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Strategy of the sour cherry verticum in the Northern Great Plain Region Hungary
(Analytic study)

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Summary: Sour cherry growing and consumption grows dynamically aroud the world. The present volume of 1 million tons will incerase within 10 years with 20–30, or even with 50%. In the world wide sour cherry production, Europe is a decisive factor, i.e. 2/3 of the volume is grown there. Prominent capacities are concentrated in East-Central Europe, mainly Poland, Germany and Hungary. In the future, new concurrent exporters are expected on the European market as Turkey, Iran, Serbia-Montenegro. Hungarian sour cherry production has rich traditions, so the growing techniques and the assortment of sour cherry varieties make Hungary a „Great Power" on this field. Fresh fruit and products developed from sour cherry represent values distinguished as „Hungaricum" on the markets. Sour cherry growing and the path of its products are one of the „pulling branches" of Hungarian fruit growing. Sour cherry occupies 15% of area for fruit growing and 40% within the stone fruits. Sour cherry was grown widely in Hungary, it was grown everywhere as for utilizing waste areas. This is the main reason that yields are low as a mean of 15 000 ha and the volume is low (50–60 000 tons) only. To that poor figure the heavy infections of Monilia contributed substantially in the last couple of years. The two most valid arguments of using the present varieties as the best solution are 1) the cross bred new varieties, and 2) the selections of local, traditional varieties, which substituted the earlier dominant 'Pándy meggy' variety, which had a good quality but yielded poorly. Sour cherry growing of Hungary shifted from the dry regions of the country toward the cooler and more humid regions, where the weather excesses secure a less risky production. The most decisive region is the Norther Great Plain Region comprising Szabolcs-Szatmár-Bereg county, where more than the half of the Hungarian sour cherry volume is produced, and which is bound to increase its production in the future. The majority of sour cherry produced in Hungary is processed, moreover, an important fraction of the exported fresh fruit is also used by the industry. The main importer of Hungarian sour cherry is Germany. The industry manufactures mainly canned products, a smaller fraction will be processed to other products. The expected volumes of sour cherry grown in Hungary in the next 5 and 10-year-period was estimated from data based on the ratio of young plantations, predicted consequences of the global climatic changes, phytosanitary aspects, furthermore, on the development of the technological level. In the region, the volume grown within 5 years, 40 000 t/year will increase within 10 years to 55 000 t/y. The processing in Hungary is not sufficiently differenciated, which is attributed partly to the characters of the varieties, partly to the weaknesses of the processing industry. One of the reasons is the suitability of varieties mainly for canning products. Processed sour cherry products could not be sold at the same price levels achieved by concurrent sour cherry growing countries. The vertical structure of the path of products of sour cherry disposes of adequate processing capacity being ready to be developed or there is sufficient intention of making investments for the purpose of manufacturing special sour cherry products. Significant tasks of development are actual in the field of the ecological and biological conditions of production. Volume and yield security as well as the maturity time and diversification of processing possibilities are the main endeavours in widening the assortment of varieties to be grown in the near future. The main objective in growing techniques is the modernization of phytotechnical procedures, and new solutions of methods of mechanical harvesting and related technical innovations are necessary in the sour cherry verticum. A key question is the effectiveness of phytosanitary procedures with special reference to the Monilia fungus and to the cherry fruit fly as the most important pest. There are two points of break through in the Hungarian sour cherry verticum. On the one hand, meeting the increasing demands in fuits for fresh consumption, on the other hand, the diversification of processed sour cherry products and their introduction to the markets. Both are aiming to increase the competitiveness of the Hungarian sour cherry. For that purpose, outstanding varieties and excellent as well as internationally recognised fruit qualities are ready to be utilized. The most susceptible problems of the Hungarian sour cherry verticum are associated with marketing, alliance of the grower- and processor organisations and their co-operation because no overall integration within the sour cherry verticum has been established yet. Most urgent necessity as well as possibility of changes are felt in the Northern Great Plain Region.

Key words: production, yield, area, processing, prices

1 Sour cherry production of the northern great plain region and of the concurrent regions of hungary as well as of other countries as potential rivals, topographic characterisation of sour cherry plantations

1.1. Sour cherry production abroad

Sour cherry production developed traditionally on the northern hemisphere, at the cooler section of the temperate zone, whereas on the southern hemisphere, the sour cherry appeared recently, just during the last years. The great majority of sour cherry grown all over the world will be processed. This would mean that the choice of varieties has been dominated by the requirements of the processing industry. The volume of sour cherry production grew substantially since the processing industry developed and the problems of mechanised harvest have been solved as the absolute condition of purchasing fruit to be processed for raisonable price.

Sour cherry production is in progress all over the world. Its volume was doubled since 1960. During the last years, 1 million tons have been registrated, 70% of it is produced in Europe. Favourable producer's prices of the 1970-es and the intervention applied in the EU during the 1980-es caused the boom of sour cherry production. In 1988, 620 thousand tons of sour cherry was harvested all over Europe.

During the last 30 years the center of gravity of sour cherry production shifted to the eastern part of Europe. The extension of mechanical harvesting favoured sour cherry production mainly in Yougoslavia and in Hungary, as most of the varieties were of double utilization and suited well to the shaker machines of processing industry. Though producing earlier one quarter of the European volume, Germany was not able to switch to mechanical harvesting because its dominant variety, 'Schattenmorelle' was not suitable to it. Mechanical harvest was the turning point of giving chances to an economical processing. That is the reason of the failure of Common Market intervention given in the 1980-es to growers because their competitivity dropped drastically in spite of the growing demand in processed sour cherry. Large plantations were abolished in Western Europe, mainly in Germany, where the sour cherry was imported from Eastern Europe.

Table 1. Data of sour cherry growing countries

Country	Surface of plantations (ha)			Volume of production (tons)				Mean yields (t/ha)			
	1995	2004	2004/1995 (%)	2002	2003	2004	Mean of the 3 years	2002	2003	2004	Mean of the 3 years
Russian federation	56 000	62 000	111	210 000	201 000	205 000	205 333	3.5	3.2	3.3	3.3
Poland	34 800	38 000	109	173 154	191 127	190 000	184 760	4.4	5.1	5.0	4.8
Turkey	12 033	13 250	110	100 000	140 000	140 000	127 667	7.5	10.6	10.6	9.6
USA	18 080	15 000	83	28 395	102 780	110 000	80 392	1.9	6.8	7.3	5.3
Serbia and Montenegro	21 000	50 000	238	49 810	86 932	100 000	78 917	2.3	2.6	2.0	2.3
Germany	13 970	13 400	96	65 000	95 000	80 000	80 000	4.9	7.1	6.0	6.0
Iran	5 500	9 000	164	50 600	50 800	50 000	50 467	5.8	5.6	5.6	5.7
Hungary	15 000	13 000	87	38 150	38 000	40 000	38 717	3.6	2.2	3.1	3.0
Czech. Republic	2 700	2 500	93	19 194	14 853	16 100	16 382	6.7	6.3	6.4	6.5
Belorussia	10 000	7 000	70	19 000	40 000	15 000	24 667	2.9	5.7	2.1	3.6
Gruzia	5 000	4 500	90	14 000	19 000	15 000	16 000	3.1	4.2	3.3	3.5
Moldavia	1 500	3 500	233	14 180	14 658	14 000	14 279	3.8	4.8	4.0	4.2
Bulgaria	2 673	4 000	150	7 529	10 000	10 000	9 176	2.4	2.9	2.5	2.6
Italy	1 400	1 400	100	9 000	9 000	9 000	9 000	6.4	6.4	6.4	6.4
Albania	3 000	3 000	100	8 300	8 300	8 200	8 267	2.7	2.8	2.7	2.7
Croatio	1 900	2 200	116	6 542	6 947	7 500	6 996	3.0	3.2	3.0	3.1
Canada	902	872	97	4 257	5 119	5 300	4 892	5.2	5.8	6.1	5.7
Austria	730	800	110	3 738	4 900	3 800	4 146	4.7	6.1	4.8	5.2
Makedonia	1 280	1 100	86	3 200	3 690	3 600	3 830	2.9	3.4	3.3	3.2
Uzbekistan	1 000	900	90	4 500	3 500	3 500	3 833	4.5	3.9	3.9	4.1
Greece	860	860	100	3 500	3 000	3 500	3 333	4.1	3.5	4.1	3.9
Bosnia – Hercegovina	950	1 000	105	1 700	2 470	2 200	2 123	2.1	2.5	2.3	2.3
Spain	–	–	–	1 500	1 500	1 500	1 500	–	–	–	–
Slovakia	765	500	65	1 200	1 200	1 200	1 200	2.4	2.4	2.4	2.4
Portugal	400	400	100	600	600	600	600	1.5	1.5	1.5	1.5
Slovenia	65	80	123	317	518	550	462	6.3	8.0	6.9	7.1

Source: FAOSTAT (2005).

The standards of production are largely different still now according to the countries involved. Yields over 10 tons per hectare are outstanding in Turkey, and as a mean of 6–7 t/ha in the USA, Germany, Iran and Czech. Republic In the late socialist countries, the majority of plantations became obsolate, the cultivation was not intense (Russian Federation), thus the yields are low. In Hungary, much planting started (70% ot them being younger than 10 year old), therefore the volume and the mean yields will increase soon.

Statistics of the FAO registered 26 sour cherry growing countries. Data of 2004 are presented in *Table 1* according to their order of mean yields. The total area per country varies between 80 ha (Slovenia) and 62000 ha (Russian Federation).

During the last 10-year-period no essential changes ensued in area of countries, where sour cherry is of minor importance. The extension of sour cherry growing has registered mainly in those countries, where the production was important earlier too. The three most important sour cherry growing countries (Russian Federation, Poland, Turkey) increased their areas with about 10%, which means an adequate growing of the expected volume too. Most growth is anticipated in Serbia and Montenegro, where the area of sour cherry plantations more than doubled (from 21000 ha to 50000 ha) and the volumes grew to its five fold during the last ten years. Further rise of volumes are expected with the aging of plants.

According to the statistics, also Iran developed its area by 64%. In both countries, Turkey and Iran, fruit growing has been stimulated by intense measures. Local climatic conditions facilitate high yields and a prolongation of the harvesting season as well. Low costs of labour favour their participation in supplying Europe with fresh and processed fruit.

