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Preparatory action on EU plant and animal genetic resources

Valorisation of hanging tomatoes in Spain

Overview

The hanging tomato is a very well-known type of tomato and is widespread in different regions of Spain, from the Mediterranean East, to inland areas, such as Cáceres, and Atlantic areas like Galicia. Beyond these visible characteristics, another common connection shared by hanging tomatoes is their selection by peasant communities with the common aim (convergent selection) of enjoying tomatoes during the winter months. The hanging tomato is a type of tomato that, when cultivated in strict non-irrigated systems or with low irrigation provisions, is characterised by the fact that, once harvested and stored in certain conditions, it can be conserved for approximately 6 months (sometimes even 9 months) (cf. Figures 1 and 2). This means that if the tomato is harvested in July and August, the fruit can be preserved until at least February of the following year. In fact, traditionally, fruits that have a lower capacity for conservation are consumed fresh, whereas those that keep for longer are used for seeds to plant the next crop season.

This type of tomato has a widespread and stable commercialisation, primarily in Catalonia. However, there are other areas, such as Mallorca or Menorca, where it is also highly valued by consumers. It was traditionally destined for consumption out of season, both fresh and when conserved. It even formed part of specific recipes such as romesco sauce. However, the appearance on the market of winter productions grown in greenhouses in regions of Southern Spain, as well as from other warmer countries, has relegated hanging tomatoes to the main geographical areas where the typical 'pan con tomate' ['bread with tomato'] is consumed (cf. Figure 3). This dish consists of a slice of bread rubbed with half a ripe tomato and dressed with olive oil and salt. Because hanging tomatoes are very juicy they are ideally suited to this traditional use in cuisine from Catalonia, Aragón, Valencia and the Balearic Islands. In Catalonia and the Balearic Islands bread with tomato (named 'pa amb tomàquet' ['bread with tomato'] and 'pa amb oli' ['bread with oil'] respectively), accompanies all meals and is the basis of any type of sandwich.

The hanging tomato is a type of tomato that is called differently according to the region where it is grown, both in Castilian Spanish and in Catalan. Thus, among others, the following denominations can be found: 'tomate de colgar' ['hanging tomato'], 'tomate de cuelga' ['tomato for hanging'], 'tomate de telaraña' ['spiderweb tomato'], 'tomate de la araña' ['spider tomato'], 'tomàtiga de ferro' ['iron tomato'], 'tomàtiga de ramellet' ['cluster tomato'],

'tomàtiga d'enfilar' ['stringing tomato'], 'tomata de penjar' ['hanging tomato'] and 'tomacó' (cf. Figure 4).

1. Objectives

The objective of the present study is to understand and analyse the current situation, both from a production and a commercial perspective, of the hanging tomato, incorporating the point of view of the actors involved in the sustainable management of this plant genetic resource.

2. Description of the case

There are many actors and entities that participate in the valorisation of the hanging tomato. In addition to the producers and traders, the means that enable the access to these plants and seeds of these local varieties also form part of this 'equation'. In Spain there are many civil society initiatives which have started seed banks and exchange networks to facilitate the access to and exchange of seeds. La Red Andaluza de Semillas 'Cultivando Biodiversidad' (RAS)¹ [the Andalusian Seed Network 'Cultivating Biodiversity' (RAS)] is one example. In 2007 this not-for-profit organisation launched a project called Red de Resiembra e Intercambio (Rel)² [Resowing and Exchange Network (Rel)]. This consists of a local seed bank managed by the RAS itself, to which farmers give the seeds of local varieties to other users, and from which they request seeds for themselves (cf. Figure 5). Over 500 professional and amateur farmers from different places in Andalusia participate in the Rel. A total of 2,716 local varieties have been recorded, 254 of which were tomatoes (12 were of the hanging type).

The Centro Nacional de Recursos Fitogenéticos (CRF)³ [National Plant Genetic Resources Centre (CFR)] belongs to the Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria [National Institute for Agronomic Research]. Among other tasks, it maintains and manages the Inventario Nacional⁴ [National Inventory] of the Red de Colecciones de Recursos Fitogenéticos para la Agricultura y la Alimentación⁵ [Plant Genetic Resources Network for Agriculture and Food]. In the database of said inventory, 3,709 tomato entries are recorded, at least 244 of which are of the hanging type (where a local name of reference is recorded) and have been surveyed in 135 municipalities in 10 different autonomous communities (cf. Figure 6). The active collection of these entries is kept in seven different conservation banks. These banks are affiliated to the Plant Genetic Resources Network for Agriculture and Food, and all seed requests from farmers and researchers from public and private entities must be tended to.

Outside the network there are other smaller conservation banks, such as the one managed, with regional funds, by the Estació Experimental Agrària de Carcaixent⁶ [Agricultural Research Station of Carcaixent] of the Institut Valencià d'Investigacions Agràries [Valencian Institute for Agricultural Research]. One of its main aims is offering local plant reproductive

¹ www.redandaluzadesemillas.org

² www.redandaluzadesemillas.org/red-de-resiembra-e-intercambio-177/

³ <http://wwwsp.inia.es/Investigacion/centros/crf/Paginas/CRF.aspx>

⁴ http://www.inia.es/inventarionacional/Bus_genero.asp

⁵ <http://wwwsp.inia.es/Investigacion/centros/crf/redtem/Paginas/Introduccion.aspx>

⁶ <http://www.ivia.gva.es/localizacion-carcaixent>

material to Valencian organic producers. This bank conserves 600 entries of horticultural species, with more than 120 tomatoes, 3 of which are hanging tomatoes.

There are several companies that sell seeds of this type of tomato. Some, such as Semillas Batlle, Diamond Seeds and Rocalba, are originally from Catalonia, but currently belong to the international sphere. There are also artisanal microenterprises of producers that sell seeds of local varieties. Les Refardes⁷ (Mura) belongs to this category. It is a family-owned company that began in 2005 and offers the organic seeds of 131 local Catalan plant populations. Their catalogue includes 8 cultivars of hanging tomatoes (among them 'Mala cara ['Ugly face'] and 'Montgrí') that represent 30% of the sales of tomato seeds. Therefore, this type of tomato is economically important for the initiative. The Associació de Varietats Locals de les Illes Balears (AVL-IB)⁸ [Association of Local Varieties of the Balearic Islands (AVL-IB)] was formed in 2002 with the aim of promoting and encouraging the use of local varieties in the Balearic Islands. At present, it has over 100 members and a catalogue offering 51 local varieties of 17 different species. These include 2 hanging cultivars.

