CHARACTERISATION OF CV. ALBARÍN BLANCO (*VITIS VINIFERA* L.). SYNONYMS, HOMONYMS AND ERRORS OF IDENTIFICATION ASSOCIATED WITH THIS CULTIVAR

CARACTÉRISATION DU CV. ALBARIN BLANCO (*VITIS VINIFERA* L.). SYNONYMIES, HOMONYMIES ET ERREURS D'IDENTIFICATION ASSOCIÉES À CE CÉPAGE

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Abstract :Two grapevine types established in the collection of the Misión Biológica de Galicia (CSIC), both commonly called Albarín Blanco (type I and II), showed characteristics suggesting an error of homonymy. Varieties with similar characteristics to Albarín Blanco I, but with different names (Blanco País, Blanco Verdín, Blanco Legítimo, Raposo), were found in the Principality of Asturias (northern Spain) and Galicia (northwestern Spain). Ampelographic characterisation, agronomic and molecular analysis showed that Albarín Blanco I should be understood as the « true » Albarín Blanco, and that Blanco País, Blanco Verdín, Blanco Legítimo and Raposo are synonyms. Albarín Blanco II was found to be Savagnin Blanc, introduced into the area after the phylloxera epidemic in the 19th century.

Résumé : Nous avons localisé (de 1987 à 1992) et mis en collection (1993), au domaine de la Misión Biológica de Galicia (CSIC) une centaine de cépages de différentes origines géographiques : nord (Principauté d'Asturies) et nord-ouest de l'Espagne (Galice). Nous avons observé que sous le nom Albarin Blanco on trouve, dans les vignobles de la Principauté d'Asturies, deux types de plantes similaires, avec des caractéristiques suffisamment différentes pour envisager qu'il s'agisse de deux cépages : Albarín Blanco I et Albarín Blanco II. En Galice et dans la Principauté des Asturies, nous avons identifié des cépages avec des caractéristiques très semblables à l'Albarín Blanco I, mais avec des noms locaux différents (Blanco País, Blanco Verdín, Blanco Légitimo, Raposo). L' objectif de ce travail est de caractériser deux types de plantes appelées Albarin Blanco (I et II). Le premier but est de vérifier s'il s'agit de deux cépages différents (erreur, homonymie) et le deuxième est de vérifier si les plantes similaires au Albarin Blanco I, provenant de différentes provinces de la Galice et d'Asturies, avec des noms locaux différents (Blanco País, Blanco Verdín, Blanco Légitime, Raposo), sont issus du même cépage (synonymies). Dans le domaine de la Mision Biologica de Galicia (CSIC) on dispose de 5 souches d'Albarín Blanc I et 5 d'Albarín Blanco II. Pour chacun de ces cépages, on a fait une caractérisation ampélographique selon la méthode de l'OIV (1983). La feuille moyenne typique a été reconstruite selon la méthode de MARTINEZ ET GRENAN (1999). Une caractérisation agronomique et moléculaire (STMs) a été effectuée. Des microvinifications ont été menés sur l'Albarin Blanco I, en analysant postérieurement certaines paramètres physico-chimiques du vin. D'autre part, sur chacune des souches des exemplaires Blanco País, Blanco Verdín, Blanco Légitimo et Raposo, de plus 300 années, on a fait un analyse d'ADN (STMs). Les résultats montrent qu'Albarin Blanco I est le véritable Albarín Blanco. Blanco País, Blanco Verdín, Blanco Légitimo et Raposo sont des synonymies de ce cépage. Nous avons démontré que l'Albarín Blanco II est réellement le Savagnin Blanc, cépage introduit dans les vignobles du nord-ouest de l'Espagne après le Phylloxéra (à la fin du XIX^{e} siècle), et au fur et à mesure du temps, les vignerons ont confondu ce cépage avec l'authentique Albarín Blanco.

Key words : *Vitis vinifera*, characterisation, ampelographic, molecular, Albarín Blanco, synonymy

Mots clés : *Vitis vinifera*, caractérisation, ampélographique, moléculaire, Albarín Blanco, synonymie

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INTRODUCTION

A search (1987-1992) for ancient grapevine varieties discovered a number unknown to Science in the Concejo de Cangas del Narcea area of Asturias (northern Spain) (MARTÍNEZ AND PÉREZ, 1999 ; 2000). Among these was a white variety known as Albarín Blanco, which the older viticulturalists of the area and several old documents referred to as being of excellent wine-making quality. This variety was not related to the Albariño cultivar of Galicia or to Albillo (MARTÍNEZ AND PÉREZ, 2000) (the traditional synonyms of Albarín according to ALLEWLEDT (1988), although this author did not describe the variety). In parallel studies, samples of this newly discovered variety were planted in a maintenance plot at the Misión Biológica de Galicia (CSIC) research station (in the Province of Pontevedra, Galicia, northwestern Spain). Before long, however, these had produced what appeared to be two different types of plant. Although similar, they were sufficiently different to suggest they might in fact be different varieties. In addition, centuries-old specimens could only be found for one of these plant types.

