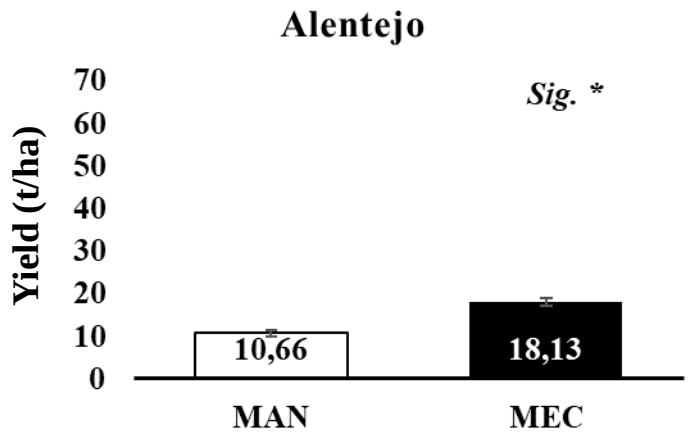

Alentejo
Sig. n.s.
Cluster weight (g)
350
300
250
200
150
100
50
0
65,39
70,34
MAN
MEC

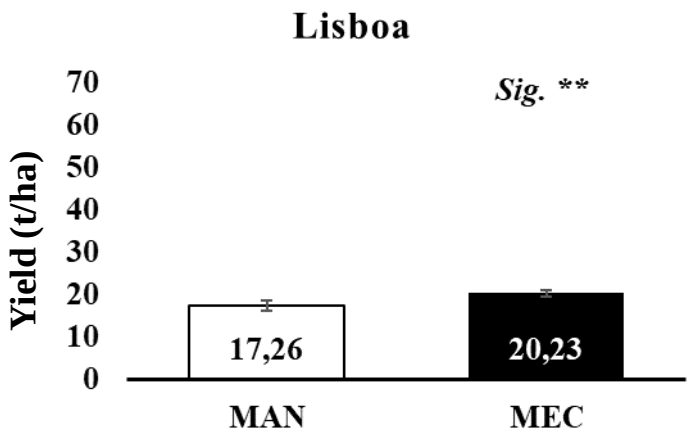

Lisboa
Sig. n.s.
Cluster weight (g)
350
300
250
200
150
100
50
0
140,26
123,34
MAN
MEC

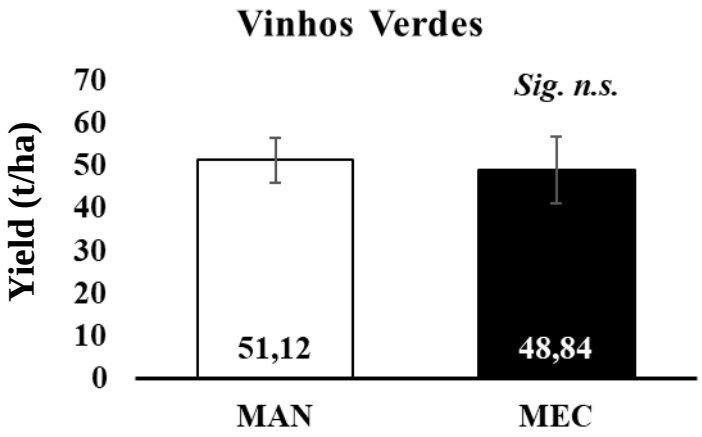

Vinhos Verdes
Sig. n.s.
Cluster weight (g)
350
300
250
200
150
100
50
0
267,20
259,90
MAN
MEC