It is common for farmers to contract out the production of seedlings using either their own seeds or other acquired ones. This is the case of Josep Serra, a Catalan organic farmer from San Jaume Sas Oliveres. He contracts out the production of the hanging tomato 'tomacó' seedling; which he has been conserving for decades and cultivates every summer; to the seedbed producers Planters Mas Pastoret (Torredembarra). The seedbeds also offer seedlings of hanging varieties and cultivars, as is the case, for example, of Planters Casas (Palafolls) and Planters i Ornamentals Nicolau (Mallorca) that have 4 and 1 different types respectively in their catalogues.

In Spain, hanging tomatoes are traditionally cultivated in different regions. Today, these productions are, in most cases, marginal or secondary. Their aim is self-consumption and/or a still limited, yet growing, market reached through the short supply chains of organic productions, such as organic stores, consumer groups and municipal markets. These circuits are characterised by, among other elements, their openness to local crop varieties and their specific usage, which makes them positive spaces for accepting this type of cultivar. Despite the effort carried out by some farmers and groups to encourage the production and consumption of hanging tomatoes, most of the commercial production of these varieties is undoubtedly concentrated in Catalonia, the Balearic Islands and the autonomous community of Valencia. Catalonia and the Balearic Islands are the regions where it clearly has the greatest commercial success. An element to be highlighted is that the local cultivars cannot be found in the large distribution circuits. On the contrary, this produce is primarily aimed at the retail market.

Three main types of commercialisation systems were detected. Firstly, diversified production for direct sale stands out, as carried out by Antoni Feliu, the president of AVL-IB. This organic farmer from Mallorca manages a family farm (horticulture and livestock) that is highly diversified. He sells his production directly to consumers through municipal markets. He

⁷ <http://www.lesrefardes.com>

⁸ <http://www.varietatslocals.org>

cultivates approximately 3 or 4 hectares of 'de ramellet' tomato annually, and has 3 different plant populations. Secondly, a highly specialised production can be found with sales through wholesalers. This is the case of the Asociación de Productores y Comercializadores de la Tomata de Penjar d'Alcalà de Xivert (APC-TP)⁹ [Association of Producers and Distributors of the Hanging Tomato of Alcalá de Xivert (APC-TP)], which was created in 2007, in the autonomous community of Valencia, with the aim of increasing the value of this singular vegetable. It is comprised of 14 local famers and 6 local traders who independently establish bilateral sale agreements. As a whole, they dedicate 20 to 25 hectares to the production of the 'de penjar' tomato, which they market in Catalonia, almost entirely in the Barcelona wholesale market (i.e. Mercabarna). Finally, the diversified production systems are commercialised through distribution structures that bring together the offer of fresh produce to supply the internal market. A good example of this type can be found in the organic sector: the Hortec distributor and cooperative of organic producers¹⁰. Hortec was founded in 1991 and is currently comprised of 30 farmers from different locations in Catalonia who have a planned production, obtaining produce they lack from other farmers, to distribute to organic stores, generally in Catalonia. 2 of their members cultivate hanging tomatoes, approximately 4,000 kg per year, which are sold between September and January, when their production ends and tomatoes start to be imported from Southern Spain, in order to maintain the offer.

Analysis

3. Funding and support

In Spain the economic support from public administrations to entities that conserve and use hanging tomatoes, or other types of local varieties, is generally very scarce or non-existent. Despite this, some initiatives have received limited funding through certain funding lines, lacking a comprehensive strategy, implemented by local or regional administrations. This is the case of the project 'Protección legal de cultivares hortícolas valencianos' ['Legal protection of Valencian horticultural cultivars'], financed out of funds pertaining to the Generalitat Valenciana [Regional Government of Valencia] and developed from 2009 to 2015 by the Centro de Conservación y Mejora de la Agrodiversidad Valenciana¹¹ [Centre for the Conservation and Improvement of the Valencian Agrodiversity], with the collaboration of the Agricultural Research Station of Carcaixent. In this project, 223 local varieties have been molecularly and morphologically characterised and identified, 6 of which are hanging tomatoes. The aim was to inscribe these varieties in the Register of commercial varieties¹² managed by the Ministerio de Agricultura, Alimentación y Medio Ambiente [Ministry of Agriculture, Food and Environment], however this was never done.

⁹ <http://www.tomatadepenjar.com>

¹⁰ <http://www.hortec.org/News/index/lang/es>

¹¹ <http://www.comav.upv.es/index.php/es/>

¹² <http://www.magrama.gob.es/app/regVar/BusRegVar.aspx?id=es>

More specific funding lines come from the measures that some autonomous communities are enacting to support the conservation and sustainable use of genetic resources in agriculture, in Rural Development Programmes within the framework of the Common Agricultural Policy of the European Union 2014-2020. However, both the object and the beneficiaries of funding and the activities eligible for funding change in each region. For example, in the case of Catalonia, activities of preservation, surveying, characterisation for the inscription of local varieties in the 'Catálogo de variedades locales de interés agrario de Cataluña'¹³ ['Catalogue of local varieties of agricultural interest of Catalonia'], the creation of databases and inventories, and the dissemination and information activities carried out by conservation entities are funded. On the contrary, in the Balearic Islands, as in the framework of 2000-2007, the cultivation of specific surface areas and quantities of local varieties, by individuals or legal entities, has again been given funding. Varieties that are the object of funding must be collected in a proposed list. The AVL-IB has participated in the preparation of said list, which includes 87 varieties of herbaceous, fruit and vegetable crops. There is a hanging tomato, called 'tomàtiga de Banyalbufar' ['tomato from Banyalbufar'], that was exported to Barcelona (cf. Figure 7) in the late 1920s and is currently used solely for self-consumption.

