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ESSAY

# Barley Types and Varieties in Spain: A Historical Overview

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**Abstract**

**F. Martínez-Moreno, E. Igartua, and I. Solís. 2017. Barley Types and Varieties in Spain: An Historical Overview. Cien. Inv. Agr. 44(1): 12-23.** Barley is currently the most cultivated crop in Spain, with an acreage of about three million ha. Its importance stems from its adaptation to areas with poor soil conditions and water stress. The aim of this work is to describe the historical evolution of barley types and varieties of barley grown by farmers in Spain. A historical review was performed by consulting articles and books on the history, archaeology, and agronomy related to the issue. Different web sites and articles about the current varietal state of barley in Spain were also consulted. Another important information source was the CRF (*Centro de Recursos Fitogenéticos*, Spanish Center of Plant Genetic Resources) of Spain, where a large collection of landraces is preserved. The first barleys came to Spain approximately 7600 years BP. The crop spread throughout the country, and the cultivation of barley was reported by the Romans, Arabs, Castilians, and Spaniards. At the beginning of the nineteenth century, the first attempt at classification was carried out. Until the 1940s, most barley acreage was sown with ancient landraces, but from that period up to the present, a steady varietal renovation occurred. The history of barley types and varieties in Spain is rich, and an extensive set of landraces is preserved in seed banks. These landraces contain genes for resistance and tolerance to biotic and abiotic stresses.

**Key words**: Barley, landraces, plant genetic resources, varieties, plant breeding.

## The beginnings: arrival in Spain

Cultivated barley (*Hordeum vulgare* L. subsp. *vulgare*) was one of the first domesticated plants. The most widely accepted hypothesis is that barley domestication first occurred in the Fertile Crescent. The oldest domesticated barley remains were found at Tell Abu Hureyra (Syria) and date back to approximately 10,500 BP (before present) (Zohary *et al.*, 2012). Barley first came to Spain along several routes along with other domesticated plants when farming was adopted during the expansion of the Neolithic culture in Europe. It seems that the first Neolithic transition and adoption of farming practices came to Spain between 7650 and 7550 BP by three routes: (1) from the Mediterranean Sea to the coast of Valencia, (2) from the Pyrenees, and (3) from Morocco by sea to southern Spain

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(Zapata *et al.,* 2004; García-Martínez de Lagrán, 2015). The latter arrival occurred approximately 200 years later than the others. In fact, barley's most ancient remains on the Iberian Peninsula were found in the Pyrenees (Balma Margineda, Andorra) (Marinval, 1995; Fang *et al.,* 2014). Neolithic uses of barley expanded rapidly over the Iberian Peninsula, probably helped by pre-existing Mesolithic networks (García-Martínez de Lagrán, 2015). Regarding barley's entrance through Morocco, a Moroccan origin of some barley types has been claimed, and some have even suggested that there was a secondary but independent domestication center of barley in Morocco, where populations of the barley ancestor (*H. vulgare* subsp. *spontaneum*) are still present. The newly domesticated barley genotypes, mostly six-row, arrived in Spain, where they evolved to become Spanish landraces. This assumption is supported by the molecular similarity between wild barley from Morocco and Spanish landraces (Moralejo *et al.,* 1994).

The oldest archaeological remains of beer in Spain and in Europe are 5,000 years BP. They were found in ceramic containers in the Cave of Can Sadurní, Barcelona, and it seems that barley was used as a raw material for brewing (Blasco *et al.,* 2008). The remains of beer in Bell-Beaker vessels in the Ambrona Valley, Soria, have been dated to approximately 4400 BP (Rojo, 2006). Evidence of brewing with barley and wheat from approximately 3100 BP has been found at Genó, Lleida. The importance of beer for the people of the Iberian Peninsula in Roman times was noted by contemporary authors such as the Greek historian Polybius in the second century BCE (before the common era), who mentioned how important this beverage was in Lusitania (García-Bellido, 1945).

However, barley was used mainly, as it is today, for animal feed. In fact, the Spanish name for barley is *cebada*, which comes from the Latin *cibata*, the past participle of the verb *cibare*, meaning 'to feed' (DLE, 2017). The Spanish verb *cebar* also exists but has the meaning 'to feed animals to increase their weight'. Thus, *cebada* (barley) is a cereal employed mainly for that purpose. The Latin name for barley was *hordeum*, which refers to the bristled or pointed aspect of the spike due to its awns. In fact, in some areas of Spain, such as Aragon, barley is still referred as *ordio*. The Catalan word for barley is *ordi*, Italian *orzo*, and French *orge*. However, in Portuguese, barley is named *cevada*, similar to the Spanish version.