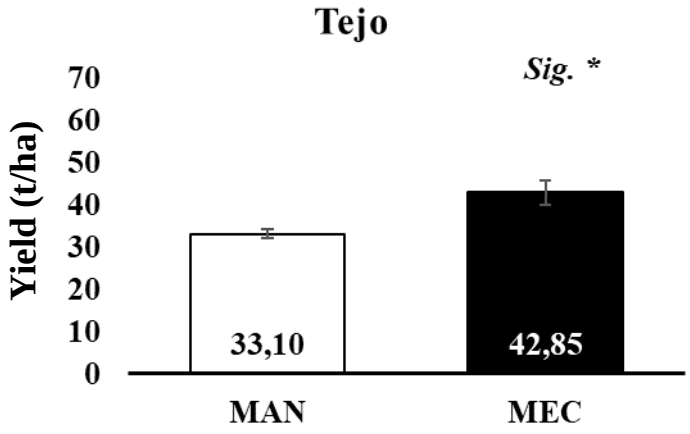

Tejo
Sig. *
Cluster weight (g)
350
300
250
200
150
100
50
0
289,41
149,86
MAN
MEC

Results

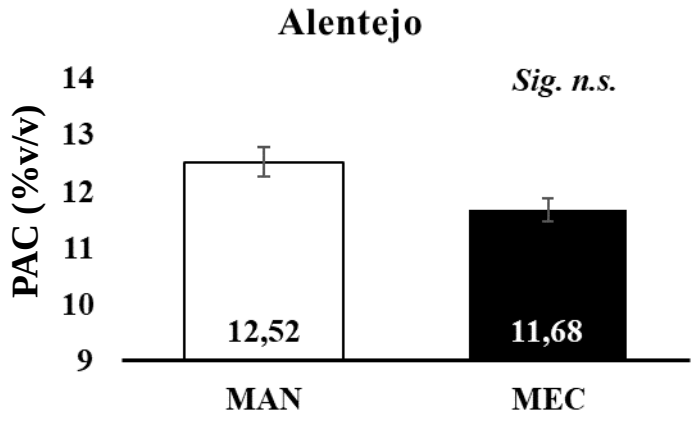

Alentejo
Sig. *
Yield (t/ha)
70
60
50
40
30
20
10
0
10,66
18,13
MAN
MEC

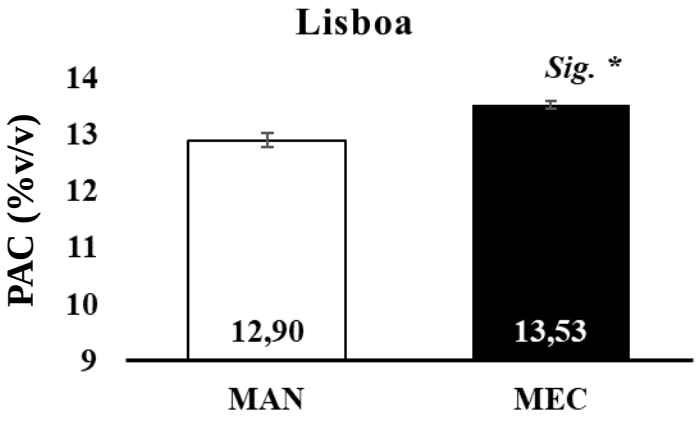

Lisboa
Sig. **
Yield (t/ha)
70
60
50
40
30
20
10
0
17,26
20,23
MAN
MEC

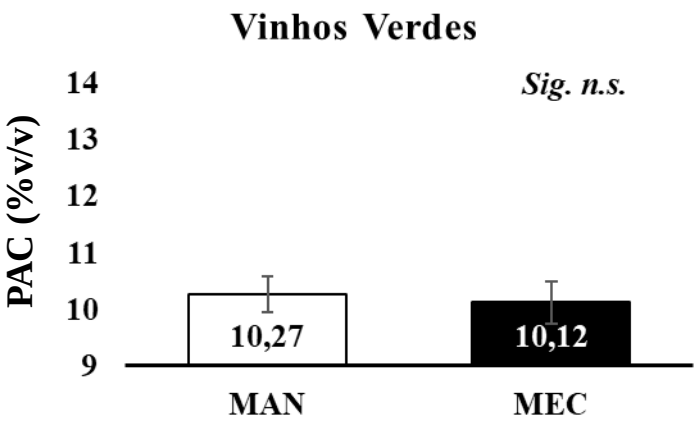

Vinhos Verdes
Sig. n.s.
Yield (t/ha)
70
60
50
40
30
20
10
0
51,12
48,84
MAN
MEC

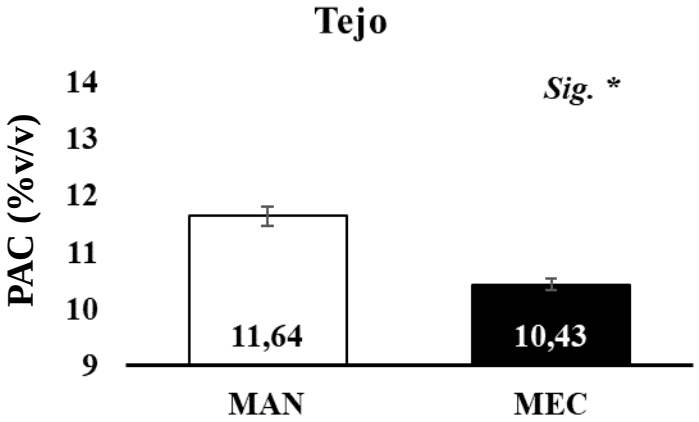

Tejo
Sig. *
Yield (t/ha)
70
60
50
40
30
20
10
0
33,10
42,85
MAN
MEC

Results

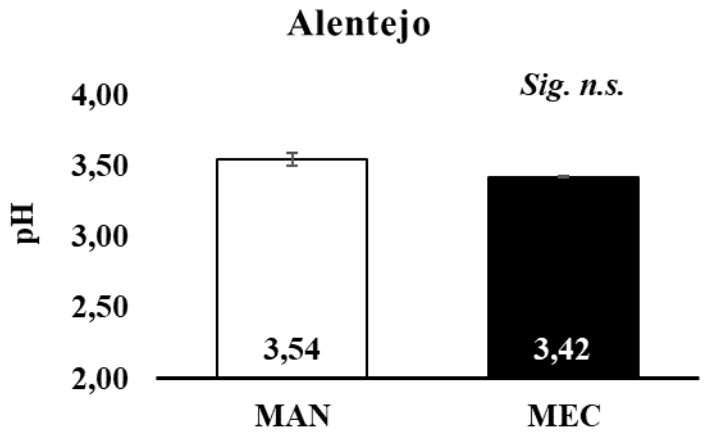

Alentejo
Sig. n.s.
PAC (%v/v)
14
13
12
11
10