4. Positioning at local or regional level

One of the main past challenges for the hanging tomato was the one faced in 2010, when the Conselleria de Agricultura i Pesca del Govern Balear [Regional Ministry of Agriculture and Fisheries of the Government of the Balearic Islands] proposed promoting the 'tomàtiga de ramellet' by means of a quality label of Protected Geographical Indication (PGI). The proposal came from an important fruit and vegetable company which produces a hybrid developed by the companies Hortseed Mediterrani and Fitó. This variety has neither the conservation capacity nor the organoleptic characteristics of the traditional variety, however it can be found in municipal markets and large distribution points of sale, marked as 'de ramillete'. On hearing this news, the AVL-IB demanded that the hybrid tomato not be placed on the market as 'tomàtiga de ramellet', and started to work towards registering this cultivar as a conservation variety. Finally, in 2012 it was inscribed¹⁴, the Institut de Recerca i Formació Agrària i Pesquera de Les Illes Balears [Institute for Agricultural and Fisheries Research and Training of the Balearic Islands] and the University of the Balearic Islands appeared as the conserving entities. This was a clear case of an attempt to appropriate a denomination recognised by the population in order to improve the position in the market of a product that bears no relation to it.

¹³ DOGC. 2012. Decreto 131/2012, de 23 de octubre, por el que se regula el Registro oficial de empresas proveedoras de material vegetal y se establecen las normas de autorización, inscripción y funcionamiento, se regulan actividades de producción y comercialización de material vegetal y se crea el Catálogo de variedades locales de interés agrario de Cataluña [Decree 131/2012, of 13 October, on regulation of the Official Register of companies supplying plant material, establishment of authorisation, inscription and functioning norms, regulation of production and trading activities of plant material, and creation of the Catalogue of local varieties of agricultural interest of Catalonia]. Online: http://dogc.gencat.cat/ca/pdogc_canals_interns/pdogc_resultats_fitxa/?documentId=619153&language=ca_ES&action=fitxa

¹⁴ Registration number 20100178. Online: <http://www.magrama.gob.es/app/regVar/DetalleVariedad.aspx?id=es&TipoV=C&IDVariedad=20100178>

The entities that work from a perspective of dynamic management of genetic resources, such as the RAS, Les Refardes or the AVL-IB have been, from their beginnings, aware of the need to build solid alliances with farmers and other organisations that encourage the use of local crop varieties. For this reason, they form part of the national coordination network Red de Semillas 'Resembrando e Intercambiando' (RdS)¹⁵ ['Resowing and Exchanging' Seed Network]. The RdS, which functions at national level, was created at the end of the 1990s and today brings together 25 local networks and groups from different regions that share as a common denominator the development of projects for the usage of local crop varieties in sustainable production and consumption systems. Additionally, it serves as a platform for the coordination of technical works and works of political import, as well as for the exchange of information and methodologies. However, there is a need for certain public entities to develop and improve their networks with other European organisations, for conducting joint projects on the conservation and use of plant genetic resources, but, above all, with local farmers and seed networks to implement collaborative lines of work that benefit from the participation and points of view of the different actors.

5. Communication

In general, 'classic' communication strategies are used, based on publicity through the initiative's own websites, agricultural journals¹⁶ and specific journals of the organic sector; on the publication of information and scientific articles¹⁷, as well as on the implementation of consumer awareness and information activities through conferences, workshops and other types of events. Another tool has been used by the APC-TP with the aim of opening new markets and improving communication. This association requested the Regional Government of Valencia the 'marca de calidad CV' ['CV Quality Mark'] for the 'Tomata de Penjar' that was granted in 2008 (cf. Figure 8). The order¹⁸ that establishes the regulation, by which this tomato is honoured with a quality mark, specifies certain distinguishing features, which are essential for a transparent communication of the importance of the management and sustainable use of this local variety. In this sense, it is the characteristics that the original plant material must present which stand out. Firstly, the regulation acknowledges the active and essential role that the farmers have had in the selection and maintenance of the variety and its characteristics. Furthermore, it establishes that the producers themselves must produce the seeds used.

6. Outputs and added value

¹⁵ <http://www.redsemillas.info>

¹⁶ Roselló, J. Valcárcel, JV. Díez, MJ. Cebolla, J. 2013. Las variedades tradicionales de tomate. Un recurso de interés [The traditional varieties of a tomato. A resource of interest]. Rev. Camp valencià. Nº 214.

¹⁷ Cortes, C. Cebolla, J. Rosello, J. 2010. Análisis de la calidad organoléptica en variedades tradicionales y obsoletas de tomate [Analysis of the organoleptic quality of traditional and obsolete tomato varieties]. V Congreso de mejora genética de plantas [V Conference on plant genetic improvement]. Madrid.

Cortés-Olmos, C. Leiva-Brondo, M. Roselló, J. Cebolla-Cornejo, J. 2013. The role of traditional varieties of tomato as sources of nutritional compounds. J Food Composition.

18 DOCV. 2008. Orden de 28 de agosto de 2008, de la Conselleria de Agricultura, Pesca y Alimentación, por la que se publica la reglamentación de calidad de la «Tomata de Penjar», para su distinción con la marca de calidad «CV» [Order of 28 August 2008, of the Regional Ministry of Agriculture and Fisheries, by which the regulation of the quality of the «Tomata de Penjar» is published, for its distinction with the quality mark «CV»]. Online: <http://www.tomatadepenjar.com/imagenes/distintivos/reglamento-CV.pdf>

Hanging tomatoes have a very reliable market (especially in Catalonia) and the production is sold without any problems. The varieties have a low yield (from 1.5 to 2 kg/plant) but in the market they reach a much higher price than the commercial hybrids. A farmer can receive, on average, between 1.10 EUR/kg and 1.20 EUR/kg for the produce sold in bulk at the beginning of the campaign. If, on the contrary, the farmer stores the production, assuming the loss, and markets it during the autumn months, or at the beginning of winter, up to 30 centimes more per kg can be obtained. Moreover, if the produce is sold directly, without intermediaries, the average price can be much higher. The marketing strategy will depend on the context and objectives of each farmer. Hanging tomatoes are varieties that are greatly appreciated, in an organoleptic point of view, and, in certain regions, they have an important cultural value. For this reason consumers are prepared to pay more for the product. Thus, at retail outlets, these tomatoes achieve a price that oscillates between 3 EUR and 6 EUR/kg depending on the season.

