

# PRIÉ BLANC AND LEGIRUELA: A UNIQUE GRAPE CULTIVAR GROWN IN DISTANT EUROPEAN REGIONS

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## Abstract

**Aims:** The aim of this study was to identify synonyms among grape cultivars growing in two distant regions, Spain and Italy, based on comparative analysis of genetic markers. The identification of synonyms and genetically-related cultivars should contribute to our understanding of their history and the preservation of biodiversity.

**Methods and results:** Using a set of 9 nuclear simple sequence repeats (SSR) markers, we compared the genetic profiles of major and currently neglected grape cultivars from two laboratories in Spain and Italy. A set of approximately 700 genotypes were analysed and several putative synonyms were discovered. Among these, a clear synonymy was identified (confirmed by ampelographic observations) between two minor varieties: the Spanish Legiruella and the Italian Prié blanc, known in the past as Agostenga. Using an additional set of 25 nuclear SSR loci, two white cultivars, Albillo Real (or Albillo de Madrid) and Luglienga bianca, from Spain and Italy, respectively, showed a genetic relationship with Prié blanc/Legiruella. To further characterise this parent/progeny kinship, chloroplast SSR analyses were performed. Several hypotheses on the origin and movements of these traditional ancient grapes are discussed.

**Conclusion:** The Italian Prié blanc and the Spanish Legiruella cultivars correspond to a unique genotype. The occurrence in Spain under the name of Legiruella, a cultivar long-recognized in Italy, and the presence in both countries of very old grape varieties genetically related to this genotype, indicate that Prié blanc/Legiruella has moved from its original to actual growing area several centuries ago.

**Significance and impact of the study:** By identifying synonyms, accurately establishing the « true to type » of traditional grapes (used for commercial trade or maintained in collections), and studying their genetic relationships, the present work affects marketing and commercial exploitations related to grape cultivars. It also contributes to the knowledge of cultivar history and movements in ancient times.

**Keywords:** *Vitis vinifera*, synonyms, kinship, microsatellite, ampelography

## Résumé

**Objectifs :** Cette étude vise à l'identification de cépages locaux cultivés dans des régions éloignées en Espagne et en Italie et à établir des synonymies possibles. En outre, l'analyse d'autres cépages proches - au point de vue génétique - de ces éventuels synonymes peut contribuer à la connaissance de leur parcours historique.

**Méthodes et résultats :** Au cours d'une étude sur les profils microsatellites de cépages importants et d'anciens cépages locaux, on a comparé les données de plusieurs d'entre eux obtenues dans deux laboratoires, l'un italien et l'autre espagnol (environ 700 génotypes en total). On a ainsi découvert la synonymie entre l'espagnol Legiruella et l'italien Prié blanc, autrefois connu également sous le nom d'Agostenga. Cette synonymie a été aussi confirmée par des observations ampélographiques. En utilisant 25 loci microsatellites additionnels, deux autres cépages à raisin blanc, Albillo Real (ou Albillo de Madrid) et Luglienga bianca, respectivement d'Espagne et d'Italie, ont montré un profil génétique en accord avec un lien de parenté en ligne directe avec Prié blanc/Legiruella. Plusieurs hypothèses sur l'origine et les parcours de ces anciens cépages sont discutées.

**Conclusions :** La présence en Espagne, sous le nom de Legiruella, d'un ancien cépage traditionnel du centre de l'Europe et la découverte, soit en Espagne, soit en Europe Centrale, d'autres vieux cépages génétiquement proches de ce génotype, semblent démontrer que le déplacement de Prié blanc/Legiruella vers les nouveaux sites remonte à plusieurs siècles.

**Signification et impact de l'étude :** Établir des synonymies et la vraie identité de cépages traditionnels, soit qu'ils donnent des produits commercialisés, soit qu'ils soient conservés dans les collections, ainsi qu'étudier leurs liens génétiques, peut avoir un impact important pour leur exploitation commerciale et, en même temps, contribuer à en reconstruire l'histoire et les déplacements dans le temps.

