

EFFECTS OF TRELLIS SYSTEM AND ROOTSTOCK ON YIELD AND VIGOUR OF SYRAH VINES DURING 8TH GROWING SEASON IN SÃO FRANCISCO VALLEY

Patrícia Coelho de Souza Leão¹, Bruna Thaís Gonçalves Nunes², Emille Mayara Carvalho de Souza²,
Jéssica Islane de Souza Rego² and José Henrique Bernardino do Nascimento²

¹Researcher Embrapa Semiárid, BR 428, Km 152, Zona Rural, P.O. Box 23, Zip Code 56302-970, Petrolina, PE, Brazil;

²Students Trainee Universidade do Estado de Pernambuco (UPE), Petrolina, PE

INTRODUCTION

The enological quality of a grapevine cultivar is primarily related to soil and climatic conditions of the growing region. Thus, the choice of vineyard site is the main way to intervene in these conditions. Use of a trellis system more appropriate for each climate condition, has enabled major advances in the global wine industry because it has allowed more balanced vines and improvement in the quality of grapes and wines.

In addition to the trellis system, the rootstock may also affect the relations between canopy and root vine coordinated by the source and drain ratio. Thus, vigorous rootstock promote greater vigor of the shoots and in plants with large amounts of fruits, if not supported by the roots, there will be restrictions on the growth of branches and leaves (SANTOS, 2006). As a result, the trellis systems and rootstock has great influence on the physicochemical characteristics of the grape, such as the content of sugars and acids, anthocyanins, tannins and other polyphenols affecting the quality of wines.

Therefore, this study aimed to evaluate the effects of the trellis systems and rootstock on production and plant vigor components aiming the development of more balanced vines, and improvement the quality of the tropical 'Syrah' grape wines in the São Francisco Valley, Northeast Brazil.

MATERIAL AND METHODS

PLACE: Bebedouro Experimental Station. Embrapa Semi-Arid. Petrolina. Pernambuco state (09°09S; 40°22W; 365.5m);

EXPERIMENTAL AREA: vineyard of 'Syrah', four years old, 3.0 m X 1.0 m spaced and drip irrigated;

PERIOD: 8th growing season, from July 1st (date of pruning) to October 29, 2015 (date of harvest);

TREATMENTS: Main Treatments: two trellis systems: lyre and vertical shoot positioned; Secondary treatments: six rootstocks: SO4, Harmony, Paulsen 1103, IAC 313, IAC 766 and IAC 572;

EXPERIMENTAL DESIGN: split plot randomized block design with four replications. Plot had 10 plants and three useful plants;

VARIABLES EVALUATED:

- Fresh weight of leaves and branches (g): measured by weighing the leaves and branches removed by pruning;
- Sprouting percentage (number of sprouted buds X 100/number of buds) and bud fertility (number of bunches/number of shoots): determined during the sprouting phase and initial shoot growth by counting number of buds, shoots, and bunches;
- Production, number of bunches per plant and estimated yield: determined by counting and weighing all bunches of useful plants during harvesting;
- Ravaz Index: obtained by the ratio of production (weight of bunches) and weight of branches per plant

STATISTICAL ANALYSIS: Mean data were submitted to variance analysis and comparison of means by Tukey test at 5% probability.

RESULTS AND DISCUSSION

Lyre promoted greater weight of branches but the weight of leaves was not affected by the trellis system.

Production and number of bunches per vine, as well as weight of bunches were influenced by trellis system, and lyre showed greater production and number of bunches per vine than vertical trellis.

Weight of leaves, sprouting, bud fertility and Ravaz Index were not affected by trellis system.

The rootstock IAC 572 promoted increase in the vegetative vigor compared to 'Paulsen 1103' and 'Harmony', resulting in unbalanced vines with the lowest values for Ravaz Index. Percentages of sprouting and bud fertility rates were also lower on 'IAC 572' rootstock.

The vines grafted on 'IAC 313', 'Paulsen 1103' and 'SO4' showed higher production of grapes per plant than the other rootstocks.

The highest yields could be estimated at 11.20 ton/ha in the vines grafted on 'SO4' and trained in a vertical trellis and 10.04 ton/ha on 'Paulsen 1103' and 'IAC 313' and trained in lyre (Figure 1).

More balanced vines with the highest values for the Ravaz Index were observed on the rootstock Paulsen 1103 that showed statistically significant differences compared to rootstock to the 'IAC 572' and 'IAC 766'.

Table 1. Mean values and coefficient of variation (%) of production and plant vigor components of 'Syrah' grapevine submitted to different trellis systems and rootstocks, Petrolina, PE, 2015.

Trellis Systems	Weight of branches (g/vine)	Weight of leaves (g/vine)	Production (kg/vine)	Sprouting (%)	Bud fertility (bunch/shoot)	Number of bunches	Weight of Bunches (g)	Ravaz Index (kg of grapes/kg of branches)
Vertical	516.33 b	875.69 ^{ns}	2.76 b	70.22 ^{ns}	0.792 ^{ns}	15.44 b	176.32 a	5.72 ^{ns}
Lyre	644.81 a	837.86	3.52 a	65.37	0.71	27.57 a	127.70 b	6.23
Rootstocks								
IAC 572	786.63 a	954.42 ^{ns}	2.33 b	62.89 b	0.61 b	16.12 c	147.95 ab	3.13 c
IAC 766	654.33 ab	892.33	2.97 ab	64.50 ab	0.74 ab	21.08 abc	150.24 ab	4.86 bc
IAC 313	620.33 abc	961.67	3.75 a	70.93 a	0.77 ab	23.96 ab	168.76 a	6.24 ab
Paulsen 1103	450.42 bc	776.17	3.75 a	70.98 a	0.88 a	26.08 a	152.29 ab	8.64 a
SO4	588.88 abc	855.67	3.65 a	67.80 ab	0.78 ab	23.08 ab	159.62 ab	6.59 ab
Harmony	382.83 c	700.42	2.39 b	69.67 ab	0.73 ab	18.71 bc	132.89 b	6.39 ab
Mean	580.57	856.58	3.14	67.79	0.75	21.50	152.00	5.97
CV	28.07	22.92	25.28	7.66	17.58	20.03	14.36	32.00

Means followed by the same small letter in the column do not differ (Tukey test, p < 0.05).

