Universitat de Lleida

Generalitat de Catalunya
Departament d'Agricultura, Ramaderia, Pesca i Alimentació

Adjusting spray volume rates to the canopy vigour from aerial images in a vineyard

Carla Román, Santiago Planas, Joan Esteve

SuproFruit 2017

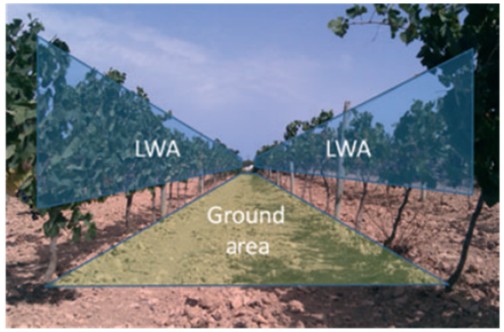
14th Workshop on Spray Application in Fruit Growing
10th may 2017
Hasselt, Limburg, Belgium

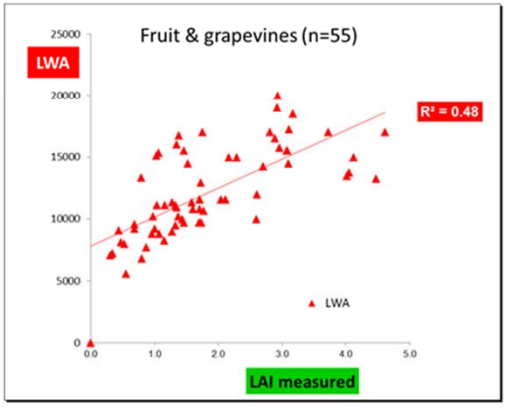
EU-CHINA LEVER FOR IPM DEMONSTRATION

Objective Task 1.4 : optimize modelling approaches to rationalize pesticide use

Pesticide dose adjustment to canopy vigour

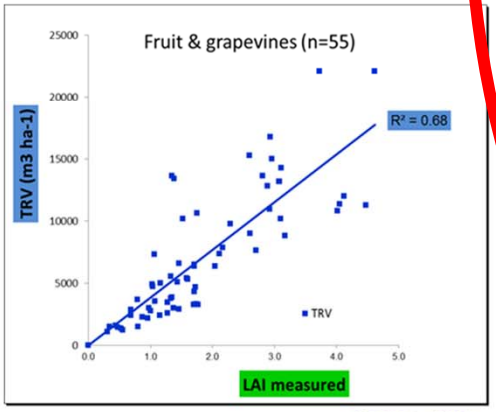
Leaf Wall Area





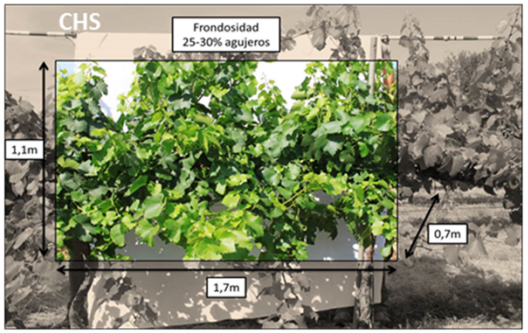
OPTIDOSA Project (2007-10)

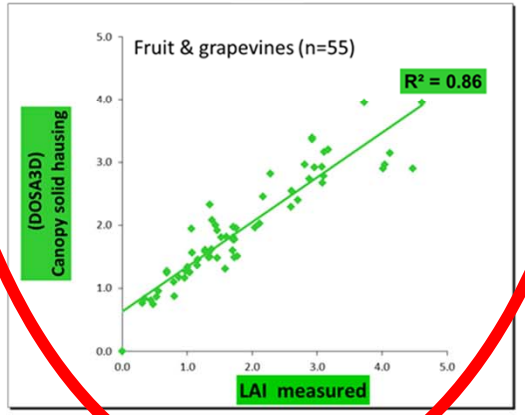
Tree Row Volume



OPTIDOSA Project (2007-10)

