

Molecular Characterization and Opportunities for the Valorization of Traditional Olive Tree Varieties in Alto Aragón (NE Spain)

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SUPPLEMENTARY MATERIAL

Table S1. Results of the survey of plant material according to the different localities; the olive trees selected for DNA analysis; results of the analysis (BGMO); interesting varieties (new genotype) and observations.

Location	Local Name	DNA Analysis	BGMO	Provisional New Name of Genotype	Comments
Abiego	Alcampelina de Abiego	No			
	Aceitunero	Yes	Changlot Real		Variety from Valencia
	Albas	No			
	Blancal	Yes	Bolvino		Variety from Aragón
	Gordera de Abizanda	Yes	Nación		Variety from Huesca
Abizanda	Royeta de Abizanda	Yes	Royeta de Abizanda		Variety from Huesca
	Royeta de Abizanda	Yes	Royeta de Abizanda		Variety from Huesca
	Cerruda	Yes	Cerruda de Liesa		Variety from Huesca
	Gordal	No			
	Aceitunero_B	Yes	Aceitunero-2249		Variety from La Rioja
Aínsa	Rañinera	No			
	Rañinera	No			
Albelda	Negreta	Yes	Manzanilla de Sevilla		
	Seira	Yes	To be assigned*	Seira	New variety
	Alquecerana	Yes	To be assigned*	Alquecerana	New variety
	Mochuto	Yes	Mochuto		Variety from Huesca
	Panseñera	Yes	Panseña		
Alquézar	Panseña Fina	Yes	To be assigned*	Panseña fina	New variety
	Albás	Yes	Verdal del Pallars		Variety from Cataluña
	Neral	Yes	Neral		Variety from Huesca
Aniés	Olivo Celia	Yes	To be assigned*	Olivonero de Ayerbe	New variety

Location	Local Name	DNA Analysis	BGMO	Provisional New Name of Genotype	Comments
Apiés	Olivonero de Apiés	No			
	Olivonero	No			
Artasona	Alía	Yes	Alía		Variety from Huesca
	Cerruda de Artasona	Yes	Cerruda de Olvena		Variety from Huesca
Asque	Royeta Asque	Yes	Royeta de Asque		Variety from Huesca
	Royeta	Yes	Royeta de Asque		Variety from Huesca
	Cerecera	Yes	Royeta de Asque		Variety from Huesca
	Bastarda	Yes	To be assigned*	Bastarda	New variety
Ayerbe	Negral 1	Yes	Royal de Calatayud		Variety from Aragon
	Olivonero de Ayerbe	Yes	To be assigned*	Olivonero de Ayerbe	New variety
	Negral	No			
	Olivonero	Yes	Royal de Calatayud		Variety from Aragon
Azlor	Olivera del Monte del Barón	No			
	Roya	No			
	Neral	No			
Baells	Royeta Baells	Yes	To be assigned*	Royeta de Baells	New variety
Banastón	Rañinera	No			
	Rañinera	No			
	Rañinera	No			
Barbuñales	Verdeña	No			
	Verdeña	No	Royal de Calatayud		Variety from Aragon
Benabente de Aragón	Biecuda de Benavente	Yes	Cerruda de Liesa		Variety from Huesca
Berbegal	Verto	Yes	To be assigned*	Verto	New variety
Bierge	Negral de Bierge	Yes	Negral de Bierge		Variety from Huesca
Binefar	Manzanilla	Yes	Hojiblanca		
Boltaña	Minutera	Yes	To be assigned*	Minutera de Boltaña	New variety
	Cerruda	Yes	Neral		Variety from Huesca
	Acebuche_1	Yes	To be assigned*	Acebuche_1	New variety
	Acebuche_2	Yes	To be assigned*	Acebuche_2	New variety
Buera	Albareta	Yes	Albareta		Variety from Huesca
	Sebastian	Yes	Nación		Variety from Huesca

Location	Local Name	DNA Analysis	BGMO	Provisional New Name of Genotype	Comments
	Olivo de La Iglesia	Yes	To be assigned*	Buera_1	New variety
	Falsa Blancal	Yes	To be assigned*	Buera_2	New variety
Capella	Biecuda de Capella	Yes	To be assigned*	Biecuda de Capella	New variety
Castillazuelo	Neral	No			
	Albás	No			
Colungo	Olivera de Nadal	Yes	To be assigned*	Olivera de Nadal	New variety
Cregenzan	Gordal Cregenzan	Yes	Gordal de Somontano		Variety from Huesca
Enate	Enate	Yes	Royeta de Asque		Variety from Huesca
Escanilla	Tempraneta	Yes	Bolvino		Variety from Aragon
	Cerruda 1	No			
	Desconocida	Yes	To be assigned*	Escanilla	New variety
	Desconocida 2	No			
	Desconocida 3 San Juan	No			
	Injerto	Yes	Caspolina		Variety from Aragon
	Mochuda	Yes	Cerruda de Liesa		Variety from Huesca
	Sevillano	Yes	To be assigned*	Sevillano_1	New variety
	Tempraneta	No			
	Verderola	Yes	To be assigned*	Verdolera	New variety
Estadilla	Nación	Yes	Nación		Variety from Huesca
	Piga	Yes	Piga		Variety from Huesca
Guaso	Guaso1	Yes	Rañinera		Variety from Huesca
Hoz de Barbastro	Castanero	Yes	To be assigned*	Castanero	New variety
	Dulce	Yes	Neral		Variety from Huesca
	Picaceta	Yes	Morcaire		Variety from Cataluña
	Royeta de Hoz	Yes	To be assigned*	Royeta de Hoz	New variety
	Ley de Coronas	No			
Huesca	Olivo de La Escuela	Yes	Royal de Calatayud		Variety from Aragon
Ibieca	Picudo de Ibieca	Yes	To be assigned*	Picudo de Ibieca	New variety
Ipiés	Monasterio Fanlo 1	Yes	Royal de Calatayud		Variety from Aragon
	Monasterio Fanlo 2	Yes	Royal de Calatayud		Variety from Aragon
Labata	Minutera de Labata	Yes	To be assigned*	Minutera de Labata	New variety
	Minutera	No			

