

Organic fruit growing in Spain: First approach to its development

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Abstract

Organic fruit growing in Spain is developing enormously in recent years, despite the fact that it presented certain important technical problems in the field of pest and disease control in particular, reaching more than 5,500 hectares at the state level, located mainly in Andalucía, Catalonia and Murcia.

The most commonly applied techniques in the organic cultivation of fruit trees are collected here, reviewing the obstacles encountered, progress made and identifying measures to be applied for their future development.

Keywords: Woodland, permanent crops, conversion, research, plantation

Introduction

For a few years, Spanish society, in the same way as other European countries, shows a greater willingness to consume food produced in harmony with the environment, proximity and high quality. This demand, together with the firm will of some producers, has resulted in a continued and sustained growth in the supply of organic fruits, based on the experimentation of their own cultivation techniques, with the support of a few technicians and researchers.

Several public administrations and private entities have encouraged the organization of technical events or meetings for the exchange and dissemination of technical information for professionals in the sector, with the participation of various experts in the field, including those integrated into the network of the Spanish Society of Ecological Agriculture (SEAE). Also several groups of researchers who have devoted their efforts to carry out studies and projects in this productive sector, but none specifically dedicated to organic fruit growing at least at the state level. There is a precedent of a Working Group dedicated to research and advice on organic fruit growing that was created within the framework of SEAE.

Even so, the organic fruit sector still has several technical deficiencies that may jeopardize its future development and the consolidation of producers and companies that bet on this productive orientation.

Material and methods

We have consulted the most common databases on organic farming, the statistical data published annually by the Ministry of Agriculture, Fisheries, Food and Environment (MAPAMA) of the Spanish Government and Regional Agriculture Governments. In addition, several experts known for their dedication to the sector and to various organic operators (farmers, processors and distributors), especially producers, as well as competent authorities and

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control body of the organic sector have been interviewed. The information has been then contrasted to define relevance and interest.

Results

1. The size of the organic fruit sector in Spain.

The area dedicated to organic farming in Spain at the end of 2016 was 2,018,802 ha. Of this area, more than half was dedicated to pastures (1,052,380.69 ha) and the rest (966,421 ha) to crops. The permanent ones were 489,941.4 ha, according to MAPAMA (2017). Organic fruit growing used 5,648.17 ha at the state level. To this is added the group of banana and subtropical fruit trees (2,912.01 ha) and 736.21 ha of berries. Not included here are 10,182.89 ha of citrus or some minor crops such as pomegranate (Campo et al., 2017). This figure means that this sector is developing by leaps and bounds in recent years despite the problems presented by its initial conversion. This area is located in Andalusia 6,451.20 ha, Valencian C 1,739.94 and Murcia 1,724.55 ha.

The Spanish Regions with the largest area of organic fruit production are Andalusia with 905 ha, Catalonia, 873.09 ha, Extremadura 815.71 ha, Murcia, 541.07 ha, Valencian C 530.48 ha, Aragón, 516.85 ha, Castilla -La Mancha 378.24 ha, and Galicia 302 ha

There is no segregated information on the number of organic operators engaged in fruit growing, of the 41,771 registered under control, or of farmers (of the 36,207 ecological), of the processors (of the 3810 existing and the 2,069 who make handling and packaging of fruits and vegetables) or of the marketers (of the 1411 existing), of the sector dedicated to this activity. We also do not have data on the size of the farms.

We have not found data on organic fruit marketing volumes either. Generally this information, if it exists, is attached to the vegetables and it would be convenient to disaggregate it. In the last study on the characterization of the sector, a commercialized volume of organic fruits of 193.72 t (2011 in 212.95 t (2015)) was indicated, with an increase of almost 30% (2011) and a stagnation in 2015), with a market share of 2.3% (MAPAMA, 2016), attributing an original value of 169.1 million €. On the consumption data, it has not been possible to obtain accurate information.

