Spanish Chestnut Cultivars

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Abstract. Chestnut (*Castanea sativa* Mill.) is an important crop in Spain. This inventory of chestnut cultivars complements previous studies. We have located 152 chestnut cultivars in 131 municipalities covering 108.6 ha, with 72 new cultivars in addition to the 80 previously found. Fewer than 50% of these cultivars are extensively cultivated. Chestnuts in Spain are grown from sea level to 1100 m, but are more frequent between 200 and 800 m on northern-facing slopes. Most of the chestnuts are harvested from 25 Oct. to 10 Nov.

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Most of the chestnuts grown in Spain are found in the northwestern part of the country in the regions of Galicia and Asturias (Fig. 1). Previous papers have listed cultivars in Galicia (Fernández and Pereira, 1994; Pereira-Lorenzo and Fernández-López, 1997) and Asturias (Fernández-Lamuño, 1984). Our long-term goal has been to establish a national germplasm bank of the genus *Castanea*.

In País Vasco and Navarra, chestnut orchards have been destroyed by chestnut blight disease, caused by the fungus *Cryphonectria*

parasitica (Murr.) Barr. This was surely introduced with Asian chestnut seeds in 1914 and 1940 (Elorrieta, 1949), although it was first reported in 1943 (Colinas and Uscupic, 1999). In Cataluña, coppicing is predominant and orchards have been abandoned for a long time. In this work, we present the results of sampling the five most important chestnut-producing regions, viz., eastern Galicia, (Pereira-Lorenzo and Fernández-López, 1997; Pereira-Lorenzo et al., 1996a, 1996b), Andalucía, Asturias, Extremadura, and Castilla-León (Fig. 1).

Materials and Methods

Locating trees. Trees were located by traveling throughout the chestnut-growing areas described by Elorrieta (1949) and asking chestnut growers to identify representative trees of each cultivar. Each tree of a specific cultivar was marked for later sampling.

Data collection. For each tree, we recorded the altitude with an altimeter and the solar orientation of the planting site with a compass. During autumn, nut samples were collected for morphological characterization, and the harvest time was recorded. We compiled data for each region, with information on the cultivar, municipality, elevation, aspect, and time of harvest. Only those cultivars found in more than four municipalities (except for those in the Andalucía and Extremadura regions, where few trees were found) were reported on the map of cultivar distribution (Fig. 1), and chestnut area was taken from Ministerio de Agricultura, Pesca y Alimentación (1997).

Fig. 1. Distribution of chestnut (*Castanea sativa* Mill.) cultivars in Spain

Table 1. Chestnut cultivars found in Huelva and Málaga provinces, Andalucía.

Cultivar	No. trees	Municipality	Elevation (m)	Aspect ^z	Harvest time
<i>Huelva</i>					
Comisaria	1	Cortegana	550	N	29 Oct.
	1	Galaroza	470	N	
	1	Castaño del Robledo	600	All	20–29 Oct.
Dieguina	1	Castaño del Robledo	600	All	20–29 Oct.
	1	Cortegana	550	N	29 Oct.
Helechál	1	Galaroza	470	N	22–29 Oct.
	1	Castaño del Robledo	600	All	25–29 Oct.
Pelón	2	Cortegana	550	N	29 Oct.
	2	La Nava	600	S	29 Oct.
Planta Alajar	1	Aracena	600	N	29 Oct.
	1	Cortegana	550	N	29 Oct.
	1	Galaroza	470	N	20–29 Oct.
	1	Fuenteheridos	600	All	20–29 Oct.
Vazqueña	2	Galaroza	470	N	20–29 Oct.
<i>Málaga</i>					
Capilla	1	Jubrique	720	W	20–26 Oct.
Corriente	1	Jubrique	700	N	18 Sep.
	1	Pujerra	750	N	23 Sep.–4 Oct.
Laga	2	Yunquera	800	E	
Pilonga	3	Jubrique	650–750	N, W, E	17 Sep.–4 Oct.
	3	Pujerra	750–850	N, SW	22 Sep.–4 Oct.
	2	Yunquera	800	E	
Rubia Tardía	1	Jubrique	650	W	25 Oct.
Temprana	4	Jubrique	600–720	N, SW, W	15 Sep.–4 Oct.
Tomasa	2	Jubrique	700	N	20–29 Oct.