Location	Local Name	DNA Analysis	BGMO	Provisional New Name of Genotype	Comments
	Picudo de Labata	Yes	Picudo de Labata		Variety from Huesca
	Rosal	Yes	To be assigned*	Rosal	New variety
	Sevillano de Labata	Yes	Picual		
Lamata	Blancal Lamata	Yes	Bolvino		Variety from Aragon
	Desconocida 1	Yes	Royal de Calatayud		Variety from Aragon
	Desconocida 2	Yes	Bolvino		Variety from Aragon
Lascuarre	Biequeruda	Yes	Biequeruda		Variety from Huesca
Liesa	Cerruda	Yes	Cerruda de Liesa		Variety from Huesca
	Negral	No			
Loscertales	Blancal	No			
	Roya	No			
Murillo de Gállego	Olivonero de Murillo	Yes	To be assigned*	Olivonero de Murillo	New variety
	Alcampelina	Yes	Verdiell		
	Alquecerana	Yes	Nación		Variety from Huesca
Peralta de Alcofea	Bravo Peralta	Yes	Royal de Calatayud		Variety from Aragon
Peralta de la Sal	Apegalosa	No			
	Blancal	No			
	Manzanilla	No			
Piracés	Verdeña de Piracés	No			
Pueyo de Araguás	Común_1	Yes	Rañinera		Variety from Huesca
	Común_2	Yes	Neral		Variety from Huesca
	Pueyo_Desconocida	No			
	Distinta_Pueyo	Yes	Rañinera		Variety from Huesca
	Desconocida 2	Yes	To be assigned*	Pueyo de Araguás	New variety
Radiquero	Minutera de Radiquero	No			
	Minutera de Viña	Yes	To be assigned*	Minutera de Viña	New variety
Secastilla	Biequeruda	No			
Riglos	Verdeña	Yes	Rañinera		Variety from Huesca
Roda	Olivonero_1	No			
	Olivonero_2	No			
Salas	Gordal de Salas	Yes	Manzanilla de Sevilla		

Location	Local Name	DNA Analysis	BGMO	Provisional New Name of Genotype	Comments
Santa Eulalia de Gállego	Casa Valentín	Yes	To be assigned*	Olivonero de Ayerbe	New variety
	Olivonero de Santa Eulalia	Yes	Gordal de Somontano		Variety from Huesca
	Olivonero de Ayerbe	No			
	Olivonero Alastuey	Yes	To be assigned*	Olivonero Alastuey	New variety
	Verdeña	Yes	Royal de Calatayud		Variety from Aragon
Sariñena	Dulcera	Yes	To be assigned*	Dulcera	New variety
Sopeira	Alargada	Yes	Royal de Calatayud		Variety from Aragon
	Casa Frasco	Yes	Verdal del Pallars		Variety from Cataluña
	Escario	Yes	To be assigned*	Escario	New variety
	Grosal_Raïniera	Yes	Raïniera		Variety from Huesca
	Mugrón	Yes	Raïniera		Variety from Huesca
	Salenca	Yes	To be assigned*	Salenca	New variety
	Choricera	Yes	Verdeal Tras-Os-Montes		Variety from Portugal

*The new variety has not yet been assigned an accession number.

Table S2. Biallelic SNP set of 96 EST-SNP Markers for 92 samples and two positive controls (C+_19-5 [Picual] and C+_F8A3 [Frantoio]). NTC abbreviation indicates "no template control". Bold italic letters indicate new.

[See separate Excel file]

Table S3. Sorted Multilocus Genotypes. Numbers correspond to A (1), C (2), G (3), T (4) and missing data (-1). Samples that shared the same genotype were clustered into the same genotype ID. Asterisks indicate samples with missing data. Bold italic letters indicate new varieties.

Genotype ID	Sample ID	Genotype	No. of Samples
Bolvino	Bolvino_1	334444221222133313331123334413134222111342112242131313221133114233112233444222444413222343331333131411224422 23224413112344331144143311112222131243331122224242221142114242424211224433424222213g	4
	Bolvino_2	334444221222133313331123334413134222111342112242131313221133114233112233444222444413222343331333131411224422 23224413112344331144143311112222131243331122224242221142114242424211224433424222213g	
	Bolvino_3	334444221222133313331123334413134222111342112242131313221133114233112233444222444413222343331333131411224422 23224413112344331144143311112222131243331122224242221142114242424211224433424222213g	
	Bolvino_4	334444221222133313331123334413134222111342112242131313221133114233112233444222444413222343331333131411224422 23224413112344331144143311112222131243331122224242221142114242424211224433424222213g	
Cerruda de Liesa	Cerruda de Liesa_1	33441442124433331313113333141313222133342114242131333221144134413114211442242444413423344131113131411224322 23234433133342131342113313134222131243431122422242221322134244442134242234244222211g	4
	Cerruda de Liesa_2*	3344144212443333131311333314131322213334211424213133322114413-1- 113114211442242444413423344131113131411224322232344331333421313421133131342221312434311224222422213221342444 442134242234244222211g	
	Cerruda de Liesa_3	33441442124433331313113333141313222133342114242131333221144134413114211442242444413423344131113131411224322 23234433133342131342113313134222131243431122422242221322134244442134242234244222211g	
	Cerruda de Liesa_4	33441442124433331313113333141313222133342114242131333221144134413114211442242444413423344131113131411224322 23234433133342131342113313134222131243431122422242221322134244442134242234244222211g	
Gordal de Somontano	Gordal de Somontano_1	234214421122133311131323331413134222131342114442331333221143134213134413442242444413222244131113131413424442 232344331133223311421133131322421312434313422242424213421342424442134242232244224211g	2
	Gordal de Somontano_2	234214421122133311131323331413134222131342114442331333221143134213134413442242444413222244131113131413424442 232344331133223311421133131322421312434313422242424213421342424442134242232244224211g	
Manzanilla de Sevilla	Manzanilla de Sevilla_1	234211421142133313131123131433114211131344114222331111211331342131142134442221442114222431311131111424342 333344131333423333441143131344221112434313424442422213221342424442134242232242422233g	2
	Manzanilla de Sevilla_2	234211421142133313131123131433114211131344114222331111211331342131142134442221442114222431311131111424342 333344131333423333441143131344221112434313424442422213221342424442134242232242422233g	
Nación	Nación_1	2344144222421333111313233314133322213134411422233131112114413423311443344224444413222344131113134433224442 23334413132221311421433111142221322434413224442424213421342224242134242234244224213g	4
	Nación_2	2344144222421333111313233314133322213134411422233131112114413423311443344224444413222344131113134433224442 23334413132221311421433111142221322434413224442424213421342224242134242234244224213g	
	Nación_3	2344144222421333111313233314133322213134411422233131112114413423311443344224444413222344131113134433224442 23334413132221311421433111142221322434413224442424213421342224242134242234244224213g	
	Nación_4	2344144222421333111313233314133322213134411422233131112114413423311443344224444413222344131113134433224442 23334413132221311421433111142221322434413224442424213421342224242134242234244224213g	

