Apple Production Trends in Europe

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THE SOUTH TYROL

The South Tyrol is recognized for producing some of the best apples in Europe, so I considered it pretty important to go and have a look. The area comprises about 18,000 hectares (44,500 acres) of apples, producing around 900,000 metric tonnes of apples (50 million boxes). Production is confined to the floors and gentle slopes running up the valley sides of the Tal, Hugel and Vinschgau valleys. Altitude ranges from about 200 m (650 ft) above sea level in the Tal valley, south of Bolzano, to 1,000 m (3,300 ft) above sea level in the higher parts of the Vinschgau valley, which runs east-west, whereas the other valleys tend to run north-south. Being inland, the area has a continental climate with summer rainfall. The area south of the Alps and Dolomites is well sheltered from the cold weather during spring and autumn experienced north of the mountains in Germany and Austria. It has a longer growing season than in these more northern areas.

Rainfall ranges from 450 mm (16 inches) in the drier parts of the Vinschgau Valley to 800 mm (32 inches) in the wetter part of the lower valleys.

Spring frosts are a hazard. Most orchards have overhead sprinklers for frost protection. However, if many frosts occur some orchards may run out of water and suffer frost injury. Hail is a regular problem with on average between 10 and 20% of orchard area damaged by hail. In the bad hail year of 1998, 27% of the area was damaged.

Summer temperatures are warm, with an average of 97 summer days experiencing temperatures above 25˚C (77˚F) with maximum temperatures on some days reaching more than 33˚C (91˚F). Fruit-growing consultants and scientists working in the area believe that in recent years summer temperatures are getting warmer and the effective length of growing season has increased by about 2 weeks. The negative side of all this is that fruit sunburn problems are increasing. Autumn conditions are very good for fruit coloring and this gives the South Tyrol a huge production advantage for apples over other areas of Italy such as Po Valley.

Land value is very high, said to be in the region of US$440,000/ha (US$162,000/acre), and orchards are very small. In the lower valleys, property size averages 2.5 ha (6 acres), while in the more recently developed Vinschgau valley, properties are much larger, typically 5 ha (12 acres). An orchardist may have 2.5 to 5 ha scattered around the area in several smaller blocks.

The whole area is very intensively planted with apple trees right up to the roads and right into the villages. This creates some real problems with spray drift when controlling orchard pests, consequently a lot of emphasis is placed on non-spraying techniques such as pheromone disruption for codling moth and oriental fruit moth control.

Generally orchard income is insufficient. Farming families usually have another source of income, often associated with the tourism industry which is extremely important in this part of Europe.

VARIETIES

Golden Delicious is by far the most important variety, accounting for almost 50% of present production. Red Delicious is next, with about 10%, followed by Morgenduft (Rome Beauty) which has dropped rapidly out of second place.

As elsewhere in the world, the industry is focusing on rapidly changing its variety mix toward the varieties New Zealand has introduced to their market, along with Pink Lady.

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The Konosortium Sudtirole Baumschuler (KSB), the organization responsible for supplying their nursery industry with planting material, indicated that apple tree propagation is greater for Golden Delicious, Gala and Fuji (Table 1). Approximately 7% is made up of a number of minor varieties

such as Pinova and a small amount of disease resistant varieties for the organic movement. At this stage, organic growers have not shown much interest in resistant varieties because their main focus is on eating quality and the presently available resistant varieties have poor quality.

Pink Lady, because of licensing agreements with other nursery organizations, is not included in their portfolio of varieties so the trees being planted of this variety are not accounted for in the above data.

Pinova is considered suited only to their cooler growing areas, so it is being planted only at higher altitudes in the Vinschgau Valley. It may not be at all suited to New Zealand growing conditions.

Fuji has been scoring very highly in their consumer taste panel work so my impression is that it will become a major variety for them. They are looking for a striped Fuji which colors well all around the fruit.

In the variety storage library at the Laimburg Research Station, Dr. Reinhold Stainer showed me Pacific Rose™ produced on the research station. Its color and appearance were impressive and certainly well ahead of most of the other varieties in their collection.

NURSERY TREE QUALITY

As elsewhere in Europe, tree quality, particularly tree size and branch development, is of paramount importance. The KSB has done a great deal of work defining tree quality and developing techniques to ensure their tree specifications are met. The tree they want must have a minimum of seven branches (feathers), all at a useable height and well positioned, with flat branch angles. Tree height should be 2.5 m (8.2 ft). Virus-free M.9 is the dominant rootstock.

The grower's objective is to fill the allotted space at planting and to bring it into production with a minimum of pruning and training. They expect fruiting in the second leaf and full production by the fourth leaf.

Production of nursery trees of this quality needs good growing conditions and careful husbandry in the nursery. Nursery trees are usually grown on deep soils that have not grown apples before. Trees are planted 40 to 50 cm (15 to 20 inches) apart in the row to allow them plenty of light to enable good branch development and satisfactory bud quality. High soil fertility is important and often nitrogen side dressings are used in early summer to maintain the spring growth flush.

When the nursery tree is 70 cm (27 inches) tall, feathering is induced by sequential spraying of Benzyladenine (Cylex).