Moldavia and Bulgaria are less important from the point of view of sour cherry production, but that may change in the future as a consequence of new plantations. From Rumania but little information is available as for its sour cherry production. They grew, ten years ago, mostly two varieties, 'Nana' and 'Schattenmorelle'. Actually, two third of the new plantations grows varieties of local breeding (e.g. 'Timpurii de Osoi', 'Timpurii Pitesti', 'Timpurii de Cluj' etc.). They also will enjoy favourable position because of low labour costs and an anticipated membership in the EU.

Outside of the European Union, the ratio of young plantations depends on the state subventions, within the EU, i.e. in the member states, mainly on the demand of the market. As the 25 EU states are covering most of the area of European sour cherry production (represented especially by the new members), the prediction of future development is difficult. New plantations are designed according to the actual demands of the market, therefore an eventual breakdown of the market may lead to massive extirpation of orchards harbouring mainly traditional, less marketable varieties.

The actual volume of production and the mean of yields suggest the following conclusions:

- In the advanced countries, the mean yields are higher (5–7 t/ha) due to the intense phytotechnique applied.
- In several countries with a socialist past (Russia, Ukraine, Belorussia, Moldavia, Rumania, etc.) the majority of plantations are obsolate, technologies of cultivation are poor, therefore their yields are low (2–4 t/ha). The fate of their sour cherry production and competitivity depends substantially on state subventions.
- The yearly variation of yields will be a heavy obstacle of becoming competitive. In the USA, the yields of 2002 were low, i.e. 25–30% of the mean of other years.
- Further development of sour cherry production is expected mainly in those countries, where production costs are relatively low, means of yield are high, production has traditions, and privat enterpreneurs or the state recognises the potential of investments and initiate serious innovations.
- The export markets ought to be shared in the future between Polish and Serbian-Montenegrine traders. The future anticipates the appearance of the Russian Federation, furthermore, Turkey, Iran, Moldavia, Rumania and Bulgaria on the markets.

In most countries, a single main sour cherry variety used to be dominant. A large majority of the West European sour cherry plantations, mainly in Germany, is based on clones and derivatives of the variety type 'Schattenmorelle', e.g. 'Fanal'. Less decisive countries (Netherland, Sweden, Denmark, Austria) are planting extensively the variety 'Kelleris 16'. In Central and East Europe former, varieties of the 'Pándy meggy' type were grown extensively under different names. In Western Europe – mainly in France – and in the USA, the light red fruits of 'Montmorency' and its derivatives (e.g. 'Meteor') are the most popular. Here, it should be noted that the new Hungarian cultivar, 'Meteor' is not related to the former mentioned one.

1.1.1. The Russian Federation

In the countries of the late Soviet Union, more than one hundred sour cherry varieties have been grown, though economically significant ones among them were few. The most important types belong to the group of 'Schattenmorelle' (generally known as 'Lyubskaya') and their variants. The Russian Federation encourages the extension of sour cherry cultivation. The volume harvested yearly is around 200 000 tons. The mean yields are between 3 and 4 t/ha.

1.1.2. Poland

The area assigned to sour cherry was 38 000 ha in the last year with a volume of 210 000 tons harvested, which means a five fold increment since a quarter of century. It represents a dynamic development of Polish sour cherry production. The majority of that, during the last five years is achieved by intensification of growing techniques. Polish people themselves were surprised with the results. On an international conference held in 2000, the anticipation of development has been rather underestimated if compared with the actual results. New plantations are promising further rise of productivity in the near future.

The mean of yield is intermediate (4.4–5.1 t) in the last couple of years. The size of plantations is small, the technology is extensive. It is expected that on an area of about 10 000 ha, the plantations will be selected and parallelly new plantations will start fruiting.

The ratio of processed volume is relatively high, about 60–70%. Juice, nectar and deep frozen fruit are significant products, moreover, 10% is going to produce concentrate (purée). In the near past, finished products have been exported to the east, Russia and Ukraine, whereas semi-finished goods went preferably to the western markets. During the last years, about 17 000 tons of fresh fruit has been exported, 3 000 tons of it delivered to Germany, in addition to 40 000 tons of deep frozen fruit.

The utilization planned prefers deep freezing, processing to juice and to concentrate. It is worth while to mark that most processing plants are owned by sister enterprises of western ones. The processing capacity is still scattered and the bulk is dealt with in individual units of small size. The product is not homogenous and the offer of raw material is variable. Productivity is at a low level being counterbalanced by the the low costs of labour. Remarkable is the dynamic impetus concentrated on development as the advantages of EU membership are consequently exhausted in growing technology as well as in building out processing outfits and co-ordinating sales – including chains of retail shops and supermarkets. In the development of Polish fruit-verticum, sour cherry growing and processing occupy a privileged position.

About ten years ago, an intense breeding program started with initial results represented by the promising varieties: 'Sabina', 'Lycina' and 'Wanda'.

1.1.3. Turkey

The country is the third largest sour cherry grower in the world with a volume of 120-140 thousand tons per year, which is three times more than that of one quarter of century earlier. The plantations are menaged by family enterprises. Leading varietiy is 'Kütahiya' with 90%; also 'Tekirdag', 'Montmorency' and 'Macar' occur. The harvested volume is processed mainly as to juice, dried and deep frozen fruit. The area of plantations increases and yields are outstanding (7.5–10.6 t/ha).

1.1.4. United States of America

Sour cherry production of the USA is concentrated around three or four foci: Michigan (40–50%), New-York (5–10%), Utah (10%) and Washington (10–20%).

In most states, especially where the larger enterprises are (Michigan, Utah), yields are utterly variable. In Michigan 2001, 83 000 tons were harvested, whereas in 2002, 450 tons only. It is Washington, where yields are the less variable.

Each time, when the yields are low in Michigan, prices rise significantly in the USA, and the reverse is true in years of abundant harvest. The only reason of the variable prices is the incidence of frost during early springtime because Michigan is exposed to winds from the north.

The demands of the market are less variable, thus the instability is rooted in the changes of supply. Between 1980 and 2001, the producer's price of sour cherry for processing varied within an interval of 0.124 $/kg and 1.026 $/kg. Meanwhile, prices of sour cherry for fresh consumption varied between 0.51–1.27 $/kg.

The primary market of sour cherry is the processing industry. Like of the sweet cherry too, the market has a strong seasonal character starting in June and ending with early August. Being processed, its commodities are available all over the year. Less than 1% is consumed as a fresh fruit in the USA. Processed sour cherry, cooked or fried, is a popular ingredient of the American diet. Between 1999 and 2001, more than the half of the volume was frozen, more than one third was canned and more than 1/10 was desiccated and juice. Substantial quantities of the USA produced sour cherry is exported (*Table 2*).

Table 2. Sour cherry export of the USA (t)

Product	2002	2003
Deep frozen fruit	4453	10903
Canned fruit	6814	2778

Source: USA-FAS. (2004)

The sole dominant variety grown in the USA is 'Montmorency' originating from the valley of the same name in France. It was introduced around the end of the 17th or early 18th century to the American continent. The fruits are 20 mm of diameter, slightly flattened, round. Its colour is bright red turnig dark at full maturity. The flesh of the fruit is pale, yellowish with a pink tint, the juice is light pink with an acidulous taste.

Fruits of 'Montmorency' ripen in July at most sites, but in the northern region, harvests are lasting until August.

The firm consistency of the fruit and the long harvesting period make 'Montmorency' an excellent processing variety, therefore, almost in all new plantations, it is the number one object. At present two Hungarian varieties are planted in the different states of the country. 'Balaton' (the name is applied to the 'Újfehértói fürtös') is the second most important after 'Montmorency'. Blooming time of 'Balaton' is later by a few days than that of 'Montmorency', therefore the probability of being damaged by frosts in late spring is lower than of the former.

In the USA (Michigan) 400 ha has been planted to 'Balaton' (i.e. 'Újfehértói fürtös') until 2000, and 100 ha to 'Danube' (i.e. 'Érdi bőtermő'). Further extension of the two Hungarian cultivars has little chances because in production unfavourable experiences were made. It is worth while to mention the magnanimous breeding program initiated in common with Hungarian researchers using Hungarian varieties. The combination of 'Schattenmorelle' and 'Érdi bőtermő' seems to be promising.

1.1.5. Germany

The majority of the crop is sold to the processing industry. The main variety is 'Schattenmorelle' (its ratio is

85%), less important is 'Kelleris 16' (7%). There are represented also 'Újfehértói fürtös' (as 'Ungarische Traubige'), furthertmore 'Topas', 'Morina' and 'Safir'. Now, the production declined by economic reasons: the revenues did not cover the costs. More than half of the plantations are older than 15 years. For mechanised harvest, they are suited partially only, because sour cherry trees, around 1 million, are mainly scattered.

A fundamental endeavour is to keep the position achieved on the market, and the economical position should be improved by means of using new varieties and technologies. At the traditional growing sites, the main difficulties are stemming from the appearance of the Prune necrotic ringspot virus (PNRV). The affected trees display a decline of 50–70% in yield ('Schattenmorelle', 'Heimanns Rubin'). During the last few years, the disease caused by *Monilinia laxa* became a hinderance number one gradually. Varieties of better tolerance would be of interest ('Schwäbische Weinweichsel', 'Debreceni bőtermő'). Some new German varieties ('Achat', 'Rubellit', 'Jade', 'Spinell') excel with their fruit size (6–8 g) and high content of titrable acidity (16–18 g/l), in addition to their self-fertility and relative tolerance to *Monilinia laxa* infection.

On the European market, Germany is the consumer number one in sour cherry. Some 50–60 thousand tons of frozen sour cherry are imported yearly. Hungary delivers about 20 000 tons of sour cherry yearly for canning.

1.1.6. Serbia and Montenegro

The last years witnessed an important increment of sour cherry plantations, in 2004, 50 000 ha was registered. Low yields are prevalent (2.0–2.6 t/ha) and 100 000 t is the volume produced. Deep frozen (10 000 t) and fresh fruit is delivered to Germany. New plantations are expected to contribute to the production in the future.

Popular varieties are suitable for processing as 'Oblačhinska' and 'Čačanska Rubin' being consumed as fresh fruit too. Hungarian varieties are also planted ('Újfehértói fürtös', 'Érdi bőtermő').

'Oblachinska' is harvested about June 10 to 25, whereas 'Heimanns Konservenweichsel' about June 25 to July 10.