Neral	Neral_1	23421422114233331113111223314133342221333421142423333132213441344131344134422424444114222441111331314112244223334433132242331144113313112222131243431342444242213221342444442134242232244224213g	4
	Neral_2	23421422114233331113111223314133342221333421142423333132213441344131344134422424444114222441111331314112244223334433132242331144113313112222131243431342444242213221342444442134242232244224213g	
	Neral_3	23421422114233331113111223314133342221333421142423333132213441344131344134422424444114222441111331314112244223334433132242331144113313112222131243431342444242213221342444442134242232244224213g	
	Neral_4	23421422114233331113111223314133342221333421142423333132213441344131344134422424444114222441111331314112244223334433132242331144113313112222131243431342444242213221342444442134242232244224213g	
Olivonero de Ayerbe	Olivonero de Ayerbe_1	3342144212421313131313233344333342221313221144221333131213331342131322334422221444132222443311131314134244223334413112222131344113311112242131243431322444242213221342444242134242234244222211g	3
	Olivonero de Ayerbe_2	3342144212421313131313233344333342221313221144221333131213331342131322334422221444132222443311131314134244223334413112222131344113311112242131243431322444242213221342444242134242234244222211g	
	Olivonero de Ayerbe_3	3342144212421313131313233344333342221313221144221333131213331342131322334422221444132222443311131314134244223334413112222131344113311112242131243431322444242213221342444242134242234244222211g	
	Rañinera_1	23441442124233331313112333441313222213334411442213331322134413423311421344224244441342224433111313441322442233344131122421313441433131322221322434311424244422213421342224442134242234244224211g	
Rañinera_2	23441442124233331313112333441313222213334411442213331322134413423311421344224244441342224433111313441322442233344131122421313441433131322221322434311424244422213421342224442134242234244224211g		
Rañinera_3	23441442124233331313112333441313222213334411442213331322134413423311421344224244441342224433111313441322442233344131122421313441433131322221322434311424244422213421342224442134242234244224211g		
Rañinera_4	23441442124233331313112333441313222213334411442213331322134413423311421344224244441342224433111313441322442233344131122421313441433131322221322434311424244422213421342224442134242234244224211g		
Rañinera_5	23441442124233331313112333441313222213334411442213331322134413423311421344224244441342224433111313441322442233344131122421313441433131322221322434311424244422213421342224442134242234244224211g		
Rañinera_6	23441442124233331313112333441313222213334411442213331322134413423311421344224244441342224433111313441322442233344131122421313441433131322221322434311424244422213421342224442134242234244224211g		
Royal de Calatayud	Royal de Calatayud_1	23441442222331311133322331413334212133342114222331311121333134213134433442244444411423344331113334413424342233344331322421313441433131122421322434311224444424213221342444242134242234244224211g	8
	Royal de Calatayud_2	23441442222331311133322331413334212133342114222331311121333134213134433442244444411423344331113334413424342233344331322421313441433131122421322434311224444424213221342444242134242234244224211g	
	Royal de Calatayud_3	23441442222331311133322331413334212133342114222331311121333134213134433442244444411423344331113334413424342233344331322421313441433131122421322434311224444424213221342444242134242234244224211g	
	Royal de Calatayud_4	23441442222331311133322331413334212133342114222331311121333134213134433442244444411423344331113334413424342233344331322421313441433131122421322434311224444424213221342444242134242234244224211g	
	Royal de Calatayud_5	23441442222331311133322331413334212133342114222331311121333134213134433442244444411423344331113334413424342233344331322421313441433131122421322434311224444424213221342444242134242234244224211g	
	Royal de Calatayud_6	23441442222331311133322331413334212133342114222331311121333134213134433442244444411423344331113334413424342233344331322421313441433131122421322434311224444424213221342444242134242234244224211g	
	Royal de Calatayud_7	23441442222331311133322331413334212133342114222331311121333134213134433442244444411423344331113334413424342233344331322421313441433131122421322434311224444424213221342444242134242234244224211g	