**Barley in Roman and Medieval Spain**

The Roman agronomist Columella (first century AD, Anno Domini) from Cádiz, Spain, wrote *De re rustica* (On agriculture), which was devoted to the entire Roman Empire (Columella, ~42 AD). The province of Hispania (Spain) was much Romanized, and it is possible that well-trodden commercial routes brought new crop varieties to Spain from the eastern part of the empire, which included the largest part of the Fertile Crescent. At that time, there was already a clear division of barley types. Columella reports the existence of a barley type named *hexastica*—that is, six-row, or *caballuna* (from *caballo*, Spanish for "horse")—because, he writes, it "raises better the horses." He continues that this type of barley must be sown at the equinox (i.e., a winter barley, sown in autumn), and we can deduce from his comments that this was the most common type. Afterwards, he describes *distica* (two-row) barley, also named *galatica* from its origin in Galatia, an inland province in current Turkey. Columella describes this barley as a grain of an excellent weight and white color and highlights the greater test weight of this barley type. He recommends sowing it in January (a spring barley, by modern accounts) (Columella, ~42AD).

The Andalusian agronomist Ibn Al-Awwam from Seville, Spain, describes barley cultivation in his work on agriculture (thirteenth century AD). In chapter 18, he writes about the convenience of sowing barley in lands of lesser quality than that

needed for wheat. He also mentions the *tharmir* of barley. According to Cubero, the *tharmir* (a word without a translation from the Arabic) referred to any secondary crop that was attached to the main crop, a common phenomenon in agriculture at that time. The first translation of this book from Arabic to Spanish was made by Banqueri, who suggests that the *tharmir* might consist of naked kernel barley plants (Cubero, 2003).

In 1513, Gabriel Alonso de Herrera, a Spanish agronomist, wrote his magnum opus *Agricultura general* (General agriculture). Barley is mentioned in chapters 8 and 13. In chapter 8, he writes about *ladillas* barleys, that is, a two-row type that "has a heavier and fuller kernel than the other...." He mentions that this type of barley is preferred for cold places. He also writes about the six-row and four-row barley, explaining that compared to wheat, barley prefers land with looser, lighter, and drier soil (Herrera, 1818).

**The nineteenth century: First attempt at classification**

In 1818, a classification of cultivated barleys in eight groups was performed by the Spanish botanist Claudio Boutelou (Herrera, 1818; Espasa, 1920):

- *Hordeum vulgare* L. (*cebada común* or *alcacer*, common barley for animal feed). A six-row barley, with square-shaped spikes. It can be winter or spring, most cultivated in the latter. There exist varieties of pale yellow, bluish, and black spikes.

- *Hordeum hexasticum* L. (*cebada ramosa*, "branched barley"; hexagonal, or *seis carreras*, "six-row"), with varieties of loose and tight spikes.

- *Hordeum coeleste* L. (*cebada desnuda*, "naked barley," or *celeste*, "sky blue"), a barley of the naked type that was scarcely cultivated in Spain. Its main varieties are the bearded and the *trifurcada* (spike split into three parts).

- *Hordeum distichum* L. (*cebada pamula, ladilla,* or *de dos carreras*, different names given to two-row barley, mentioned above), a type of barley widely cultivated over Europe but hardly sown in Spain—only in Catalonia, Navarra, and Castilla. These were all Spanish landraces, but at the turn of the twentieth century, they were replaced with new, improved foreign varieties of this type with good malting quality (Chevallier and Imperial from the UK and Hanna from central Europe).

- *Hordeum zeocriton* L. (*cebada de abanico*, "fan barley"), a very rustic type of barley scarcely cultivated in Spain.

- *Hordeum nigrum*, a barley with dark awns and glumes.

- *Hordeum hexasticum* β *nudum*, a naked, six-row barley.

- *Hordeum distichum* β *nudum*, also a naked, two-row barley.