During our current search for new grapevine varieties, we came across one that appeared to be very similar to Albarín Blanco in the Concejo de Ibias area (very close to Cangas del Narcea), which both the local growers and old documents referred to as Blanco Verdín. In Galicia (to the west of Asturias), we also found varieties with characteristics very similar to those of Albarín Blanco but which went by different local names: Blanco Legítimo in Betanzos, Raposo in Boiro (both in the Province of La Coruña), and Blanco País in Negueira de Muñíz (Province of Lugo).

The main aim of the present work was to characterise the two apparent types of Albarín Blanco to decide whether there had been an error of homonymy (i.e., that the name in fact represented two different varieties). The second aim was to clarify, as far as possible, whether the Albarín Blanco-like cultivars (Blanco País, Blanco Verdín, Blanco Legítimo and Raposo) were truly different varieties or simply Albarín Blanco under different synonyms. Finally, the agronomic and basic oenological characteristics of what was considered to be the true Albarín Blanco were examined to determine whether the variety could indeed be considered of high wine-making quality.

MATERIALS AND METHODS

I - PLANT MATERIAL

The ampelographic and agronomic characteristics of five individuals of each of the Albarín Blanco plant types (hereafter referred to as Albarín Blanco I and II) were examined over a period of three years. The Albarín Blanco I material was taken from plants about 300 years old (figure 1); the Albarín Blanco II material came from much younger specimens (about 100 years old). Both types were similar to the naked eye, had been grafted onto 110-Richter stocks, had grown en espalier for 11 years in a maintenance plot at the Misión Biológica de Galicia (CSIC), and had undergone Sylvoz pruning. All plants had received identical protection treatments and had been subject to identical cultivation practices.

Figure 1 - 300+ year-old plant of Albarín Blanco I

Souche d'Albarín Blanco I de plus de 300 années

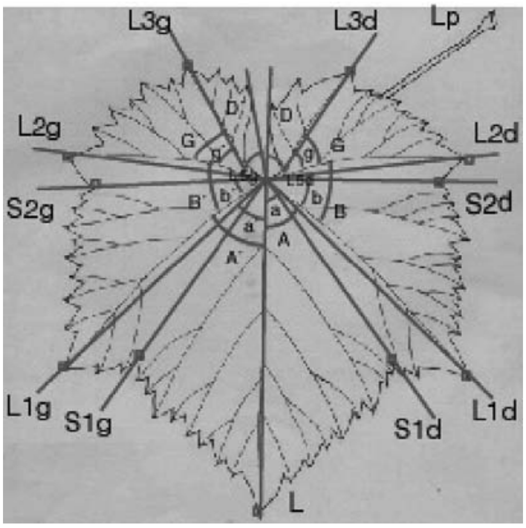


Figure 2 - Leaf variables measured (following the method of MARTINEZ and GRENAN [1999]).

Paramètres mesurés sur la feuille (selon la méthode de MARTINEZ Et GRENAN, 1999)

II - AMPELOGRAPHIC AND AGRONOMIC VARIABLES

The ampelographic and agronomic characteristics of the leaves, grape clusters, berries and seeds of Albarín Blanco I and II were recorded in 2000, 2001 and 2002.

1) Ampelographic characterisation

a) Leaves

Two leaves (from node 8-9 of a fruiting vine shoot produced by one year old wood) of each of the five Albarín Blanco-type representatives were taken between fruit-set and veraison. These were pressed and stored dry until the moment of use. The following variables, proposed by the OIV (1983), were observed and measured: 067, 068, 069, 070, 071, 076, 079, 080, 081, 082, 083, 084, 085, 086, 087, 088, 089. The necessary variables for the construction of a average leaf were also measured following the method of MARTÍNEZ AND GRENAN (1999) (see figure 2): L= linear distance between the petiolar point and the central vein end; L1=linear distance between the petiolar point and the end of the first right (L1d) and left (L1g) lateral veins; L2= linear distance between the petiolar point and the end of the second right (L2d) and left (L2g) lateral veins; L3= linear distance between the starting point of the first secondary vein belonging to the second lateral vein and the end of the right (L3d) and left (L3d) secondary vein; L5d= linear distance between the petiolar point and the starting point of L3d; L5g= linear distance between the petiolar point and the starting point of L3g.