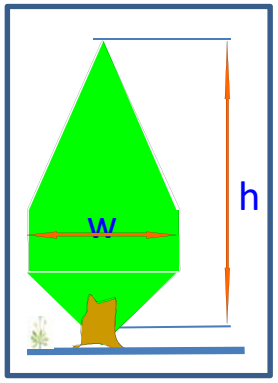
Canopy Solid Housing DOSA3D

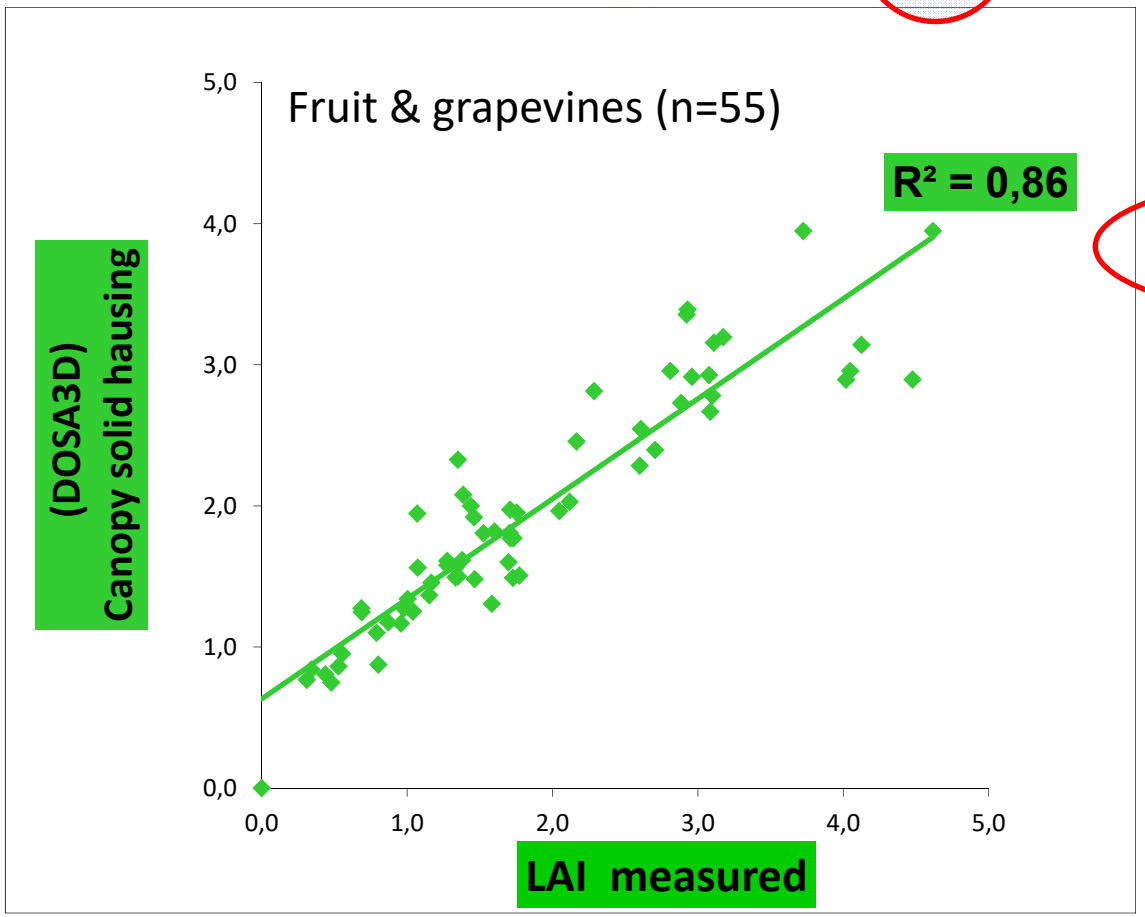




OPTIDOSA Project (2007-10)