**Mots-clés :** *Vitis vinifera*, synonymie, consanguinité, microsatellite, ampélographie

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## INTRODUCTION

It is estimated that around 10,000 grape varieties are grown in the world (Alleweldt, 1988). However, only 300-400 cultivars account for most of the plantings. Therefore a great number of minor grapes, of local importance and often neglected, are still grown in secondary areas. While major cultivars are usually well known, it is difficult to retrieve information about minor varieties because of their limited and local use. Their correct identities and the occurrence of synonyms in other locations are generally unknown. Morphological and genetic characterisation of minor cultivars should therefore contribute to the protection and maintenance of genetic diversity, as cultivars in danger of extinction in one area may still be present in other regions/countries but under different names. The discovery of synonymies, especially in grape cultivars from rather distant regions, should also contribute to the knowledge of their history and movements across Europe in ancient times. Furthermore, it could have a positive impact on local economy as the majority of wines produced from minor cultivars, although often appreciated, are only traded locally. This would be very beneficial, especially in growing areas such as mountain slopes whose development is possible due to the adaptability of local grapes to the challenging environmental conditions.

The development of molecular markers for grape variety identification through comparative genetic study (This *et al.*, 2006), and the ease to transfer these data between laboratories, have become promising tools to investigate putative synonyms among grapes from distant regions (Vargas *et al.*, 2008). In this report, we have analysed the genetic profiles of major and minor grape cultivars from Spain and Italy. The Italian CNR-IVV database (which includes the nuclear SSR profiles of around 600 genotypes) was compared with the Spanish gene bank (Martin *et al.*, 2003) on the basis of nuclear simple sequence repeat (SSR) loci. This paper presents evidence of an unexpected synonymy between two minor grapes cultivars grown in distant regions: Legiruela (Spain) and Prié blanc (Aosta Valley, Italy). The two synonym cultivars, both of early ripening grapes, are currently grown on limited acreages in mountainous areas where they give wines appreciated by the locals. Further nuclear (additional 25 markers) and chloroplast SSR analysis revealed a genetic relationship between Prié blanc/Legiruela and Albillo Real (from Spain) and Luglienga bianca (from Italy). Several hypotheses on the origin and movements of these grapes cultivars are discussed. It is worth noting that at least three Albillo cultivars homonyms were previously described and genotyped in Spain (Cervera *et al.*, 2001). Accordingly, we refer in this study to the cultivar Albillo de Madrid, the variety behind the appellation « Vinos de Madrid ».

This variety is at present officially registered in Spain as Albillo Real.

## MATERIALS AND METHODS

### 1. Grape cultivars

The study involved the following grape cultivars: Legiruela and Prié blanc (two putative synonyms), Albillo Real and Luglienga bianca. Albillo and Legiruela are maintained in the grape germplasm collection of IMIDRA (Alcala de Henares, Spain), Prié blanc belongs to the grape collection of CNR-IVV (Torino, Italy) located at Grinzane C. (Italy) and Luglienga bianca is maintained in both collections.

### 2. DNA analysis

DNA extractions were carried out from young leaves. At IMIDRA, DNA extractions were carried out using the DNeasy 96 Plant Kit (Qiagen). At CNR-IVV, samples were extracted according to Thomas *et al.* (1993) with some modifications. Fluorescent-labelled primers were used for PCR amplification. PCR products were electrophoresed on an ABI 3130 Genetic Analyzer (Applied Biosystems) and data analysis was performed with the GeneMapper 4.0 software using GeneScan-LIZ 500 as internal marker (Applied Biosystems). In order to compare data obtained from the two laboratories, allele sizes were standardised using several common international cultivars as references.