1.2. Sour cherry production in Hungary

1.2.1. The development of Hungarian sour cherry growing

According to the earliest written documents of fruit growing, sour cherry was considered to be a native plant of the area and grown all over the country. The State Office of Statistics registered in 1895, as in its first publication, 2.9 million sour cherry trees in Hungary. In the conscripton dated 1935 – as a consequence of the reduced area by the peace treaty of Trianon – somewhat less trees are mentioned. According to the census of 1959, sour cherries comprised 9% of the whole number of 87 million fruit trees. The second five-year-plan (1961–1865) performed an impetus of planting, and as a result, the number of trees grew to 7.5-fold, in 1972.

In spite of the intense planting program, the volume of sour cherry did not trespass the limit of 40 000 tons during the 1970-es. A dynamic increment of the volume produced is due to the plantations of an area of 5500 ha realised after 1970. That period is marked by the introduction of new varieties bred by Pál Maliga, researcher of the Horticultural Research Institute. At the same time, also new clones of the varieties 'Pándy meggy' and 'Cigánymeggy' selected by Sándor Brózik were inroduced. The next impetus started in 1975 with the appearance of shaking machines, which attained a population of about 90 units in 1985. During the same period, the varieties planted were mainly 'Érdi bőtermő', furthermore 'Újfehértói fürtös' and at lower frequencies clones of 'Pándy meggy' and 'Cigánymeggy'.

Up to the middle of the 1980-es, the country wide volume of sour cherry rose to 80 000 tons and hit the record of 90 000 tons in 1989. Beside the commercial orchards, about the same number of trees was planted in the home gardens.

During the period of 1991–1994, the branch of fruit growing touched the bottom, when very few planting occurred. Subsequently, a slow recovery ensued with a new dash developed overbidding the past times in 2001, when sour cherry became the champion rider of fruit species in the region. It is based on the fact that during the last years of the past millennium, sour cherry proved to be the most demanded and most economic fruit species on the market. Sour cherry occupies 15% of the Hungarian area assigned to fruit production and almost 40% of stone fruits.

The most extended planting design suggests a spacing of 8 x 5 m, which is adapted to the largest Kilby shakers. On poor soils, the 7 x 5 m has been recommended, where the Schauman type of shakers are applied.

The highest rate of sour cherry plantations is registered in Szabolcs-Szatmár-Bereg county, which means that the growers considered sour cherry as an issue, let alone apple, of breaking free from the deadlock of selling difficulties witnessed in the near past. The Research Station of Újfehértó has, on the long run, precious traditions in selecting clones of sour cherries.

More than a half of the sour cherry crop is delivered by small enterprises. Their rate is variable in the other counties.

1.2.2. The present status of the Hungarian sour cherry culture

In Hungary 2003, about 15 930 ha was assigned to sour cherries, which is the 16% of the fruit growing area. The 50–60 000 t crop is 7% of all fruits produced. More than one quarter (27%) is delivered by the county Szabolcs-Szatmár-Bereg, Bács-Kiskun (13%) and Pest (9.2%) counties follow.

Table 3. Age structure of sour cherry plantations of Hungary

Date of planting	Area (ha)
1980 and earlier	2000
1981–1984	800
1985–1989	800
1990–1994	800
1995–1999	5200
after 2000	6200

Source: Estimates for 2005 based on the data of the KSH (2001 and 2003)

The distribution of the plantations according to their age is presented in *Table 3*. A substantial ratio of the area, 3 000 ha, is obsolate, i.e. economically ambiguous. The majority of them is loosely spaced (7–8 x 5–6 m) on poor sandy sites, where many trees are lacking and poorly cared for.

Fortunately, the ratio of new plantations is increasing, so 39% of them is younger than 5 years. In the young plantations, however, the technical level of cultivation is not adequate, and the possibilities of watering are low (14% on the country wide level). The rising number of new orchards promises, all the same, a volume of the crop attaining 100 000 tons.

One of the obstacles, which impair further rise is the fact that the majority of plantations are small in Hungary as seen in *Table 4*.

Table 4. Distribution of sour cherry plantations according to their area

Categories of area (ha)	The ratio of the area of the respective category in relation to the total sour cherry area (%)
≤ 0.5	11.11
0.51–0.99	5.64
1.0–2.99	11.07
3.0–5.99	12.25
6.0–9.99	12.41
10.0–14.99	9.77
15.0–19.99	7.70
20.0–24.99	7.01
25 ≤	23.04

Source: KSH (2001)

The 53.5% of the area is scattered in plots smaller than 10 ha each. For the processing industry, this is a handicap.

Table 5. Distribution of plantations according to the mean of yields (2001)

Mean yields (t/ha)	The ratio of the category (%)
≤ 10	86.16
10–12.9	9.40
13.0–15.9	2.18
16 ≤	2.26

Source: KSH (2001)

Low mean yields prevail in most plants. (*Table 5*). There are many reasons of that, as: loose spacing, age and lacks of trees, high ratio of young plantings, drought because no irrigation and a poor care performed by the growers. In intensive plantations, yields over 15–20 t/ha could be realised, moreover, there are records of 20–30 t/ha too.

Most of the plantings are made to be harvested by shakers for the processing industry. Therefore a suitable loose spacing, high trunks and large trees have been targeted.

Table 6. Distribution of plantations according to the density of plantings (2001)

Density of plantations: (number of trees per /ha)	Ratio of plantations of the respective category (%)
≤ 150	0.05
150–200	17.90
201–300	14.75
301–400	17.38
401–500	37.64
501–600	3.50
601–800	5.04
800 ≤	1.47

Source: KSH (2001)

Spacing of the trees is summarised in *Table 6*. Loose spacing (7–8 x 5 m) is not defeating a successful production provided that suitable care is taken to keep favourable conditions e.g. hand picking for fresh consumption of top quality. However, for that purpose, high densities (over 500 trees/ha) are recommended with irrigation, so all operations, hand picking as well as mechanised harvest are more effective. For that purpose, trees trained to free spindles are spaced to 5 x 3 m or to 4.5 x 1.5 m as slender spindles.

The majority of sour cherry plantations (55.2%) still represents the traditional training system (with central axis or combined). After the introduction of shaking machines in the early 1970es, the vase forms are preferred in the new plantations, as 30.2% of the area. Other forms (Y, spindle, slender spindle) are found in 14.6% of plantations.

Unfortunately, 14.2% is irrigated, further 8.1% is planted on sites, where water is available, but 77.7% is far from sources. Drought is the main reason of the slow growth and late fructification of trees, as well as of the low and variable yields. An intense cultivation cannot be realised without regular watering in Hungary.

1.2.3. Utilization of varieties in Hungarian sour cherry plantations

The abundance of sour cherry varieties in Hungary is outstanding on a world wide scale. We are a „world power" from the point of view sour cherry varieties. It is owed to the large population of seedlings and clones occurring on several sites and being the source of new varieties selected during the last centuries. Purposeful crosses initiated by Pál Maliga half a century ago secured a remarkable progress in sour cherry growing.

Hungary represents a member of sour cherry growing countries of the world with a volume of 50–60 000 tons of crop. Until the 1970es, 'Pándy meggy' was the leading

Table 7. Multiplication of sour cherry varieties in Hungary between 1997 and 2003

Variety	1997–2000		2001		2002		2003	
	tree	%	tree	%	tree	%	tree	%
'Debreceni bőtermő'	853 327	19	259 347	20	196 253	21	259 057	20
'Kántorjánosi'	492 888	11	189 547	14	135 664	15	189 547	14
'Újfehértói fürtös'	1 062 837	24	300 147	23	182 657	20	299 807	23
Totel of the three varieties:	*2 409 052*	*54*	*749 041*	*57*	*514 574*	*56*	*748 411*	*57*
'Érdi bőtermő'	1 523 578	35	430 314	32	302 532	33	430 004	33
Other varieties (16)	467 725	11	146 122	11	103 934	11	138 062	10
Total	**4 400 355**	**100**	**1 325 477**	**100**	**921 049**	**100**	**1 316 477**	**100**

Source: OMMI

variety (81%) of commercial plantations. Significant ratio is occupied by the clones selected from the variety 'Cigánymeggy'. Their ratio diminishes in favour of 'Érdi bőtermő' and in the north-east of land races ('Újfehértói fürtös', 'Debreceni bőtermő', 'Kántorjánosi', 'Éva', 'Petri'). During the last years, 10% only was occupied by clones of 'Pándy meggy', 15% of 'Cigánymeggy' clones, cca. 35–40% of 'Újfehértói fürtös' and related varieties. On the rest (30–35%), first of all 'Érdi bőtermő'is grown.

Recent surveys prove that with the declining ratio of 'Pándy meggy' varieties of the same quality but much more productive selections gained space ('Újfehértói fürtös', 'Kántorjánosi', 'Debreceni bőtermő'). Those are multiplied since a couple of years in the nurseries at a rate over 50%. 'Érdi bőtermő' shares one third of the nursery capacity (*Table 7*). The plantings of the varieties mentioned are summarised according to their distribution in the region and counties, which is an important information from the point of view of supplying the processing industry. (*Table 8*).