2. Most common cultivation techniques used

2.1 Hedges and biodiversity

An important aspect of the fruit trees in the plantation is the hedge for the conservation of natural vegetation, which is usually located bordering the plots, although it is also placed in the tree line, being generally aromatic plants. Although the productive area is occupied, the benefits of locating the hedges compensate for this loss, although there are few comparative studies that confirm this (Domínguez et al, 2007).

Many growers have green infrastructure, mainly hedges, which protect the plantation from the effects of the wind, reducing water losses by increasing soil retention capacity, reducing both wind and water erosion, increasing and protecting agrodiversity that improves organic performance of the farm and provides additional crops, improving the agricultural landscape. Plants placed in the treelines, increase the number of beneficial insects that feed on pests and even scare away them. In addition, in some cases, originate additional income from its sale.

For its design, organic fruit growers usually choose species adapted to the area, preferably indigenous. The most common is that they combine a minimum of 5 to 8 species, of staggered flowering, with different root lengths and airships, and of different families. The hedge using for it species not very dense, do not create negative effects like excesses of

humidity, swirls of wind, etc. Farmers leave a minimum distance between the hedge and the crop of 3 to 5 m

2.2 Irrigation and water management

In any case in organic fruit growing the main objective is not the amount produced per hectare, but to obtain fruit of good quality (Vila, 2016a), therefore, it is very important to regulate the contributions of water to the crop, avoiding excessive waterings in the last weeks of fruit growth and that water is of quality.

2.3. Vegetable cover crops

The advantages that contribute to the fruit plantation are known by the producers, although they use them little, in the dry ones. The most mentioned benefits are specified by Alonso et al (2008). In the arid climates of the south of the Iberian Peninsula, due to the weather, the planting takes place in the first autumnal rains. The species selected for this usually adapt to the area, being less demanding in nutrients and water, effective competitors of the herbs, producers of high amount of vegetation, with low implantation costs, being a source of nutrients for the crop..

The dose of sowing is greater than if it is sown as a crop (approximately between a third and a half more). Depending on the rain of the year, the first clearing is done in the flowering of the cover, at the beginning of spring. The rest of the campaign controls the weeds with harrow or brushcutter, although some choose the option of introducing cattle that also distributes manure in the whole plot.

Like the sown covers, many producers begin to be aware of the benefits of herbs in the fruit plantation. These, having different periods of flowering and attracting many insects, are a source of beneficial organisms that help in the natural control of pests. Therefore, it is left and handled as a cover during non-competition for water (winter) and is even respected in certain areas of the farm. Some producers have observed that over the years, species are changing, disappearing the most aggressive

2.4 Fertilization of fruit trees

The soil, as a habitat for a wide variety of beneficial organisms (earthworms, insects, molluscs, bacteria, fungi, algae), essential for the stability and functioning of the farm, thus guaranteeing nutrient cycles and the decomposition of plant material and / or animal. Soil management is aimed at increasing and conserving organic matter and promoting the activities of the organisms living there. Nitrogen excesses are monitored by triggering outbreaks of pests, such as aphids (trophobiosis theory).

The contributions of organic matter based on animal manures (mainly poultry manure and swine), are usually done with caution because of their high nitrogen content, reducing them with mixtures with plant materials or other less strong manures and compost.

2.6 Management of pests and diseases

The presence of these auxiliary organisms depends a lot on the diversity that exists in the farm and its surroundings. The conversion favors the natural biological control of pests, diminishing and even disappearing the phytosanitary problems of years ago that have affected the fruit plantation.

The management of pests and diseases performs a set of preventive techniques (soil management, sowing of vegetation cover, conservation of natural vegetation by installing

hedgerows that increase the agrodiversity of the farm, making contributions of organic matter, making careful pruning or introducing grazing animals in the plot (ducks and / or chickens, mainly).