^zN, All, S, W, E, and SW = north-facing, no predominant aspect, south-facing, west-facing, east-facing, and southwest-facing slopes, respectively.

Orchard areas in the map are marked with letters corresponding to the main cultivars.

Results and Discussion

We examined 65 municipalities in Galicia (Fernández and Pereira, 1994), nine in Andalucía, 49 in Asturias, six in Castilla-León, and two in Extremadura (Fig. 1 and Tables 1–5). Only municipalities with cultivars that could be positively identified are presented. In southern Castilla-León, cultivars could not be identified by the growers, some orchards were abandoned, and thus were not used in this study. In Extremadura, some growers graft selected cultivars on seedling chestnuts. In southern Andalucía, chestnuts are grafted in Huelva and Málaga, but not in Granada.

Cultivars found. We found 66 cultivars in Asturias, 13 in Andalucía, eight in Castilla-León, four in Extremadura, and four in a part of Galicia not previously studied. Of the cultivars reported by Fernández-Lamuño (1984) in Asturias, and by Fernández and Pereira (1994) in Galicia, we found only ‘Temprana’ in Andalucía. Tests are in progress to determine if the identification was correct. In Asturias, we found 43 new cultivars, in addition to the 14 reported by Fernández-Lamuño (1984). Four of these were found by Fernández and

Table 2. Chestnut cultivars found in Asturias.

Cultivar	No. trees	Municipality	Elevation (m)	Aspect ^z	Harvest time
Argua	1	Colunga	410	S	23 Nov.
	1	Piloña	450	S	5 Nov.
Baragaña	2	Santo Adriano	600	E	29 Oct.
Boroña	1	Mieres	450	SE	4 Nov.
Brullina	1	Llanes	150	All	2 Nov.
Calva	2	Cangas del Narcea	450	E	23–26 Oct.
	1	Pola de Allande	600	All	26 Oct.
Cañuela	1	Langreo	410	W	28 Oct.
Caranquexa	1	Quirós	340	NW	27 Oct.
Carreña	1	Candamo	50	NE	26 Oct.
Cerbana	1	Langreo	350	E	27 Oct.
Cofina	1	Llanes	500		2 Nov.
Colunga	1	Llanes	500		2 Nov.
Crespa	1	Llaviana	450	E	28 Oct.
	2	Piloña	300–420	W	28 Oct.
	1	Sobrescobio	400	W	26 Oct.
Cruz	1	Piloña	450	S	5 Nov.
Chamberga	3	Belmonte de Miranda	300–350	E, W, NW	27 Oct.
	1	Candamo	50	NE	26 Oct.
	3	Grado	275–520	W, NW	26 Oct.
	3	Las Regueras	60–120	W, S	26 Oct.
	1	Pravia	350	W	4 Nov.
	3	Salas	100–480	N, E	19 Oct.–4 Nov.
	1	Valdés	120	S	
Chancloya	1	Belmonte de Miranda	300	E	27 Oct.
Doriga	1	Boal	430	E	25 Oct.
	1	Ibias	600	E	23 Oct.
	1	Pesoz	450	N	25 Oct.
	5	Pola de Allande	420–690	N, S, W	23 Oct.–4 Nov.
	2	Tineo	300–400	W, SW	27 Oct.
Escamplero	1	Valdés	340	S	7 Nov.
Fano	1	Quirós	340	NW	27 Oct.
Feltrona	1	Quirós	340	NW	27 Oct.
	1	Santo Adriano	240	N	29 Oct.
Forniega	1	Aller	629	NE	2 Nov.
	1	Langreo	410	W	28 Oct.
	2	Mieres	300–450	W, SE	2 Nov.