9
12,52
11,68
MAN
MEC

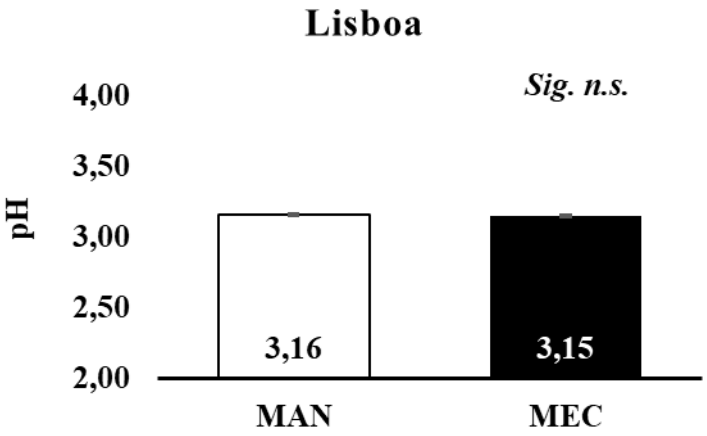

Lisboa
Sig. *
PAC (%v/v)
14
13
12
11
10
9
12,90
13,53
MAN
MEC

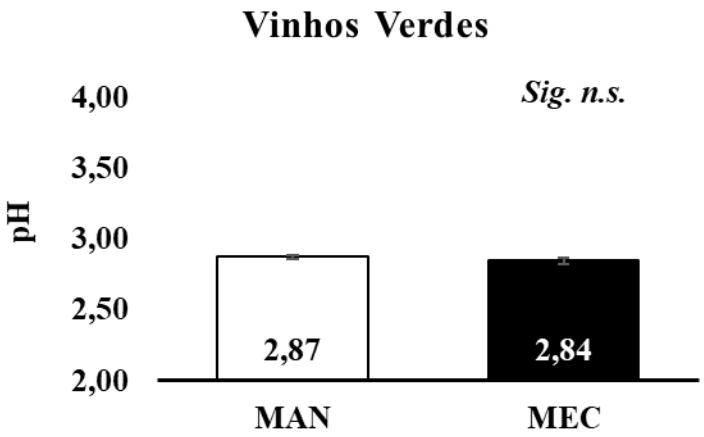

Vinhos Verdes
Sig. n.s.
PAC (%v/v)
14
13
12
11
10
9
10,27
10,12
MAN
MEC

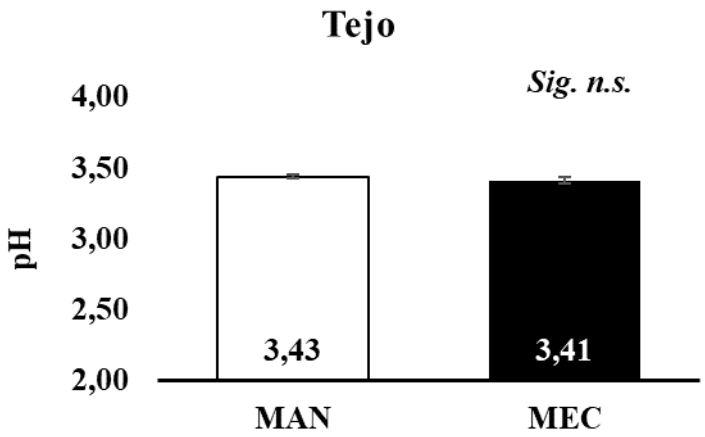

Tejo
Sig. *
PAC (%v/v)
14
13
12
11
10
9
11,64
10,43
MAN
MEC

Results

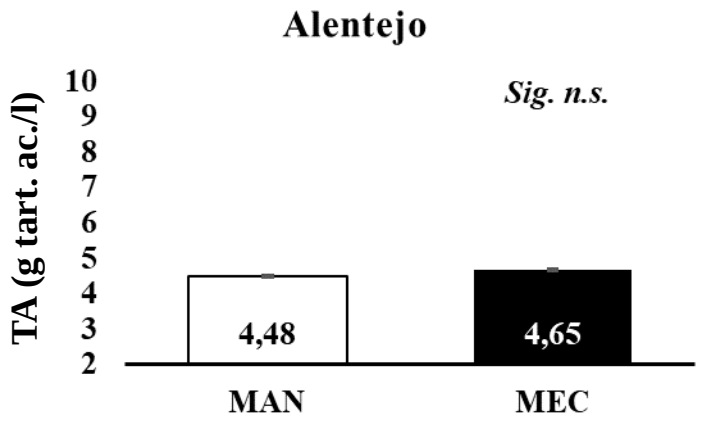

Alentejo
Sig. n.s.
pH
4,00
3,50
3,00
2,50
2,00
3,54
3,42
MAN
MEC

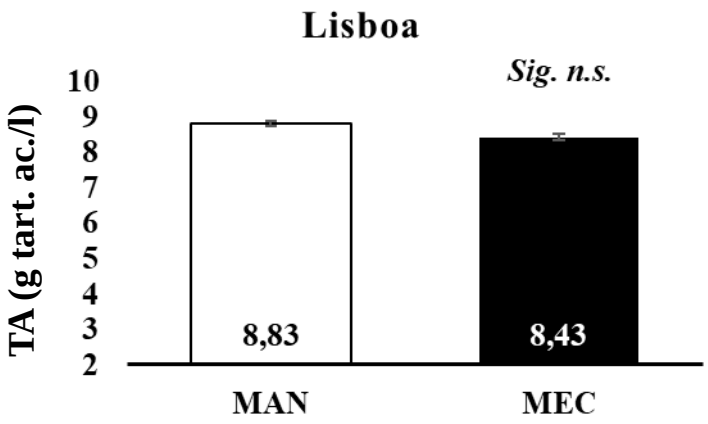

Lisboa
Sig. n.s.
pH
4,00
3,50
3,00
2,50
2,00
3,16
3,15
MAN
MEC

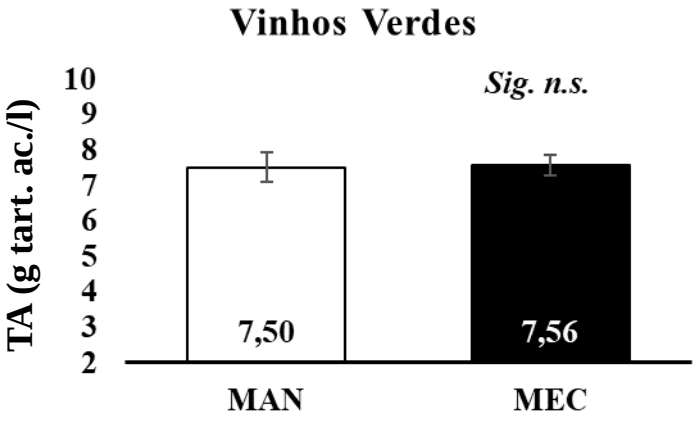

Vinhos Verdes
Sig. n.s.
pH
4,00
3,50
3,00
2,50
2,00
2,87
2,84
MAN
MEC