**The twentieth century: New varieties gradually replace ancient landraces**

In 1900, Mendel's laws of genetics were rediscovered, opening new avenues for plant breeding. In France, Germany, the United Kingdom, and the Netherlands, barley breeding programs had been established according to the principles of genetics since the turn of the century. In 1937, a French program obtained the cultivar Hâtif de Grignon, a six-row winter barley resistant to lodging, early maturing, and high yielding. Ager, Barberousse, and Esterel are other examples of six-row winter barleys obtained in France (Doré and Varoquaux, 2006). These French six-row varieties have all had good acceptance in Spain. Part of the breeding effort was carried out by the public sector (e.g., INRA in France) and part by private companies (SECOBRA, Svalof, Cebeco, etc.).

The decrease of animal-drawn transport and machinery during the twentieth century and the increase of barley beer consumption in the Western world caused a shift in the preference of varieties towards malting types, mostly two-row spring cultivars, some of which were milestones of barley breeding in Europe, including Spain (Doré and Varoquaux, 2006):

- Beka: obtained by SECOBRA (France, 1954).

- Pallas: obtained by Svalof (Sweden, 1958).

- Ceres: obtained by INRA (France, 1962).

- Julia: obtained by Cebeco (The Netherlands, 1969).

- Triumph: obtained by VEB (Germany, 1973).

- Alexis: obtained by Breun (Germany, 1987).

- Vodka: obtained by Florimond Desprez (France, 1991).

- Pewter: obtained by Syngenta (Switzerland, 2002).

The main traits that were modified to obtain better barley cultivars were earlier maturity, shorter plant height (dwarfing) to diminish lodging, higher yield, and higher disease resistance. Traits for beer making quality were also sought, such as higher test weight, higher germination capacity, higher content in amylases and diastases to reduce the sugars in the germinated kernel, and lower protein percentage (Ullrich, 2011).

These new cultivars were readily adopted in Spain, but the cultivation of landraces persisted longer than in other western European countries, particularly in areas with the harshest environmental conditions. In Spain, barley landraces were still sown well into the twentieth century. In 1949, Dr. Sánchez-Monge carried out a study to characterize the Spanish barley landraces. He screened 343 six-row barley landraces for several morphological and agronomic traits and ended up selecting the best inbred lines from the best landraces. The main result was the release of the cultivars Albacete, adapted to semiarid land, and Almunia, adapted to high-rainfall or irrigated areas. Albacete was released in 1955 and enjoyed great success (Lasa and Romagosa, 1988). In 1988, more than 30 years after its release, it was still sown in more than one million hectares, more than 50% of the Spanish barley acreage. By 2002, 69% of the semiarid dryland of Aragon acreage was still sown with Albacete (Yahiaoui *et al.,* 2014).

However, the creation of new cultivars by crossing and selection in Spain was scarce and had limited success. During the 1950s and 1960s, most cultivated varieties in Spain were the following (García-Fernández, 1958; Mela, 1966):

1. Traditional Spanish landraces: *cebada común* (common barley), *desnuda* (naked), *negra de seis carreras* (six-row black), *trifurcada* (split into three parts), and *cuadrada* (square).

2. Beer barley: all varieties were imported from abroad, Aurora, Herta, Beka, Etoile de Velay, Foma, Freva, Mari, Pallas, Pioneer, Piroline, and Sonia.

3. Barley for animal feeding: Albacete, Almunia, Atlas, Berta, Cerro, Granja de Ejea, Guadiana, Keka, Lupe, Pané, and Wisa; some local and the rest imported.

Since the nineteenth century, the national wheat acreage had been approximately 3.5 million ha and barley approximately 1.4 million ha. That proportion continued well into the twentieth century until the 1960s, when the wheat surface decreased in favor of barley. In fact, in 1975, barley replaced wheat as the most cultivated cereal in Spain, with the acreage of both cereals approximately reversed (Pujol-Andreu, 2011) (Figure 1). The reasons for this change were varied:

1. An increased in meat consumption and intensive animal farming. There was even a national policy to promote the cultivation of feed cereals such as barley.

2. A decline in bread consumption and an increase in beer consumption.

3. A decrease in wheat prices due to the raising of new high-yielding cultivars from CIMMYT (International Maize and Wheat Improvement Center) (from the 1974–75 season).

4. The better adaptation of barley than wheat to many regions in Spain with a semiarid climate.

5. The improvement of the transportation system (railway and road), which permitted an easy wheat supply to bakeries in most villages, even those located in remote areas.