S1= linear distance between the petiolar point and the bottom (towards the petiolar point) of the right (S1d) and left (S1g) lateral upper sinuses; S2= linear distance between the petiolar point and the bottom (towards the petiolar point) of the right (S1d) and left (S1g) lateral lower sinuses A= angle between the central vein and the first right lateral vein; A'=angle between the central vein and the first left lateral vein; a= angle between the central vein and L1d; a'= angle between the central vein and L1g; B= angle between the first and the second right lateral veins; B'= angle between the first and the second left lateral veins; b= angle between the first right lateral vein and L2d; b'= angle between the first left lateral vein and L2g; G= angle between the second right lateral vein and the first secondary vein of this; G'= angle between the second left lateral vein and the first secondary vein of this; g= angle between the second right lateral vein and L3d; g'= angle between the second left lateral vein and L3g; D= angle between L5d and the tangent of the leaf right side from the petiolar point; D'= angle between L5g and the tangent of the leaf left side from the petiolar point. Following the same method we count teeth by sectors (see figure 3). In each interval, a number is given to every tooth: Arabic numerals if the attached vein is a lower secondary one and Roman numerals if the attached vein is an upper secondary vein. If the vein of the tooth is a tertiary vein, the tooth is given the number of the previous tooth to which a letter is added.

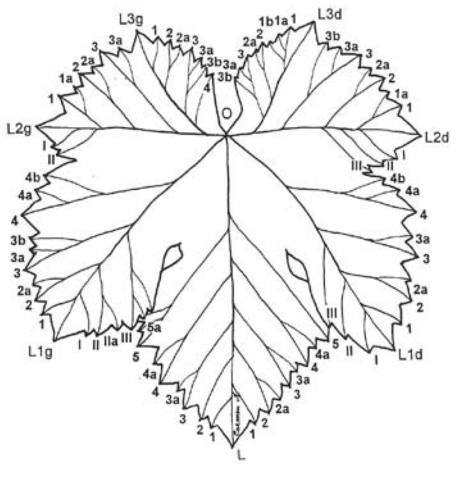


Figure 3 - Tooth numbering of the leaves (following the method of Martínez and Grenan [1999])

Numérotation des dents sur les feuilles (selon la méthode de MARTINEZ et GRENAN , 1999)

b) Grape cluster and berries

Two grape clusters were collected during ripening from each of the Albarín Blanco I and II plants. Five berries were taken from the centre of each to provide a total of 50 berries from each type. The following cluster and berry variables were measured, as proposed by the OIV (1983): codes 201, 204, 222, 223, 224, 225, 226, 227, 229, 230, 231, 232, 234, 236, 237, 239 and 240. The OIV cluster morphology was modified and the following classes established: 1=conical, 2=conical with a wing, 3=conical with two wings, 4=conical with tendrils, 5=cylindrical, 6=branching, 7=double.

2) Agronomic characterisation

a) Stages in grapevine shoot development

The development of buds and shoots was recorded at weekly intervals for three years, starting in mid-March, following the methods of BAGGLIOLINI (1952) and EICHHORN AND LORENZ (1977).

b) Number of grape clusters per vine shoot

The number of grape clusters per vine shoot on each specimen of Albarín Blanco I and II was recorded. They were then removed, placed in a bag and weighed (yield = kg/vine).

c) Grape clusters, berries and seeds

Two representative clusters from each of the five specimens per type were then selected according to the norms of the OIV (1983), and their weight (g), length (cm), width (cm) and number of berries recorded. The length of the stem (cm) was also measured.

Ten berries were selected from the central part of each of the 10 clusters for both types (i.e., 50 berries per type); each berry was given a number. The length of the pedicel (cm) and the length (cm), width (cm), and weight (g) of the berries were then recorded, and the number of seeds per berry counted. Once the seeds were dry, 50 from each clone were randomly selected and their individual lengths and weights recorded.

d) Must yield

Two grapes clusters were again selected from each of the 5 specimens per Albarín Blanco type, and 10 berries from the middle part of each were sampled. These berries were placed in a centrifuge tube, gently ground, and then centrifuged for 3 minutes at 3000 r.p.m. The volume of supernatant was measured (ml) and the must yield per berry (%) estimated as follows:

(Must of 10 berries / Weight of 10 berries) x 100

d) Alcohol potential

A 50 ml sample of the supernatant was taken with a Pasteur pipette and placed in a refractometer to obtain the sugar concentration (Brix). The alcohol potential of the must (degrees Baumé) was estimated using conversion charts.

f) Total acidity of the must

Sampling was conducted following the same procedures used to determine the must yield per berry. The total acidity of the must was estimated using the coloration pattern volumetric method (D.O.C.E., 1990).

g) Weight of pruning wood

Pruning was always performed in February. The wood obtained from each of the 5 specimens per type was weighed.