Table 2. Continued.

Cultivar	No. trees	Municipality	Elevation (m)	Aspect ^z	Harvest time
	2	Oviedo	280	N, E	29 Oct.
	1	San Martín del Rey Aurelio	560	E	
Galega	3	Amieva	80–120	All	28 Oct.
	1	Boal	290	All	25 Oct.
	1	Cabrales	50	All	2 Nov.
	2	Cangas de Onís	80	W, E	28 Oct.–2 Nov.
	1	Ibias	600	E	24 Oct.
	1	Parres	210	NW	28 Oct.
	2	Peñamellera alta	10	N	2 Nov.
	1	Pesoz	240		25 Oct.
	1	Ponga	200	S	28 Oct.
	1	Oscos	600	S	26 Oct.
De la Grúa	1	Parres	240	W	28 Oct.
	4	Villaviciosa	100–180	N, S	19 Oct.–12 Nov.
Inxerta	2	Aller	530–700	N	2 Nov.
	1	Cangas del Narcea	830	W	27 Oct.
	3	Degaña	750–900	W	27 Oct.
	2	Ibias	840–880	S, E	22 Oct.
Largaña	1	Cabrales	50	All	2 Nov.
	5	Cangas de Onís	10–80	All	28 Oct.–2 Nov.
	1	Parres	240	W	28 Oct.
	1	Peñamellera alta	10	N	2 Nov.
Leinova	1	Oscos	630	E	26 Oct.
	1	Tapia de Casariego	80	E	25 Oct.
	1	Taramundi	300	N	26 Oct.
Loura	1	Oscos	630	E	26 Oct.
Llanisca	1	Parres	240	W	28 Oct.
	5	Piloña	270–420	W, E, N	28 Oct.
	2	Ponga	200–615	S, SW	28 Oct.
	1	Sobrescobio	400	W	
Mariana	1	Villaviciosa	170	N	19 Oct.
Marimoeche	2	Pola de Allande	550–660	E	23 Oct.
Marina	1	Llaviana	570	E	4 Nov.
	1	Proaza	300	W	29 Oct.
Mediana	1	Teverga	600	E	28 Oct.
Miguelina	1	Pravia	300	NE	4 Nov.

Pereira (1994) in Galicia, and five in both Galicia and Asturias.

In Castilla-León, all cultivars found were reported previously in Asturias as 'Rapega' (or 'Rapuca') and 'Gallego' (Fernández-Lamuño, 1984); in Galicia as 'Inxerta', 'Marelo', and 'Rapada' (Fernández and Pereira, 1994); and in both Asturias and Galicia as 'Negral', 'Paredé', and 'Verdello'. In Extremadura, only 'Verata' was a new name, because 'Temprana' was reported in Andalucía and Galicia, 'Tardía' in Asturias and Galicia ('Serodia' in the local dialect), and 'Inxerta' in

Asturias, Galicia, and Castilla-León. In the new area surveyed in Galicia, only 'De Fecha' and 'Cruzá' were not previously reported (Fernández and Pereira, 1994).

Some of the cultivars are distributed across a range of >100 km (Fig. 1). For example, 'Inxerta' is known from Galicia and Asturias to Andalucía, and 'Paredé' is cultivated in Galicia, Asturias, and Castilla-León. This wide distribution suggests that the domestication process in the Middle Ages was based on grafting of the most profitable cultivars. In contrast, six cultivars in Andalucía were found

only in one municipality (Table 1), while in Asturias there were 30 cultivars in one location (Table 2).

Galicia had the largest number of cultivars (Fernández and Pereira, 1994) (16 more than Asturias) although it has less than half the area of Asturias (Fig. 1) because of the transformation of the orchards in Asturias into forest management for timber in the 1950s. In Extremadura, growers have selected fewer cultivars than in Andalucía. In Andalucía, management of chestnut for timber was important, but an increase in the price of

Table 2. Continued.