	Royal de Calatayud_8	23441442222331311133322331413334212133342114222331311121333134213134433442244444411423344331113334413424342 233344331322421313441433131122421322434311224444424213221342444242134242234244224211g	
	Royal de Calatayud_9	23441442222331311133322331413334212133342114222331311121333134213134433442244444411423344331113334413424342 233344331322421313441433131122421322434311224444424213221342444242134242234244224211g	
Royeta de Abizanda	Royeta de Abizanda_1*	234214221122333313331122334433132212131122114242133313121133134433114233444422144213222343131333131411224322 2322443311224213134414331111442211113343134222424242132213224242421342423322442222-1-1g	2
	Royeta de Abizanda_2	234214221122333313331122334433132212131122114242133313121133134433114233444422144213222343131333131411224322 232244331122421313441433111144221111334313422242424213221322424242134242332244222213g	
Royeta de Asque	Royeta de Asque_1	224444221222131313331333331411114222333342114242333313221133114211114233422242144413422243111333334411444422 232344331322421311421433131122443312434311224242422211421344422242112244334442422211g	3
	Royeta de Asque_2	224444221222131313331333331411114222333342114242333313221133114211114233422242144413422243111333334411444422 232344331322421311421433131122443312434311224242422211421344422242112244334442422211g	
	Royeta de Asque_3	224444221222131313331333331411114222333342114242333313221133114211114233422242144413422243111333334411444422 232344331322421311421433131122443312434311224242422211421344422242112244334442422211g	
Verdal de Pallars	Verdal del Pallars_1	2242142211423313131333233344331122123333421122441133111211441344331344134422224444112223431313131413224422 232344131123421313441433131322221322433313424242422213421342224242134242232242222211g	2
	Verdal del Pallars_2	2242142211423313131333233344331122123333421122441133111211441344331344134422224444112223431313131413224422 232344131123421313441433131322221322433313424242422213421342224242134242232242222211g	
Acebuche_1	Acebuche_1	224444421142131311331323331411112222111342114442133313221144132213114213442242144233442243331313134413424422 223344131122221313421133131342421322434413444242422213421144424242114242234444222211g	1
Acebuche_2	Acebuche_2	3344112211423333131311221314133322233334211424213331122334433423311223344222214421322243331111134411424322 22234413132244133344443111344221322443311222242442211421344424222114244334242424211g	1
Aceitunero-2249	Aceitunero-2249	334414421222113311331333331411134222111142112242331113221133134233114233442242444433223343331133134413224442 232344131323423311441133111122221322434311224244422213441322424244132242234244222213g	1
Albareta	Albareta	3344442212221333113313233314333422233132211422233111121144334211134433442242444413222344131311131413224422 222344131122423313421143131122221322433313224444424213421142444442134242334244224213g	1
Alía	Alía	23441422122213131113132333443313221213334211224213131322113313423313441344224444411422244331111134413224422 233344131322421311421443131122221322434311222242424213221342424442134242232244222213g	1
Alquecerana	Alquecerana	234444221122111311131123334413332222131342112222331313221143134213114433442242444413222343111313131411424422 232244111122443311421143111122421322443313224244422211441142444242112244334242224213g	1
Bastarda	Bastarda	2342142212223313113313233314111142221333421142223333322113311441313421342224244441342224311133134411444422 332344331123423311421133111322443312434313422242422213421144444242132244234242222211g	1
Biecuda Capella*	Biecuda Capella*	334214221242133311133322334433132222131342114242-1- 11333221133134233114233444222144413222343331333134413224342232344331123421313444443111222213114343132222424 24213221142422242134242234244222211g	1
Biequeruda	Biequeruda	224411421244333311131123334413134211131342114444111333121133134433112233442244144411422344131313331411424422 33334413132222131342113311132242131243441142424444221322134244424413424222244422211g	1
Buera_1	Buera_1	33441422112211331313132233141113442211134211444233333221343114211114411444242444213422244131313334413424444 22334433132342331342114311112242131144433344424442421322332242442213442222244424413g	1

<i>Buera_2</i>	<i>Buera_2</i>	334414221222133311113323334433134212131342114242131313121143134233114213442242444413222344131113331413224442 33334433112342111142113311112222332243431142424222211441142224244132244232242224211g	1
Caspolina	Caspolina	234411421242333313131122131433134222113342132242331333221133134233134413444242144411222244131111334433423322 23224433132244331142144311132222332243331322424222211221122444442114242232242424211g	1
<i>Castanero</i>	<i>Castanero</i>	334444422222333313133323331413334222111342112242131313221143134413114233422242444213423343111333114413224442 333343331123421313421433111342221322434313424422422213421342424242132242232242224211g	1
Cerruda de Olvena	Cerruda de Olvena	334214422242131311133322334433334222131322114242133313121143134233134233442222144413222344331113131433224422 233344131322421313441133111122221322434413424242424213221342424242134242232244222213g	1
Changlot Real*	Changlot Real*	334214421142131313132313143313422213134211222233131312113311441311223342222444211442343111111331411423344 232344131323443333421143111344423312-1-1431342422222213441142424442132244232242424413g	1
<i>Dulcera</i>	<i>Dulcera</i>	22421444124411131133132313111333421211332211224213333322134313221311423342444214441142224333111111111443342 23224311132242131122444313134242331143431322244224213421344424222114444332244424411g	1
<i>Escanilla</i>	<i>Escanilla</i>	224411421242131111313333333141311421133134213424413331111333114213334213442242144411423343113313131433224322 3322441313234413114414331311222211244431122444242221142134242224213222234242422211g	1
<i>Escario</i>	<i>Escario</i>	334214221142131313131323331413134212133344114242331313121343134213114413442222144411423344131111131433224422 23334433112242131144114311112222132243441342424242221342134242444213424223244222211g	1
Hojiblanca	Hojiblanca	33421142114233131313332333443311421213134413222233111121133134413114433424222144233443344111313331413423344 233343133333423333441143111142221112434413424442422213221342224242134242232242424211g	1
<i>Minutera Boltaña*</i>	<i>Minutera Boltaña*</i>	2344144212221333113313231314331322113333221322423311132213431144131342-1- 14242421442134223433313133314134233442223433313224413134214431313222213124444132244442223322334244424213424 4232242422211g	1
<i>Minutera de Labata*</i>	<i>Minutera de Labata*</i>	2342144411421313113313231314111144121333441342423333131213443342111342-1- 142424414421142224411331133141344434223234413132342-1- 11322144313112242131244443342424222421342134444222211424233222224211g	1
<i>Minutera de Viña</i>	<i>Minutera de Viña</i>	23421442114211131313112313141113222213134411424233131322133333221111423344424444211222244111111131413424342 232344111322443313221143111122421112444333424442424211421342442222114242334444222213g	1
Mochuto	Mochuto	334414421244331311133333331433334212133342114222331313121133134413132233442244144411222344131113131413424342 233344131123221313421143111122421312433313424422422213221342424442134242232244222211g	1
Morcaire	Morcaire	334414221122333313331323131433334212131342114422131111221343134413114413444242144211423344111133131413424422 233344111323421313421133131122421312433311222242422213221342224444132242332242424211g	1
Negral de Bierge	Negral de Bierge	334444221242133333331123334411334222133342114242131311221143134233112233442222444413222243131333114413424422 232244111123423311441133111142423322434313224244422211441144422242112244334244224211g	1
<i>Olivera de Nadal</i>	<i>Olivera de Nadal</i>	234214221142133311111123334413334222131344112242333311221143114213114433442242444411222343111113334411424422 33234413132244331142113313112242331244331342424222213421342444242132242234242224411g	1
<i>Olivonero Alastuey*</i>	<i>Olivonero Alastuey*</i>	23441444124211131133132313111132212131144114242133313221343132213112233444242-1- 142134223433333131314134243442322431313342331342-1- 143131322423311433313442244424213421344444222114444232242424211g	1
<i>Olivonero de Murillo</i>	<i>Olivonero de Murillo</i>	2342444212421311113333231314133322221134211224213331322113313223311423344422244441122234333131313111444342 332244111123423311421433111122443311433313424244422211421344424422114444234242224211g	1