Six-row barley accounted for more than 95% of the national acreage until 1966. Then, the two-row acreage started to increase annually, and from 1986 onwards, two-row became the most cultivated barley type (Figure 2). As mentioned above, the main reason for this change was the increased breeding efforts for this type of barley, especially in Europe, where beer is very important. Given this asymmetric breeding effort, currently, two-row cultivars surpass most six-row cultivars in yield, and farmers also grow the former for animal feed. However, there is no proven genetic superiority of one type over the other, and there are examples of high-yielding varieties of both types.

From 1985 to 1991, the barley acreage in Spain was the largest in history (4.25–4.42 million ha). In 1988, there were 144 registered cultivars, of which 105 were two-row barleys and 39 six-row barleys, according to the INSPV (*Instituto Nacional de Semillas y Plantas de Vivero*, or National Institute of Seeds and Nursery Plants) (López-Bellido, 1991). However, the percentage of certified seed used by farmers was low, ranging between 9 and 15%. This could be one of the reasons for the scarce interest in developing cultivars among national private companies. Cultivar renovation was faster in two-row spring barley, with the cultivars Beka, Pallas, Hassan, Alpha, Menuet, Korus, and Kym being the most important in those years. These cultivars were sown in the most fertile land and in areas with mild weather. Six-row winter, or facultative, barley was sown in the most arid lands with cold winters. The most popular cultivars were Albacete, Hâtif de Grignon, Monlón, and Barbarrosa (Barberousse). In the region of Castilla y Leon, two-row barley prevailed, whereas six-row barley dominated in Aragon. In Castilla-La Mancha, Extremadura, and Andalusia, the two types of barleys were evenly distributed (López-Bellido, 1991).

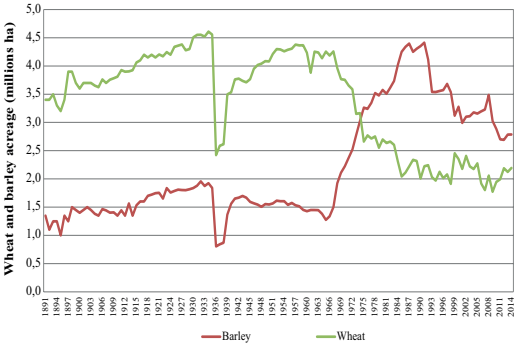


**Figure 1.** Barley and wheat acreage in Spain (1891–2014). Source: MAPAMA, *Anuario de Estadística* (agricultural annual directory of Spain).

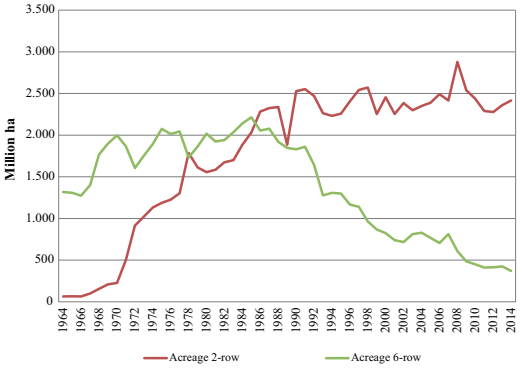


**Figure 2.** Barley acreage in Spain, two-row *vs.* six-row (1964–2014).
Source: MAPAMA, *Anuario de Estadística* (agricultural annual directory of Spain).

The creation of a new species of cereal in Spain must be highlighted. In 1977, Antonio Martin from IAS-CSIC (Institute for Sustainable Agriculture, Spanish National Reseach Council) in Córdoba (Spain) successfully crossed durum wheat and *Hordeum chilense* (a wild species from Chile and Argentina). It was the first report of a cross between the *Triticum* and *Hordeum* genera, yielding partially fertile plants. Using colchicine to double the chromosomes, Martín's group obtained poliploid plants that were more fertile. This species received the name "tritordeum" (scientific name ×*Tritordeum* spp.), and it was the second man-made cultivated cereal after triticale. Currently, tritordeum flour can be purchased in many establishments in Spain and southern Italy and it is employed as high-quality flour for baking as well as for brewing (Martín *et al.,* 1999).