7. Sustainability

The APC-TP is participating in the Traditom project¹⁹, financed through the Horizon 2020 European Union Framework Programme for Research and Innovation, in which 14 members participate. The main aim of this programme is to “valorise the genetic diversity stored in traditional tomato varieties and to increase their resilience in order to prevent their steady replacement by higher yielding, hardier and often less tasty modern cultivars”. During the summer of 2015, within the framework of the project, farmers linked to the APC-TP have cultivated 275 traditional varieties of tomatoes from different countries for their evaluation. The 3 hanging tomato cultivars used by the producers in the association are included in these varieties.

¹⁹ <http://traditom.eu>

Conclusions

STRENGTHS	WEAKNESSES
<p>Numerous tomato cultivars of the hanging type are conserved in Spain. In certain regions of Mediterranean Spain there is a different variety for every two or three municipalities;</p> <p>These plant populations' organoleptic characteristics are much more interesting than those of the hybrids produced under plastic in winter;</p> <p>They have a developed market that is stable and operates in Catalonia and the Balearic Islands.</p>	<p>Competing with hybrid productions out of season that come from Southern Spain, as well as other countries, and that reach the internal market at lower prices;</p> <p>The lack of a Programa Nacional de Conservación y Utilización Sostenible de los Recursos Fitogenéticos para la Agricultura y la Alimentación [National Programme for the Conservation and Sustainable Use of Plant Genetic Resources for Agriculture and Food] to finance <i>in situ</i> conservation carried out by farmers and seed networks.</p>
OPPORTUNITIES	THREATS
<p>There is a potential market for the valorisation of this type of tomato, such as, for example, the one linked to the consumption of organic products;</p> <p>The production and valorisation of these cultivars are an opportunity to maintain the rural population;</p> <p>There are many production and commercial projects linked to hanging tomatoes.</p>	<p>The use of denominations of local varieties to register improved varieties or specific local ecotypes that do not reflect the complexity of the plant populations. The use of these denominations in quality marks;</p> <p>Local varieties end up being improved with a straightforward 'quick fix' and later protected.</p>

The strengths of this type of tomato are basically linked to its appreciated organoleptic characteristics and to the active conservation of a multitude of cultivars through their valorisation in specific markets and for self-consumption. As it has been said, hanging tomatoes were used in numerous regions in Spain, however, in some of them they have been abandoned. Therefore, opportunities exist to increase their value in those regions where they do not currently have a strong presence (such as the autonomous community of Valencia or Aragón, as a starting point). It is true that the actions of certain producers to introduce these types of varieties have not been very successful. It is therefore necessary to start actions, with the support of the public administrations, to raise awareness and encourage the consumption of local varieties in general, and hanging tomatoes in particular, in the commercial sectors that are more open to this type of produce, such as the organic sector. This sector must be actively involved in promoting biodiversity in cultivation among its consumers.

These types of productions constantly face the entry, from other regions, of hybrid varieties with radically inferior organoleptic characteristics and much lower prices. Hanging tomatoes cannot compete economically with these varieties. Mechanisms to protect hanging tomatoes, a produce of distinct quality, must be articulated through strategies that disseminate the importance of their consumption. By means of the appropriate tools this weakness can be transformed into an opportunity, because hanging tomatoes allow for a

staggered sale, and can therefore be a nutritious and tasty alternative to the relocated winter productions of tasteless tomatoes, which are unsustainable in the context of a future energy crisis.

As indicated by the Food and Agriculture Organization of the United Nations (FAO) in the First Report of the State of the World's Plant Genetic Resources for Food and Agriculture in 1996, legislation and public policies have a considerable influence on genetic erosion. From this point of view it is vital to develop friendly normative frameworks for the valorisation of the plant reproductive material of local cultivars with a certain level of heterogeneity. In addition, specific conditions adapted to artisan producers that distribute this type of seeds need to be established. In that sense, in Spain, the 'Ley 30/2006, de 26 de julio, de semillas y plantas de vivero y de recursos fitogenéticos' ['Law 30/2006, of July 26, on seeds and nursery plants and plant genetic resources'], 9 years after coming into force, does not contain a specific regulation to develop Farmers' rights²⁰, to commercialise the seeds of local varieties or to support *in situ* conservation by farmers through the 'Programa Nacional de Conservación y Utilización Sostenible de los Recursos Fitogenéticos para la Agricultura y la Alimentación' ['National Programme for the Conservation and Sustainable Use of Plant Genetic Resources for Agriculture and Food'] established by said law.

Furthermore, in encouraging the use of local crop varieties and respecting farmers' rights, steps should never be taken to limit the use of local cultivars by producers and consumers. For example, public administrations must prevent the registration of varieties, be they particular ecotypes of local cultivars or improved varieties, with the names of local plant populations. With regard to particular ecotypes of local cultivars, those who conserve them must be urged to use, with the consensus of the peasant communities that use these plant genetic resources, apart from the denomination of the local variety, another distinctive word so as not to limit the future use of the local name. In the case of improved varieties, other denominations that are completely different from those of the local cultivars must be used.

The concession of quality marks and other quality regimes to agricultural and food products, such as the PGI and Protected Designation of Origin, must be prevented in order to avoid confusion among consumers as well as unnecessary law suits involving producers and commercial structures. It is equally necessary for public administrations to pursue misleading advertising that certain companies can utilise to sell improved produce varieties benefiting from the local varieties' social recognition. Some seed networks and farmers' groups have demonstrated these types of abuse, by active monitoring, and have confronted the companies in question. In certain cases they have managed to stop them.

Finally, there is a need to prevent the wrongful appropriation of local cultivars. That is to say, the selection of local cultivars through a simple improvement of their characteristics, for example their homogeneity, and later protected by plant breeder's rights or patents. Therefore, in research projects in which groups of farmers and seed networks participate, contracts must be signed in which both parties agree not to pursue this aim.

²⁰ FAO. 2004. International Treaty on Plant Genetic Resources for Agriculture and Food. Rome. Online: <ftp://ftp.fao.org/docrep/fao/011/i0510s/i0510s.pdf>

Figures

Figure 1. 'Tomàtiga de ramellet' ['cluster tomato'] stored (hung on strings) on the island of Mallorca. Photograph: Association of Local Varieties of the Balearic Islands.



Figure 2. Female farmer stringing tomatoes on the island of Mallorca. Photograph: Association of Local Varieties of the Balearic Islands.