Pesticide dose adjustment to canopy vigour





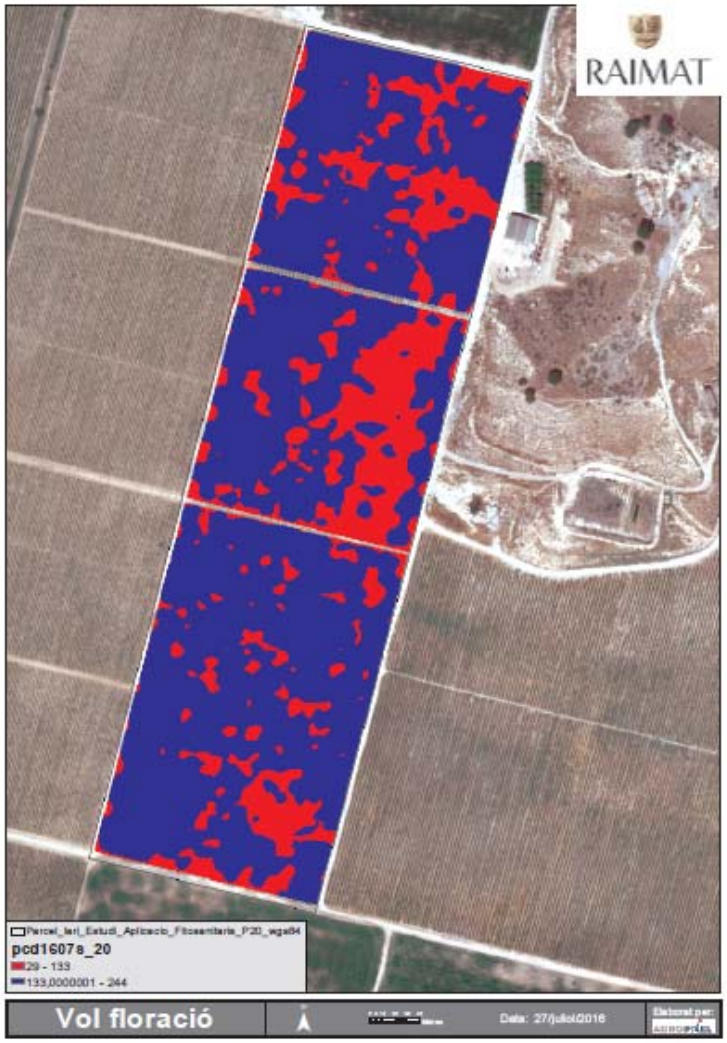
	R^2
LWA	0.48
TRV	0.68
CSH	0.86*

Material & Methods. Location

Vineyard (date of flight: 27 July 2016)	
Code	P20 (13 ha)
Variety	Tempranillo
BBCH stage	83-85
Row spacing (m)	3,20
In-row distance (m)	2,00

Material & Methods. Maps

Plant Cell Density index (k-means)



Treatment final map

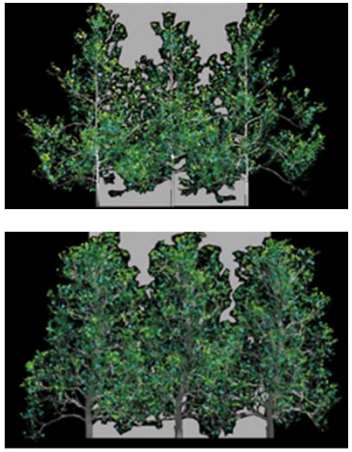
Material & Methods. Leaf Area Index

LOW VIGOUR

HIGH VIGOUR

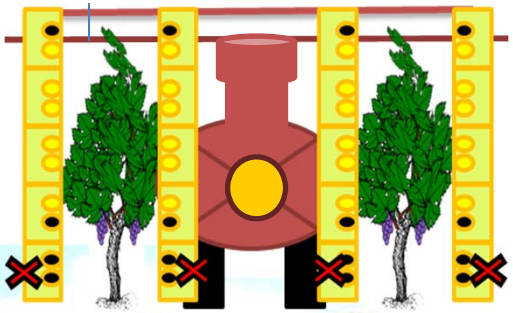
Material & Methods. Canopy Solid Housing

Classes	Low vigour (LV)	High vogour (HV)
Canopy height (m)	0,80	1,20
Mid-width canopy(m)	0,60	0,90
Porosity (%)	30	15
LAI estimated (DOSAFRUT)	0,91	1,56
LAI manual measured	0,98	1,45
Volume rate (L/ha)	318	418



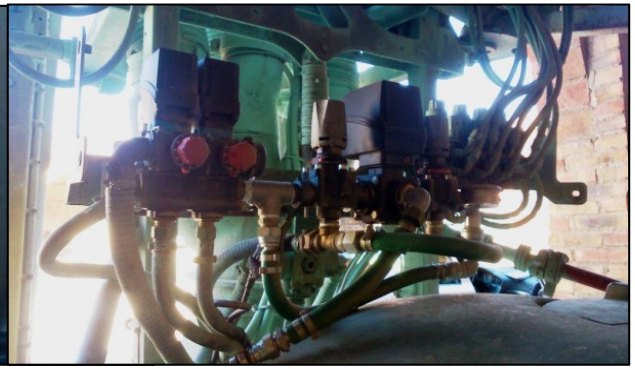
Materials & Methods. Sprayer calibration