<i>Panseña Fina</i>	<i>Panseña Fina</i>	2342114222213131311332333111113221213334211222233331122133313441311443344224444411423344131311131411424342 22234333322441311441433111122421322444313224244422213221142442222112242234244424211g	1
Panseñera	Panseñera	2344444212221311133333233314111342221333421142421333112211431342111142134422424444132222431313134411444422 232344131123423311221133111122443322434313224244422211421144424242112244334242224211g	1
Picual	Picual	334414421222133313131322334433134211131322114444111133121343134413114233422242114213442244131313331413424342 232344131123421133441143131342221312433313424442424213423342424442134242232242424213g	1
<i>Picudo de Ibieca</i>	<i>Picudo de Ibieca</i>	234211222242131311333322331413334212331342114222333313121144114233134233442242444411422344131133334413424344 223344331323221313441133131122421122334313224444444213223344444242134444234244222211g	1
Picudo de Labata*	Picudo de Labata*	3342142212441333111313233314333342221313-1- 111224233131312134313421311221344224214441322234413111333141342444223334433112322131144114311132242131243441 3224442422213221342424242134242234244222211g	1
Piga	Piga	22444444222233331313332333111113421213334211422233131311133134413134233442242144411222344131311334413224342 232344131122421313444443331322221122434311224242424233421142442222134242232242224211g	1
<i>Pueyo de Araguás</i>	<i>Pueyo de Araguás</i>	334444421222131113333333331411332222133342114242133333221143134211114233444222444411222243331333131413224422 23224411113344331142144311112222331244331322424442221142114442222112244334244224211g	1
<i>Rosal</i>	<i>Rosal</i>	334414421222133313131323331411334422113342114242331311221333134213134233442242444411222343331113134413444342 222344131322221313441133131122443322433313224444422213421342444242132242234244224211g	1
<i>Royeta de Baells</i>	<i>Royeta de Baells</i>	23441422242331113133322131413134412131322134442331313121143114211114213444242144411422343131313331433424342 232344131323441311441133111122221112443313424444444411221144424242114444234242424211g	1
<i>Royeta de Hoz</i>	<i>Royeta de Hoz</i>	234414441222331311331322131413132211113344114422333311121344114411114233442244444211422344331111134433424342 232343131322221311421133331122421112434313424442422213421344442242134242334244224211g	1
<i>Salenca</i>	<i>Salenca</i>	334214421142333313131122334433134222133344112222133313221343134433134413442222444413222344331113114413424322 232344131323421313421143131122421322433313424442424213421342224242134242232244224211g	1
<i>Seira</i>	<i>Seira</i>	33441422124213331113112333441313222213332211444413131322114333423333221344224414441322224411131311111224342 333344131123423313421133111122221311434411444242444332213424244441342422224222213g	1
<i>Sevillano</i>	<i>Sevillano</i>	224411421142333311131123331433134222331342114442331333221133134411134213442244144213422244111133111413224422 22234413132322131142143313112222111243431122224244443344332244444213444222244222211g	1
Verdal de Figols	Verdal de Figols	23444422112211131133133313441333422211334211444233131322113311221311423344222244441322234333131111413444422 232344111122423311221143111122441322444313224242422211441144424442114244334442224213g	1
<i>Verderola</i>	<i>Verderola</i>	224414221222133313331323334433334212133342114422131333121343132213134413422242144433422344131311334413424342 332344131123221313421133111322421112434311424242224411221344424244114444232244224213g	1
Verdial Tras-Os-Montes	Verdial Tras-Os-Montes	2244112211421313131333331314331342221313441122421311132213431342131142134442421442132224311111134413424344 33234313112242111344144311134222131143441142222422213423342224242134442234244222211g	1
Verdiell	Verdiell	234414421244331133333231311111342221313421342423313332213441144131322134442421442114223431313131413444442 232244111333443313421143111122421312444313424244424211421344224242114244332242424213g	1
<i>Verto</i>	<i>Verto</i>	224444422242133313133323134413134222333344132242333313111144134433134213422242144411223344131311134413424344 2333441311234213114414431311222211224343134242424443322134422422211444233424222211g	1

Table S4. Diversity parameters of the 96 EST-SNPs genotyped in the 58 non-redundant genotypes. Number of non-redundant genotypes (N), Average number of observed alleles (Na), Number of effective alleles (Ne), Shannon's Information Index (I), Observed Heterozygosity (Ho), Expected Heterozygosity (He) and Minor Allele Frequency (MAF) were computed by GenAEx v.6.503. Polymorphic Information Content (PIC) was computed by MolMarker v.1.0 software.