III - MICROSATELLITE ANALYSIS

DNA analyses were performed (over a period of one year) on one Albarín Blanco I and one Albarín Blanco II plant, and on one of each of 300+ year old plants representing Blanco Verdín, Blanco País, Blanco Legítimo and Raposo. Figure 4 shows where each of these putative cultivars were found.

Cuttings were taken from Albarín Blanco I and II, Blanco Legítimo, Blanco Verdín, Raposo and Blanco País during the dormant period, and maintained in a cold chamber for several months. One month before analysis, they were taken from the chamber and left to sprout in a greenhouse.

DNA was extracted from young leaves and pruned wood using the MasterPure™ Plant Leaf DNA Purification Kit (Epicentre Technologies, Madison, Wis.). Extracted DNA was quantified and a working solution of DNA (10 ng·°µl^{-1}) was made. The following STMs loci were then analysed: VVS2 (THOMAS AND SCOTT 1993), VVMD5, VVMD7 (BOWERS et al. 1996), ssrVrZAG47, ssrVrZAG62 and ssrVrZAG79 (SEFC *et al.*, 1999). These loci are well known and were used in the European RESGEN-081 project (http://www.genres.de/vitis/) since their discriminating power is of great use

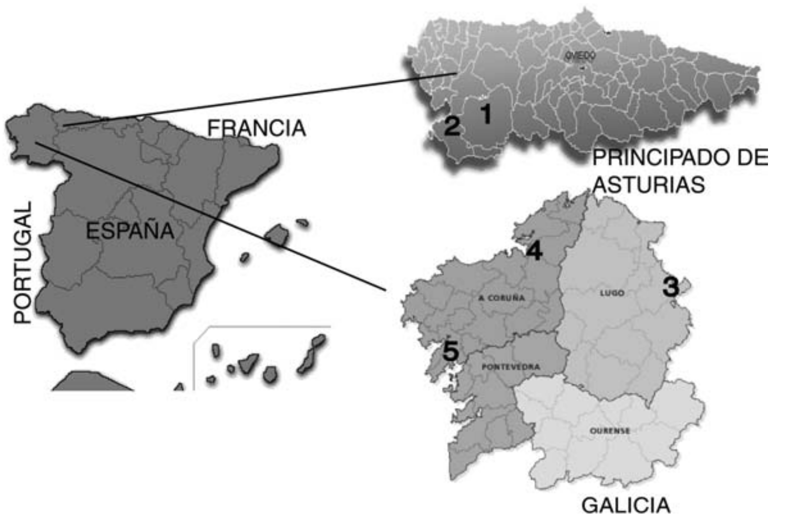


Figure 4 - Areas where Albarín Blanco and its synonyms (1: Albarín Blanco I and II ; 2 : Blanco Verdín ; 3 : Blanco País; 4 : Blanco Legítimo ; 5 : Raposo) are traditionally grown.

Zones où l'Albarín Blanco et leurs synonymies (1: Albarín Blanco I and II ; 2 : Blanco Verdín ; 3 : Blanco País ; 4 : Blanco Legítimo ; 5 : Raposo) sont traditionnellement cultivés

Table I - Means, maxima (Max) and minima (Min) for ampelographic variables of adult Albarín Blanco I and II leaves, clusters and berries measured over three consecutive years.

Moyenne, maximum (Max) et minimum (Min) des paramètres des feuilles, des grappes et des baies d'Albarin Blanco I et II

