

The plantation frame as a measure of adaptation to climate change

María Dolores Loureiro Rodríguez, Ángela Díaz Fernández, Yolanda Bouzas Cid, María José Graña Caneiro, María Rodríguez Romero, Carmen Saborido Díaz and Emilia Díaz Losada

Axencia Galega da Calidade Alimentaria (AGACAL)-EVEGA. Leiro, Ourense, Spain
Presenting author: maria.dolores.loureiro.rodriguez@xunta.gal

INTRODUCTION

The mechanization of vineyard work originally led to a reduction in planting densities due to the lack of machinery adapted to the vineyard. The current availability of specific machinery makes it possible to establish higher planting densities

OBJECTIVE

The evaluation of the effect of different plantation frames on the performance of four Galician grapevine cultivars (Albariño, Treixadura, Sousón and Mencía)



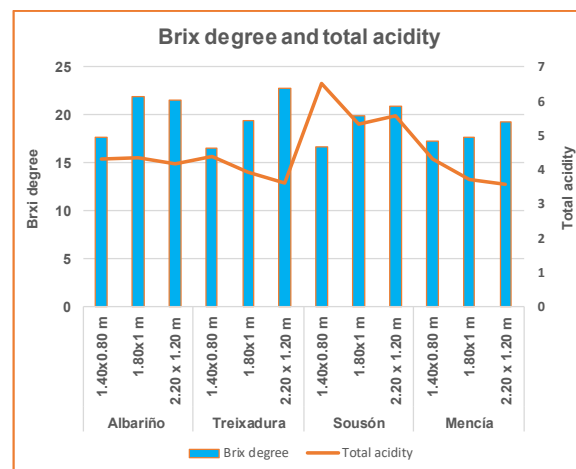
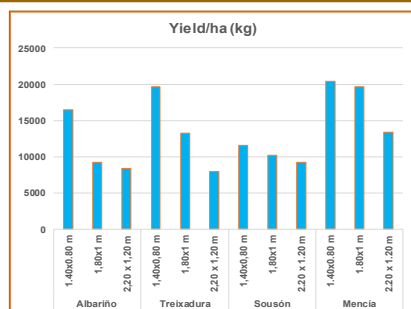
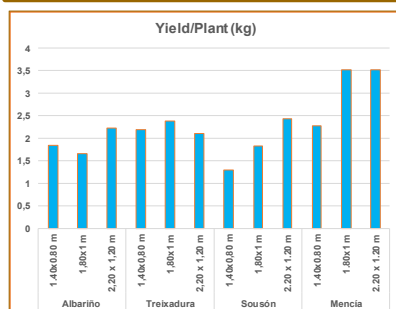
MATERIAL AND METHODS

- Two white (Albariño, Treixadura) and two red cultivars (Sousón, Mencía), trained in a vertical shoot positioning system using a single Royat cordon, pruned to spurs with two buds each.
- Three plantation frames: 1.40x0.80 m (8,928 plants/ha), 1.80x1 m (5,555 plants/ha) and 2.20x1.20 m (3787 plants/ha). Four repetitions of 10 vines each for every density and cultivar.
- Measured parameters: yield/vine, pruning wood weight, and calculation of the Ravaz index. Enological parameters in must: Brix degree, total acidity, pH, tartaric and malic acids, total and extractable anthocyanins, cell maturity index (EA%), probable stable colour (CPE), total polyphenol index (TPI), phenolic maturity index (IMF), total tannins.
- Methods: Brix degree, pH and total acidity by FTIR. Malic acid by enzymatic method. Tartaric acid by colorimetric reaction with vanadate. Parameters of phenolic maturation following the CROMOENOS method.

RESULTS

The higher planting density (1.40x0.80 m) had no significant effect on grape yield per vine in white varieties, although production per hectare was much higher due to the greater number of plants.

In red varieties, this planting density resulted in a significantly lower production per vine, compensated by the greater number of plants. In addition, it significantly reduced the Brix degree in the must of the Albariño, Treixadura and Sousón varieties, and increased the total acidity in the latter two and Mencía. It also caused an increase in extractable and total anthocyanins and IPT in red grapes.



Global parameters in must	Albariño			Treixadura			Sousón			Mencía		
	1.40x0.80 m	1.80x1 m	2.20 x 1.20 m	1.40x0.80 m	1.80x1 m	2.20 x 1.20 m	1.40x0.80 m	1.80x1 m	2.20 x 1.20 m	1.40x0.80 m	1.80x1 m	2.20 x 1.20 m
Brix degree (°)	17.63b	21.93a	21.55a	16.52c	19.47b	22.80a	16.7b	19.93a	20.88a	17.35	17.73	19.25
Total acidity (g/L tartaric acid)	4.32	4.35	4.18	4.40a	3.93b	3.63b	6.53a	5.35b	5.58ab	4.33a	3.73ab	3.60b
pH	3.87	3.95	3.89	3.93b	3.92b	3.99a	3.59	3.71	3.75	3.95	3.95	3.94
Tartaric acid (g/L)	5.5	5.8	5.4	6.0a	5.9a	5.5b	5.9a	5.2ab	4.9b	5.8	5.7	5.3
Malic acid (g/L)	2.8	2.8	2.8	2.4	2.4	2.3	2.9	2.6	3.1	2.7	2.3	2.2

Parameters with significant differences between treatments are marked with different letters and shaded in grey.

Colour parameters in must of red cultivars	Sousón			Mencía		
	1.40x0.80 m	1.80x1 m	2.20 x 1.20 m	1.40x0.80 m	1.80x1 m	2.20 x 1.20 m
Total anthocyanins	4,150.4	3,158	3,509.6	2,069.6	1,654.5	1,641.2
Extractable anthocyanins	1,637.9	1,221.8	1,350.4	798.1	682.3	681.1
Cell maturity index (EA%)	60.54	61.31	61.52	61.44	58.76	58.50
Probable stable colour (CPE)	37.27	30.7	33.23	19.05	16.58	16.38
Total polyphenol index (TPI)	74	62	67	49	40	40
Phenolic maturity index (IMF)	1.18	1.30	1.27	1.58	1.64	1.64
Total tannins	1.9	1.6	1.8	1.3	1.1	1.1

CONCLUSION

The effects of high planting density on grapes are of great interest for the adaptation of varieties in the context of climate change. In the future, it could be advisable to modify the limits imposed by the appellations of origin on the planting density of these varieties in order to obtain more balanced wines.

ACKNOWLEDGEMENTS