An alternative method also widely used and gaining in popularity is the Dutch knip boom (cut tree) technique in which the tree is bench grafted off the stool bed and held in the nursery for 2 years of scion variety growth. During the first dormant season after grafting, these trees are headed back in the nursery to 70 cm (27 inches) and the resultant new growth brought back to a single shoot, which will then give a good number of useable branches at the right height. Trees produced this way are usually of higher quality than those produced with a 1-year-old scion.

Apple trees of this quality usually cost the grower US $4.10-4.70 depending on variety popularity and royalties. There is generally no demand for nursery trees of lesser quality. If the New Zealand fruit industry is to be competitive, we have to be able to source similar high quality trees at comparable prices.

PLANTING SYSTEMS

The great majority of orchards are intensively planted on M.9 rootstock. Occasionally one can see the odd old orchard with large trees on standard rootstocks. These are dinosaurs and rapidly disappearing. Intensive plantings on M.9 were first made in the early 1970s and since then a range of planting densities has been tried including multi rows and ultra high density systems up to 12,000 trees/ha (4,850 trees/acre).

Low prices for fruit in recent years have made investing so much capital into trees unattractive and, as a consequence, the growing system is becoming standardized at 3,300 trees/ha (1,335 trees/acre) in a single row configuration planted 3.3 m (10.8 ft) between rows and 1 m (3.2 ft) between trees in the row.

Nearly all their planting is into replant land and is done without treatment for specific apple replant disease. This seems to work and provides high yields as long as the tree planted is large enough to fill its allotted space (Table 2). At the higher altitudes with shorter, cooler growing seasons, fruit sizes tended to be smaller and yields lower.

PRODUCTION COSTS AND RETURNS

Production costs at orchard level were said to be US$.24/kg (US$.11/lb). This does not include harvest, packing, storage or marketing costs. Harvesting costs lift this to about US$.31/kg (US$.14/lb).

Wage rates are high by New Zealand standards with skilled workers for pruning

TABLE 1

The percentage of apple trees propagated by variety for South Tyrol. The nurseries are supplied with 4.5 million buds per year (Konosortium Sudtirole Baumschuler, March 2000).

Golden Delicious	20%
Royal Gala types	20%
Fuji	20%
Red Delicious	18%
Braeburn	15%

TABLE 2

Yield expectations at full production in years 3 and 4.

	Yield (t/ha)
Fuji	60-70
Braeburn	60
Gala	60-70[z]

[z]with fruit in the 70-80 mm (2.75-3.15 inch) size range

TABLE 3

Labor hours required for a producing orchard in South Tyrol.

	Labor hours	
Operation	**per hectare**	**per acre**
Harvest	261	106
Harvest supervision	30	12
Winter pruning	67	27
Summer pruning	12	5
Tree training	14	6
Hand thinning	38	15
Spraying	31	12
Mulching	17	7
Mowing, herbicide and fertilizer	8	3
Total	478	193

being paid US$11/hour and pickers US$8.25/hour. Labor hours for producing orchards are listed in Table 3. Pickers harvest 160-200 kg (353-441 lbs) per hour. Spraying is done at three to four times concentrated at 500 liters/ha (54 gallons/acre).

Returns in the last 2 or 3 years have been below the cost of production. Only Braeburn, Fuji, Royal Gala, Red Delicious and higher altitude Golden Delicious have produced substantial margins above production costs. Production of Braeburn, Fuji and Royal Gala is confined to the lower, warmer areas with Golden Delicious the main higher altitude variety.

FERTILIZING AND CHEMICAL THINNING

Biennial bearing has been a problem with Fuji but not with Braeburn and, therefore, chemical thinning is very important to minimize biennial bearing in Fuji. Ethrel is becoming the main blossom thinner for Fuji because of its return bloom enhancement. It is usually applied before full bloom to minimize adverse effects such as russet and reduced fruit size. The blossom thinner is followed up with two sprays of Carbaryl. At the time of my visit growers were fairly confident about the long-term availability of Carbaryl for thinning in the post-blossom period even though in New Zealand we are hearing strong rumors of its withdrawal from use in Europe. They do not use NAA or N A Amide on Fuji. Trial work is underway looking at Benzyladenine (Cylex) and its synergistic behavior with other thinning products.

Tree nutrition is very carefully monitored and an important aspect of their integrated fruit production (IFP) procedures. Prior to planting, the soil is carefully studied and analyzed so that any major imbalance can be corrected before planting.

Because their soils are generally light and free draining, they have found large differences from season to season in nitrogen and potassium depending on winter rainfall. These two nutrients are very closely monitored on an annual basis by leaf and soil analysis. Available nitrogen soil testing is carried out in the spring about 3 weeks prior to bud break to determine if there is sufficient nitrogen available to grow the crop. If nitrogen is found to be low in this sample, urea is applied 2 to 3 weeks before bloom.

Recently growers have developed interpretation standards for early season leaf analysis so the fertilizer program can be fine-tuned by taking leaf analysis samples 3 weeks after full bloom.

Postharvest two urea sprays and a boron spray are applied to build up the buds for next season. This is considered very important where cropping has been heavy.