ILEMO-HARDI IRIS
24 Albuz ATR yellow



Materials & Methods. Sprayer calibration

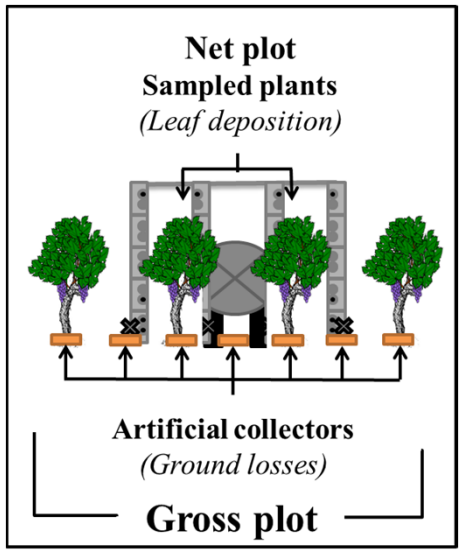
Return valve

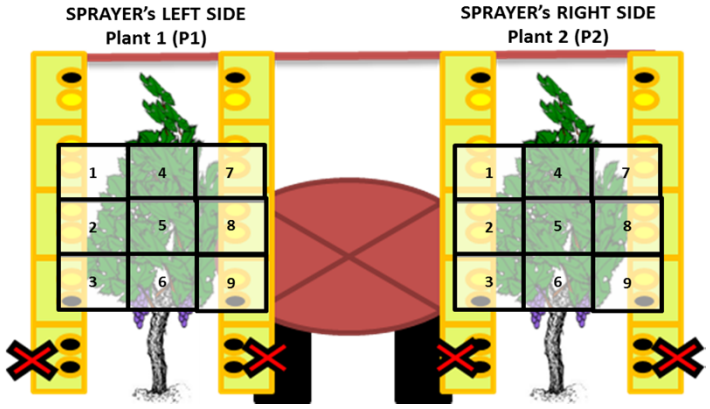


Forward speed (km/h)	6,50	
Classes	**LV**	**HV**
Working pressure (bar)	8	14
Volume rate (L/ha)	318	418

Materials & Methods

3 Replicates / Vigour class





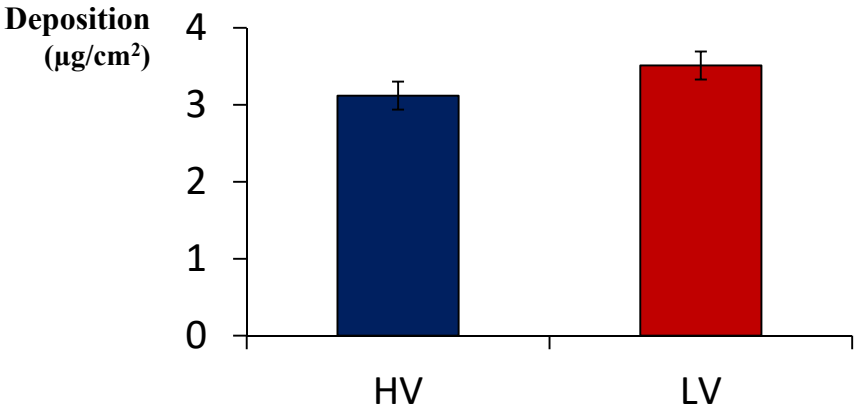
Tracer
Mn EDTA 13%: **15.4 g L^{-1}**
Established concentration Mn^{++} : 2.0 g Mn^{++} L^{-1}