Locus	N	Na	Ne	I	Ho	He	MAF	PIC
EContig10374	58	2.000	1.708	0.605	0.379	0.414	0.293	0.32852908
EContig10531	58	2.000	1.918	0.672	0.414	0.479	0.397	0.364
EContig10539	58	2.000	1.708	0.605	0.483	0.414	0.293	0.32852908
EContig10640	58	2.000	1.904	0.668	0.534	0.475	0.388	0.36212507
EContig10787_1	58	2.000	1.334	0.417	0.293	0.250	0.147	0.21886146
EContig1180_2	57	2.000	1.611	0.567	0.404	0.379	0.254	0.33279426
EContig12203_1	58	2.000	1.918	0.672	0.448	0.479	0.397	0.36406941
EContig12584	58	2.000	1.942	0.678	0.448	0.485	0.414	0.36745791
EContig1263	58	2.000	1.399	0.460	0.345	0.285	0.172	0.24465524
EContig1372_4	58	2.000	1.578	0.553	0.310	0.366	0.241	0.29916822
EContig1634	58	2.000	1.728	0.612	0.466	0.421	0.302	0.33259561
EContig1775_5	58	2.000	1.207	0.314	0.190	0.172	0.095	0.15693523
EContig181_2	58	2.000	1.942	0.678	0.586	0.485	0.414	0.36745791
EContig1813_3	58	2.000	1.999	0.693	0.569	0.500	0.491	0.37492567
EContig1816_1	57	2.000	1.928	0.674	0.737	0.481	0.404	0.39043658
EContig1839	58	2.000	1.942	0.678	0.483	0.485	0.414	0.36745791
EContig188	58	2.000	1.422	0.473	0.362	0.297	0.181	0.25255935
EContig1947_3	58	2.000	1.875	0.659	0.569	0.467	0.371	0.35771964
EContig1962_1	58	2.000	1.687	0.597	0.500	0.407	0.284	0.32423754
EContig1987_2	58	2.000	1.859	0.655	0.448	0.462	0.362	0.35525113
EContig2068_2	57	2.000	1.990	0.691	0.614	0.498	0.465	0.39867472
EContig2172_2	58	2.000	1.399	0.460	0.276	0.285	0.172	0.24465524
EContig2305_1	58	2.000	1.787	0.632	0.517	0.441	0.328	0.34350615
EContig2458_2	57	2.000	1.800	0.637	0.561	0.444	0.333	0.37069195
EContig2514	58	2.000	1.985	0.689	0.534	0.496	0.457	0.37313519
EContig2705_2	58	2.000	1.963	0.684	0.517	0.490	0.431	0.37019851
EContig2785_2	58	2.000	1.953	0.681	0.500	0.488	0.422	0.36890791
EContig2906_2	58	2.000	1.556	0.543	0.466	0.357	0.233	0.293381
EContig2937_4	58	2.000	1.147	0.251	0.138	0.128	0.069	0.12017289
EContig2950_2	58	2.000	1.334	0.417	0.155	0.250	0.147	0.21886146
EContig298_1	58	2.000	1.995	0.692	0.603	0.499	0.474	0.374
EContig2998	58	2.000	1.931	0.675	0.638	0.482	0.405	0.36584601
EContig3075	58	2.000	1.578	0.553	0.448	0.366	0.241	0.29916822
EContig3144_2	58	2.000	1.979	0.688	0.379	0.495	0.448	0.3723103
EContig3225_1	58	2.000	1.824	0.644	0.586	0.452	0.345	0.34976198
EContig3597_1	58	2.000	1.147	0.251	0.138	0.128	0.069	0.12017289
EContig3889	58	2.000	1.998	0.693	0.517	0.499	0.483	0.37470256
EContig3935_2	58	2.000	1.985	0.689	0.534	0.496	0.457	0.37313519
EContig4112	58	2.000	1.942	0.678	0.586	0.485	0.414	0.36745791
EContig4297_2	58	2.000	1.768	0.626	0.466	0.434	0.319	0.34007831
EContig435_10	58	2.000	1.890	0.664	0.655	0.471	0.379	0.36000967
EContig4380_1	58	2.000	1.985	0.689	0.707	0.496	0.457	0.37313519
EContig4424_1	58	2.000	1.806	0.638	0.500	0.446	0.336	0.347
EContig4490	58	2.000	1.511	0.521	0.362	0.338	0.216	0.28097009
EContig460_6	58	2.000	1.985	0.689	0.431	0.496	0.457	0.37313519
EContig465	58	2.000	1.904	0.668	0.500	0.475	0.388	0.36212507
EContig4794	58	2.000	1.556	0.543	0.362	0.357	0.233	0.293381
EContig504_6	57	2.000	1.611	0.567	0.474	0.379	0.254	0.33279426
EContig5140	58	2.000	1.963	0.684	0.552	0.490	0.431	0.37019851