Figure 3. 'Pan con tomate' ['bread with tomato']. Photograph: Association of Producers and Distributors of the Tomata de Penjar d'Alcalà de Xivert.



Figure 4. Different hanging tomato cultivars with their local denominations. Photograph: Association of Local Varieties of the Balearic Islands.



Figure 5. Database of the Resowing and Exchange Network of the Andalusian Seed Network ‘Cultivating Biodiversity’. Photograph: Andalusian Seed Network ‘Cultivating Biodiversity’.

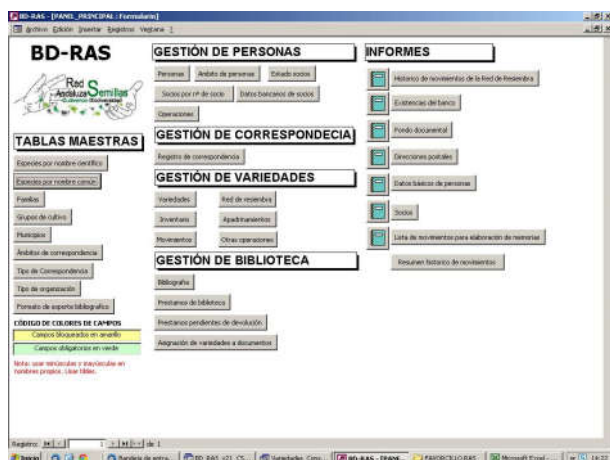


Figure 6. Tomato entries of the hanging type in the National Inventory of the Plant Genetic Resources Network for Agriculture and Food.

Inventory number	Local name	Autonomous Community	Province	Locality
NC086153	Tomate de colgar	Andalucía	Cádiz	Torrecedera; Jerez de la Frontera
NC086160	Tomate de cuelga	Andalucía	Cádiz	Cabeza la Seña; Jerez de la Frontera
NC082162	Tomate de colgar	Andalucía	Málaga	Siete Pilas; Benalauría
NC082255	Tomate de colgar o untar	Andalucía	Málaga	Cuevas de San Marcos
NC082350	Tomate de cuelga del piquillo	Andalucía	Málaga	Estepona
NC053007	Tomate de culo de colgar	Andalucía	Málaga	Igualeja
NC080568	Tomate de cuelga de pera	Andalucía	Sevilla	Lebrija
NC080569	Tomate de cuelga redondillo	Andalucía	Sevilla	Lebrija
NC099190	Tomate de cuelga	Aragón	Huesca	Adahuesca
NC074978	Tomatilla de cuelga	Aragón	Huesca	Almazorre; Barcabo
NC105289	Tomate de cuelga chato rosa	Aragón	Huesca	Alquezar
NC055013	Tomate cuelga del carpintero rojo	Aragón	Huesca	Alquézar
NC055014	Tomate cuelga del carpintero rosa	Aragón	Huesca	Alquézar
NC082222	Tomatilla de cuelga pera de Larrosa	Aragón	Huesca	Alquézar
NC082221	Tomatilla de cuelga redonda de Larrosa	Aragón	Huesca	Alquézar
NC082220	Tomatilla de cuelga redonda de Larrosa	Aragón	Huesca	Alquézar
NC078270	Tomatilla picudeta de cuelga de Esplus	Aragón	Huesca	Anies; La Sotonera
NC099244	De cuelga	Aragón	Huesca	Asque; Colungo
NC074982	Tomate de cuelga rojo	Aragón	Huesca	Ayera; Loporzano
NC085398	Tomate de cuelga	Aragón	Huesca	Buera; Santa Maria de Dulcis
NC083936	Tomate de colgar	Aragón	Huesca	Castillazuelo

Inventory number	Local name	Autonomous Community	Province	Locality
NC105273	Tomate rojo de colgar	Aragón	Huesca	Castillazuelo
NC083928	Tomate rosa de colgar	Aragón	Huesca	Castillazuelo
NC074987	Tomate de colgar anaranjado	Aragón	Huesca	Miralsot de Abajo; Fraga
NC073424	Tomate de colgar rosa	Aragón	Huesca	Miralsot de Abajo; Fraga
NC099192	Tomatilla de cuelga	Aragón	Huesca	Morcat; Boltaña
NC099193	Tomatilla de cuelga (hoja patatera)	Aragón	Huesca	Morcat; Boltaña
NC082207	Tomatilla de cuelga	Aragón	Huesca	Pozán de Vero
NC082208	Tomatilla de cuelga	Aragón	Huesca	Pozán de Vero
NC082216	Tomate literano de cuelga	Aragón	Huesca	Tamarite de Litera
NC073422	Tomate de penjar rojo	Aragón	Huesca	Velilla de Cinca
NC073423	Tomate de penjar rosa	Aragón	Huesca	Velilla de Cinca
NC099236	Tomate de colgar	Aragón	Teruel	Barrio Los Giles; Olba
NC103765	Tomate de colgar	Aragón	Teruel	Barrio Los Giles; Olba
NC039907	Tomate de cuelga	Aragón	Teruel	Mas de las Matas
NC096608	Tomate de cuelga rojo	Aragón	Teruel	Masico de Ruiz; Alcorisa
NC096607	Tomate de cuelga rosa	Aragón	Teruel	Masico de Ruiz; Alcorisa
NC035885	Tomate de Ferro	Baleares	Baleares	Ciutadella de Menorca
NC095227	Tomàtiga de ferro	Baleares	Baleares	Eivissa
NC019523	Tomàtic de penjar	Baleares	Baleares	Felanitx
NC087852	Tomata de penjar tres caires	Baleares	Baleares	Formentera
NC095206	Tomàtiga de ramellet grossa	Baleares	Baleares	Llucmajor
NC018490	Banyal Bufar	Baleares	Baleares	Manacor
NC035882	Banyalbufar	Baleares	Baleares	Manacor
NC035881	Ferro	Baleares	Baleares	Manacor
NC080340	Ferro	Baleares	Baleares	Manacor
NC080341	Ferro	Baleares	Baleares	Manacor
NC018493	Tomàtiga de Ferro	Baleares	Baleares	Manacor
NC024003	Tomàtiga de Ferro	Baleares	Baleares	Manacor
NC024001	Tomàtiga de penjar	Baleares	Baleares	Manacor
NC024218	Tomàtic de ramellet	Baleares	Baleares	Maó
NC018489	Tomàtiga de Ferro	Baleares	Baleares	Maó
NC024011	Tomàtic de ramellet	Baleares	Baleares	Mao-Mahon
NC095264	Tomàtiga de ferro	Baleares	Baleares	Petra
NC051601	Tomatige de penjar	Baleares	Baleares	Porreres
NC024004	Tomàtiga de Ferro	Baleares	Baleares	Sa Pobla
NC087841	Tomata de penjar	Baleares	Baleares	Sant Llorenç de Belafia; Can Reco; Sant Joan de Labritja
NC024012	Tomàtic de ramellet	Baleares	Baleares	Sant Lluís
NC087801	Tomata de penjar ferro	Baleares	Baleares	Santa Agnes de Corona; Sant Antoni de Portmany
NC024005	Tomàtiga de penjar	Baleares	Baleares	Sineu
NC024007	Tomàtiga de penjar	Baleares	Baleares	Sineu
NC024008	Tomàtiga de penjar	Baleares	Baleares	Sineu