### 2. Nuclear SSR

The Prié blanc/Legiruela synonymy was based on the comparison of their genetic profiles at the following 9 nuclear microsatellite loci: VVS2 (Thomas and Scott, 1993), VVMD5, VVMD7 (Bowers *et al.*, 1996), VVMD21, VVMD24, VVMD25, VVMD27, VVMD28 and VVMD32 (Bowers *et al.*, 1999). For kinship studies, genetic analyses were then carried out on 25 additional loci: VVS1, VVS3 (Thomas and Scott, 1993), VVMD6, VVMD31, VVMD36 (Bowers *et al.*, 1999), VrZAG21, VrZAG29, VrZAG62, VrZAG67, VrZAG79, VrZAG83, VrZAG112 (Sefc *et al.*, 1999), VVIB01, VVIH54, VVIN16, VVIN73, VVIP31, VVIQ52, VVIV37, VVIV67 (Merdinoglu *et al.*, 2005), VMC5A1, VMC5C1, VMC5H5, VMC1B11 and VMC4F3-1. Five of the microsatellite markers were obtained from the Vitis Microsatellite Consortium (VMC5A1, VMC5C1, VMC5H5, VMC1B11, VMC4F3), six were obtained from previous studies (VVS2, VVMD5, VVMD7, VVMD27, VrZAG62, VrZAG79) (This *et al.*, 2004), and three were selected from the EU Project GrapeGen06 (<http://www1.montpellier.inra.fr/grapegen06/>) as common markers for international use (VVMD28, VVMD25,

VVMD32). Most of the primer sequences are available at <http://www.ncbi.nlm.nih.gov/>.

#### 4. Chloroplast SSR

Five chloroplast microsatellites were also analysed: Ccmp3, Ccmp5, Ccmp10 (Weising and Gardner, 1999), ccSSR9 and ccSSR14 (Chung and Staub, 2003) using a multiplex PCR as described previously (Ibáñez *et al.* 2009).

#### 5. Ampelographic description

In order to confirm the synonymy found with molecular markers, ampelographic characterisation of

the accessions under examination was also carried out using 33 descriptors from the OIV Vitis descriptor list updated in 2007 ([http://news.reseau-concept.net/images/oiv/Client/2\\_Edition\\_Caracteres\\_ampelographiques\\_OIV.pdf](http://news.reseau-concept.net/images/oiv/Client/2_Edition_Caracteres_ampelographiques_OIV.pdf)).

## RESULTS

### 1. Prié blanc/Legiruela synonymy

In order to identify putative synonyms among grape cultivars grown in Spain and Italy, approximately 700 genotypes were analysed based on the SSR profiles of 9 nuclear microsatellite markers (data not shown).

**Table 1. Genetic analysis of Legiruela, Prié blanc, Albillo Real and Luglienga bianca with 34 nuclear SSR markers (in bp, shared alleles are in bold).**

Loci	Albillo Real	Legiruela	Prié blanc	Luglienga bianca
VVS1	<b>180:189</b>	<b>180:189</b>	<b>180:189</b>	<b>180:189</b>
VVS2	135:155	<b>133:155</b>	<b>133:155</b>	145:155
VVS3	<b>217:217</b>	<b>217:217</b>	<b>217:217</b>	<b>217:217</b>
VVMD5	<b>227:227</b>	<b>227:237</b>	<b>227:237</b>	<b>227:235</b>
VVMD6	<b>208:210</b>	<b>208:210</b>	<b>208:210</b>	<b>210:210</b>
VVMD7	<b>233:239</b>	<b>233:247</b>	<b>233:247</b>	<b>247:247</b>
VVMD21	242:254	<b>248:254</b>	<b>248:254</b>	<b>248:254</b>
VVMD24	<b>209:211</b>	<b>209:209</b>	<b>209:209</b>	<b>209:209</b>
VVMD25	<b>241:241</b>	<b>241:251</b>	<b>241:251</b>	243:251
VVMD27	<b>184:188</b>	<b>184:188</b>	<b>184:188</b>	<b>184:184</b>
VVMD28	<b>246:246</b>	<b>236:246</b>	<b>236:246</b>	<b>236:248</b>
VVMD31	<b>195:211</b>	<b>195:215</b>	<b>195:215</b>	<b>195:195</b>
VVMD32	<b>253:273</b>	<b>253:273</b>	<b>253:273</b>	<b>253:263</b>
VVMD36	<b>251:286</b>	<b>251:296</b>	<b>251:296</b>	<b>263:296</b>
VrZAG21	<b>207:207</b>	<b>191:207</b>	<b>191:207</b>	<b>191:203</b>
VrZAG29	<b>110:110</b>	<b>110:110</b>	<b>110:110</b>	<b>110:110</b>
VrZAG62	<b>196:196</b>	<b>194:196</b>	<b>194:196</b>	192:194
VrZAG67	<b>126:132</b>	<b>126:126</b>	<b>126:126</b>	<b>126:126</b>
VrZAG79	<b>238:250</b>	<b>238:250</b>	<b>238:250</b>	<b>238:250</b>
VrZAG83	<b>191:195</b>	<b>191:195</b>	<b>191:195</b>	189:191
VrZAG112	227:231	<b>231:237</b>	<b>231:237</b>	<b>231:231</b>
VMC1B11	<b>185:189</b>	<b>185:185</b>	<b>185:185</b>	171:185
VMC4F3-1	167:173	<b>173:173</b>	<b>173:173</b>	165:173
VMC5A1	160:166	<b>156:166</b>	<b>156:166</b>	<b>166:166</b>
VMC5C1	<b>145:145</b>	<b>145:145</b>	<b>145:145</b>	145:151
VMC5H5	182:184	<b>184:186</b>	<b>184:186</b>	<b>184:186</b>
VVIB01	291:295	<b>289:295</b>	<b>289:295</b>	<b>289:291</b>
VVIH54	<b>166:168</b>	<b>166:174</b>	<b>166:174</b>	168:174
VVIN16	154:156	<b>156:162</b>	<b>156:162</b>	<b>156:156</b>
VVIN73	<b>256:256</b>	<b>256:256</b>	<b>256:256</b>	<b>256:263</b>
VVIP31	192:194	<b>176:194</b>	<b>176:194</b>	194:196
VVIQ52	<b>81:85</b>	<b>81:85</b>	<b>81:85</b>	<b>81:85</b>
VVIV37	163:177	<b>161:177</b>	<b>161:177</b>	171:177
VVIV67	361:365	<b>365:365</b>	<b>365:365</b>	<b>365:372</b>