1.2.4. Sour cherry production according to regions and counties

As for the area of plantations and volume produced, North Eastern Hungary including Szabolcs-Szatmár-Bereg county is outstanding (*Table 9*). That means, 41.8% and 34.7%, respectively, of the crop were derived from this region in 2003. In the year of low yields, in 2002, the

Table 8. Distribution of the sour cherry area in Hungary according to varieties (ha)

County	'Debreceni bőtermő'	'Érdi bőtermő'	'Érdi jubileum'	'Kántor-jánosi'	'Meteor korai'	'Újfehértói fürtös'	'Cigány-meggy' types	Clone of 'Pándy meggy'	Other varieties	Total
Budapest	5.50	5.65	-	5.55	-	5.50	-	-	-	22.20
Baranya	10.08	43.53	13.68	5.88	6.25	30.36	0.27	0.59	0.22	110.89
Bács-Kiskun	163.51	798.70	109.09	56.82	53.57	566.29	198.16	145.85	65.63	2 157.63
Békés	26.04	65.85	5.64	5.83	0.03	24.9	1.03	2.54	11.78	143.74
Borsod-Abaúj-Zemplén	42.46	86.79	13.97	30.91	1.72	91.32	3.40	14.72	11.40	296.71
Csongrád	20.97	118.69	0.77	6.64	0.51	88.55	7.85	36.30	10.51	290.77
Fejér	48.98	113.23	17.02	55.30	0.04	167.12	88.04	11.79	35.87	537.38
Győr-Moson-Sopron	24.30	78.03	3.14	16.94	0.32	88.54	50.20	13.92	13.99	289.36
Hajdú-Bihar	56.54	82.53	1.23	23.25	7.32	132.17	12.56	9.53	5.73	330.87
Heves	147.9	215.94	0.38	75.61	5.26	160.44	88.15	61.28	47.99	802.96
Komárom-Esztergom	-	15.53	-	-	13.63	7.02	23.65	21.99	1.27	83.09
Nógrád	36.76	80.03	0.91	18.02	0.62	78.52	24.80	4.27	8.33	252.26
Pest	243.61	841.84	38.11	72.21	12.49	699.11	277.86	224.64	135.17	2 545.04
Somogy	6.87	48.08	0.40	18.58	4.49	92.89	21.37	16.37	5.90	225.94
Szabolcs-Szatmár-Bereg	415.32	552.98	64.44	1 570.47	26.26	1 285.12	90.32	24.87	97.05	4 126.85
Jász-Nagykun-Szolnok	8.19	134.90	14.78	5.96	16.32	88.50	113.03	55.36	38.56	475.62
Tolna	3.39	30.74	1.19	1.75	7.14	8.51	12.58	27038	8.04	100.70
Vas	4.57	29.20	-	-	5.69	28.99	3.05	13.87	3.23	88.60
Veszprém	1.30	34.33	0.05	6.60	0.40	70.86	177.94	35.07	53.62	380.17
Zala	4.06	17.11	-	3.58	-	5.44	-	-	2.50	32.69
Total	1 270.35	3 393.68	284.80	1 979.89	162.09	3 720.24	1 205.26	720.34	556.79	13 293.47
%	9.6	25.5	2.1	14.9	2.2	28	9.1	5.4	4.2	100

Source: KSH (2001)

Table 9. Data of sour cherry plantations according to counties and regions

Counties and regions	The area of 2001 (ha)	The area of 2004 (ha)	Difference (ha)	Plantings after 1995 *		Volume of crops in 2003 (tons)	Mean yields in 2003 (t/ha)
				area (ha)	ratio (%)		
Budapest	22	225	203	225	100	522	2.3
Pest	2 545	2 702	157	1 611	59.6	3 951	1.5
Central Hungary	2 567	2 927	360	1 836	62.7	4 473	1.5
Fejér	537	581	44	508	87.4	2 208	3.8
Komárom-Esztergom	83	57	- 26	1	1.8	190	3.3
Veszprém	380	346	- 34	82	23.7	3 198	9.2
Central Transdanubia	1 001	984	- 27	591	60.1	5 596	5.7
Győr-Moson-Sopron	289	393	104	340	86.5	1 146	2.9
Vas	89	134	45	83	61.9	288	2.2
Zala	33	74	41	74	100	70	0.9
Western Transdanubia	411	601	190	497	82.7	1 504	2.5
Baranya	111	134	23	96	71.6	1 148	8.6
Somogy	226	242	16	152	62.8	1 756	7.3
Tolna	101	157	56	132	74.1	555	3.5
South Transdanubia	438	533	95	380	71.3	3 459	6.5
Borsod-Abaúj-Zemplén	297	512	215	432	84.4	1 864	3.6
Heves	803	1 150	347	868	75.5	2 644	2.3
Nógrád	253	330	77	289	87.6	400	1.2
North Hungary	1 352	1 992	640	1 589	79.8	4 908	2.5
HajdúBihar	331	602	271	480	79.7	2 434	4.0
Jász-Nagykun-Szolnok	476	609	133	309	50.7	1 020	1.7
Szabolcs-Szatmár-Bereg	4 127	5 008	881	3 904	77.9	16 870	3.4
Northern Great Plain	4 933	6 219	1 286	4 693	755	20 324	3.3
Bács-Kiskun	2 156	2 194	38	1 438	65.5	6 314	2.9
Békés	144	144	0	100	69.4	676	4.7
Csongrád	291	336	45	316	94.0	1 400	4.2
Southern Great Plain	2 592	2 674	82	1 854	69.3	8 390	3.1
COUNTRY TOTAL	13 293	15 930	2 637	11 440	71.8	48 654	3.1

Source: KSH (2005)
Remark: *calculated from the data of KSH

importance of the region was more accentuated: 51.2%. The Southern Great Plain (17.2%), Bács-Kiskun county within (13%) are the following in importance. Central Hungary, Central Transdanubia and Northern Hungary produce about 5000 tons each. Pest county alone contributes 4000 tons, Veszprém county 3200 tons.

Analysing the size of new plantations, further volumes of crops are expected. During the last 10 years 11 440 ha were planted, 71.8% of the whole area. The mean yields will rise substantially, and the basis of the processing industry is secured for the next 10–15 years. The area of sour cherry grew with 20% between 2001 abd 2004 on the country wide level. One exception is Central Transdanubia, where the area of extirpations was larger than of the plantings. All the same, the ratio of plantations less than 10 years old is there still 60%. Most of the young (10 or less year old) plantations are in the county Szabolcs-Szatmár-Bereg. As further plantations are scarcely expected in the near future, the relative volume delivered from the latter county will increase steadily. Significant areas of new plantations are registered in Pest county (1611 ha, i.e.14% of the country wide increment) and in Bács-Kiskun county (1438 ha – 12.6%), thus conditions of large volumes of sour cherry to be produced in the next 15 years are prosperous.

Costs of production are rising constantly, whereas producers' prices are variable (often too low), therefore, a successful husbandry, let alone development of the enterprise, postulates high yields (more than 10 t/ha). Unfortunately, our mean yields are to low by divers reasons, insufficient cultivation, lack of irrigation, frost damage, problems of fertilisation or pollination, etc. Mean yields appearing in the statistic refer to the whole volume of commercial enterprises. Non fruiting areas are also incorporated and are masking the insufficiencies of cultivation. Promising high yields are registered in some counties (Veszprém, Baranya), where 8–9 t/ha is attained. We may predict that in the new plantations, where technical conditions (irrigation, intensive cultivation) are fulfilled, 15–20 t/ha, and on county level, means of 10 t/ha (for the whole country 8 t/ha) will be achieved.

Table 10. Distribution of sour cherry plantations according to the irrigated area and mean yields

Counties and regions	Plantation (ha)	Ratio of the irrigated surface (%)	Non irrigated but possible to be irrigated (%)	The ratio of plantations of mean yields above 10 t/ha (%)
Budapest	22	99.3	0	0
Pest	2 545	18.9	10.0	11.4
Central Hungary	2 567	19.6	9.9	11.3
Fejér	537	1.8	28.7	23.6
Komárom-Esztergom	83	0.9	0.6	0.6
Veszprém	380	0	0.5	0.2
Central transdanubia	1 001	1.0	15.6	12.9
Győr-Moson-Sopron	289	5.3	13.3	2.4
Vas	89	10.2	0	0.2
Zala	33	0	0	97.7
Western Transdanubia	411	5.7	9.3	9.1
Baranya	111	20.6	0	27.2
Somogy	226	13.7	16.4	0.7
Tolna	101	1.5	4.7	14.5
South Transdanubia	438	12.6	9.5	10.6
Borsod-Abaúj-Zemplén	297	6.1	0	0.7
Heves	803	42.1	5.8	10.6
Nógrád	253	23.5	10.3	3.2
North Hungary	1 352	30.8	5.3	7.0
Hajdú-Bihar	331	8.5	1.3	36.6
Jász-Nagykun-Szolnok	476	2.2	16.0	7.6
Szabolcs-Szatmár-Bereg	4 127	9.9	2.1	18.8
Northern Great Plain	4 933	9.1	3.4	18.9
Bács-Kiskun	2 156	15.7	12.6	11.3
Békés	144	9.2	42.5	44.4
Csongrád	291	25.5	6.2	1.4
Southern Great Plain	2 592	16.4	13.5	12.1
COUNTRY TOTAL	13 293	14.2	8.1	13.8

Source: KSH (2001)

At present, the ratio of plants producing more than 10 t/ha yields is low, i.e. 13.8% (*Table 10*). The cardinal condition of high yield is, undoubtedly, irrigation. Unfortunately, 14.2% of the plantations are irrigated, and the possibility to apply the technique is given in 8.1% of cases. From that point of view, Northern Hungary has the best chances, where the 30.8% of plantations are irrigated, whereas in the Northern Great Plain region 9.1% only. It is advisable to include the conditions of irrigation in planning further development.

1.2.5. Utilization of the sour cherry produced in Hungary

The bulk of sour cherry, 40–60% (25–30 000 t) is delivered to the processing industry. The majority of processing plants is owned by German enterprises, and 2/3 of the canned product is exported to Germany (*Table 11*).

Table 11. Export of canned sour cherry from Hungary in 2003

Target country	tons	1000 USD
All countries	25 947	27 855
Germany	20 766	21 564
Belgium	1 335	1 725
Austria	730	776
Netherland	623	589
Russia	494	759
Croatia	451	508
Slovenia	275	299
Australia	191	248
Canada	176	216
Estonia	113	137
Bosnia-Hercegovina	79	93
Poland	76	88
Serbia-Montenegro	57	211
Others	577	642

Source: Fodor. (2003)

The exported fresh volume is significant (15–20 000 t/year), which is going mainly to Germany (60–70%), where it is processed as well (*Table 12*). Freezing industry and other utilizations are of minor importance (6–8%, 3–4%, respectively).

Table 12. Sour cherry export for fresh consumption from Hungary in 2003

Target country	tons	1000 USD
All countries	15 243	15 006
Germany	10 997	11 238
Netherland	1 935	2 085
Austria	1 013	731
Slovenia	818	469
Belgium	382	381
Others	99	99
June	7 199	6 900
July	8 027	8 100
August	17	6

Source: Fodor. (2003)

Statistical data refer to the volumes going through the commercial channels only. Sour cherry is, however, a commodity that occurs all around the coutryside, markets of small and large communities, alleys and home gardens. It is an important item of home economy. The statistic ignores those quantities. According to estimates, several thousands of tons are involved as fresh fruit as well as processed in households.

Most important partners of sour cherry producers of Hungary, buying either fresh fruit or processed commodities, are Germany, furthermore, Netherlands, Austria, Slovenia and Belgium.