Inventory number	Local name	Autonomous Community	Province	Locality
NC105840	Tomate de la telaraña pera	Castilla y Leon	Ávila	Candeleda
NC025691	Tomate de la telaraña rojo	Castilla y Leon	Ávila	Candeleda
NC025690	Tomate de la telaraña rosa	Castilla y Leon	Ávila	Candeleda
NC068878	Tomate de colgar;De bola	Castilla y Leon	Salamanca	Serradilla del Arroyo
NC041813	Tomàquet de penjar	Cataluña	Tarragona	Alcanar
NC035084	Tomate de colgar	Cataluña	Tarragona	Amposta
NC100140	Tomate de colgar	Cataluña	Tarragona	Amposta
NC100152	Tomate de colgar	Cataluña	Tarragona	Amposta
NC042105	Tomàquet de penjar	Cataluña	Barcelona	Arenys de Mar
NC041815	De penjar bombeta	Cataluña	Barcelona	Arenys de Munt
NC042302	Tomacó	Cataluña	Barcelona	Arenys de Munt
NC041808	Tomàquet de penjar	Cataluña	Barcelona	Arenys de Munt
NC041809	Tomàquet de penjar	Cataluña	Barcelona	Arenys de Munt
NC041814	Tomàquet de penjar	Cataluña	Barcelona	Arenys de Munt
NC042910	Tomàquet de penjar	Cataluña	Barcelona	Arenys de Munt
NC042922	Tomàquet de penjar groc	Cataluña	Barcelona	Argentona
NC056783	Tomàquet de penjar groc	Cataluña	Barcelona	Argentona
NC042918	Tomàquet de penjar vermell	Cataluña	Barcelona	Argentona
NC041821	Tomàquet de penjar	Cataluña	Barcelona	Barcelona
NC041823	Tomàquet de penjar bombeta	Cataluña	Barcelona	Barcelona
NC042075	Tomaquera de penjar	Cataluña	Barcelona	Begues
NC042924	Tomàquet de penjar	Cataluña	Barcelona	Bellprat
NC100150	Tomate de colgar	Cataluña	Tarragona	Bitem; Tortosa
NC035058	Tomate de penjar	Cataluña	Girona	Borrassa
NC035059	Tomate de penjar	Cataluña	Girona	Borrassa
NC035060	Tomate de penjar	Cataluña	Girona	Borrassa
NC035061	Tomate de penjar	Cataluña	Girona	Cabanes
NC042304	Tomacó capullet	Cataluña	Barcelona	Cabrera de Mar
NC042305	Tomacó de penjar	Cataluña	Barcelona	Cabrera de Mar
NC041816	De penjar tísic	Cataluña	Barcelona	Caldes de Montbui
NC041810	Tomàquet de penjar	Cataluña	Barcelona	Caldes de Montbuí
NC041811	Tomàquet de penjar	Cataluña	Barcelona	Caldes de Montbuí
NC042078	Tomàquet de penjar	Cataluña	Barcelona	Caldes de Montbuí
NC035051	De penjar	Cataluña	Girona	Campllong
NC041824	Tomàquet de penjar	Cataluña	Girona	Cassa de la Selva
NC042082	Tomàquet de penjar	Cataluña	Girona	Cassa de la Selva
NC042097	Tomàquet de penjar	Cataluña	Girona	Cassa de la Selva
NC043006	Tomàquet de penjar	Cataluña	Girona	Cassa de la Selva
NC042932	Tomàquet de penjar	Cataluña	Barcelona	Castellbell i el Vilar
NC042935	Tomàquet de penjar chorito	Cataluña	Barcelona	Castellbell i el Vilar
NC042934	Tomàquet de penjar frances	Cataluña	Barcelona	Castellbell i el Vilar

