

Quote: . . . to achieve large crops in the early life of the orchard, we have recently moved . . . to a more informal axis with minimal pruning.

Considerations in Establishing an Apple Orchard in Chile

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From the climatic and topographic points of view, Chile is an extremely variable country. Being such a long and narrow country which lies in a north-south position, the climate varies from extremely dry and hot in the northern desert to wet and cold in the south. The topography varies very rapidly from the high Andes Mountains in the east to the Pacific Ocean on the west, all within a few miles.

Apples are mainly produced in the central valley that runs in a north-south direction between the Andes and the coastal range in a section stretching some 250 miles from Santiago south to Linares in the mid-south. It is fairly recent that apples have been established further south in an area stretching from Temuco (400 miles south of Santiago) to Osorno (550 miles south of Santiago).

As a result of this diversity of growing conditions, most apple cultivars can be successfully grown in this long country, including some of the northern European types suitable for cool and mild climates.

The growing conditions encountered in this region are close to perfect: the seasons are well defined, winters are cold and rainy, spring and summer are dry, winter chilling is sufficient, hail and spring frost are extremely rare, and strong winds during the season are unknown. Inexpensive irrigation water flows from the Andes Mountains every year. The area is free of some pests and diseases like fire blight. Irrigated land already under cultivation is available for planting apples.

SELECTION OF CULTIVARS

Chile is a small country with a small local market. Consequently, whatever is planted should be earmarked for export. Up until recently, the decision of what varieties to plant was a fairly easy one. Some of the new bi-color cultivars and improved clones of the existing varieties were the preferred ones. The area planted following these guidelines grew rapidly from 63,990 acres in

1989 to 98,500 acres in 1997. Export projections, based on these plantings, show significant increases (Table 1). From these figures, it is evident that the bi-colored cultivars, which at present command the highest returns per acre, will increase far more than the traditional Red Delicious and Granny Smith. The same trend is expected in some of the other apple exporting countries in the Southern Hemisphere, introducing some degree of uncertainty in future prices for these types of apples. What we should plant now is a far more complex decision than it has been in the past in light of increased competition, lower prices, escalating production costs plus a number of not-yet-fully-proven cultivars.

Our current outlook on cultivar selection is far more critical than in the past. Some of the general considerations when planning a new orchard in Chile are:

1. Include a wider range of cultivars in order to extend the season and to attract personnel over a longer period of time, to spread the risk and to satisfy the markets.
2. Select the cultivars that are suited to the district and the specific site within the farm. Plant more of those that are already proven to produce a higher packout or ripen at a better period than in other areas, even if they do not command premium prices.
3. Plant brand new cultivars or those for niche markets, depending on the level of risk that is acceptable to the specific project.

Considering the wide range of growing conditions, a more specific approach to cultivar selection in Chile will be as follows:

1. In the far south, between Temuco and Osorno, where the growing conditions are similar to those encountered in northern Europe, cultivars like Jonagold, Elstar, Fiesta and some Blushed Golden produce a high packout of top quality fruit. This is the only area in the Southern Hemisphere where this type of apple can be grown and supplied fresh to the markets in the north during the winter months.
2. Red Delicious and Fuji apples should be grown between Curicó and Chillán or at a higher elevation at the foot of the Andes Mountains.
3. Galas could be grown over a large area, including some of the valleys to the north of Santiago, where picking is somewhat earlier than in the more traditional areas.
4. Braeburns of very high quality can be produced from Linares south to Temuco.
5. Golden Delicious are not very popular in Chile, but they should be included in future plantings.
6. Granny Smith are grown successfully over a large section of the country.

SOIL TYPES AND ROOTSTOCKS

The type of soils in which apples are normally planted in Chile are of alluvial or volcanic origin, with a variable amount of stones. Their texture ranges from medium to light and occasionally a drainage system is required. A large number of orchards are irrigated by furrows, using the natural gradient of the land. Soil preparation is fairly straightforward and consists of loosening the soil profile to a depth of some 30 inches by ripping in two directions. The phosphorous content is normally low and it should be increased to 25 ppm by incorporating the required amount of super phosphate before the soil is cultivated. In the area south of Chillán where the annual rainfall is higher, the soil pH is low and it should be corrected by using lime.

Because most of the soils used for planting have been under cultivation with annual crops, it is fairly common to find very high levels of potassium and sometimes soil active weed killers.

The bulk of the industry is planted on seedling rootstocks with a plant population of less than 300 plants per acre. It is only in the last 10 years that clonal rootstocks have become available in significant quantities and higher tree densities have been used. Most of these newer plantings are on MM.106, MM.111, M.26 and M.7. The new M.9 types are already in the country, under evaluation, but not yet in full use.

It appears that, as a result of the high incidence of sunburn and also the technical influence from New Zealand, the industry will continue using a fairly large tree at a medium density.

Once M.9 becomes available, tree density will increase and the choice of rootstocks for the different conditions and cultivars must be made (Table 2).

Replanting apples on old apple land is very uncommon. However, if that is to be required, Merton 793, which is so popular in other apple producing countries in the Southern Hemisphere, could be the rootstock of choice.

ORCHARD ARCHITECTURE

In order to achieve large crops in the early life of the orchard, we have recently moved from vase-shaped trees or the typical Washington State central leader to a more informal axis with minimal pruning. The rigid framework that was required to decrease the incidence of sunburn has been

replaced by poles and wires. A solid wall of fruit that could accept a picking platform, as opposed to individual trees, is preferred.

Due to the use of furrow irrigation, the rows are normally in an east-west direction, which is not the preferred row direction for minimum sunburn and maximum color development. Undoubtedly this traditional way of irrigating is a bottleneck in our orchards not only in terms of water usage but also for the spraying, picking and the integrated fruit production approach.

Table 1. Apple export projections (million cartons).

Cultivar	1996	1997	2000	2005	% variation
					1997-2005
Gala	1.5	2.0	4.4	6.4	225
Fuji	0.5	0.8	2.4	4.3	425
Braeburn	0.4	0.6	1.7	2.8	369
Red Delicious	13.5	11.8	13.8	16.9	44
Granny Smith	7.1	6.7	7.4	9.0	34
Others	0.7	1.0	2.5	4.3	309
Total	23.7	22.9	32.3	43.6	91

Source: Decofrut

Table 2. Apple rootstock choice for different cultivars and soil types.

Cultivar	Alluvial soil	Volcanic soil
Granny Smith	MM.111/M.7	MM.106
Spur Red Delicious	MM.106/M.25	MM.106
Gala	M.26	M.9
Fuji	MM.106	M.9
Jonagold	M.9	M.9
Braeburn	MM.106	M.26