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Tree growth descriptors of main early-flowering almond Spanish varieties

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SUMMARY – This work studies vegetative habits at the end of the first growing year of almond trees that were not pruned. The following 8 early-flowering Spanish varieties were studied: 'Asperilla', 'Blanquerna', 'Cartayera', 'Desmayo Langueta', 'Garrigues', 'Marcona', 'Peraleja' and 'Verd'; the Tunisian variety 'Achaak' was also studied. The parameters analysed were growth habit, trunk diameter, canopy height and width and the ratio between canopy height and width. Most varieties showed upright or spreading growth habit. No relevant differences on vigour were found among the studied varieties.

Key words: Almond, *Prunus dulcis*, almond Spanish varieties, growth habit, tree vigour.

RESUME – "Descripteurs de croissance de l'arbre chez les principales variétés espagnoles d'amandiers à floraison précoce". Ce travail examine les modes végétatifs des amandiers, à la fin de la première année de croissance, sans aucune taille. Les 8 variétés espagnoles suivantes à floraison précoce ont été étudiées : 'Asperilla', 'Blanquerna', 'Cartayera', 'Desmayo Langueta', 'Garrigues', 'Marcona', 'Peraleja' et 'Verd', ainsi que la variété tunisienne 'Achaak'. Les paramètres analysés étaient les tendances de croissance, le diamètre du tronc, la hauteur et la largeur de la canopée et le ratio entre hauteur et largeur de la canopée. La plupart des variétés montraient des tendances à une croissance élancée ou éparse. On n'a pas trouvé de différences importantes concernant la vigueur parmi les variétés étudiées.

Mots-clés : Amandier, *Prunus dulcis*, variétés espagnoles d'amandiers, tendances de croissance, vigueur de l'arbre.

Introduction

Spanish varieties of almond can be distinguished because of being very early or early flowering, self-incompatible and hard or semi hard shell varieties. Although during the last years many have been substituted by late-flowering and self-compatible varieties, these traditional cultivars are still of paramount importance because of their perfect adaptation to culture medium and good commercial characteristics.

Growth pattern of a variety are of paramount importance because of their determinant influence on cultural techniques (mainly tree spacing, training and pruning systems) that will determine production level as well as crop productions costs.

There are several researches on the different varieties growth habit but all of them were carried out on adult trees that were previously pruned. However, this work was carried out on one-year-old trees that were not previously pruned, therefore, allowing each variety to have its own natural growth habit.

Materials and methods

The work was carried out in an almond varieties orchard at CIFA "Alameda del Obispo" in Córdoba (Spain), at tree spacing of 7x2 m, under drip irrigation, in deep soil and very suitable climatic conditions. This trial was made with one-year-old plants, planted on January 2002 and selecting 3 main branches of the tree on May 2002, to obtain a vase-shaped tree. All the trunk buds appeared during the vegetative period were removed. These primary scaffolds were not pruned at all. Data collection was made on December 2002, after vegetative growth was finished.

The following 8 early-flowering Spanish cultivars were studied: 'Asperilla', 'Blanquerna', 'Cartayera', 'Desmayo Largueta', 'Garrigues', 'Marcona', 'Peraleja' and 'Verd'; the Tunisian variety 'Achaak' was also included. All the cultivars were grafted on peach x almond hybrid rootstock, GF-677.

The trial was made on 6 trees or repetitions by variety. The following parameters were analysed:

(i) Tree growth habit. It was assessed by visual evaluation, establishing five types: extremely upright, upright, spreading, drooping and weeping (Fig. 1).

(ii) Tree vigour. It was quantified by the trunk diameter measure, at 30 cm high from the ground. Height and width of the canopy and relation between them were also measured.



Fig. 1. Growth habits types.

Results

Tree growth habit

Most varieties presented upright or spreading growth habit. 'Achaak' was the only one variety showing extremely upright growth habit while 'Blanquerna' and 'Desmayo Largueta' showed a drooping growth habit (Table 1).

Table 1. Varieties classification attending to their growth habit

Extre. upright	Upright	Spreading	Drooping
'Achaak'	'Asperilla'	'Cartayera'	'Blanquerna'
	'Peraleja'	'Garrigues'	'Desmayo L.'
	'Verd'	'Marcona'	

Tree vigour

As it is shown in Table 2, 'Peraleja' has the lowest trunk diameter size with no significant differences among the others varieties. Attending to height/width ratio, 'Achaak' and 'Verd' showed the highest value, while 'Blanquerna', 'Cartayera' and 'Asperilla' were the ones with the lowest ratio.

Table 2. Trunk diameters and canopy dimensions

Cultivar	Trunk diameter (cm)	Canopy		
		Height (m)	Width (m)	Height/width
'Achaak'	4.1 ± 0.05	1.8 ± 0.05	1.4 ± 0.05	1.29 ± 0.06
'Asperilla'	4.0 ± 0.06	1.7 ± 0.06	2.0 ± 0.09	0.87 ± 0.03
'Blanquerna'	4.0 ± 0.08	1.2 ± 0.05	1.6 ± 0.04	0.74 ± 0.02
'Cartayera'	3.9 ± 0.18	1.3 ± 0.09	1.5 ± 0.05	0.83 ± 0.06
'Desmayo L.'	4.0 ± 0.07	1.6 ± 0.05	1.7 ± 0.03	0.97 ± 0.02
'Garrigues'	3.9 ± 0.39	1.4 ± 0.15	1.4 ± 0.18	0.95 ± 0.01
'Marcona'	3.9 ± 0.11	1.4 ± 0.08	1.5 ± 0.12	0.94 ± 0.09
'Peraleja'	3.4 ± 0.24	1.8 ± 0.07	1.8 ± 0.05	0.98 ± 0.02
'Verd'	3.8 ± 0.29	1.4 ± 0.10	1.4 ± 0.00	1.04 ± 0.07

Mean values ± standard error.

Comparing the results obtained for the height/width ratio (Table 2) with the growth habits results (Table 1), it can be deduced that the varieties of most upright growth habits also showed a higher value of the height/width ratio.

Conclusions

Most Spanish almonds trees varieties have upright or spreading growth habit. The ratio height/width of the canopy can be a good parameter to quantify the growth habit type of the tree.

During the first growing year there were no relevant differences of trunk diameters among the different varieties.

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