Inventory number	Local name	Autonomous Community	Province	Locality
NC041827	Tomàquet de penjar	Cataluña	Barcelona	Castellolí
NC042090	De penjar bombeto	Cataluña	Barcelona	Cervelló
NC043042	Tomàquet petit rodo de penjar	Cataluña	Tarragona	Creixell
NC042142	Tomàquet Tomacó de pom	Cataluña	Tarragona	Creixell
NC100163	Tomate de colgar	Cataluña	Tarragona	El Lloar
NC042102	Tomacó	Cataluña	Barcelona	El Masnou
NC042317	Tomacó de penjar	Cataluña	Barcelona	El Masnou
NC042087	Tomàquet de penjar	Cataluña	Barcelona	El Masnou
NC042101	Tomàquet de penjar cirereto	Cataluña	Barcelona	El Masnou
NC042140	Tomàquet de penjar gros	Cataluña	Tarragona	El Vendrell
NC042138	Tomàquet penjar petit Tomacó	Cataluña	Tarragona	El Vendrell
NC039392	Tomàtiga de penjar rojo	Cataluña	Girona	Esponella
NC049409	Tomàtiga de penjar rosa	Cataluña	Girona	Esponella
NC042129	Tomàquet de penjar	Cataluña	Barcelona	Gallecs; Mollet del Valles
NC042944	Tomàquet de penjar	Cataluña	Barcelona	Gavà
NC042948	Tomàquet de penjar	Cataluña	Barcelona	Gavà
NC042953	Tomàquet de penjar	Cataluña	Barcelona	Gavà
NC041804	Tomàquet de penjar	Cataluña	Barcelona	Lliça d'Amunt
NC042964	Tomàquet de penjar	Cataluña	Barcelona	Lliça de Vall
NC042116	De penjar	Cataluña	Barcelona	Llinars del Valles
NC042095	De penjar bombeto	Cataluña	Barcelona	Llinars del Valles
NC042120	Tomàquet de penjar	Cataluña	Barcelona	Llinars del Valles
NC042124	Tomàquet de penjar	Cataluña	Barcelona	Llinars del Valles
NC042132	Tomàquet de penjar	Cataluña	Barcelona	Marganell
NC042133	Tomàquet de penjar	Cataluña	Barcelona	Marganell
NC042098	Tomàquet de penjar	Cataluña	Barcelona	Molins de Rei
NC042972	Tomàquet de penjar	Cataluña	Barcelona	Molins de Rei
NC035601	Tomàquet de penjar tissic rojo	Cataluña	Barcelona	Molins de Rei
NC041805	Rosa de penjar	Cataluña	Barcelona	Mollet del Vallès
NC042134	Tomàquet de penjar	Cataluña	Barcelona	Monistrol de Montserrat
NC035080	Tomate de penjar	Cataluña	Girona	Montiro; Ventallo
NC035052	De penjar	Cataluña	Barcelona	Palau-solita i Plegamans
NC042978	Tomàquet de penjar rodo tísic	Cataluña	Barcelona	Piera
NC035038	Penjar	Cataluña	Barcelona	Polinya
NC042325	Tomacó de penjar	Cataluña	Tarragona	Reus
NC042983	Tomàquet de penjar	Cataluña	Barcelona	Sallent
NC042112	Tomàquet de penjar	Cataluña	Girona	Salt
NC042128	Tomàquet de penjar	Cataluña	Barcelona	Sant Boi de Llobregat
NC042081	Tomàquet de penjar	Cataluña	Barcelona	Sant Celoni
NC041825	Tomàquet de penjar	Cataluña	Barcelona	Sant Cugat del Vallès
NC042089	Tomàquet de penjar	Cataluña	Barcelona	Sant Cugat del Vallès

Inventory number	Local name	Autonomous Community	Province	Locality
NC042091	Tomàquet de penjar	Cataluña	Barcelona	Sant Cugat del Vallès
NC042093	Tomàquet de penjar	Cataluña	Barcelona	Sant Cugat del Vallès
NC051552	Tomàquet de penjar	Cataluña	Tarragona	Sant Jaume dels Domenys
NC035057	Tomate de penjar	Cataluña	Girona	Sant Martí; Santa Pau
NC042992	Tomàquet de penjar allargat	Cataluña	Barcelona	Sant Quintí de Mediona
NC080185	Tomàquet de penjar allargat	Cataluña	Barcelona	Sant Quintí de Mediona
NC080186	Tomàquet de penjar allargat	Cataluña	Barcelona	Sant Quintí de Mediona
NC080187	Tomàquet de penjar allargat	Cataluña	Barcelona	Sant Quintí de Mediona
NC042993	Tomàquet de penjar Tomacó	Cataluña	Barcelona	Sant Quintí de Mediona
NC042994	Tomàquet penjar frances rodo	Cataluña	Barcelona	Sant Quintí de Mediona
NC035044	Penjar	Cataluña	Barcelona	Sant Quirze del Vallès
NC042079	Tomàquet de penjar	Cataluña	Barcelona	Sant Vicenç de Montalt
NC035081	Tomate de penjar	Cataluña	Girona	Santa Coloma de Farners
NC035082	Tomate de penjar	Cataluña	Girona	Santa Coloma de Farners
NC035083	Tomate de penjar	Cataluña	Girona	Santa Coloma de Farners
NC042110	Tomàquet de penjar	Cataluña	Girona	Santa Cristina d'Aro
NC042998	Tomàquet de penjar pera	Cataluña	Barcelona	Seva
NC042314	Tomacó	Cataluña	Barcelona	Teia
NC042999	Tomàquet de penjar	Cataluña	Barcelona	Terrassa
NC043000	Tomàquet de penjar	Cataluña	Barcelona	Terrassa
NC042107	Tomàquet de penjar	Cataluña	Barcelona	Tordera
NC042109	Tomàquet de penjar	Cataluña	Barcelona	Tordera
NC035068	Tomate de penjar rosa	Cataluña	Girona	Torroella de Montgri
NC100142	Tomate de colgar	Cataluña	Tarragona	Tortosa
NC042080	Tomàquet de penjar	Cataluña	Barcelona	Ullastrell
NC042099	Tomàquet de penjar	Cataluña	Barcelona	Ullastrell
NC043001	Tomàquet de penjar	Cataluña	Barcelona	Ullastrell
NC105857	Tomàquet de penjar rojo	Cataluña	Barcelona	Ullastrell
NC105858	Tomàquet de penjar rosa	Cataluña	Barcelona	Ullastrell
NC105859	Tomàquet de penjar rosa;hoja patatera	Cataluña	Barcelona	Ullastrell
NC035065	Tomate de penjar	Cataluña	Girona	Vilabertran
NC035075	Tomate de penjar	Cataluña	Girona	Vilabertran
NC068221	Tomate de penjar	Cataluña	Girona	Vilabertran
NC068222	Tomate de penjar	Cataluña	Girona	Vilabertran
NC035076	Tomate de penjar rojo	Cataluña	Girona	Vilabertran
NC035077	Tomate de penjar rosa	Cataluña	Girona	Vilabertran
NC039402	Tomàtiga de penjar	Cataluña	Girona	Vilabertran
NC043002	Tomàquet de penjar	Cataluña	Barcelona	Vilafranca del Penedes
NC043003	Tomàquet de penjar Tomacó	Cataluña	Barcelona	Vilafranca del Penedes
NC035078	Tomate de penjar	Cataluña	Girona	Vilamalla
NC039409	Tomàtiga de penjar	Cataluña	Girona	Vilanant