Determined by **Atomic Absorption Spectrometry**

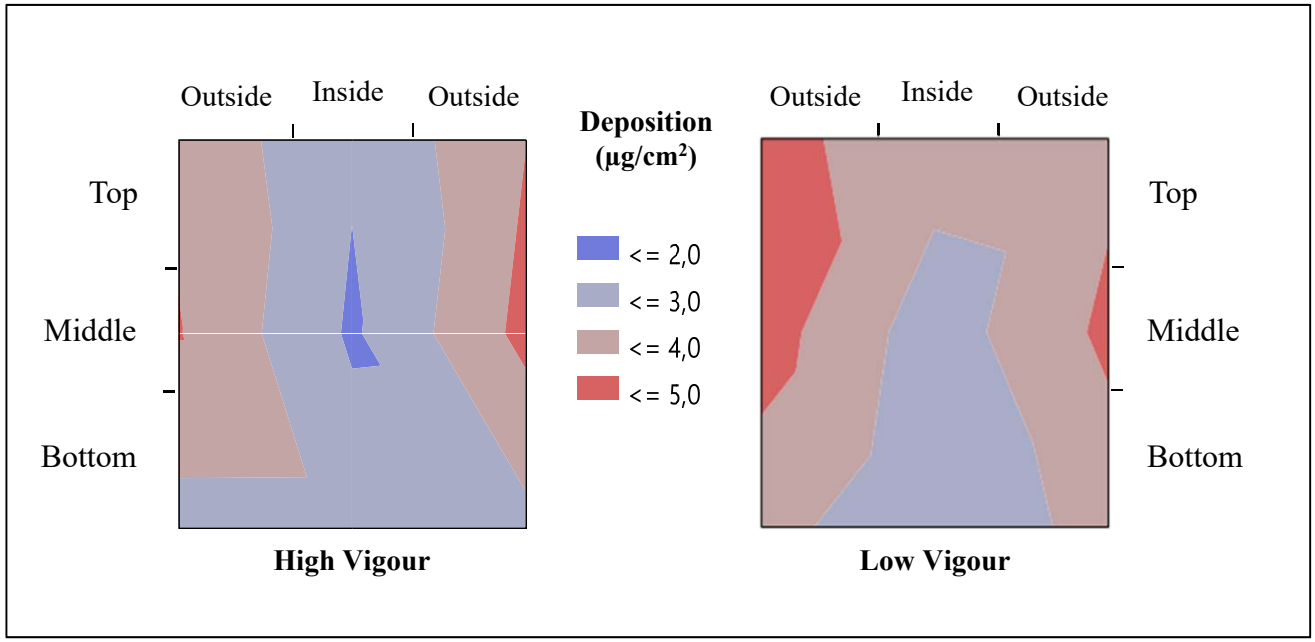
Plant Protection Product
APACHE: Abamectine **0,05%**