Several candidates were identified and among them were the two grape cultivars Legiruela (Spain) and Prié blanc (Italy), which were further analysed using 25 additional markers (Table 1). Our results indicate that Legiruela and Prié blanc are most likely synonyms, as the two profiles exhibit a perfect match on all of the 34 nuclear SSR loci tested. The probability of obtaining an identical profile on the 9 SSR loci selected as common international markers (VVS2, VVMD5, VVMD7, VVMD21, VVMD24, VVMD25, VVMD27, VVMD28 and VVMD32) was estimated as  $10^{-12}$  for a pool of 450 European grape cultivars (data not shown). It is therefore highly unlikely that false synonyms were detected.

Legiruela is a minor, local variety grown in a limited area in the province of Ávila (Central Spain), whereas Prié blanc is present in the Aosta Valley (North Western Italy). Morphological characters were described and results showed a high level of similarity between Legiruela and Prié blanc phenotypes (Table 2). Di Rovasenda (1877) previously mentioned the synonymy between Prié blanc and Agostenga, an ancient grape described in detail by Mas and Pulliat (1874). The reported morphological characters of Agostenga correspond to those currently found on Prié blanc and Legiruela. In the past, Agostenga was quite common in Piedmont and neighbouring regions, as well as in the gardens of the cooler European districts (Mouillefert, 1902; Molon, 1906).

## 2. Kinship analysis

Two putative parents of the Legiruela/Prié blanc genotype were identified based on their genetic profiles at 34 nuclear SSR loci (Table 1). For each analysed loci, Albillo Real and Luglienga bianca share one allele with Legiruela and Prié blanc, respectively. Therefore, it is likely that Albillo Real and Luglienga bianca are related to Prié blanc/Legiruela by a first degree kinship. However, their genetic profiles are not consistent with the possibility of them being the two parents of Prié blanc/Legiruela. A parent/progeny relationship between Albillo and Legiruela, and Luglienga and Prié blanc, respectively, seemed the most likely scenario. Accordingly, Albillo and Luglienga share a relative number of alleles, suggesting a 2° degree relationship (half-sibling, grand-parent/grand-children).