In some cases, farmers use natural products of vegetable, mineral, viral or bacterial origin, but although they know that they are authorized by the European norm of organic production, they also recognize that most of these products are not safe for the auxiliary fauna and affect both this as to the plagues. Some active substances already have limited use or must be used with extreme caution even for the applicator.

In addition to commercial products, they use a wide variety of vegetable preparations based on slurry, maceration, decoction or infusion, as effective repellents of pests, which usually also have biofertilizing effect.

3. Obstacles, achievements and needs of organic fruit growers

Organic fruit growers express the difficulty they have had in the control of pests and diseases, especially the fruit fly in the conversion period or the difficulty of getting organic materials of animal origin to be used as fertilizers. They also state that they have needs for tools to monitor and control herbs, pests and diseases and require support in the use of appropriate machinery.

However, they state that organic cultivation of fruit trees with a good root system (with mycorrhizae and other symbiotic relationships that can establish the plant), good nutrition and proper management, has a lower chance of contracting a pest or disease (many of us have verified that and phytoplasmas usually affect the weak trees of a plantation first). Farmers state that technical support and exchange between producers has been a way to overcome the obstacles encountered in crop management

4. Research and advice in organic fruit growing

There is little research on organic fruit growing developed in Spain. We have identified a score of studies that have that name as a keyword. As for species, the most studied is undoubtedly the apple tree; Peach and pomegranate are also mentioned. The aspects addressed in a group of 40 identified studies focus on plant health (35%), identification and recovery of traditional varieties, reproduction and biodiversity (28%), general questions on fruit growing and conversion (18%), 10% culture techniques and others in the rest

Although the key to soil fertility is the content of organic matter in the soil and its management, very few jobs are concerned with soil fertility, not finding work on quality and fruit commercialization or on measures to support its practice and its impact or about livestock integration.

As for the places where the studies are carried out, we have Catalonia (Alins et al., 2010, Alegre et al., 2010a and 2010b) and Asturias (Dapena et al, 2008 and 2010). There are also works developed in Andalucía (Sánchez et al, 2008, Hermoso et al., 1994), Valencia (Domínguez et al, 2010, Canet et al., 2011, Campo et al., 2017) or Murcia (González et al, 2008, Egea et al., 2014). Interestingly, we have found few research works in Extremadura, the second Autonomous C on the surface devoted to organic fruit growing, or in Aragón, Castilla-La Mancha and Galicia.

We have identified a large group of articles and informative publications on organic fruit growing in Spanish, mainly in Catalonia and Valencia (Alegre et al., 2010a and 2010b, Alins et al, 2010 and 2012, Alonso et al, 2008, Arroyo et al., 2014, Campo et al., 2017, Vila, 2016a and 2016b, Porcuna et al, 2013, Torrejón, 2011, Glez Martínez et al., 2011). Many of these publications provide general information on general aspects and cultivation techniques in fruit trees of stone and seeds or on the control of certain pests and diseases.

Discussions and conclusions

Organic fruit production has already over 5000 has in our country, practiced in most fruit species and throughout the Spanish geography, overcoming the technical problems of pests and diseases.

There is also already a series of cultivation practices and techniques that are applied, work and have been extended among organic fruit growers everywhere, based on their own experience or that of technical advisors disseminated by them.

All this shows that the organic cultivation of fruit trees, with a good root system, with mycorrhizae, and other symbiotic relationships that the plant can establish, an adequate management of the soil and its nutrition, coupled with proper management, has a lower incidence of pests or diseases. Many organic producers have found that viruses and phytoplasmas affect more weak trees in a fruit plantation. However, there does not seem to be an equal development in the management of soil fertility, which seems to have received no equal attention. An indicator of this is the scarcity of work on plant cover, identification of impacts and uses of organic materials as fertilizers.

In Spain, research in organic fruit growing is low, concentrated on few species and in some autonomous communities, in a few research teams. Its development seems to be based on the exchange and experiences of technicians and fruit growers.

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