EContig515_2	58	2.000	1.931	0.675	0.500	0.482	0.405	0.36584601
EContig515_3	58	2.000	1.728	0.612	0.397	0.421	0.302	0.33259561
EContig5168_5	58	2.000	1.859	0.655	0.483	0.462	0.362	0.35525113
EContig5183	58	2.000	1.787	0.632	0.483	0.441	0.328	0.34350615
EContig5193	58	2.000	1.334	0.417	0.293	0.250	0.147	0.21886146
EContig5258	58	2.000	1.995	0.692	0.397	0.499	0.474	0.37433026
EContig526_2	58	2.000	1.728	0.612	0.466	0.421	0.302	0.33259561
EContig5399_1	58	2.000	1.787	0.632	0.655	0.441	0.328	0.34350615
EContig5478_1	58	2.000	1.931	0.675	0.500	0.482	0.405	0.36584601
EContig5674_1	58	2.000	1.890	0.664	0.621	0.471	0.379	0.36000967
EContig6361	58	2.000	1.488	0.510	0.379	0.328	0.207	0.27432944
EContig6479	58	2.000	1.355	0.432	0.310	0.262	0.155	0.22781663
EContig6629	58	2.000	1.708	0.605	0.414	0.414	0.293	0.32852908
EContig6851	57	2.000	1.566	0.547	0.333	0.361	0.237	0.32171088
EContig695_2	58	2.000	1.991	0.691	0.448	0.498	0.466	0.37380811
EContig698_3	58	2.000	1.979	0.688	0.517	0.495	0.448	0.3723103
EContig6995	58	2.000	1.687	0.597	0.466	0.407	0.284	0.32423754
EContig7442_2	58	2.000	1.971	0.686	0.466	0.493	0.440	0.37133198
EContig749_1	58	2.000	1.979	0.688	0.552	0.495	0.448	0.3723103
EContig8421_1	58	2.000	1.687	0.597	0.500	0.407	0.284	0.32423754
EContig845_1	58	2.000	1.824	0.644	0.483	0.452	0.345	0.34976198
EContig86	58	2.000	1.600	0.562	0.293	0.375	0.250	0.3046875
EContig8662	58	2.000	1.999	0.693	0.569	0.500	0.491	0.37492567
EContig894_1	58	2.000	1.942	0.678	0.379	0.485	0.414	0.36745791
EContig8993_1	58	2.000	1.942	0.678	0.621	0.485	0.414	0.36745791
EContig9136_3	58	2.000	1.748	0.619	0.483	0.428	0.310	0.33644337
EContig9157_1	58	2.000	1.768	0.626	0.500	0.434	0.319	0.34007831
EContig9302_3	58	2.000	1.806	0.638	0.397	0.446	0.336	0.34673232
EContig9302_4	58	2.000	1.533	0.532	0.448	0.348	0.224	0.28731774
EContig9677	58	2.000	1.985	0.689	0.638	0.496	0.457	0.37313519
EContig9922_3	58	2.000	1.904	0.668	0.603	0.475	0.388	0.36212507
IContig1226_3	58	2.000	1.890	0.664	0.586	0.471	0.379	0.36000967
IContig125_1	56	2.000	1.577	0.552	0.411	0.366	0.241	0.34811481
IContig1260_3	58	2.000	1.842	0.650	0.638	0.457	0.353	0.35260003
IContig19_3	58	2.000	1.991	0.691	0.483	0.498	0.466	0.37380811
IContig2083_2	58	2.000	1.806	0.638	0.431	0.446	0.336	0.34673232
IContig2350_3	58	2.000	1.859	0.655	0.448	0.462	0.362	0.35525113
IContig257_8	58	2.000	1.904	0.668	0.534	0.475	0.388	0.36212507
IContig2640_3	58	2.000	1.998	0.693	0.655	0.499	0.483	0.37470256
IContig2753_2	58	2.000	1.904	0.668	0.603	0.475	0.388	0.36212507
IContig2783_3	58	2.000	1.963	0.684	0.690	0.490	0.431	0.37019851
IContig2981_4	58	2.000	1.687	0.597	0.431	0.407	0.284	0.32423754
IContig3160_2	58	2.000	1.998	0.693	0.655	0.499	0.483	0.37470256
IContig353	58	2.000	1.578	0.553	0.414	0.366	0.241	0.29916822
IContig3651	58	2.000	1.998	0.693	0.759	0.499	0.483	0.37470256
IContig52_2	58	2.000	1.904	0.668	0.638	0.475	0.388	0.36212507
IContig667_1	58	2.000	1.377	0.446	0.293	0.274	0.164	0.23641107
Mean	57.917	2.000	1.777	0.615	0.479	0.427	0.341	0.334

Table S5. Matrix of admixture coefficients (Q-matrix) for K=4 indicating the ancestral populations of the 58 non-redundant genotypes. In the Q-matrix, red and green colors denote the highest and lowest values, respectively. Bold italic letters indicate new varieties.

Genotypes	Location	K1	K2	K3	K4	Average proportion for the predominant cluster	Predominant cluster (K)
Alía	Artasona	0.9997	1.00E-04	1.00E-04	1.00E-04	0.84	K1
<i>Olivonero de Ayerbe</i>	Sta Eulalia, Ayerbe, Anies	0.9997	1.00E-04	1.00E-04	1.00E-04		
Cerruda de Liesa	Abizanda, Benabente, Escanilla, Liesa	0.9997	1.00E-04	1.00E-04	1.00E-04		
Cerruda de Olvena	Artasona	0.9997	1.00E-04	1.00E-04	1.00E-04		
Gordal de Somontano	Cregenzan, Salas Altas	0.9997	1.00E-04	1.00E-04	1.00E-04		
Nación	Abizanda, Murillo, Buera, Estadilla	0.9997	1.00E-04	1.00E-04	1.00E-04		
Neral	Alquézar, Boltaña, Hoz, Pueyo	0.9997	1.00E-04	1.00E-04	1.00E-04		
Rañinera	Guaso, Pueyo, Riglos, Sopeira	0.9997	1.00E-04	1.00E-04	1.00E-04		
Salenca	Sopeira	0.9997	1.00E-04	1.00E-04	1.00E-04		
Seira	Albelda	0.983132	1.00E-04	1.00E-04	0.0166683		
Royal de Calatayud	Ayerbe, Ipies, Huesca, Riglos, Sopeira, Barbastro	0.944204	1.00E-04	0.0555958	1.00E-04		
Picudo de Labata	Labata	0.930474	0.0693261	1.00E-04	1.00E-04		
Mochuto	Alquézar	0.913723	0.0860767	1.00E-04	1.00E-04		
Verdal del Pallars	Alquézar, Sopeira	0.884157	0.114227	1.00E-04	0.00151584		
Sevillano	Escanilla	0.863642	0.136158	1.00E-04	1.00E-04		
Biequeruda	Lascuarre	0.839013	0.160787	1.00E-04	1.00E-04		
Biecuda Capella	Capella	0.830869	1.00E-04	1.00E-04	0.168931		
<i>Escarío</i>	Sopeira	0.816273	0.183527	1.00E-04	1.00E-04		
Albareta	Buera	0.783934	1.00E-04	1.00E-04	0.215866		
Piga	Estadilla	0.763218	1.00E-04	0.236582	1.00E-04		
Royeta de Abizanda	Abizanda	0.738034	1.00E-04	0.181621	0.0802451		
Verderola	Escanilla	0.718103	1.00E-04	0.281697	1.00E-04		
Rosal	Labata	0.659947	1.00E-04	1.00E-04	0.339853		
<i>Buera_2</i>	Buera	0.631715	1.00E-04	1.00E-04	0.368085		
<i>Picudo de Ibieca</i>	Ibieca	0.602124	1.00E-04	0.397676	1.00E-04		