Target Pest
Yellow spider ***Eotetranychus carpini***

Results. Absolute deposition

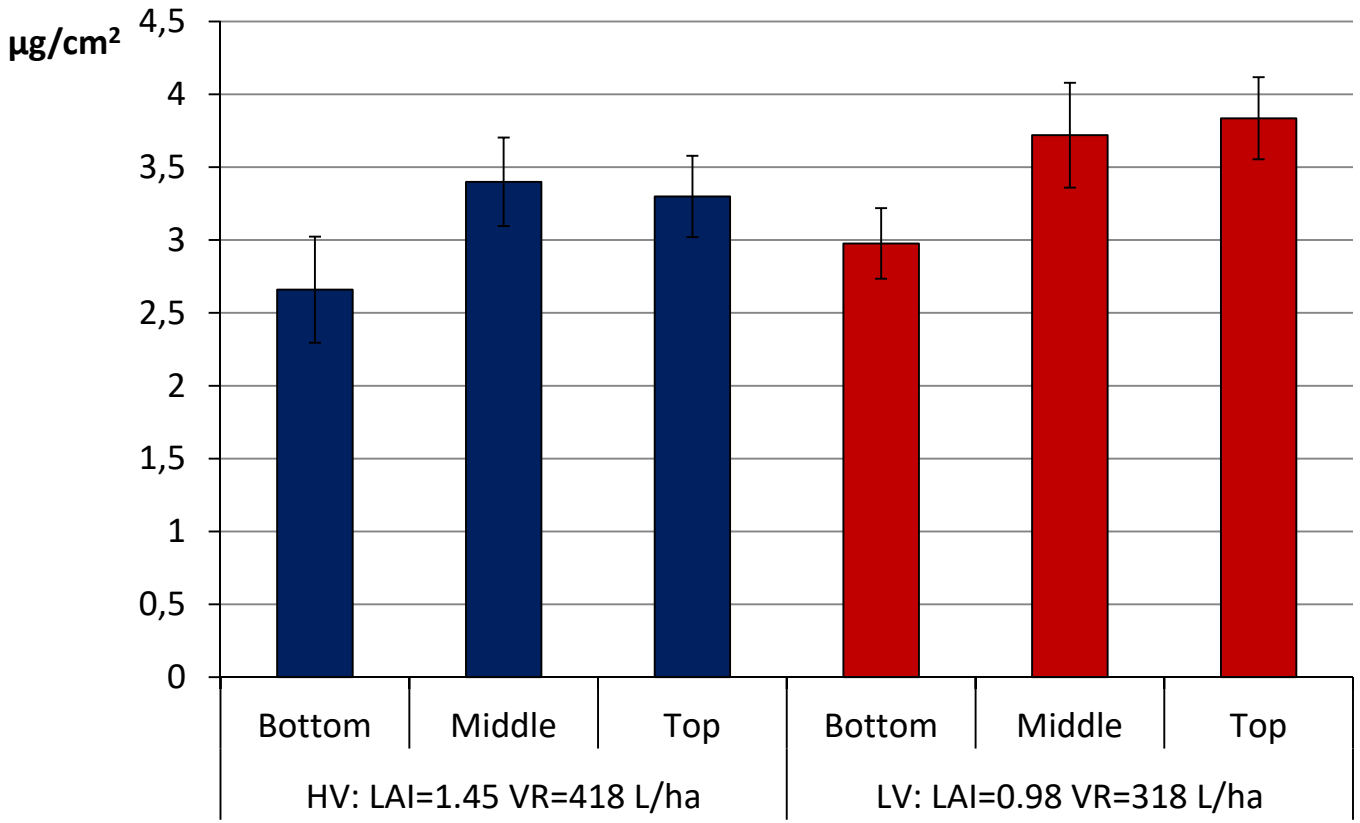


The absolute spray depositions had similar zonal distributions in both vigour classes