**The Spanish landraces collection at the seed bank CRF-INIA**

Most barley landraces were sown in Spain well into the second half of the twentieth century. From that time on, they were steadily replaced by high-yielding elite cultivars. Fortunately, most landraces were collected, and their seeds were stored under refrigeration at the CRF (CRF, 2016). The CRF belongs to INIA (*Instituto Nacional de Investigación Agraria*, National Institute of Agricultural Research), and the largest seed bank is at 'Finca La Canaleja' (Madrid). The diversity of Spanish crops and local types caught the attention of pioneers in plant genetic resources, such as Nikolai I. Vavilov, who collected a large amount of seeds from local landraces of many different crops, barley among them, during his trip to Spain in 1927 (Vavilov, 1931). Even earlier, in 1923, Harry V. Harlan collected barley samples in the Northern Plateau of Spain (Harlan, 1957). These samples were incorporated into the collections of what is today called the N. I. Vavilov Institute for Plant Genetic Resources (VIR, Russia) and the United States Department of Agriculture (USDA).

The collection of barley landraces by Spanish researchers started in approximately 1942. In 1949, Enrique Sánchez Monge from the Aula Dei Experimental Station, CSIC (Zaragoza, Spain), assembled an extensive collection covering all the regions where barley was cultivated in the country. Most landraces were six-row barleys, accounting for more than 90% of the total (Lasa and Romagosa, 1988).

The list of barley accessions kept at the CRF-INIA shows 1,756 accessions of Spanish origin, which appear under the denomination *cultivar primitivo o tradicional* (primitive or traditional cultivar). The distribution of these landraces in Spain was quite homogeneous. Almost all Spanish provinces (48) supplied accessions. The province from which the most landraces were collected was Valladolid (161), followed by Zaragoza, Badajoz, and Palencia (Table 1). Regarding regions, most landraces were collected in Castilla-León (517), followed by Andalusia, Aragon, and Castilla-La Mancha (Figure 3). Some of the epithets given to Spanish barley landraces (normally traditional names of oral transmission by farmers) that are most commonly found in the passport data are the following (Herrera, 1818; García-Fernández, 1958).

- *Caballar* (from *caballo*, Spanish for "horse"): barley for animal feed. The great majority are six-row barleys.

- *Del país* ("from the country"): a typical name given in Spain to varieties and landraces cultivated for a long time in a region, without detailing any characteristics.

- *Ladilla* (from *lado*, Spanish for "side"): barleys that have two "sides" of kernels, that is, two-row barleys.

- *Pamula* (from "*palmula*", Latin for "little palm, date, blade of an oar, wing of a bird"): also a two-row barley (for its palm-tree leaf shape).

**Table 1.** Distribution of Spanish barley landraces from the CRF-INIA (Spanish Center of Plant Genetic Resources) collection by autonomous regions and provinces of Spain.

| Region | No. accessions | Province | No. accessions |
|---|---|---|---|
| Castilla y Leon | 517 | Valladolid† | 161 |
| | | Palencia | 84 |
| | | Soria | 74 |
| | | Zamora | 69 |
| | | Segovia | 37 |
| | | *Others* | *92* |
| Andalusia | 285 | Jaen | 52 |
| | | Cordoba | 44 |
| | | Cadiz | 40 |
| | | Granada | 37 |
| | | Seville | 35 |
| | | *Others* | *77* |
| Aragon | 271 | Zaragoza | 157 |
| | | Huesca | 60 |
| | | Teruel | 54 |
| Castilla-La Mancha | 223 | Toledo | 61 |
| | | Albacete | 55 |
| | | Cuenca | 51 |
| | | Ciudad Real | 35 |
| | | *Others* | *21* |
| Extremadura | 111 | Badajoz | 92 |
| | | *Others* | *19* |
| Madrid | 41 | Madrid | 41 |
| Navarra | 38 | Navarra | 38 |
| Murcia | 36 | Murcia | 36 |
| Canarias | 34 | | |
| Galicia | 22 | | |
| Euskadi | 15 | | |
| La Rioja | 15 | | |
| Baleares | 4 | | |

†Only provinces with the most accessions.

- *Marzal* (from *marzo*, Spanish for "March"): barley that can be sown in March, that is, spring barley.

- *Mazuela* (from *maza*, Spanish for "club"): six-row barley (for the club shape of the spike).

- *Mondada* (from *mondar*, Spanish for "peel"): naked, or hull-less, barley.

- *Tremesina* (from *tres meses*, Spanish for "three months"): barley whose supposed time from sowing to heading is about three months. It refers to spring barley, mostly of a short heading time. This epithet is also found in Spanish wheat landraces.