Inventory number	Local name	Autonomous Community	Province	Locality
NC039410	Tomàtiga de penjar	Cataluña	Girona	Vilant
NC106401	Tomàtiga de penjar	Cataluña	Girona	Vilant
NC042307	Tomacó	Cataluña	Barcelona	Vilassar de Mar
NC042308	Tomacó	Cataluña	Barcelona	Vilassar de Mar
NC042309	Tomacó	Cataluña	Barcelona	Vilassar de Mar
NC042310	Tomacó	Cataluña	Barcelona	Vilassar de Mar
NC042311	Tomacó	Cataluña	Barcelona	Vilassar de Mar
NC042303	Tomacó capullet	Cataluña	Barcelona	Vilassar de Mar
NC042312	Tomacó capullet	Cataluña	Barcelona	Vilassar de Mar
NC042316	Tomacó de penjar	Cataluña	Barcelona	Vilassar de Mar
NC042306	Tomacó frances	Cataluña	Barcelona	Vilassar de Mar
NC041822	Tomàquet de penjar	Cataluña	Girona	Vilobi d'Onyar
NC035103	Tomacó fort	Cataluña	Barcelona	
NC042069	Tomacó fort	Cataluña	Barcelona	
NC042070	Tomata de penjar	Cataluña	Barcelona	
NC035100	Tomate de colgar	Cataluña	Barcelona	
NC099582	De colgar;de Horta de Sant Joan	Cataluña	Tarragona	
NC080769	Tomate de colgar	Euskadi	Vizcaya	Busturia
NC082414	Tomate de cuelga	Extremadura	Badajoz	Calera de Leon
NC091751	Tomate de cuelga blanco	Extremadura	Badajoz	Hornachos
NC091750	Tomate de cuelga rosado	Extremadura	Badajoz	Hornachos
NC080316	Tomate de colgar	Extremadura	Badajoz	Malpartida de la Serena
NC035156	Tomate de cuelga; Colguines	Extremadura	Badajoz	Medellin
NC052441	Tomate de telaraña; De colgar	Extremadura	Badajoz	Mirandilla
NC106405	Tomate de telaraña; De colgar	Extremadura	Badajoz	Mirandilla
NC077841	Tomate de cuelga calereño	Extremadura	Badajoz	Pallares; Montemolín
NC035157	De colgar	Extremadura	Badajoz	Torremejia
NC025693	Tomate de cuelga gordo	Extremadura	Badajoz	Valdetorres
NC029561	Tomate de cuelga gordo rojo	Extremadura	Badajoz	Valdetorres
NC035876	Para colgar	Extremadura	Badajoz	Villanueva de la Serena
NC100136	Tomate largo de colgar	Extremadura	Cáceres	Hervás
NC100125	Tomate rosa de colgar	Extremadura	Cáceres	Hoyos
NC052612	Tomate de boteRosa; Embotellar o colgar	Extremadura	Cáceres	Logrosán
NC106407	Tomate de bote; Rojo; Embotellar o colgar	Extremadura	Cáceres	Logrosán
NC100133	Tomate de colgar	Extremadura	Cáceres	Navaconejo
NC051738	Tomate largo de colgar	Extremadura	Cáceres	Navaconejo
NC052685	Tomate de colgar	Extremadura	Cáceres	Robledillo de Gata
NC106409	Tomate de colgar	Extremadura	Cáceres	Robledillo de Gata
NC018823	Tomate de colgar	La Rioja	La Rioja	Calahorra
NC075068	De colgar	Murcia	Murcia	Finca las Canteras; Águilas
NC055769	De colgar	Murcia	Murcia	Zaradilla de Totana; Lorca

Inventory number	Local name	Autonomous Community	Province	Locality
NC043758	Tomate de colgar	Valencia	Alicante	Cañada
NC082474	Tomate de colgar	Valencia	Alicante	La Romana
NC100098	Tomate de colgar	Valencia	Castellón	Argelita
NC100086	Tomate de colgar	Valencia	Castellón	Castillo de Villamalefa
NC100095	Tomate de colgar	Valencia	Castellón	Fanzara
NC100074	Tomate de colgar	Valencia	Castellón	Figueroles
NC100069	Tomaca de penjar	Valencia	Castellón	L'Alcora
NC035193	Tomate de colgar	Valencia	Castellón	La Serratella
NC100075	Tomate de colgar	Valencia	Castellón	Lucena del Cid
NC100076	Tomate de colgar	Valencia	Castellón	Lucena del Cid
NC100093	Tomate de colgar grande	Valencia	Castellón	Onda
NC100066	Tomate pequeño de colgar	Valencia	Castellón	Onda
NC100078	Tomate de colgar	Valencia	Castellón	Villahermosa del Río
NC100080	Tomate de colgar	Valencia	Castellón	Villahermosa del Río
NC100081	Tomate de colgar	Valencia	Castellón	Villahermosa del Río
NC035604	Tomate de colgar	Valencia	Castellón	Viver
NC100004	Tomate de colgar todo el año	Valencia	Valencia	Chelva
NC035196	Tomate de colgar	Valencia	Valencia	Lliria

Figure 7. Strung tomatoes 'tomàtiga de Banyalbufar', in the municipality of Banyalbufar for their exportation to Barcelona at the end of the 1920s. Photograph: Association of Local Varieties of the Balearic Islands.



Figure 8. Advertising poster of the 'marca de calidad CV' ['CV Quality Mark'] of the 'Tomata de Penjar' of the Association of Producers and Distributors of the Tomata de Penjar d'Alcalà de Xivert.



Annex 1 – List of interviewees

- Josep Roselló Oltra. Organic Horticultural Specialist of the Agricultural Research Station of Carcaixent of the Valencian Institute for Agricultural Research.
- Ester Casas Griera. Director of Les Refardes, microenterprise of organic seeds of local varieties.
- Antoni Feliu. Organic farmer in Mallorca, president of the Association of Local Varieties of the Balearic Islands.
- Mauricio Calduch. Secretary of the Association of Producers and Distributors of the Hanging Tomato of Alcalá de Xivert.
- Lucía de la Rosa. Head of documentation and plant genetic resources coordination of the National Centre of Plant Genetic Resources. National Institute of Agricultural and Food Research and Technology. 'Ministerio de Economía y Competitividad' ['Ministry of Economy and Competitiveness'].
- Josep Serra. Organic farmer of San Jaume Sas Oliveres (Barcelona), member of the Hortec cooperative.

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