A number of morphological characters corroborated the relationship between Albillo and Luglienga (Table 2). Indeed, several adult leaf and bunch traits (size, overall shape, sinuses and teeth shape) were the same in Albillo and Legiruela, hairiness of young shoots and back side of leaves being the major differences observed. Prié blanc and Luglienga also exhibited many common characteristics, and especially in young shoots and fruit, both traits that were often confused in the past (Molon,

1906). All four cultivars share an early bud burst and early grape ripening. They are all well adapted to cool climates and are traditionally grown on mountains, even at considerable altitudes on sheltered southern exposure, where cool summers do not prevent the grapes from fully ripening and the risk of frost damages in spring is decreased. Prié blanc, Luglienga bianca and Albillo Real's morphological profiles match up with the descriptions reported in the historical references under the names of Agostenga, Lignan and Albillo, respectively (Pulliat, 1897; Mas and Pulliat, 1874; Costantinescu *et al.*, 1961; Mouillefert, 1902; Alonso de Herrera, 1513). Therefore, there is no doubt that Prié blanc, Luglienga bianca and Albillo Real grapes examined in this study correspond to their historical references. As for Legiruela, it was previously cited but never described (García de los Salmones, 1914).

The maternal inheritance of chloroplast in *Vitis vinifera* allows the identification of the female parent using the chloroplast haplotypes (Arroyo-Garcia *et al.*, 2002). In an attempt to identify the parent among the four grape cultivars, chloroplast SSR analyses were performed using five markers (Table 3). From our data, we ruled out Luglienga bianca as being the female parent of Legiruela/Prié blanc and vice versa because they share different haplotypes. However, Albillo shares an identical chloroplast haplotype with Prié/Legiruela and could therefore be the female or the male parent.

## DISCUSSION

The results presented in this study confirm a synonymy between the Italian Prié blanc and the Spanish Legiruela cultivars. Further kinship analysis including Luglienga bianca and Albillo Real also suggests a strong relationship between the four cultivars. This raises two questions whether Prié blanc/Legiruela moved to Spain or vice versa, and whether Luglienga bianca and Albillo Real are Prié/Legiruela's parents or progeny. For a more comprehensive picture, here is the historical background of each of the cultivars.

Prié blanc is the official Italian name of the early ripening cultivar traditionally grown in a small area located at the foot of Mont Blanc in the Aosta Valley, in the south of the Western Alps (Di Rovasenda, 1877). As already stated, a more popular synonym is Agostenga which means « August grape ». Agostenga is reported to have been grown in the past as table and wine grapes in Northern Italy, especially in Piedmont (Molon, 1906).

In France, it was introduced during the mid 1800s under the wrong name of « Vert précoce de Madère » (Mouillefert, 1902) and had a limited cultivation. It was also known in Germany as « Grüne Seidentraube » and in other countries of Central and Northern Europe

(Mouillefert, 1902; Molon, 1906), either grown outdoors or in greenhouses. In some cases, it was undoubtedly confused with Luglienga bianca (Gelbe Seidentraube) or even with Chasselas blanc, another morphologically similar cultivar. Since the first report of Agostenga refers to Piedmont (Croce, 1606), it is commonly believed that this grape spread to Europe from Italy.

In the past, Luglienga, which means « July grape », was even more popular than Agostenga. As for the latter, Luglienga is believed to come from Italy where it was widely grown (especially in the north) and where it was first reported by Croce in the early 1600s, although historical references to some « Luglienche » grapes in Piedmont go back to 1329 (Comba, 1990). Mainly used as a table grape, Luglienga was spread throughout most

**Table 2. Morphological and agronomical traits of Legiruela, Prié blanc, Albillo Real and Luglienga bianca (identical phenotypes are in bold).**