In the late twentieth century, a team of several Spanish research groups created the Spanish Barley

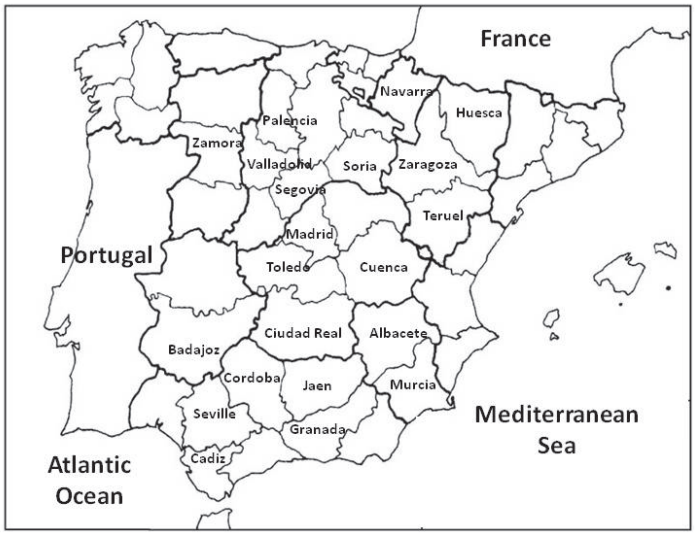


**Figure 3.** Map of Spain detailing provinces with the most barley landrace accessions collected by the CRF-INIA.

Core Collection with 160 varieties (Igartua *et al.,* 1998). Several studies have been performed on this collection, many of them addressing both the genetic singularity and the diversity of the collection. At least four groups of barleys were identified: the two smaller groups (one made up of six-row barleys, the other of two-row) were similar to European varieties, while the two largest groups (both six-row types) were quite different from other European varieties. One of them occurred in the warmer areas of southern Spain and the Mediterranean coast, and it is genetically close to varieties from Morocco. The other was collected in inland areas, in the high Central Plateau of Spain; its origin is uncertain. This distinction fits well with the hypothesis of there being more than one origin of Spanish barleys. The southern varieties may be descendants of barleys that arrived from the south, either during the Neolithic arrival in Spain from Morocco or during the Arab invasion of the eighth century, whereas the inland varieties could have come through any route, but the time passed has been long enough to produce a profound differentiation from other European types (Yahiaoui *et al.,* 2008). Another study of this collection revealed that modern cultivars generally performed better than landraces in agronomic trials carried out in productive locations, but at low-production sites (with water stress and poor soil), some landraces performed better than all modern cultivars. This means that there are genetic features in landraces that could be used to enhance the adaptation of modern cultivars to stressful environments (Yahiaoui *et al.,* 2014).

Other studies also revealed interesting resistances of accessions of the core collection to several diseases that affect barley, particularly powdery mildew and scald. In general, landraces from the Mediterranean coast and from the south were more resistant to powdery mildew and to leaf rust but more susceptible to virosis (Silvar *et al.,* 2009). In another study on barley landraces from CRF-INIA, Martínez et al. (2001) reported the existence of several landraces with a partial resistance to leaf rust. This type of resistance is incomplete, but it has durability, that is, it remains effective for many years. These results highlight the relevance of Spanish barleys as a genetic resource for plant breeding.

**The current situation of barley diversity in Spain**

In 2014, the barley acreage in Spain was 2.9 million ha with a production of 6.4 million tons, which resulted in a yield of 2.212 kg/ha. Ninety-one percent of this area was cultivated with two-row cultivars (MAPAMA, 2016). Regarding cultivars, GENVCE (National Association for Testing of Field Crops) divides barley cultivars into early cultivars (*ciclo corto*, spring) and late cultivars (*ciclo largo*, facultative, or winter). There are 30 late cultivars, of which 24 are two-row and 6 six-row. Most (16) are provided by French breeding companies, although British (5) and German (2) cultivars are also among them. There are just two cultivars obtained by Spanish companies or institutions (Aicara and Azara). There are 27 early cultivars, all two-row. The breeders are mainly British (7), German (6), and French (5). Four cultivars (Belén, Cecilia, Calgary, and Ori) were obtained by national breeders from public institutions (ITAP, Technical Agronomic Institute from Albacete, and IRTA, Institute for Agrifood Research and Technology from Catalonia) or private companies (Agrosa Semillas and Semillas Batlle) (GENVCE, 2016). The most widely sown cultivars in Spain in 2014 were Pewter (two-row, alternative) and Shakira (two-row, spring) for beer and Hispanic (two-row, winter), Meseta (two-row, winter), and Volley (two-row, winter) for feed. The use of certified seed is very low (approximately 16% of the total acreage) (Igartua, 2013). GENVCE lists and tests the new cultivars and produces recommendations. The complete list of cultivars available to Spanish farmers is published in the Spanish Catalog of Plant Varieties (OEVV). Currently, it lists 101 cultivars, and it does not describe the growth cycle or spike type, as GENVCE does. Thirteen cultivars have been produced either by Spanish public programs or in close partnership with public research organizations. Among them, high-yielding six-row cultivars such as Cierzo (with good malting quality, distributed by Eurosemillas) and Yuriko (Semillas Manchuela) are now challenging the two-row domination of recent decades (OEVV, 2016).