Table 13. Utilization of the sour cherry produced in Hungary

Commodity	Purchases in 2001		Purchases in 2002		Purchases in 2003	
	Volume (1000 t)	Price (Ft/kg)	Volume (1000 t)	Price (Ft/kg)	Volume (1000 t)	Price (Ft/kg)
Fresh export	20.8				15.2	
Canning industry	25.0	58	25.9	63	29.3	95
Deep frozen	4.1	89	5.7	79	4.1	150
Concentrate, juice, dried fruit and others	0.0				2.2	77

Source: Fodor. (2001; 2002; 2003)

1.2.6. Producer's prices of sour cherry

The generally appearing demand of the processing industry is 30–35 000 t/year and of fresh fruit in sour cherry for export 15–20 000 t/year is a reliable sale in Hungary. However, the variation of the volume harvested yearly is of decisive influence on the producer's prices (*Table 13*). Among the processors, best prices are offered by the freezing industry (in 2000, 150 Ft/kg), much less by the canning enterprises (95 Ft/kg) and the less prices are given for the fruit to be desiccated and for making juice (77 Ft/kg).

Export items for fresh consumption are paid differently according to the variety and the region of the country. At the start of season (early ripening varieties and southern growing sites) higher prices may be attained than at the end of the season. Some years characterised by low yields excel with producer's prices as high as 200–300 Ft/kg, on the contrary, in 2004, 60–100 Ft/kg was achieved only.

As a mean of all purcheses, the following prices were registered in 2001: 89 Ft/kg, in 2002: 72 Ft/kg, in 2003: 171 Ft/kg.

Early ripening varieties achieve always higher prices than late ripening ones. The prices on the markets of Germany are around 5 EUR/kg. During the harvest period the prices tend to diminish quickly down to 1 EUR/kg (*Table 14*). In 2004 particularly low prices developed (half of the accustomed ones). Fruit of early varieties were sold around 1.5 EUR/kg, whereas at the end of the season fresh sour cherry dropped to 0.5 EUR/kg.

On the retail markets prices varied around 200–600 Ft/kg, in supermarkets, 0.5–1.0 kg packs were sold for 168–398 Ft/kg (*Table 15*). On the producer's market, fresh fruit costed in 2001: 292 Ft/kg, in 2002: 266 Ft/kg, in 2003: 269 Ft/kg as a mean.

Table 14. Variation of prices of sour cherry on the markets of Germany (Euro/kg)

2002

Week	Hamburg		Munich		Berlin		Stuttgart	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
29.	1.7	2.2	1.7	2.0	1.5	2.2	1.6	2.0
30.	1.7	2.2	1.5	1.9	1.6	2.2	1.5	2.0
31.					2.4	2.8		
32.					2.4	2.8		

2003

Week	Hamburg		Munich		Berlin		Stuttgart	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
25.					3.4	3.8		
26.			3.3	4.5	2.8	3.4	2.0	2.5
27.	1.8	2.0	1.8	2.5	1.8	2.8	1.8	2.0
28.	1.8	2.0	1.6	2.3	1.6	2.0	1.2	1.6
29.	1.5	1.8	1.7	2.0	2.0	2.8	1.4	1.5
30.	1.6	2.2	2.0	2.3	1.5	2.4	1.0	1.5
31.	1.5	2.0			1.5	2.4	1.0	1.5

2004

Week	Hamburg		Munich		Berlin		Stuttgart	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
25.			4.8	5.0				
26.			4.8	5.0				
27.	3.5	3.5	2.8	3.0	3.4	4.2		
28.	2.4	2.4	2.2	2.3	2.6	3.0	1.6	1.8
29.	1.6	2.0	2.2	2.4	1.8	2.5	1.1	2.0
30.	1.3	1.4	1.7	1.9	1.6	2.4	1.4	1.7
31.	1.3	1.4	1.6	2.2	1.3	1.6	0.9	1.2
32.	1.0	1.5	1.5	2.0	1.3	1.7	1.1	1.2
33.	1.0	1.5	3.0	3.2	1.2	1.8	1.1	1.2

Source: Statistisches Bundesamt. BMVEL

Remark: in 2002 29th week = July 15-21.
in 2003 25th week = June 16-22.
in 2004 24th week = June 7-13.

Table. 15 Prices of sour cherry in 2004, wholesale- and supermarkets (Ft/kg)

Week	Wholesale market	Auchan	Cora	Interspar	Tesco	Match
24.	220–350					
25.	240–300					
26.	150–230					
27.	140–200	199	259	398	199	
28.	130–200		259	299	219	
29.	100–150	199		299	199	318
30.	140–200			299	199	299
31.	110–130					

Source: Zöldség- és Gyümölcspiac

Remark: 24th week = June 7–13.

Table 16. Age structure of sour cherry plantations in Hungary and in Szabolcs-Szatmár-Bereg county (2001)

Area		between 0–2 years	between 3–7 years	between 8–12 years	between 13–17 years	between **18–22 years**	**older than 22 years**	total
Whole country	ha	2.693	5.250	890	796	816	2.844	13.289
	%	20	39	7	6	6	22	100
Szabolcs-Szatmár-Bereg county	ha	912	1.993	437	308	187	289	4.126
	%	22	48	11	7	5	7	100

Source: Ministry and the Office of Sz-Sz-B county

1.3. The status of sour cherry production in the Northern Great Plain Region

1.3.1. Sour cherry production in Szabolcs-Szatmár-Bereg county

Within the fruit growing industry of the county, sour cherry is the second most important species after apple. Its area was 5008 ha according to the 2003 data of the State Office of Statistics. The non fruiting acreage was 1651 ha, which was planted in and after 2000. The too old, neglected areas were also included in the figures *(Table 16)*.

Compared with the country wide statistic, 31.4% of sour cherry is most important similarly to apple in this area.

Since 1993, more than 90% of sour cherry plantations were established with state subvention, as all investments were shared with the state at a rate of 50%. The highly variable costs were completed with 600 000–1 000 000 Ft/ha contribution *(Table 17)*.

Table 17. Areas and volumes of yield of plantations in Szabolcs-Szatmár-Bereg county

Definition	1999	2000	2001	2002	2003
Subventionised sour cherry plantings (ha)	338	479	403	649	120
Total sour cherry plantations (ha)	2 492	2 828	4 129	4 778	4 767
Total volume of sour cherry produced (t)	9 000	13000	19009	15207	11379

Source: Office of FVM in Sz-Sz-B county

The profile of varieties changed decisively as a consequence of the introduction of the varieties 'Érdi bőtermő' and 'Újfehértói fürtös' during the 1980-es. In every county and region, North-East Hungarian local varieties and 'Érdi bőtermő' were planted. In Szabolcs-Szatmár-Bereg county varieties of local origin are dominant. According to data of 2001, 'Kántorjánosi' shared 38.0%, 'Újfehértói fürtös' 31.1%, 'Debreceni bőtermő' 10.1%, 'Érdi bőtermő' 13.4% of the area. The rest of varieties are negligible: 'Cigánymeggy' 2.2%, 'Érdi jubileum' 1.6%, 'Meteor korai' 0.6%, 'Pándy meggy' 0.6%, others 2.4%.

The level of phytotechniques and intensity is satisfactory in most of the plantages. Under usual conditions, at the dates of harvests in the larger concurrent countries, Hungarian sour cherry growers completed the harvest. Ripening dates are variable conspicuously as being influenced by the weather. In 2004, the cool spring delayed the harvest by two weeks.

Table 18. Volume of sour cherry produced in different plantations and the possibility of irrigation

Mean yields (t/ha)	Coutrywide total		Szabolcs-Szatmár-Bereg county	
	Ha	%	ha	%
Less than 10	11 459	86.2	3 350	81.2
Between 10–16	1 539	11.6	633	15.3
Between 16–22	135	1.0	88	2.1
More than 22	165	1.2	56	1.4
Total	13 298	100	4 127	100
Irrigated (ha)	1 883	14.2	410	9.9

Source: KSH. (2001)

The age profile of the plantations of the respective counties is favourable, in spite of that the mean of yields is rather low (*Table 18*), in 2002, the average of the county was 5.3 t/ha. All labour costs of cultivation including hand picking are around 100 Ft/kg, whereas with 8 t/ha yields they would have been 65 Ft/kg. With mechanised harvest, further 10 kg/Ft could be subtracted. This indicates the outlooks of increasing competitiveness.

The age of the plantations promises further increments of the volume produced. It means also that we should be careful with further plantings if troubles on the market show up repeatedly. New plantings should not exceed the area of extirpations of decrepit stands, all the same, the volume to be harvested will still grow for a while. Unfortunately, the level of technology cannot be praised with the 9% as the ratio of irrigated plantations. The progress of integrated technologies, however, ought to be judged favourably.

1.3.2. Sour cherry growing in Hajdú-Bihar county

Mean sour cherry yields of the county are between 4 and 7 t/ha depending on years and weather (mainly frosts). This figure is better than the country mean. As the majority of plantations is young, further increment in yields is expected, thus 8 t/ha seems to be realistic, which means about 3500 tons.

On the contrary of that found in other fruits, mainly apple, the age profile of the sour cherry plantations is very good because the ratio of young, non fructifying trees is about 57%, bearing, 5–10 year old trees are represented with 57%, older than 10 years with 17%. All that indicates the rising tendency of yields as well.

In Hajdú-Bihar county, sour cherry is grown preferably near to the neighbouring sour cherry growing region of Nyírség. The commune of Hajdúdorog had the most important plantations of about 100 ha, but outside of the commune the same growers attend further 260 ha near to the border of the county, around Újfehértó, which are not included in the statistic of Hajdú-Bihar county.

Sour cherry was represented by the variety 'Pándy meggy' of good quality but of low yields until the mid of the 1970es following the country wide trend. Then, the growers turned to self-fertile 'Cigánymeggy', which was used as polliniser of the former. A real impetus of growth followed in sour cherry growing in the 1980es, when 'Érdi bőtermő' and the varieties of Újfehértó were planted on large areas. Most plantations existing before 1980 were extirpated partly because their low yield, partly with the collaps and deterioration of larger collectively cultivated areas. The speed-up of renewal ensued around the mid of the 1990es also due to subventions given by the state. The 50% of investment could be requested for by competition.

The actual composition of the sour cherry plantations in the county is the following: 'Érdi bőtermő' 40%, 'Újfehértói fürtös', 'Kántorjánosi' and 'Debreceni bőtermő' together cca 60%. The rest of varieties ('Meteor korai' and 'Érdi jubileum') represents less than 1–2%.