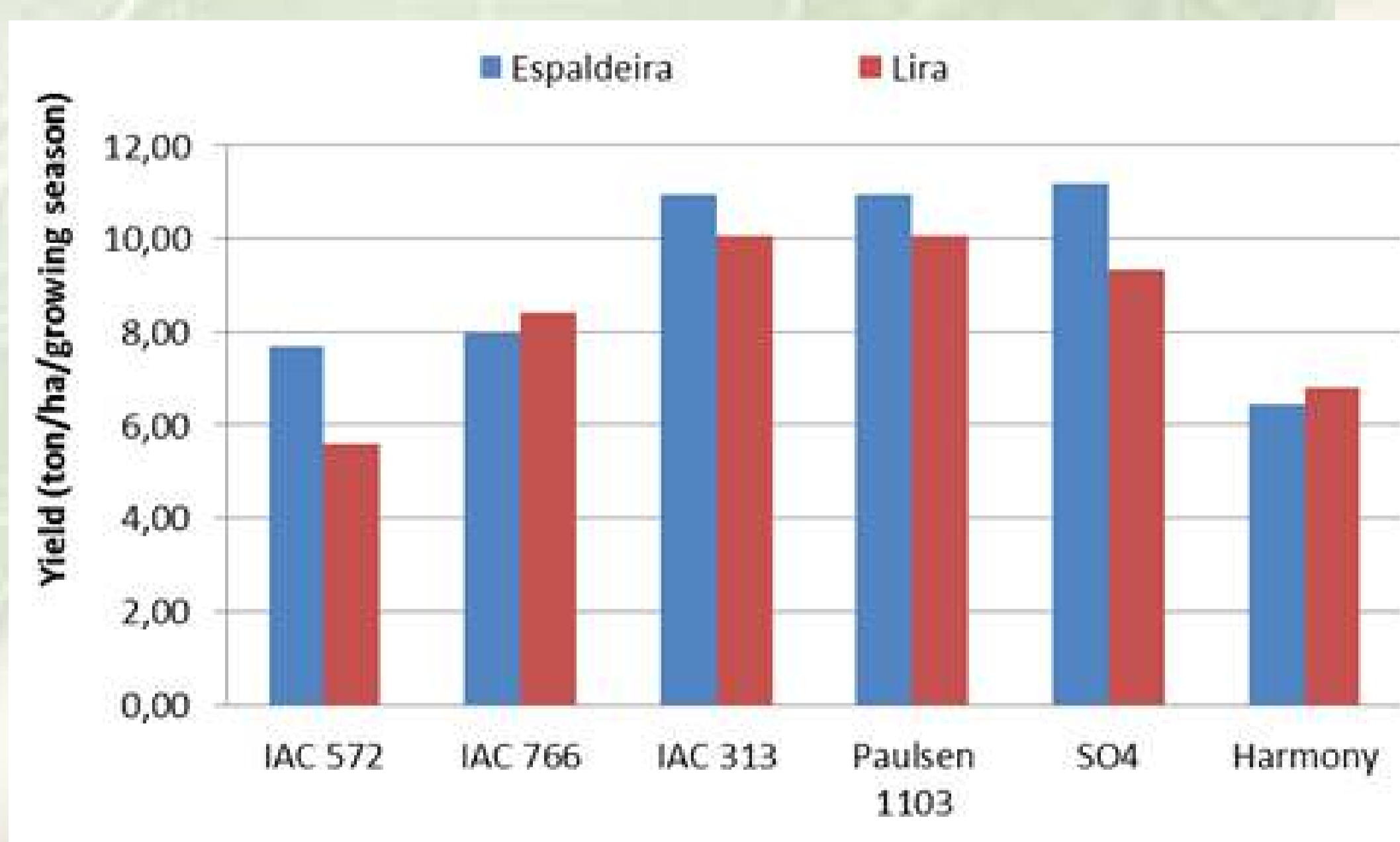


Figure 1. Estimated yield (tons/ha) for 'Syrah' trained in shoot vertical and lyre and grafted on five rootstocks, Petrolina, PE, 2015.



Figure 2. Experimental vineyard of 'Syrah', Petrolina, PE, 2015.



Figure 3. 'Syrah' grafted on 'IAC 766' rootstock at harvesting, Petrolina, PE, 2015.

CONCLUSIONS

Trellis system influenced the responses of grapevine cv. Syrah in relation to the vegetative vigor (weight of branches), number and weight of bunches and production per vine, but weight of leaves, sprouting, bud fertility and Ravaz Index were not affected. Lyre trellis system increased production per vine, but there was no great difference in the estimated yield between trellis systems.

Rootstocks IAC 313, Paulsen 1103 and SO4 promoted higher production, number and weight of bunches, percentage of sprouting and bud fertility.

Further studies on the quality of grapes and wines and for several consecutive growing seasons are necessary to enable the recommendation of the trellis system and most suitable rootstock for growing 'Syrah' in the São Francisco Valley, Northeast of Brazil.