A technological novelty worth mentioning is the recent presentation of the first hybrid cultivar of barley. It is the cultivar Jallon of the Swiss company Syngenta®, which has established a special brand for its hybrid cultivars of different crops (Hyvido®). After remarkable successes in European countries, particularly in Germany, this cultivar was commercialized in Spain in 2014–15. The hybrid varieties are six-row winter barleys for areas of high-yield potential in northern Spain (Navarra, Catalonia, etc.). The seed is more expensive than that of conventional inbred lines, but the seeding rate is lower, and it yields approximately 15% more than pure lines of cultivars in most field tests (Syngenta, 2016). Independent and more general results of these promising types of barley under the highly variable conditions of Spanish climates will be necessary to confirm the high expectations that have been created.

Currently, approximately 92% of the Spanish barley acreage is devoted to grain for animal feed. Approximately 3.5 million t of barley are used in the feed industry, which is about a third of all cereal production in Spain (Igartua, 2013).

However, barley for beer is also important. The national production of beer in 2014 was 3.35 billion liters, making Spain the fourth largest producer in the European Union and the tenth largest in the world. There are eighteen industrial breweries in Spain, and the annual beer value in the market has surpassed 14.6 billion euro, representing 1.4% of the national GDP. In 2014, six brewing groups in Spain controlled 99.7% of the national production. These were (in order of importance) Mahou San Miguel®, Heineken España, S.A.®, Grupo Damm®, Hijos de Rivera, S.A.U.®, CIA Cervecera de Canarias, S.A.®, and La Zaragozana, S.A,®. The first three companies had 90% of the production (Cerveceros de Es-

paña, 2014). Hijos de Rivera and La Zaragozana are the only major industrial beer producers that remain in local hands.

Barley is currently the most cultivated crop in Spain, with an acreage of nearly three million ha. Modern cultivars are grown in the field, and their products, mainly animal feed and beer, are very important in Spain.

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**Resumen**

**F. Martínez-Moreno, E. Igartua, y I. Solís. 2017. Tipos y variedades de cebada en España: Un panorama histórico. Cien. Inv. Agr. 44(1):12-23.** La cebada es actualmente el cultivo más sembrado en España con cerca de tres millones de ha. Su importancia es debida a su adaptación a zonas con suelos pobres y falta de agua. Este trabajo trata de describir la evolución histórica de tipos y variedades de cebada en España desde su llegada hasta la actualidad. Se ha realizado una revisión histórica consultando artículos de revistas de historia, arqueología y agronomía así como libros sobre el mismo tema. También se han consultado artículos y páginas web sobre la situación varietal actual del cultivo. Otra fuente de información importante la proporcionó el CRF (Centro de Recursos Fitogenéticos de España) donde se conserva una gran colección de variedades locales de cebadas españolas. Las primeras cebadas llegaron a España hace unos 7600 años. El cultivo se extendió y es descrito por romanos, árabes, castellanos y españoles. A principios del siglo XIX se producen el primer intento de clasificación. Hasta la década de 1940 la mayor parte de la superficie se sembraba con variedades locales, pero desde entonces ha habido una renovación varietal continua. La historia de la evolución de variedades de cebada españolas es rica y disponemos de una gran colección de variedades locales conservadas en bancos de germoplasma. Algunas de estas contienes genes de resistencia a estreses bióticos y abióticos.

**Palabras clave**: Cebada, mejora vegetal, recursos fitogenéticos, variedades, variedades locales.

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