Results. Absolute deposition

Study of deposition by **HEIGHT** to each sprayer

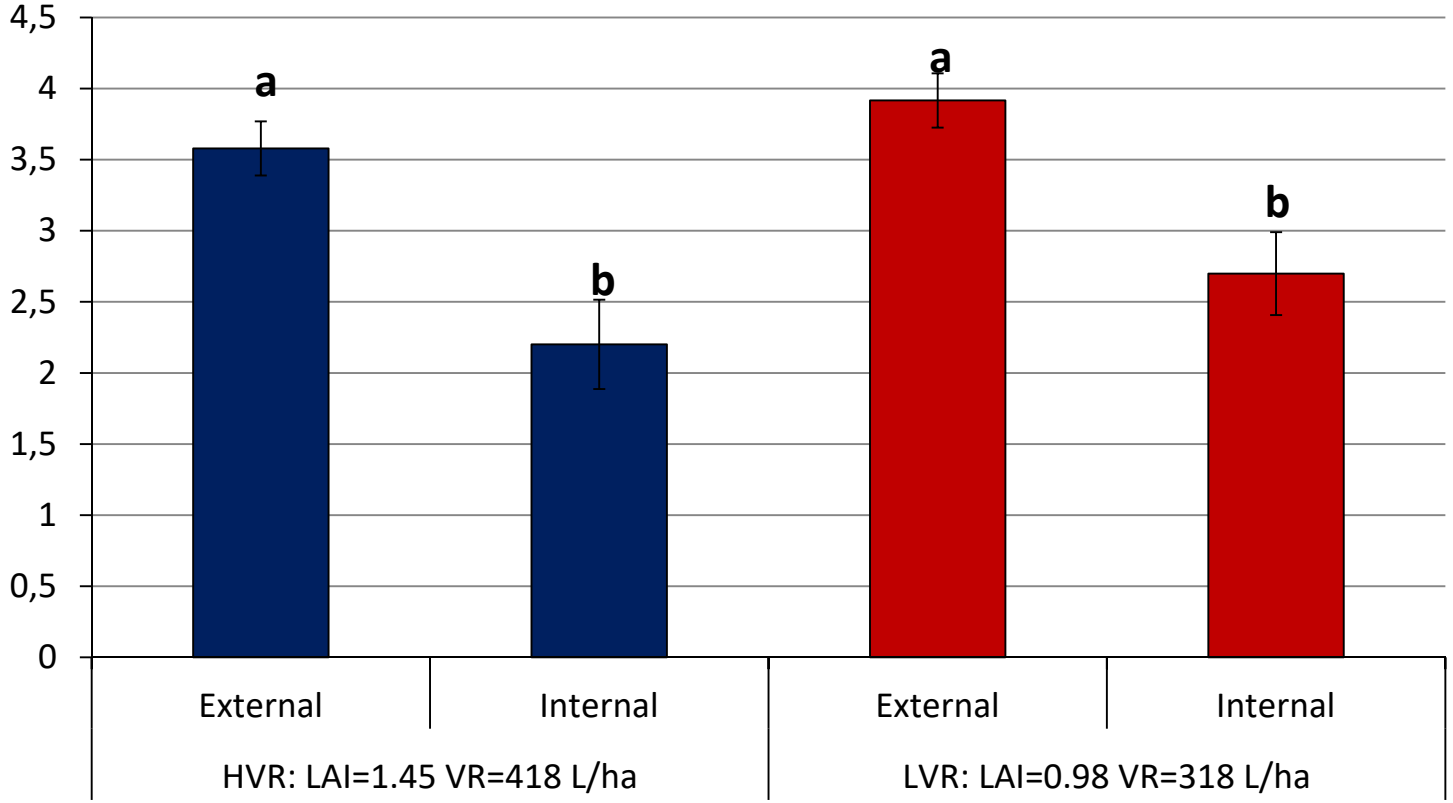


Results. Absolute deposition

Results: (mean ± SE)

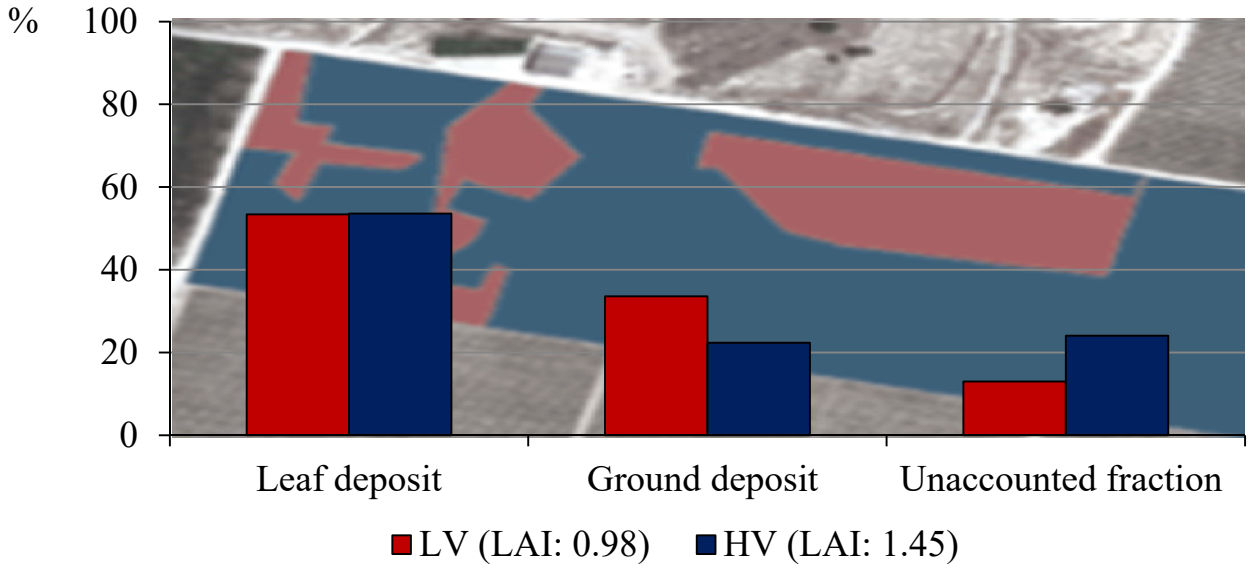
Study of deposition by **DEPTH** to each sprayer