Descriptor	Cultivar			
	Albillo	Legiruela	Prié blanc	Luglienga bianca
OIV003: intensity of anthocyanin coloration on prostrate hairs of the shoot tip	<b>low</b>	<b>low</b>	<b>low</b>	<b>low</b>
OIV004: density of prostrate hairs of the shoot tip	high	low	<b>medium</b>	<b>medium</b>
OIV007: shoot; colour of dorsal side of internodes	<b>green</b>	<b>green</b>	<b>green</b>	<b>green</b>
OIV008: shoot; colour of ventral side of internodes	<b>green</b>	<b>green</b>	<b>green</b>	<b>green</b>
OIV051: young leaf; color of upper side of blade	<b>green</b>	<b>copper-reddish</b>	<b>green/copper-reddish</b>	<b>copper-reddish</b>
OIV053: young leaf; density of prostrate hairs on lower side	high	<b>low</b>	<b>low</b>	<b>low</b>
OIV067: mature leaf; shape of blade	<b>pentagonal</b>	<b>pentagonal</b>	<b>pentagonal</b>	wedge-shaped
OIV068: mature leaf; number of lobes	<b>five</b>	<b>five</b>	three/ <b>five</b>	three/ <b>five</b>
OIV070: mature leaf; anthocyanin coloration of main veins on upper side	<b>absent</b>	<b>only at the petiolar point</b>	<b>absent/only at the petiolar point</b>	up to the 1 <sup>st</sup> bifurcation
OIV072: mature leaf; goffering of blade	<b>absent</b>	<b>absent</b>	<b>absent</b>	very weak
OIV074: mature leaf; profile of blade	<b>involute</b>	<b>involute</b>	<b>involute</b>	flat
OIV075: mature leaf; blistering of upper side	<b>medium</b>	<b>medium</b>	weak	<b>medium</b>
OIV076: mature leaf; shape of teeth	<b>convex</b>	<b>convex</b>	<b>convex</b>	one side concave, one side convex
OIV079: mature leaf; degree of opening overlapping of petiole sinus	<b>open</b>	<b>open</b>	open/closed	<b>open</b>
OIV080: mature leaf; shape of base of petiole sinus	<b>brace-shaped</b>	<b>brace-shaped</b>	V-shaped/ <b>brace-shaped</b>	<b>brace-shaped</b>
OIV081-1: mature leaf; teeth in the petiole sinus	<b>none</b>	<b>none</b>	<b>none</b>	<b>none</b>
OIV081-2: mature leaf; petiole sinus base limited by vein	<b>not limited</b>	<b>not limited</b>	<b>not limited</b>	<b>not limited</b>
OIV083-2: mature leaf; teeth in the upper lateral sinus	<b>none</b>	<b>none</b>	<b>none</b>	<b>none</b>
OIV084: mature leaf; density of prostrate hairs between main veins on lower side	medium	<b>very low</b>	<b>very low</b>	none
OIV087: mature leaf; density of erect hairs on main veins on lower side	<b>very low</b>	<b>very low</b>	<b>very low</b>	low
OIV094: mature leaf; deep of upper lateral sinuses	<b>medium</b>	<b>medium/high</b>	<b>medium/high</b>	<b>medium/high</b>
OIV202: length of bunch	small	<b>small-medium</b>	<b>small-medium</b>	<b>medium</b>
OIV204: density of bunch	medium/dense	<b>dense</b>	<b>dense</b>	<b>dense</b>
OIV206: length of peduncle of primary bunch	<b>very short</b>	<b>very short</b>	short	medium
OIV208: shape of bunch	<b>cylindrical</b>	<b>cylindrical</b>	<b>cylindrical/conical</b>	<b>cylindrical/conical</b>
OIV209: number of wings of the bunch	<b>1-2 wings</b>	<b>1-2 wings</b>	<b>1-2 wings</b>	<b>1-2 wings</b>
OIV220: length of berry	<b>medium</b>	<b>medium</b>	<b>medium</b>	<b>medium</b>
OIV223: shape of berry	globose	<b>broad ellipsoid</b>	<b>broad ellipsoid</b>	<b>broad ellipsoid</b>
OIV225: colour of berry skin	<b>green yellow</b>	<b>green yellow</b>	<b>green yellow</b>	yellow
OIV236: particular flavour of berry	<b>none</b>	<b>none</b>	<b>none</b>	<b>none</b>
OIV301: time of bud burst	early	<b>very early</b>	<b>very early/early</b>	medium
OIV303: time of beginning of berry ripening	early	<b>very early</b>	<b>very early</b>	<b>very early</b>
OIV503: single berry weight	low	<b>medium</b>	<b>medium</b>	<b>medium</b>