Cultivar	No. trees	Municipality	Elevation (m)	Aspect ^z	Harvest time
	3	Salas	100–480	N, E	19 Oct.–4 Nov.
Montesín	1	Villaviciosa	250		19 Oct.
Mourisco	2	Pola de Allande	550–600	W	26 Oct.
Nargana	1	Llanes	500		2 Nov.
	4	Peñamellera alta	100–380	All	2 Nov.
Navexa	1	Belmonte de Miranda	330	NW	27 Nov.
	3	Tineo	300–400	All	24–27 Oct.
Negral	1	Santo Adriano	720		4 Nov.
	1	Teverga	700	N	28 Oct.
	1	Villaviciosa	100	NW	19 Oct.
Ordaliega	2	Corvera	150	All	18 Nov.
	1	Illas	340	W	
	2	Las Regueras	100		26 Oct.
	2	Pravia	300–340	NE, S	4 Nov.
Padana	1	Pola de Allande	550		26 Oct.
Pagana	1	Candamo	50	NE	
	1	Cangas del Narcea	440	E	23 Oct.
	1	Villayón	300	W	
Palaciana	1	Mieres	300	S	2 Nov.
Panchina	1	Belmonte de Miranda	350	W	27 Oct.
Paredé	1	Boal	430	E	25 Oct.
	8	Cangas del Narcea	450–700	W, E, S, N	22–27 Oct.
	1	Castropol	10	N	
	5	Ibias	300–780	E, S	23 Oct.
	1	Pesoz	220	N	25 Oct.
	10	Pola de Allande	420–690	All	22 Oct.–4 Nov.
	2	Oscos	580–600	All	26 Oct.
	2	Tapia de Casariego	30–200	All	25 Oct.
	2	Taramundi	300	N	26 Oct.
	1	Vegadeo	270	E	
Parruca	1	Parres	210	NW	28 Oct.
	4	Piloña	400	N, S	28 Oct.–4 Nov.
	1	Ponga	615	SW	28 Oct.
Pelgo	1	Pola de Allande	600	W	26 Oct.
Pelona	1	Grado	520	W	26 Oct.
	1	Mieres	300	S	2 Nov.
	3	Oviedo	150–270	E, W	19 Oct.–29 Oct.
	2	Santo Adriano	600–650	E	29 Oct.–4 Nov.
Pelosa	1	Candamo	50	NE	26 Oct.
	1	Cangas de Onís	10	N	28 Oct.
Ramoniega	1	Bimenes	350	N	
	2	Siero	200–400	N, E	25 Oct.–3 Nov.
	1	Sobrescobio	400	W	26 Oct.
Rapuca	5	Cangas del Narcea	440–600	E, N, S	22–27 Oct.
	1	Ibias	560	S	24 Oct.
	6	Pola de Allande	600–750	All	24 Oct.–4 Nov.
	1	Teverga	700	N	28 Oct.
	2	Tineo	350–440	All	24 Oct.

Table 2. Continued.

