PROTECTION of fruit trees under plastic covers

by Juan Antonio García
The protection of fruit trees under plastic covers is not a new practice (orange trees were protected in France for the Royal family as early as the 17th century), but in recent years it has established itself as an essential tool in the search for the early return on investment in some fruit species (grape, cherry, banana) and as a valuable alternative for the viability of success in the commercialization of other species (kiwi, mango, peach, papaya, Japanese medlar... etc.)

Berries (raspberry, blueberry, blackberry and strawberry) whose production under plastic covers and worldwide demand has exploded in this century, require a special consideration that we will address in another specific article.

The advantages of fruit tree protection are highly related to the advantages of plastics in traditional horticultural protection (tomatoes, peppers...etc):

- harvest advance and lengthening (extension of the crop cycle)
- physical protection/reduction of crop losses (rain, hail, wind, frost)
- fruit quality
- productivity increase
Although, all fruit trees have their specific peculiarities, in general they need to accumulate a certain amount of “cold hours” to sprout, so the tree can be exploited for many years without interruption. Considering also that the size of fruit trees is larger than the size of regular vegetable trees means that the structures that protect them must be specially adapted to the needs of the crop and therefore, that applies as well to the plastics that protect them.

Depending on the species of fruit and the latitude in which they are located, we will find different challenges to overcome, although, in general, the high temperatures in the summer and the need for cold hours in the winter will be the factors that determine the design of the structure.

Unlike horticultural plastic covers, this cover must be designed to be able to be installed and removed constantly to adapt to the conditions during these periods of heat and cold. The plastic must have, among other things, the special mechanical resistance to support extreme handling but also maintain the optical properties required throughout its use.

The degree of technology of the structure will depend on the return on investment. The better the price for the fruit obtained in the target market, the higher the technology we can implement in the production of it, and at the same time, the higher the technology of the fruit plastic covers.

We chose grapes and cherries as a relevant example of fruit trees that increase their area of production under protected structures each year and admit very different types of structure depending on the fruit market prices.

Thus, we would have:

1. Low technology structures (Tent type)

The cost of this type of structures is between €16,000 and €26,000, depending on the distance between the poles and the composition of the material (wood or concrete).

The material should allow the colouring of the fruit and avoid burns due to the proximity of the leaves to the plastic cover. Generally, thermal conductivity is not required (since the structure is not airtight) and must have a minimum resistance to pesticides.

These are structures that mainly seek the physical protection of the tree but as a consequence of that protection they also obtain many other advantages (discussed above).

It is also very common to find laminated Raffia protecting the crop. This provides additional resistance against atmospheric agents and influences the crop in a different way than the usual plastic, being used by the producer when required (for example, it delays the harvest of some varieties of table grapes in the Mediterranean basin).
2. Intermediate technology structures

Included in this classification are those materials that are installed on High Tunnels or Spanish tunnels type structures, as well as basic flat and curved greenhouses, but with ridge heights of up to 5 meters.

Aside from complying with the properties required in low technology types, the plastic must have an additional mechanical strength, due to the height and composition of the structures and the handling thereof, since it will be removed and reinstalled on the structure several times throughout its useful life. The thickness ranges from 100 to 180 microns (400 to 720 gauges).

Frequently, depending on the type of fruit tree, crop cycle and geographical latitude, the recommended material must be thermal.
3. Finally, high-tech structures (flat or semi-flat greenhouses)

These are directed towards very specific market niches where earliness, even if it is a few days, before the rest of the competitors can multiply by ten times the sale price. These are windows of opportunity where nobody/very few can produce out of the mainstream season. These are structures with costs ranging from € 100,000 to € 250,000 (depending on whether they have retractable ceilings or not).

Appropriate covers will vary according to the objective pursued and the type of climate in which they are located (tropical, subtropical, desert or cold); so for example less diffuse and more transparent covers for temperate and cold climates and covers with greater diffusion, and even shade factor, for hot climates.

Within this range of technology, all the properties that a general cover plastic can have are already optionally available:

- anti-drip
- anti-fog
- anti-dust
- thermal conductivity
- anti-thermal conductivity

Currently, cherries and cranberries are the fruits that can afford this type of structure, but also other crops are already being tested (for example, papaya) seeking those windows of opportunity on the export fruit markets. All these structures previously discussed are frequently protected with different types of meshes as well (usually anti-hail mesh) that are often complemented with plastic covering materials.

The growing worldwide demand for fruits, either due to the increase in population or because of cultural trends regarding healthy eating habits, means that fruit producers seek to place them in the destination markets at any time of the year with the required quality.

The best profitability and the success of the producer will depend on the quantity produced, the quality of the fruit and the time of sale. In today’s global economy, timing and availability becomes essential to modern farming.