	Albarín Blanco I		Albarín Blanco II	
Variables	Mean	Max-Min	Mean	Max-Min
Adult leaves				
OIV067	3.00	(3-3)	3.41	(4-3)
OIV068	2.33	(3-2)	2.00	(2-2)
OIV069	5.50	(7-5)	6.32	(7-3)
OIV070	4.57	(7-3)	3.91	(4-3)
OIV071	4.71	(5-3)	3.00	(3-3)
OIV076	2.62	(4-2)	2.98	(4-2)
OIV079	3.57	(7-2)	4.25	(7-3)
OIV080	1.93	(2-1)	2.00	(2-2)
OIV081	1.07	(2-1)	1.00	(1-1)
OIV082	1.22	(3-1)	1.05	(2-1)
OIV083	1.95	(2-1)	1.98	(2-1.5)
OIV084	3.20	(4-3)	4.18	(5-3)
OIV085	4.30	(6-3)	4.14	(7-3)
OIV086	3.63	(5-3)	4.95	(6-4)
OIV087	4.53	(6-3)	4.77	(7-3)
OIV088	8.47	(9-1)	9.00	(9-9)
OIV089	1.00	(1-1)	1.00	(1-1)
Clusters & berries				
OIV204	5.50	(7-5)	5.00	(5-5)
OIV205	4.06	(7-1)	3.25	(7-1)
OIV222	2.00	(2-2)	2.00	(2-2)
OIV223	3.94	(4-3)	3.63	(4-3)
OIV224	2.00	(2-2)	2.00	(2-2)
OIV225	1.00	(1-1)	1.00	(1-1)
OIV226	2.00	(2-2)	2.00	(2-2)
OIV227	5.00	(5-5)	5.00	(5-5)
OIV229	1.00	(1-1)	1.00	(1-1)
OIV230	1.00	(1-1)	1.00	(1-1)
OIV231	1.00	(1-1)	1.00	(1-1)
OIV232	1.00	(1-1)	1.00	(1-1)
OIV234	1.00	(1-1)	1.00	(1-1)
OIV236	2.00	(2-2)	1.00	(1-1)
OIV237	5.00	(5-5)	1.00	(1-1)
OIV239	2.00	(2-2)	2.00	(2-2)
OIV240	5.00	(5-5)	5.00	(5-5)
Cluster morphology	1.56	(2-1)	1.25	(2-1)

in grapevine characterisation studies. All experiments were performed in duplicate.

Primer pairs were synthesized (PE Applied Biosystems, Foster City, Calif.) from published sequences. One of the primers of each pair was fluorescently labelled with a Perkin Elmer fluorophore, 6-FAM (blue), TET (green), or HEX (yellow).

Two different multiplex PCR reactions were performed (MARTÍN *et al*., 2003). Amplified products were separated by capillary electrophoresis using an ABI PRISM (model 310) automated DNA sequencer (Perkin Elmer Applied Biosystems). The fluorescently labelled fragments were detected using GENESCAN software (Perkin Elmer Applied Biosystems).

The results of the microsatellite analysis were expressed as allele sizes (number of base pairs).

IV - OENOLOGICAL CHARACTERISTICS

1) Fermentation

Only the oenological characteristics of Albarín Blanco I were studied. All the grapes produced (in 2001, 2002 and 2003) in the maintenance plot by this cultivar were manually crushed, the must extracted and sulphite added (6 g/Hl SO_2). Spontaneous fermentations (at 18 ºC, for 18-20 days) were performed in 16 L glass vessels containing 10 L of grape juice. The specific density and temperature were measured every day. At the end of fermentation, the wines were subjected to several transvage procedures. The products clarified spontaneously, were sulphited again (6 g/Hl) and bottled. All microfermentations of every harvest were performed in duplicate.

2) Standard chemical analysis of the wines

The wines produced were analysed following standard European analytical methods (CEE, 1990). The variables measured were ethanol content, total acidity, volatile acidity, dry extract, pH, and the residual sugar, tartaric acid and malic acid contents.

RESULTS AND DISCUSSION

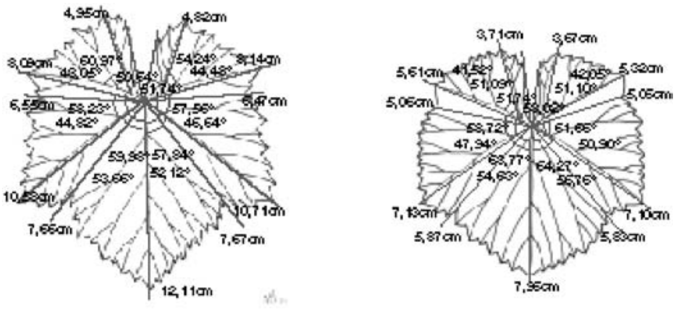
Table I shows the results of the ampelographic characterisation of Albarín Blanco I and II (leaf, cluster, berry and seed characteristics). Figure 5 shows an average leaf for each Albarín Blanco type.