Surveying the spatial distribution of plantations according the their size in 2004 (*Table 19*), the picture is utterly variable. Compared with the data of the State Office of Statistics 2003, conditions seem to be somewhat more favourable because the areas below 1 ha represent 15.4%, meanwhile the country's mean is nearly 35%. Most characteristic for the county are units between 1 and 6 ha and larger plantations. About 30% is the ratio of plantatios, which are large enough to be cultivated and harvested by machines.

The professional level of technology rose considerably during the 1990es. The high producer's prices stimulated the growers to improve their technology of cultivation. Poor plantations were extirpated and for the good ones all cares, nutrition and phytosanitary measures have been given. Unfortunately, the difficulty of sales in 2004 after the harvesting season pressed the growers deficient in funds without real reason to economise, which impaired the technological level of the plants.

Table 19. Distribution of sour cherry plantations according to their size within Hajdú-Bihar county

Size groups of plantations (ha)	Within the whole country		In Hajdú-Bihar county	
	ha	%	ha	%
less than 0.5 ha	1.477	11.3	21	4.4
0.5–1	3.099	23.5	52	11
1–6	1.650	12.5	172	36.5
6–10	1.299	9.8	65	13.8
10–15	1.023	7.7	11	2.3
15–20	831	6.3	15	3.2
20–25	3.063	23.2	42	8.9
more than 25 ha	750	5.7	94	19.9
Total	13.192	100	472	100

Source: KSH. FVM HBM county FM Office (2005)

The economical outlooks of sour cherry production have been favourable during the last ten years and secured conspicuous returns except in 2004, when the low producer's prices caused deficit. The costs of production of sour cherry are around 90–120 Ft/kg depending on the level of technology and quality of the produce. With a producer's price above 150 Ft/kg still some profit could be calculated.

The majority of the volume of sour cherry produced in the county is given to the industry and to fresh fruit export. The outstanding target country is Germany. Home consumption and conservation are less important though significant and are associated with the significant capacity of home gardens. The export is performed by commercial organisations owning cooling plants, especially by the Producing Organization (PO) which are established recently. Their commodities also are processed and mostly exported.

The county Hajdú-Bihar contributes to the country's volume of sour cherry at a rate of 3–4%. The age structure of plantations promises a dynamic increment of the volume as the young plants are represented with 57%. The level of technology as well as the profile of varieties are satisfactory. The sour cherry growers have favourable conditions and prosperous chances provided their business federation rose to the occasion. The area of irrigated plantations should be increased. The majority of the crop should be sold by the Producing Organization (PO) organisation if possible. The possibilities of joining to the Producing Organization (PO) associations of Szabolcs-Szatmár-Bereg county as a means of accumulating the supply of goods for the advantage of growers should be reconsidered.

1.3.3. Sour cherry production of Jász-Nagykun-Szolnok county

Data of 2001 show a high ratio of old (over-aged) plantations within the 476 ha occupied by sour cherry.

Year of planting	Ratio of the area (%)
after 2000	6.7
1995–1999	13.9
1990–1994	0.9
1985–1989	0.8
1981–1984	18.2
earlier than1980	59.5

In 2004, the area of sour cherry was 609 ha. The increment after 2001, when a detailed survey has been made, was 133 ha. Young (less than 10 year old) plantations were relatively few, but from the point of view of yielding capacity the chances are favourable, i.e. 50%.

Plantations older than 20 years amount more than 200 ha in the county.

An assessment of 2001 stated that 35.9% of the plantations are poor or poorly tended, 37.7% scarcely tended or neglected, 41.4% scantly populated (less than 251 trees/ha), 25.2% where more than 25% of the trees died. Irrigation is possible in 2.8% only of the sour cherry area. After those preliminaries, mean yields were very low in 2003, i.e. 1.7 t/ha.

The high ratio of aged plantations caused that the profile of varieties was more traditional, but 'Érdi bőtermő' (28.3%), 'Pándy meggy' (11.6%) and 'Cigánymeggy' (23.7%) are also represented. Varieties of North-East Hungary are less represented in relation of the former two counties: 'Újfehértói fürtös' (18.6%), 'Debreceni bőtermő' (1.7%), 'Kántorjánosi' (1.3%). 'Meteor korai' is also there (3.4%), while 'Érdi jubileum' 3.1% and other varieties occupy 8.1%.

2 Estimates of harvested and traded volumes of sout cherry as outlooks of the future 5 and 10 years

2.1. Conditions of the growing site and technologies applied and their influence on the volume and security of yields and fruit quality

2.1.1. The influence of the expected global climatic changes on sour cherry production in the concurrent regions as well as in the Northern Great Plain Region

A successful cultivation of sour cherry depends on a yearly mean temperature of 8–10 °C, which is valid for the whole territory of Hungary, i.e. light and temperature conditions are fulfilled. Compared with the sweet cherry, lower temperatures are preferred. On the European scale, Southern Hungary belongs to the southernmost region of sour cherry production. Climatic changes as a warming up may alter the situation in the future.

In the Northern Great Plain Region, traditions of sour cherry production are several centuries old, especially in Szabolcs-Szatmár-Bereg county. In spite of that, little attention has been paid to the development of this rural area of N-E Hungary, perhaps because the dominance of apple production exhausted the reserves. The boom of sour cherry growing started much more in the south of the country. Being a plant of cooler habitats, the southern gravitation of the production seems to be unexpected, the severe drought on the sandy soils of the mesopotamian area between the two rivers Danube and Tisza, though tolerated, really did not good for sour cherries. The varieties famous of their large fruit grew to large trees and shaded the hot sand, consequently, proved to be useful as a pioneer on those marginally utilized areas. It was not the sour cherry but the countryside, which profited from the combination. However, we should mark that the water table was former, before the warming up, about 2–3 m deep thus available for the trees.

The water table sank, drastically, that means sour cherry requires irrigation since then. Sour cherry production shifted towards areas, where the global changes of the climat did not aggravate yet the deleterious effects of drought. Sometimes minor changes of relief and of soil may become significant conditions of successful production under those marginal conditions. Less variation of winter temperatures and to escape from spring frosts, i.e. SE exposition of the trees is preferred nowadays. Open habitats on the plain are better than depressions dangerous, where cold air, moreover, water may accumulate.

In the Region of the Northern Grait Plain, the most dreaded casuality of sour cherry growing is the waether, risks of spring and winter frosts, in addition there is the unreliable distribution (in space and time) of precipitation. Thirty years ago, the yearly rainfall – and the reserve of the winter – were sufficient until the ripening of fruit. The amount of rainfall of the first half of the year are not enough to achieve adequate yields and fruit quality any more. Moderate watering is needed also after harvest time as well. Drought after harvest promotes the fall of foliage, which will impair the performance of trees in the next year.

There are also deleterious consequences of the precipitation. During the blooming period, infections of the fungus *Monilinia* are imminent at rainy weather and the success of pollination is reduced. Near to maturity, fruits may burst and rot as an effect of prolonged moisture. Cool and rainy weather may delay ripening, which causes losses in the price paid mainly for fruits of late ripening varieties ('Újfehértói fürtös', 'Debreceni bőtermő' etc.) because the concurrent growers start harvesting already in Germany and Poland and appear on the market.

2.1.2. Effects of expected changes in the phytosanitary conditions in the Northern Great Plain Region and in the concurrent regions on sour cherry production

The most deleterious pathogenes of sour cherry plantations are, in the Northern Great Plain Region, the fungus of stone fruits *Monilinia laxa* and the leaf spot caused by *Blumeriella jaapii*, furthermore the prevailing pests: grubs of maybeetle species (of the *Melolontinae* subfamily), the white moth (*Leucoptera scitella*), and the cherry fruit fly (*Rhagoletis cerasi*).

The *Monilinia laxa* fungus as the most dangerous could be controlled by exactly timed sprays also in average seasons. Most harmful is the damage caused on the floral organs, progressing into the shoot proximally causing wilting, subsequently, wet rot of growing fruits. The conidia penetrate the stigma of the flowers, like pollen tubes, during cool and rainy periods, and may destroy 30–60% of the crop. The regular appearance of the fungus may kill older branches and larger parts of the crown, moreover, whole trees. As rainy weather is rather probable during the blooming period, chances of infection threaten every year the plantations.

Unfortunately, our most important varieties are susceptible to *Monilinia* rot ('Pándy meggy', 'Újfehértói fürtös' and 'Érdi bőtermő'). Highly or moderately tolerant are some so called „pipacsmeggy" varieties, 'Csengődi' and others of the „bosnyák" group. The rot of fruit depends rather on the tendency to burst, or on damage caused by pests and on the rainy weather during the ripening period. The Region of the Northern Great Plain used to be less frequented by rains around ripening, except the year of 2004. A copious rain may start bursting of half ripe fruits and trigger an outbreak of the epiphytotic.

The *Blumeriella jaapii* appears mainly after the harvest. In warm and rainy seasons the purple-brown spots of 2–3 mm size multiply themselves and cause leaf abscision prematurily. Until the mid of August, 70–80% of the foliage may drop, thus development of flower buds, lignification of shoots and the chances to survive the winter frosts are impaired. The Northern Great Plain Region experiences mostly dry and hot summer weather, but some leaf drop of 10-40% may cause, all the same, concern in the viability of flower buds in the next spring.

Grubs of maybeetles are most harmful in the new plantations, where the possibilities of control are rather modest because desinfection of the soil is too expensive let alone the progressive environmental anxieties. Some 10–15 larvae feeding on the roots of a young tree may cause wilting and yellowing, then early fall of leaves, moreover, even larger trees may die as a consequence of repeated attacks.within 1–2 years. In the Northern Great Plain Region, maybeetles are regular pests, and represent one of the most urgent problems of growers.

The white moth (*Leucopthera scitella*) larvae are leaf miners and their presence is marked as designs, 5–8 mm long ont he leafg blade. Higher gradation of the pest, which occurs every 2 or 3 year, may destroy the leaves much before the fall time, sometimes in mid summer. The effects are similar to that caused by blumeriella, impairing the vital power of buds, shoots and yield of the next year.

The cherry fruit fly develop its larvae in the ripening fruit. The damage is two fold: its dropping defiles the fruit and opens door for fungal infection. The pest requires heath, therefore apears relatively late, consequently, varieties of late maturity are more affected (20–60%). 'Pándy meggy' and new varieties released at Érd-elvira are attacked regularly.

In estimating the volumes expected, also the risks and advantages ought to be compared with the concurrent regions of sour cherry production.