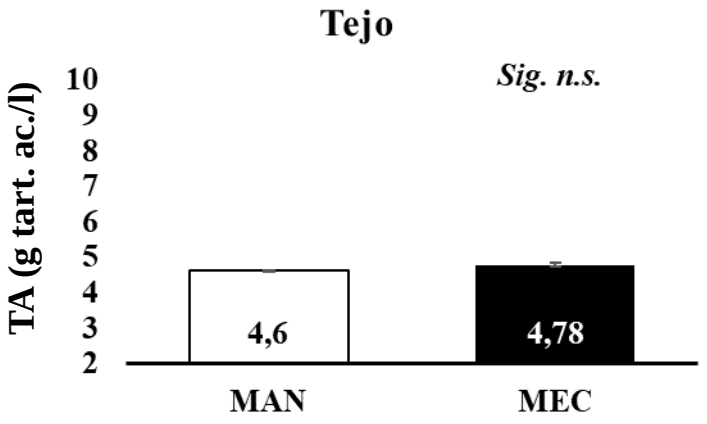

Tejo
Sig. n.s.
pH
4,00
3,50
3,00
2,50
2,00
3,43
3,41
MAN
MEC

Results


Alentejo
TA (g tart. ac./l)
10
9
8
7
6
5
4
3
2
Sig. n.s.
4,48
4,65
MAN
MEC


Lisboa
TA (g tart. ac./l)
10
9
8
7
6
5
4
3
2
Sig. n.s.
8,83
8,43
MAN
MEC


Vinhos Verdes
TA (g tart. ac./l)
10
9
8
7
6
5
4
3
2
Sig. n.s.
7,50
7,56
MAN
MEC


Tejo
TA (g tart. ac./l)
10
9
8
7
6
5
4
3
2
Sig. n.s.
4,6
4,78
MAN
MEC

Conclusions

1. Box pruning allows a reduction in **hand labour** and na increase in **productivity**.

2.1 When the increase in yield is not high there is no delay in ripening.

2.2 When the yield increase is high, a delay in the sugar accumulation occurs.

2.3 Total acidity and pH were not significantly affected by box pruning.

3. It is fundamental to adjust pruning (systems and bud load) to the objectives of the production.

Thank you for your attention

Grupo Operacional IntenSusVITI **PDR2020 (Medida 1.0.1/2016, parceria nº82, iniciativa 164)**

Co-financiado:

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UNIÃO EUROPEIA
Fundo Europeu Agrícola de Desenvolvimento Rural
A Europa investe nas Zonas Rurais

Parceiros:

INSTITUTO SUPERIOR DE AGRONOMIA Universidade de Lisboa

QUINTA DO GRADIL

JOSÉ MARIA DA FONSECA

ADEGA DE ALMEIRIM DESDE 1958

QUINTA·DE·LOUROSA

Quinta da Aroeira

AVIPE

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Jorge Graça