Albarín Blanco I and II were very similar in terms of the leaf variables measured (table I) ; the only differences were the slightly stronger pigmentation of the veins of type I (OIV codes 070 and 071), and the absence of prostrate hairs on the main veins (on the upper side of the leaf) in Albarín Blanco I (OIV code 088). Type II showed a

Table II - Means, standard deviation (SD) and coefficients of variability (CV [%]) for days to reach the different stages in grapevine shoot development following the method of Baggliolini (1952) and Eichhorn and Lorenz (1976), counting from B stage over the three years of study for Albarín Blanco I and II.

Moyenne, écart type et coefficient de variabilité (CV %) des jours pour arriver aux différents stages de développement en suivant la méthode de Baggliolini (1952) et Eichhorn Lorenz (1976), compté à partir du stage B pendant les trois années d´étude pour l'Albarin Blanco I et II.

Variables	Albarín Blanco I			Albarín Blanco II		
	Mean	SD	CV (%)	Mean	SD	CV (%)
Days to C (dormant bud)	10.00	4.10	40.99	8.86	2.67	30.17
Days to D	15.00	4.82	32.11	12.63	3.62	28.70
Days to E	20.00	4.36	21.79	18.09	3.45	19.06
Days to F	28.79	3.45	11.97	26.70	2.36	8.84
Days to G	34.81	4.17	11.97	32.75	3.08	9.40
Days to H	61.20	11.11	18.16	55.83	6.97	12.48
Days to Flowering	80.44	3.56	4.42	79.17	3.59	4.53
Days to 27	94.50	3.74	3.96	93.80	3.61	3.85
Days to 29	102.00	3.74	3.67	101.11	3.69	3.65
Days to 31	111.50	3.74	3.36	110.80	3.61	3.26
Days to 33	128.88	6.72	5.22	132.50	8.33	6.29
Days to 35	152.13	4.72	3.10	151.67	5.85	3.86
Days to 38 (maturity)	180.88	4.18	2.31	177.83	3.27	1.84



ALBARÍN BLANCO I *ALBARÍN BLANCO* II

Figure 5 - Average leaves of Albarín Blanco I and II (following the method of MARTINEZ and GRENAN [1999]).

Feuilles moyennes d'Albarin Blanco I et II (selon la méthode de MARTINEZ et GRENAN, 1999) .

few of these prostrate hairs. However, the size and shape of the leaves clearly differed. Figure 4 shows that those of Albarín Blanco I were larger, had longer veins, and smaller main vein angles. The leaves of Albarín Blanco II were smaller, almost circular, and their vein angles larger.

Albarín Blanco I had much more compact grape clusters (figure 6) with short, oval or elliptical berries that tasted strongly like Moscatel grapes (table I). The clusters of Albarín Blanco II were less compact, and their rounded berries had an insipid taste.

Table II shows the days to reach the different stages in grapevine shoot development following the method of BAGGLIOLINI (1952) and EICHHORN AND LORENZ (1977), counting from B stage. Albarín Blanco I and Albarín Blanco II were no differents in this terms.

Table III compares the agronomic characteristics of the two Albarín Blanco types. Type I was more fertile, produced typical clusters and its berries were larger. Its seeds were longer although they weighed the same as those of type II. The potential alcohol level of the type I grapes was lower and their acidity higher.

Table IV shows the number of seeds contained in the berries of Albarín Blanco I and II. The differences were quite noticeable: type II had no berries with 3-4 seeds and 87.31% of their fruits had only one seed; in type I, only 43 % of the berries had one seed, 40 % had two, and the rest had between three and four.

The results of the ampelographic and agronomic analyses of Albarín Blanco I and II show that an error of homonymy has occurred, i.e., the same name has been

Table III - Means, standard deviation (SD) and coefficients of variability (CV [%]) for agronomic variables (over the three years of study) for Albarín Blanco I and II.

Moyenne, écart type (SD) et coefficient de variabilité (CV %) des paramètres agronomiques (pendant les trois années d'étude) pour l'Albarin Blanco I et II