Cultivar	No. trees	Municipality	Elevation (m)	Aspect ^z	Harvest time
Ravexa	1	Pola de Allande	420	N	
Roxa	1	Laviana	310		26 Oct.
	1	Piloña	420	W	28 Oct.
	1	Sobrescobio	400	W	26 Oct.
Roxina	1	Caravia Baja	100	N	2 Nov.
Rubia	1	Pola de Allande	420	N	23 Oct.
	1	Santo Adriano	650	E	
Seronda	1	Proaza	300	W	29 Oct.
Sevillana	2	Caso	530–660	S	26 Oct.
	1	Piloña	400	S	
	1	Sobrescobio	400	W	26 Oct.
Tamón	1	Gijón	300	E	3 Nov.
Tixera	1	Proaza	300	W	29 Oct.
Valduna	1	Bimenes	350	N	
	1	Gijón	30	N	18 Nov.
	1	Langreo	350	E	
	1	Las Regueras	210	S	26 Oct.
	2	Mieres	300–430	S	2 Nov.
	4	Oviedo	150–280	N, E, W	19–29 Oct.
	1	Pola de Allande	690	S	4 Nov.
	1	Pravia	340	S	4 Nov.
	1	Salas	130	N	19 Oct.
	2	Santo Adriano	200–600	All	29 Oct.
	6	Siero	200–500	All	2 Nov.
	1	Tapia de Casariego	80	E	25 Oct.
	1	Teverga	600	E	28 Oct.
	2	Tineo	300–400	W, SW	27 Oct.
	4	Villaviciosa	100–180	S, SW, NW	19 Oct.
Vaquera	2	Belmonte de Miranda	300–330	E, NW	27 Oct.
	2	Ibias	600–780	E	22 Oct.
	1	Salas	480	E	4 Nov.
	3	Tineo	300–440	N, W, SW	22–27 Oct.
Vegamesada	3	Ibias	560–780	E, S	22 Oct.
	1	Pola de Allande	420	E	27 Oct.
Verde	4	Aller	350–690	E, N, NE	2 Nov.
	1	Cangas de Onís	10	N	28 Oct.
	1	Grado	520	W	26 Oct.
	1	Ibias	560	S	2 Nov.
	3	Pola de Allande	550–690	E, S	22 Oct.
	1	Salas	400	N	4 Nov.
	1	Tapia de Casariego	200	E	25 Oct.
	1	Taramundi	300	N	26 Oct.
	3	Teverga	600–700	N, E	28 Oct.
Villaviciosa	2	Belmonte de Miranda	350	W	27 Oct.–9 Nov.
Vizcaína	1	Caravia Baja	100	N	2 Nov.
	1	Laviana	570	E	4 Nov.
Xidra	2	Mieres	300	W	2 Nov.
Ximara	1	Taramundi	300	N	
Zapatona	1	Oviedo	280	N	29 Oct.
	2	Piloña	300–330	N, E	28 Oct.
	2	Siero	200–220	All	25 Oct.–3 Nov.

^zS, E, SE, All, W, NW, NE, N, and SW = south-facing, east-facing, southeast-facing, no predominant aspect, west facing, northwest-facing, northeast-facing, north-facing, and southwest-facing slopes, respectively.

Table 3. Chestnut cultivars found in Castilla-León, province of León.

Cultivar	No. trees	Municipality	Elevation (m)	Aspect ^z	Harvest time
Gallego	2	Vega	850	All	13 Oct.
Inxerta, Injerta	1	Sigüeyá	950	N	13 Oct.
	5	Palacios del Sil	800	E, SW	---
Marelo	3	Villafranca	650–880	All	13 Oct.
Negral	8	Médulas	700	All	13 Oct.–5 Nov.
		Pombriego	440	W	13 Oct.
Parede	2	Villafranca	540–880	N, S	13 Oct.
Rapada	1	Vega	850	All	13 Oct.
Rapega	1	Villafranca	880	S	13 Oct.
Verdello	1	Villafranca	880	S	13 Oct.

^zAll, N, E, SW, W, and S = no predominant aspect, north-facing, east-facing, south-west facing, west-facing, and south-facing slopes, respectively.

Table 4. Chestnut cultivars found in Extremadura; Badajoz and Cáceres provinces.

Cultivar	No. trees	Municipality	Elevation (m)	Aspect	Harvest time
<i>Badajoz</i>					
Temprana	2	Cabeza de la Vaca	900	North	
Tardía	3	Cabeza de la Vaca	900	North	
<i>Cáceres</i>					
Inxerta	1	Guadalupe	800	North	29 Oct.
Verata	3	Guadalupe	800	North	29 Oct.

Table 5. New chestnut cultivars found in Galicia, province of Ourense.