Morcaire	Hoz	0.563244	0.353835	0.0828207	1.00E-04		
Aceitunero-2249	Abizanda	0.502612	1.00E-04	1.00E-04	0.497188		
Acebuche_1	Boltaña	0.481049	0.0439177	1.00E-04	0.474933		
Hojiblanca	Binefar	1.00E-04	0.9997	1.00E-04	1.00E-04		
Manzanilla de Sevilla	Albelda, Peralta de Alcofea	1.00E-04	0.9997	1.00E-04	1.00E-04		
Changlot Real	Abizanda	1.00E-04	0.911545	0.000665486	0.0876892		
Verdeal Tras-Os-Montes	San Felices	0.134324	0.825576	1.00E-04	0.0400001		
Picual	Labata	0.267644	0.732156	1.00E-04	1.00E-04	0.71	K2
Escanilla	Escanilla	1.00E-04	0.630574	1.00E-04	0.369226		
Minutera Boltaña	Boltaña	1.00E-04	0.519329	0.480471	1.00E-04		
Verto	Berdegall	0.238058	0.411866	1.00E-04	0.349977		
Castanero	Hoz	0.304771	0.38962	1.00E-04	0.305509		
Dulcera	Sariñena	1.00E-04	1.00E-04	0.9997	1.00E-04		
Minutera de Labata	Labata	1.00E-04	1.00E-04	0.9997	1.00E-04		
Olivonero Alastuey	Sta Eulalia	1.00E-04	1.00E-04	0.9997	1.00E-04		
Minutera de Viña	Radiquero	0.156012	1.00E-04	0.843788	1.00E-04		
Verdiell	Murillo	1.00E-04	1.00E-04	0.786168	0.213632	0.74	K3
Royeta de Hoz	Hoz	0.409538	1.00E-04	0.590262	1.00E-04		
Buera_1	Buera	0.479888	1.00E-04	0.519912	1.00E-04		
Panseña Fina	Alquézar	0.416277	1.00E-04	0.468473	0.11515		
Royeta de Baells	Baélls	1.00E-04	0.382106	0.407385	0.210409		
Bolvino	Abizanda, Escanilla, Lamata	1.00E-04	1.00E-04	1.00E-04	0.9997		
Pueyo de Araguás	Pueyo	1.00E-04	1.00E-04	1.00E-04	0.9997		
Negral de Bierge	Bierge	1.00E-04	1.00E-04	1.00E-04	0.9997		
Panseñera	Buera	1.00E-04	1.00E-04	1.00E-04	0.9997		
Verdal de Figols	Sopeira	1.00E-04	1.00E-04	1.00E-04	0.9997		
Olivonero de Murillo	Murillo	1.00E-04	1.00E-04	0.0361495	0.963651		
Alquecerana	Alquézar	0.0460156	1.00E-04	1.00E-04	0.953784	0.84	K4
Royeta de Asque	Asque, Barbastro	1.00E-04	0.0537175	0.0346767	0.911506		
Acebuche_2	Boltaña	1.00E-04	0.213774	0.0765055	0.709621		
Bastarda	Asque	0.32526	0.00959183	1.00E-04	0.665048		
Caspolina	Escanilla	0.197243	0.326806	1.00E-04	0.475852		
Olivera de Nadal	Colungo	0.394291	0.18077	0.00184561	0.423093		

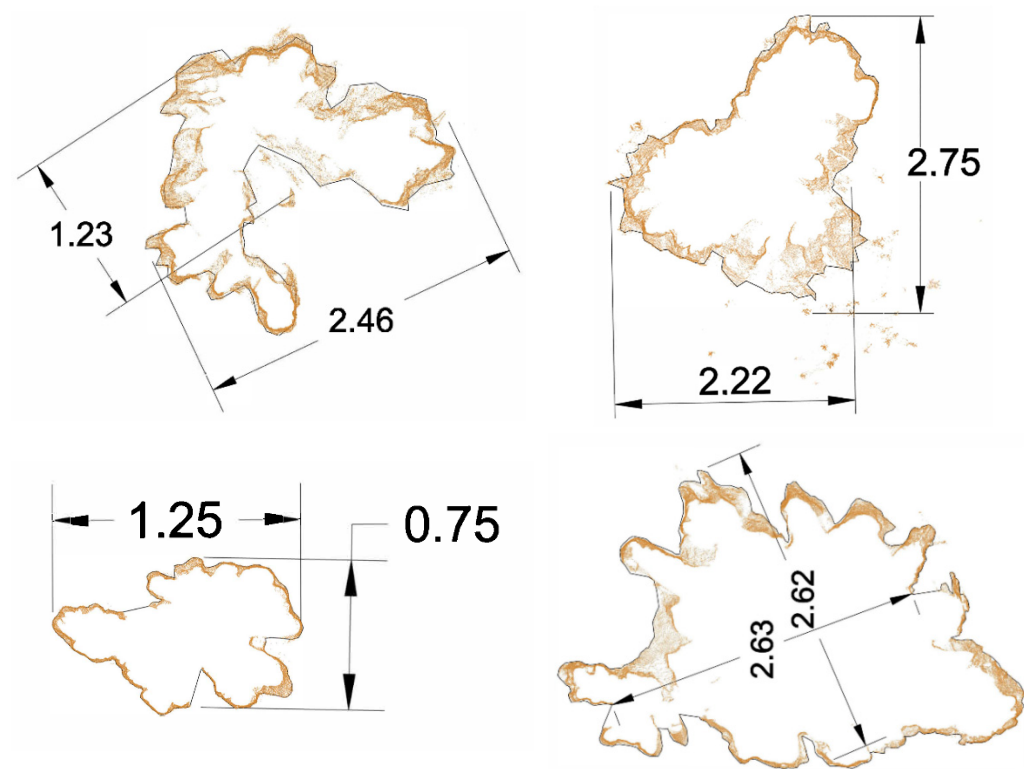


Figure S1. Examples of results from LIDAR scanning of the monumental olive trees shown in Figure 4: Tree cross-sections at 1.3 m above the soil level. Distances are indicated in meters.