Variables	Albarín Blanco I			Albarín Blanco II		
	Mean	SD	CV (%)	Mean	SD	CV (%)
kg grapes/ha	7346.42	9047.79	123.16	4815.32	5452.96	113.24
Fertility index	10.38	5.17	49.79	7.49	1.60	21.30
Nº clusters/vine shoot	1.60	0.47	29.03	1.67	0.52	30.98
Total clusters/plant	18.94	6.60	34.84	23.75	1.26	5.30
kg grape /plant	3.60	4.43	123.16	2.36	2.67	113.24
Representative cluster weight (g)	290.06	172.19	59.36	196.48	108.12	55.03
Representative cluster length (cm)	11.80	2.16	18.34	10.91	1.42	13.00
Representative cluster width (cm)	10.26	2.82	27.49	9.03	1.99	22.00
Cluster peduncle length (cm)	2.28	0.70	30.74	1.56	0.34	21.71
Pedicel length (cm)	0.56	0.16	29.01	0.42	0.08	18.95
Berry length (cm)	1.50	0.14	9.63	1.48	0.11	7.48
Berry width (cm)	1.40	0.12	8.86	1.40	0.08	5.76
Berry weight (g)	2.14	0.46	21.25	1.88	0.36	19.35
Seed weight (g)	0.03	0.01	18.41	0.03	0.01	20.32
Seed length (g)	0.70	0.05	7.37	0.62	0.06	10.39
Nº seeds/berry	1.75	0.78	44.39	1.14	0.35	30.80
Must yield	35.10	5.92	16.88	35.37	3.74	10.58
Potential alcohol yield (ºBaumé)	11.52	0.97	8.44	11.82	1.54	13.07
Total acidity (g/l tartaric acid)	9.04	1.89	20.87	8.48	2.86	33.70
pH	3.09	0.12	3.92	3.14	0.07	2.37
Weight of pruned wood (kg)	0.89	0.25	28.45	0.75	0.38	51.15

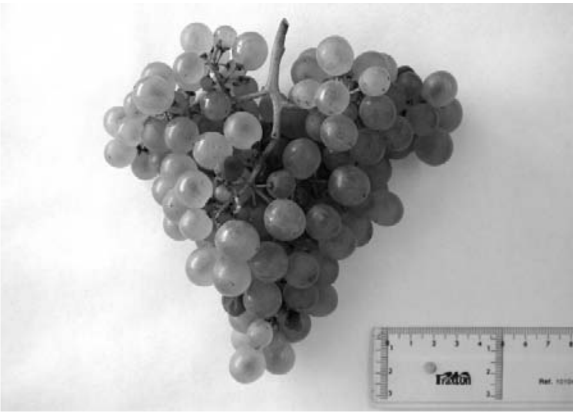


Figure 6 - Typical grape cluster of Albarín Blanco I

Grappe typique d'Albarin Blanco I

given to two different varieties. In addition, comparisons of types I and II confirmed that neither were the same as the Albariño or Albillo cultivars, as previously reported (MARTÍNEZ AND PÉREZ, 2000). Albarín Blanco I (the oldest cultivar of the region with some individuals over 300 years old) showed some very particular characteristics, such as the shape of its leaves, its oval, translucent-green berries, and the Moscatel taste of its ripe fruits (although neither its agronomic nor its ampelographic characteristics match those of any Moscatel variety, as described by MARTÍNEZ AND PÉREZ [2000]).

The DNA analysis (table V) showed Albarín Blanco I to be the same cultivar as Blanco Legítimo, Blanco Verdín, Raposo and Blanco País (figure. 1) (originally collected as putatively different cultivars but whose strong resemblance to Albarín Blanco I in terms of leaf, cluster, berry and seed characteristics had been noticed). The DNA analysis also showed that Albarín Blanco I and II were different in terms of their microsatellite profiles. In fact, the results for Albarín Blanco II coincide with those for Savagnin Blanc, Gewurztraminer and the Albarín Blanco cultivar analysed by MARTÍN *et al.* (2003) from the El Encín collection. The ampelographic characteristics of Albarín Blanco II and Savagnin Blanc (BOIDRON *et al.*, 1995 ; AMBROSI *et al.*, 1994) suggest these cultivars are one and the same.

Table VI shows the basic oenological characteristics of the true Albarín Blanco wines produced by the micro-fermentations, which suggest that this variety may indeed be of good winemaking quality. Studies are underway on

Table IV - Means, standard deviation (SD) and coefficients of variability (CV [%]) for percentage of berries with 1, 2, 3 and 4 seeds (Albarín Blanco I and II).

Moyenne, écart type (SD) et coefficient de variabilité (CV %) pour les pourcentages de baies avec 1, 2, 2 et 4 pépins (Albarín Blanco I et II).

Variables	Albarín Blanco I			Albarín Blanco II		
	Mean	SD	CV (%)	Mean	SD	CV (%)
(%) berries with 4 seeds	2.04	2.89	141.42	0	0	
(%) berries with 3 seeds	13.81	2.22	16.07	0	0	
(%) berries with 2 seeds	40.66	3.11	7.64	12.69	3.81	30.00
(%) berries with 1 seed	43.49	3.77	8.68	87.31	3.81	4.36

Table V - Allele sizes (bp) at each of the 6 loci studied (VrZAG47, VVMD5, VrZAG62, VVMD7, VVS2,VrZAG79).