The *Monilinia laxa* fungus is also a plague number one in the concurrent regions. Poland and Germany, north to Hungary, the blooming season ensues later, cool periods and rains are more risky than in the south. Epiphytotics of *Monilinia* are more frequent in the north than in Hungary, and the selection of strains resistant to chemicals has more chances. Going to south, the risk of *Monilinia laxa* is decreasing in the following order (Serbia–Montenegro, Turkey). The springs are there warm, less rainy, the risk of fungal infection is lower than in Hungary. The shorter blooming season diminishes also the risk of infection. The risk of developing resistant strains is also low.

The *Blumeriella jaapii* fungus, on the other hand, requires more heat, therefore, it appears late in the summer in the northern countries, however, its damage may become conspicuous, in rainy periods more heavy than in Hungary. In southern countries (mainly Turkey) it appears even earlier than harvest time. This may become deleterious to the next season, but in late summer, the hot, dry weather gives less chances to blumeriella epiphytotics.

Maybeetle larvae are also present in all countries of sour cherry production. There is a whole series of related species adapted to different geographic regions (Maybeetle, April-, June-, forest-, mottled-, oriental-, greenbeetles). Moreover, there are different strains of the same species too, 7 of them occur in Hungary, where one or two of the maybeetle are noxious. The control of all species is equally difficult. The only advantage of the plantations in Germany is an expensive net expanded over the area at the time of flights and egg deposition.

Larvae of the white moth *Leucoptera* cause more damage in the south than in Hungary. There, the weather being more hot, the flight ensues earlier and more (3–4) generations per year may develop, while in Hungary generally 2 only. In the south, young leaves are more exposed to suffer, and higher degrees of gradation are expected, whereas in the north, troubles are less serious.

Also the cherry fruit fly causes more damage in the south than in Hungary. An earlier flight and better chances of overwintering are the decisive moments of the differences. In the south, complaints are heavy, whereas in the north, the later flight reaches only a part of the fruits of latest ripening varieties.

Summarising the outlooks of diseases and pests, we may state that fungal infections (mainly *Monilinia*) are more important in the north, whereas in southern countries, the damage of pests are more serious than in Hungary. Comparing the countries, we may consider Germany as one, which ows some advantage to be able to apply measures of control.

2.2. *Volumes of sour cherry produced in the Northers Great Plain Region and in the concurrent regions expected in 2010 and in 2015*

According to our estimates, sour cherry production of the world increases slowly and will reach 1.2–1.3 million tons in 2010, and 1.5 milion tons in 2015.

On the short run, also the new plantations of many countries are to be taken into account. Most concern deserve Serbia and Montenegro, where 50 000 ha sour cherry plantings are registered, 60% of them were planted after 1995, which means a significant increment of yields. Further growth, though less important is expected in Moldavia, Bulgaria, Turkey and Iran, where the expanding area is more effective than a progress in technology.

The global climatic changes, especially the warming up, may shift the optimum of sour cherry production toward the

north, i.e. from the countries (Serbia, Montenegro, Bosnia-Hercegovina, Croatia, Turkey, Iran) into Hungary and in other northern countries (Germany, Poland) as well as on other continents (North America, Asia), here also substantial growth is expected. In the USA, sour cherry production will increase in Michigan state. Yields will decline at warmer habitats, whereas increase at cool sites.

According the trends and decisions of planting, in the eastern part of Europe, mainly in Poland, the volumes will increase, resulting in 2010 about 210 thousand tons, in 2015, 220–230 thousand tons. In Germany, a temporary stagnation is expected, i..e. figures will not change until 2010, but it will attain 100–110 thousand tons in 2015. Ukraine and Bielorussia are also potential cherry growers, though the technological level is rather low, they could cause surprises during the next ten years on the markets with low grower's prices.

Cherry growing will certainly become more concentrated also in Hungary. In the regions of dry climat, only plantations equipped with outfits for irrigation only will be economical because mean yields depend on sufficient moisture available. Most reduction is expected in the Southern Great Plain Region especially in Bács-Kiskun county. The focus of production will shift to cooler sites, i.e. the participation of the Northern Great Plain Region and of the two counties Szabolcs-Szatmár-Bereg and Hajdú-Bihar will be more accentuated. In the future, that region has to find its way and fight with its own resources in the competition for the buyer's market. Decisions made for the long run should be based on strategical considerations, of course, and they ought to involve a tight co-operation with the competitive growers of the microregions of the country.

In *Table 23*, really calculated yields are shown as predicted for the next 5 and 10 years comparing the expected country means and means of the Northern Great Plain Region, i.e. of its three counties. The increment of yields is contributed to the rising technological level, and less to the extention of the area of plantations. Innovations of the growing techniques are aimed to compensate the excesses of weather and to develop thoughtful phytosanitary measures. They are convinced that those are the most critical points, which need to be considered as the best way to improve yields.

3 Analysis of the production and processing of sour cherry in the northern great plain region and an assessment of its industrial capacity

3.1. International features of sour cherry processing

The trade between different countries of sour cherry for fresh consumption is relatively a minor item (scarcely more than 40 thousand tons) in relation to the whole volume produced of that fruit. Two reasons are mentioned. The more decisive one means that the sour cherry being processed into many different commodities, which reach the consumers and does not mean the consumer's one-sided demands, but rather the (world wide) reduced supply of varieties also suitable for fresh consumption. The second, commonly known reason is that fresh consumption is largely covered mainly by the home grown contingent of fruit, which means also that where sour cherry cannot be grown, the consumers must renounce of this pleasure and of a most healthy food.

Sour cherry for fresh consumption was exported from Hungary, in 2003, around 16336 tons, from Serbia and Montenegro 8734 tons, from the USA 4047 tons, Germany 2875 tons, Austria 2042 tons, Moldavia 1423 tons. Turkey and Belgium contributed with 1000 tons to the foreign markets. Data of the FAOSTAT indicate an increasing tendency of exports from Serbia and Montenegro, as well as from Turkey. The main importers of sour cherry for fresh consumption are Germany (25158 t), Austria (7324 t), Netherland (3857 t) and Belgium (3584 t).

Unfortunately, on the world wide trade of processed sour cherry products documents are not available. In most cherry growing countries, the sale of processed products prevails. Most deep frozen fruit is registered in the USA and in Turkey.

According to our studies, the second most frequent commodity is the canned sour cherry compote. The manufacture of juice and desiccation represent the smallest volumes.

Volumes of commodities containing processed sour cherry is much more important than that for fresh consumption. Germany imported yearly 50–60 thousand tons of deep frozen sour cherries. The contingent of Poland is 40000 tons, that of Serbia and Montenegro 10000 tons.

3.2. The status of sour cherry processing in Hungary

In Hungary, the compote of sour cherry is the main processed product. 25–30 thousand tons are purchased by the canning industry, and the majority of the commodity was exported, in 2003, 25946 tons, 20766 tons of it to Germany and 1335 tons to Belgium. The rest of 11 importing countries altogether took less than 1000 tons.

The factories owned by Germans process fruits at increasing rates here in Hungary, and take the ready product. That tendency will continue in the future.

At the moment the majority of the Hungarian sour cherry, both for fresh consumption as well as processed products is exported to Germany at 70–80%. Since the German market earlier seeming unconfined started to become saturated, it is advisable to explore other foreign markets for additional possibilities to sell processed sour cherry products because other sour cherry exporting countries would do the same. Hungarian commodities ought to be presented and introduced in all potential importer countries. Those commodities should be the most favourable ones as being processed from the Hungarian sour cherry varieties.

The countries producing the large volumes of sour cherry prefer deep freezing as the optimal form of processing. In Hungary, the ratio is 10–15% frozen from the total processed

Table 20. The producer's prises of sour cherry in 2002

Country	Producer's prices (local currency/kg)	Exchange rate of the local currency to Hungarian Forint	Producer's price in Hungarian currency (Ft/kg)
Russian federation	7.482	6.85	51.3
Poland	0.780	59.6	46.5
Turkey	825.641.984	0.00014	115.6
USA	0.988	190	187.7
Germany	0.978	250	244.5
Iran	3.754.114	0.0215	80.7
Hungary	71.544	1.0	71.5
Czech. Republic	21.061	8.3	174.8
Bulgaria	1.022	128	130.8
Croatia	4.3	33.8	145.3
Austria	2.034	250	508.5
Makedonia	25.0	4.0	100
Slovakia	20.835	6.3	131.3
Portugal	1.309	250	327.3

Source: FAOSTAT (2003)

volume. The rise of this fraction is expected because of the increasing demand, but a joint initiative of the participants of the path of sour cherry products as well as state subventions are necessary in order to realise the expectations.

Further forms of processing (juice, concentrate, desiccation) have but little share in the utilization of sour cherry.

Table 20 presents the values of sales, paying the producer's prices, in 2002, expressed in local currency as well as in Hungarian Forint according to the rates of exchange valid in 2005 April. The changes of exchange rates caused by inflation help to make a realistic approximation of the variable prices.

In the two largest sour cherry producing countries (Russian Federation and Poland), the producer's price achieved was 50 Ft/kg, only. In 2002, the producer's price did not attain 100 Ft/kg in Iran, Hungary and Makedonia. For processing, the acceptable price was less than 150 Ft/kg in Turkey, Bulgaria, Croatia, Makedonia and Slovakia too.

In the USA, the severe frost damage caused high prices in 2002, i.e. double as much than usual (1 USD). German, Austrian and Portuguese growers enjoyed of high prices (1–2 EUR/kg). Those examples would be stimulating for the Hungarian growers too provided the competition of countries with low labour costs would not interfere with increasing supplies. As for the prices obtained for canned sour cherry, *Table 21* should give information.

For the sake of growers, the channels of trade promising higher prices should be targeted. Hungarian data prove that the lowest income is promised by manufacturing juice. Canning industry is more generous, sometimes even better than the cooling plants.

The manufacture of juices is one of the youngest branches of the processing industry. The capacity of the Hungarian industry is about 500 million liter/year. The

Table 21. Prices of sour cherry

The type of sale	2001		2002		2003	
	Volume (1000 t)	Price ($/kg)	Volume (2000 t)	Price ($/kg)	Volume (1000 t)	Price ($/kg)
Fresh export	20.8	0.48	15.5	0.49	15.2	0.98
Canned export	24.4	0.73	16.7	0.78	25.9	1.07
Mean price the buyers paid (Ft/kg)		89.2		71.5		170.5
Mean producer's price on the market (Ft/kg)		291.8		265.7		268.5

Source: Fodor. (2001–2003)

exploitation of that capacity is not exhausted in spite of a series of closing downs. The export orientation of that branch became less accentuated, recently.