HV: External 38,5% > Internal.
LV: External 31,1% > Internal



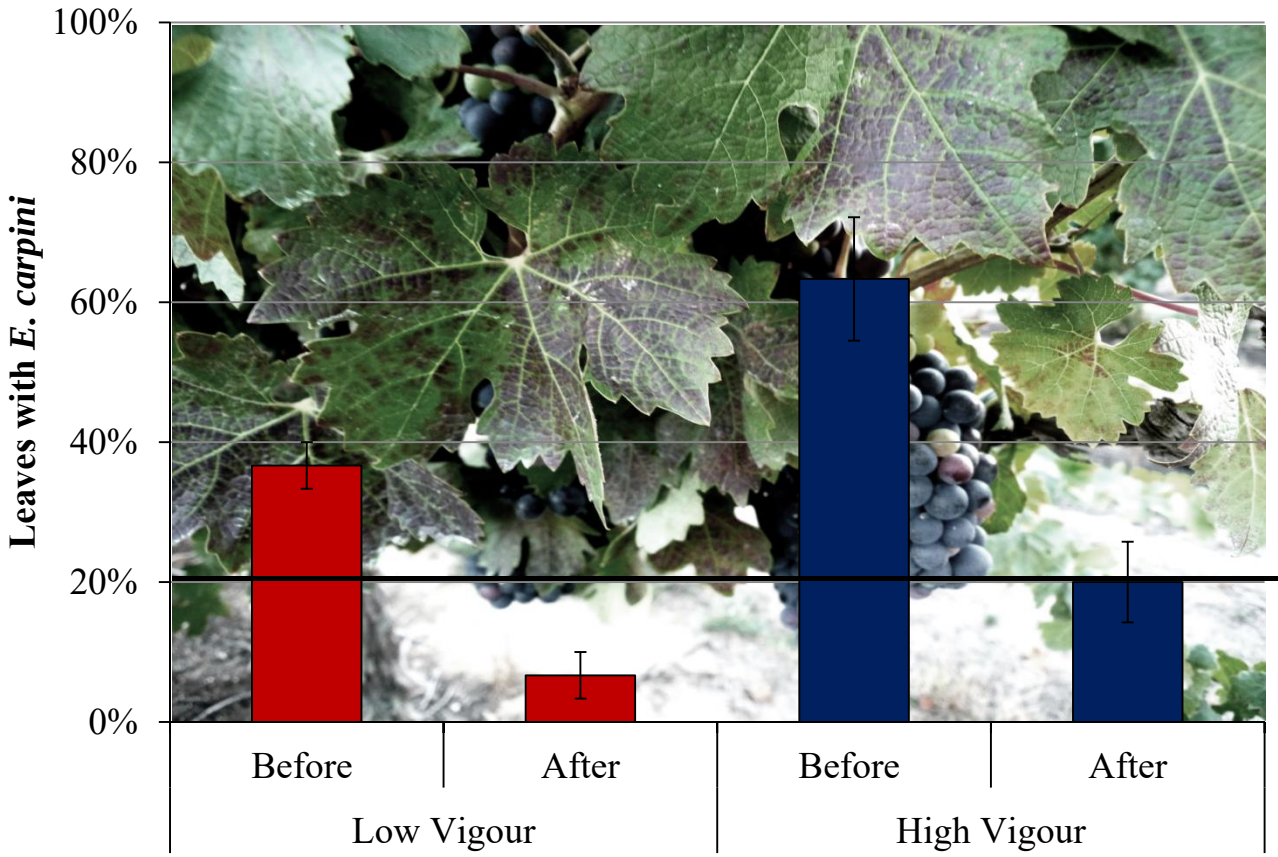
Results. Absolute deposition

Efficiency



Results. Efficacy

Results: Efficacy



Before treatment:

- 11-12/08/2016

After treatment:

- 29-30/08/2016

Treatment threshold
BBCH > 70

27/09/2016 Randomized sampling: 10% leaves with *E. carpini*

Results. Savings

Class	Dimension (ha)	LAI	Volume rate (L ha^{-1})	Mn^{++} dose (g ha^{-1})	Working pressure (bar)
HV	10.4	1.45	418	843	14
LV	2.6	0.98	318	642	8

Dose reduction in LV: **24%**

Product total savings: 5%

Conclusions

The results confirm the barrier effect of the vine leaves complicates spray penetration

This study lays the groundwork for the adjusted dosage of 3D crops through the use of aerial images

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CODORNÍU

Thanks!

EUCLID
Europe China Lever for IPM Demonstration

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