Taille des allèles (bp) pour chacun des 6 loci étudiés (VrZAG47, VVMD5, VrZAG62, VVMD7, VVS2,VrZAG79).

Cultivar	VrZAG47		VVMD5		VrZAG62		VVMD7		VVS2		VrZAG79	
Albarín Blanco I	157	165	218	234	185	193	237	255	130	150	243	245
Albarín Blanco II	165	165	228	234	187	193	241	255	150	150	243	249
Blanco Legítimo	157	165	218	234	185	193	237	255	130	150	243	245
Blanco País	157	165	218	234	185	193	237	255	130	150	243	245
Blanco Verdín	157	165	218	234	185	193	237	255	130	150	243	245
Raposo	157	165	218	234	185	193	237	255	130	150	243	245

Table VI - Results for chemical analysis of Albarín Blanco I wines (means for the 2001, 2002 and 2003 vintages).

Résultats des analyses chimiques des vins d'Albarin Blanco (moyennes des millésimes 2001, 2002 et 2003)

Variables	Mean	SD	CV(%)
Ethanol % vol.	11.51	1.05	9.12
Total acidity (g/l)	7.70	0.1	0.01
Volatile acidity (g/l)	0.50	0.1	20
Residual sugars (g/l)	2.00	0.4	20
Tartaric acid (g/l)	3.55	0.05	1.40
Malic acid (g/l)	2.80	0.8	28.57

the aromatic composition of this wine; the results will be published in a future paper.

The only centuries-old individuals found all belonged to Albarín Blanco I and its synonyms (about 300 years old). These were commonly un-grafted and cultivated as large shade-providing vines, although some had been grafted and grown en espalier in post-phylloxera vineyards. The Albarín Blanco II specimens found were all of post-phylloxera epidemic age (under 100) and were always grafted and grown en espalier. Most vineyards in the surveyed regions now contain a great many varieties, some that are native to the area and others that are well known internationally (e.g., Alicante, Chasselas, Jérez etc.). Albarín Blanco I can be found among them (although in reduced numbers), as can type II, and it would be quite easy for them to be confused by growers who are not expert in the identification of different varieties.

MARTÍNEZ AND PÉREZ (1999) indicate that French wine technicians from the Bordeaux area came to the wine growing region of Asturias after the Spanish phylloxera epidemic of the late 19th century. As well as introducing grafting techniques and the en espalier cultivation method, they brought with them certain varieties from France which adapted well according to documents of the time. Among these may have been Savagnin Blanc, which we show here to be the same as Albarín Blanco II. With respect to the Albarín Blanco specimens conserved in the El Encín collection, it is known that they were sent from Asturias in 1971 (long after the phylloxera epidemic) by persons who were not grapevine experts. This might explain the present ampelographic results and the molecular results of MARTÍN *et al.* (2003), which show these specimens belong to Albarín Blanco II or Savagnin Blanc. The El Encín records show that most of the varieties making up this collection were gathered from the different wine-growing regions of Spain in the mid to late 20th century by experts such as García de los Salmones, Martínez-Zaporta, Manso de Zúñiga and Hidalgo etc. (CABELLO, personal correspondence). However, in the second half of the century, the collection was completed by requesting plant material from the Jefatura Agronómica (the Agricultural Authority) of each Province. The persons who collected this material were, therefore, not always grapevine experts - especially so in Asturias, Galicia, the Province of Santander and other northern territories. This may have led to the naming errors discovered.

CONCLUSION

In conclusion, the microsatellite, ampelographic and agronomic profiles recorded for Albarín Blanco I match those of no other known variety, which alone (including its synonyms) has clones more than 300 years old. The present data therefore suggest that Albarín Blanco I is the true Albarín Blanco and that Albarín Blanco II is in fact it is a French variety, Savagnin Blanc, probably brought to the region by French technicians after the Spanish phylloxera epidemic of the late 19th century. Due to its similarly to the true Albarín Blanco, and its similar habit of early ripening, the growers of the region probably confused it with the native plant and called it by the same name.

Acknowledgements: This work was supported by the Ministerio de Ciencia y Tecnología (Spain) (VIN00-036-C6-3) (VIN03-002-C6-3) (RF02-004-C5-2).

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Manuscrit reçu le 2 décembre 2004 ; accepté pour publication, après modifications le 10 mai 2005