**Table 3. Genetic analysis of Legiruela, Prié blanc, Albillo Real and Luglienga bianca with five chloroplast SSR markers (shared haplotypes are in bold).**

Chloroplast SSR loci	Albillo Real	Legiruela	Prié blanc	Luglienga bianca
Ccmp3	<b>104</b>	<b>104</b>	<b>104</b>	105
Ccmp10	<b>110</b>	<b>110</b>	<b>110</b>	111
Ccmp5	<b>105</b>	<b>105</b>	<b>105</b>	104
ccSSR14	<b>200</b>	<b>200</b>	<b>200</b>	201
ccSSR9	<b>171</b>	<b>171</b>	<b>171</b>	170
HAPLOTYPE <sup>1</sup>	A	A	A	D

<sup>1</sup>Chloroplast haplotypes named according to Arroyo-Garcia *et al.* (2006).

of the European grape growing countries (Mouillefert, 1902; Molon, 1906), explaining the great number of synonyms which include Lignan and Jouanen (France), Seidentraube and Früher Leipziger (Germany), and Augustaner (Romania). In Italy, it is officially registered among the table grapes as Santa Anna di Lipsia. In spite of the high quality of its fruits, Luglienga almost disappeared from cultivation when the table grape business became centred in Southern Europe.

The cultivar Legiruela is grown on the southern slopes of the Central Mountains in Spain, more precisely in San Esteban del Valle and surroundings (province of Ávila). Giving a light wine, its name Legiruela could be derived from the Spanish ligero, meaning light. In its traditional growing area, verbal statements were collected linking this cultivar to the Italians who migrated in the area in the 19th century, working in the nearby Castle of Monbeltran. Moreover, relationships between central Spain and Piedmont, where Prié blanc was widespread in the 1600s, existed in those times due to the marriage of Felipe V King of Spain and Maria Luisa from the House of Savoy, which ruled Piedmont from the XI to the XX century.

According to historical references, Albillo seems to have only been cultivated in Spain. It was first cited by Alonso de Herrera (1513) and later mentioned and/or described by other Spanish ampelographers (Valcarcel, 1791; Garcia de los Salmones, 1914), who all referred to the actual Albillo Real examined here. Nowadays, this cultivar is mainly grown on the southern side of the Central Mountains of Spain (provinces of Ávila, Madrid and Toledo) in a broader area than the one in which Legiruela is grown.

From our results, four hypotheses on the origin/movement of the examined cultivars can be drawn: 1) Luglienga bianca is the male parent of Prié blanc which was later introduced into Spain where it gave rise to Albillo Real. 2) Prié blanc is the parent of Luglienga in Italy, and also the parent of Albillo after being introduced in Spain.

3) Prié blanc is the parent of Albillo in Spain, and also the parent of Luglienga after being introduced in Italy. 4) Albillo is the parent of Prié blanc in Spain, which was later introduced in Italy or Central Europe, being the male parent of Luglienga.

According to historical information such as annotated references and the former spread of involved cultivars in specific areas, hypotheses 1) and 2) seem to be more likely. In fact, Luglienga and Prié blanc were already well known in the early 1600s and widely grown at that time in Northern Italy, while Legiruela, never cited until the early 1900s, probably had a very limited acreage in Spain. Even so, only the discovery of the other putative parent in the proposed genetic relationships could contribute to clarify the genetic origin of the investigated cultivars. As for the geographical origin, European countries other than Italy or Spain could also be involved. A wider picture of the genetic background of Italian, Central European and Spanish cultivars, including the discovery of other synonyms, would greatly contribute to our comprehension of this parent/progeny relationship.

## CONCLUSION

This work reports evidence of an unexpected synonymy between two grape cultivars, Legiruela and Prié blanc, both minor varieties currently grown in distant European regions in similar environmental conditions. The likely kinship of this genotype with two other grape cultivars (Albillo Real and Luglienga bianca), mentioned in ancient times in Spain and in Central Europe, respectively, suggests that Legiruela/Prié blanc would have moved from its original growing area to the new site several centuries ago. The occurrence of this currently minor grape variety in two distant regions would guarantee the preservation of diverse genetic material, benefiting to germplasm conservation and selections for commercial use.

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