Cultivar	No. trees	Municipality	Elevation (m)	Aspect ^z
Cruzá	2	A Bola	500	East
	1	A Merca	500	All
De Fecha	2	A Merca	500	All
Negrá	1	A Bola	500	East
Verdeas	1	A Merca	500	All

^zAll = no predominant aspect.

nuts has encouraged land owners to rejuvenate the old orchards, top-working them to profitable cultivars. This has happened more in the southern part of Andalucía than in the west.

Influence of altitude. The lowest elevation of sampling in Andalucía was in the west, where chestnut is grown from 470 to 600 m. In southern Andalucía, cultivars are found in more elevated orchards, (650 to 850 m). In Castilla-León, all cultivars were found between 440 and 950 m, and in Extremadura, between 800 and 900 m. Four cultivars were collected from southern Galicia at an elevation of 500 m, including 'De Fecha' and 'Cruzá', which were not reported by Fernández and Pereira (1994). In Asturias, the range of altitudes was from sea level to 900 m, similar to that in Galicia. Of the municipalities with chestnut cultivars that we visited, 39% were between sea level and 200 m, 67% between 200 and 400 m, 45% between 400 and 600 m, 22% between 600 and 800 m, and only 6% between 800 and 1000 m. Therefore, chestnut orchards in Asturias are located mainly between sea level and 600 m. In comparison, the chestnut orchards in Galicia were in more elevated areas, between 400 and 800 m (Fernández and Pereira, 1993). Over 45% of municipalities with chestnuts had grafted cul-

tivars. In Asturias, chestnut trees survive well in low areas where ink disease (caused by *Phytophthora* sp.) could be a serious problem.

Aspect. As reported by Fernández and Pereira (1993) and Elorrieta (1949), Spanish chestnut trees grow best on north-facing slopes, especially in areas where drought is frequently a problem, such as in Andalucía and Extremadura. In areas with more abundant moisture, as in Asturias, the orientation of the orchards is not as important.

Harvest time. Most of the chestnuts in Spain are harvested between 26 Oct. and 20 Nov. Harvest begins in southern Andalucía between 15 Sept. and 10 Oct. with the cultivars Pilonga and Temprana (Table 1). Harvest continues in Castilla-León on 13 Oct. (Table 3). 'Negral' also is harvested in southern Galicia ≈13 Oct. (Pereira-Lorenzo and Fernández-López, 1997). In Asturias, harvest begins on 19 Oct., with cultivars such as 'DelaGrúa', 'Pelona', 'Valduna', 'Chamberga', 'Miguelina', 'Montesín', 'Negral', and 'Mariana' (Table 2). At this time, some cultivars from western Andalucía also begin to produce nuts (Table 1).

Late or very late cultivars are harvested after 25 Oct. In southern Andalucía, some cultivars, such as 'Tomasá' and 'Rubia Tardía',

ripen after 25 Oct. Growers said that late cultivars were predominant in the past, but now harvest after 11 Nov. is very rare.

Conclusions

In the regions of Andalucía, Asturias, Castilla-León, Galicia, and Extremadura we found chestnut cultivars in 131 municipalities. We have added 45 new cultivars and located examples of most of the cultivars previously reported (Fernández and Pereira, 1993; Fernández-Lamuño, 1984). Fewer than 50% of the cultivars are widely grown in large numbers in any area. Trees that produced well and had good nuts were shared among growers until they were widespread.

Chestnut cultivars in Spain are grown at elevations from sea level up to 1100 m, but are more frequently planted between 200 and 800 m. Aspect is important in all areas, with north-facing slopes being most suitable for production.

Harvest in Spain begins ≈15 Sept. in Andalucía, followed by Castilla-León and some areas of southeastern Galicia, which produce nuts after 10 Oct., and finishes ≈23 Nov. in Asturias. Most of the cultivars are harvested from 25 Oct. to 10 Nov.

Representatives of these Spanish chestnut cultivars will now be preserved and tested for genetic characteristics in our germplasm repository, located at the Centro de Investigaciones Forestales e Ambientais, Xunta de Galicia, in collaboration with the Univ. of Santiago de Compostela, Spain.

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