In the future, it is anticipted that the relative importance of processing forms adding much more to the value of the product will increase conspicuously (dehydration, dried fruit, powder, etc.). It should be kept in mind that those enterprises will gain advantage, which start first to produce the novelty.

The majority of the processed sour cherry is exported. Data presented by the Interdisciplinary Organization and Council of Vegetables and Fruits served as a basis of calculating the ratio of exported and the total volumes of processed products. The values of import are negligible, and there will be no change.

As an endeavour to diversify the supply of the Hungarian market, we should also consider the possibility to receive imported products too (*Table 22*).

4 Strategical objectives of the development of the vertical path of competitive sour cherry products

4.1. Bringing up-to-date the system of ecological as well as biological conditions of growing sour cherry

The termal and light-claims of sour cherry are less high than of other stone fruit species. Therefore, normal yield and fruit quality are expected at moderately cool sites of the temperate zone. Dry and hot habitats cause a reduced size and inferior quality of the sour cherry fruit. That is the reason of successful sour cherry growing in the region of the Northern Great Plain, which is considered a center of European sour cherry production. Sour cherry became a true „hungaricum", i.e. a Hungarian speciality. In spite of that, the selection of the growing site is still a delicate point of decision. No doubt that in Hungary anywhere we will find suitable conditions for a competitive commercial plantations. Attention should be paid especially to micro-sites threatened with excesses of waether casualities, which could be avoided or compensated by wise anticipation.

The role of frost tolerance as a varietal character is

Table 22. Export and import data of processed sour cherry

Product	Export				Import			
	mean of 1997–2003		2003		mean of 1997–2003		2003	
	Volume (t)	Mean price (USD/kg)	Volume (t)	Mean price (USD/kg)	Volume (t)	Mean price (USD/kg)	Volume (t)	Mean price (USD/kg)
Deep frozen s. cherry	1 422	1.12	803	1.61	104	1.13	187	1.16
Canned sweet and sour cherry	17 769	1.00	28 096	1.08	749	1.37	861	1.59
Juice of sweet and sour cherry	522	2.12	364	2.70	37	3.00	68	3.65

Source: Fodor (2003)

considered as one of the most important criteria of choosing the planting material. Early blooming as a consequence of an innate short rest period of the variety ('Érdi nagygyümölcsű', 'Érdi bőtermő') means a higher risk of frost damage caused by low minima of temperature. Therefore, the varieties selected and released in the region offer safe alternatives being more frost tolerant from this point of view.

The best substitutes of the famous 'Pándy meggy' are the self-fertile progenies of crosses 'Érdi bőtermő', and the North-East Hungarian selections of local varieties, notably 'Újfehértói fürtös'. Those varieties being though self-fertile, they need all the same a polliniser variety to be associated in order to achieve adequate fruit set (especially in the last mentioned variety). According to recent results, those varieties are poorly self-fertile only, they need polliniser varieties. In planning of the association of varieties, all varieties selected in N-E-Hungary are insufficiently self-fertile and inter-fertile with each other as being closely related ('Újfehértói fürtös', 'Kántorjánosi', 'Debreceni bőtermő') whereas other Hungarian varieties are adequate partners for them. Open questions to be answered in the near future are related with the new selections of the same area and local varieties ('Éva', 'Petri' etc.).

The unsatisfactory yields in the area may refer to the information published in the literature that the respective varieties are self-fertile and are planted in mono-varietal blocks. Another reason of decisions to be revised is the fact that experiments exploring the fertility of trees used to compare fruit set with that obtained on the auto-incompatible and poorly fertile variety 'Pándy meggy' where a fruit set of 5–10% was considered to be suffcient. However, those varieties are able to set much more fruit, fortunately, and set even more fruit with alien pollen than with their own. In sour cherry plantations a 10–20% rate of fruit set is necessary for an acceptable yield. The same condition should be considered in deciding upon self-fertility and of planting mono-varietal blocks. Otherwise, the possibility of cross pollination should be secured by associating varieties and by utilizing bee hives in the blooming season. All that has to be accentuated in intense technologies with high planting density and small trees.

The problems indicated above call our attention on the questions of fertilisation and mutual fertility relations of varieties, including the tracing up of the S genotypes, which will be more difficult in the tetraploid sour cherry than in the diploid sweet cherry.

Indications from abroad seem to confirm the contention that our varieties of poor self-fertility set less fruit elsewhere too. 'Érdi bőtermő' and 'Újfehértói fürtös' are grown in the USA and also in Germany on an important surface, but their productivity seemed to be unsatisfactory as well. It may considered as a good news for us because the excellent fruit quality is still a stimulating character, which may justify their planting, nevertheless the yielding potential is a limiting factor of variety utilization..

The experiences of foreign growers call our attention on the importance of ecological conditions acting on different growing sites, and change the opinion developed on the varieties. Our varieties keep to maintain their competitiveness under Hungarian conditions only. As for the experiences gained in foreign countries, it is worth while to refer to results obtained in Germany, where the fertility of sour cherry varieties was rated on a scale of 1 to 9 (9 being the best grade). The Hungarian varieties obtained the following grades:

Table 23. Area and volume produced of sour cherry plantations

County	Area (ha)	Volume produced (t)	2010		2015	
			Area (ha)	Volume (t)	Area (ha)	Volume (t)
Szabolcs-Szatmár-Bereg	5 008	16 870	5 000	36 000	5 000	45 000
Hajdú-Bihar	602	2 434	560	3 000	600	4 400
Jász-Nagykun-Szolnok	609	1 020	550	3 000	500	3 600
Hungary	15 930	48 654	15 000	84 000	15 000	112 000

Remark:

In 2010, bearing plantantions 8 t/ha volume was calculated, for Hungary, for Hajdú-Bihar and Jász-Nagykun-Szolnok counties 8 t/ha; whereas for Szabolcs-Szatmár-Bereg county 10 t/ha.

In 2015, 8 and 10 t/ha was calculated.

1: 'Debreceni bőtermő', 'Érdi jubileum', 'Favorit', 'Maliga emléke', 'Csengődi', 'Meteor korai'
2: 'Érdi bőtermő', 'Újfehértó fürtös', 'Pándy meggy'
3: 'Kántorjánosi', 'Parasztmeggy'
4: 'M 7'
5–6: 'Cigánymeggy'

At the same time, the size of fruit was much larger than measured in Hungary. This was, however, not due to the outstanding favour of the ecological conditions but to the plain consequence of the low fruit set.

The susceptibility to flower-monilia (*Monilinia*) is expressed by the ratio of fading flowers on one hand, but also by the length of the shoots wilting subsequently, on the other hand. The varieties 'Csengődi', 'Kántorjánosi', 'Piramis' and 'Bosnyák' are exempt from shoot wilting in spite of sometimes even heavy flower damages. Those varieties may loose the crop of the respective year without further consequences in the next spring, i.e. the tree keeps to be healthy. Very susceptible varieties (as 'Újfehértói fürtös', 'Favorit', 'Meteor korai') loose a good deal of their young shoots after the flowers wilted. Spraying during the main blooming period with fungicids and pruning of the affected shoots ought to be co-ordinated thoughtfully.

The choice of varieties requires careful decisions as for the economic value (quality of fruit, productivity, ecotolerance, resistance to diseases and pests, possibilties of mechanic harvest, agro- and phytotecnical requirements) and potential qualities of the variety. An additional duty is the observation of Hungarian and EU prescriptions. Some advantage is expected from the fact that varieties are accepted already with DUS certificates of a few years, but so the quality of the variety was not tested before the introduction into cultivation. This means some risk in the case of varieties introduced from abroad because the suppression of tests of cultivation may cause difficulties later. The examination of the varieties should be organised carefully, therefore that would be an important strategical task of the near future.

In the examination of varieties, the quality related with processing should receive special attention. The Hungarian assortment of sour cherry varieties should be revised urgently in order to increase the competitiveness of the industry as several characters are undesirable from the point of view of processing (*Table 24*).

The general belief that our varieties are rich in alternatives and cover all possible requirements one quarter of centure ago, but the validity of that contention ought to be called in doubt whether that biological basis would be sufficient to solve the main problems and to serve the innovations of the next period ahead. The tendency of narrowing the score of varieties to be planted should be braked, furthermore, special requirements of the markets related with the much desired prolongation of the harvest season and qualities expressed by the experts of the processing industry should be met.

Former the dominance of the variety 'Pándy meggy' was substituted by the expansion of local varieties selected from the population found in North-Eastern Hungary, at an extent of 50–60%. The partial advantage of synchronous ripening is a homogenous supply for the market, however, it has also disadvantages because of their overweight. 'Újfehértói fürtös', 'Debreceni bőtermő' and 'Kántorjánosi' are rather similar to each other, therefore their harvest, transport and processing may cause jamming at the end of June, early July. The situation is aggravated by the fact that hand picking is performed for considerable masses of fruit delivered to the industry, moreover, the peak of supply exposes, increasingly, the growers to the mercy of buyers. The former problem could be solved by organising harvest operations according to the destiny of the fruit and so the costs of picking could be lowered by applying shakers for items to be processed, and the transitory storage with precooling could be applied to items for fresh consumption. The importance of varieties with earlier harvest dates will increase substantially in the future. Similarly, varieties of later ripening dates (after July 10) may become justified.

4.2. *Possibilities of innovation in the field of phytotechnics and phytosanitary operations*

Two endeavours of modernizing the technology are at stake. On the one hand, high and regular yields are to be achieved as a basic condition of competitivness. The existing plantations should produce 10 t/ha as a real objective, but the new, intense orchards should be bound to harvest 15 t/ha. On the other hand, readiness protocolls should be elaborated for the cases of weather anomalies appearing with relatively high probability, e.g. late frosts. The prevention of and the restoration or mitigation of the damage may have chances by refined techniques.

One of the key questions will be in the near future the watering of plantations. The deleterious effects of prolonged drought periods during the summer cannot be moderated without significant volumes of water. Rains at the end of the growing period after severe drought may cause concern, because sour cherry trees are genuinly resistant to drought. The late appearing moisture triggers a vigorous shoot growth, which weakens at that late date the winter hardiness of the trees conspicuously. The winter damage impairs the transport system of the trunk clogging the circulation of water and nutrients and deteriorates the drought tolerance next year.

With phytosanitary treatments, a couple of norms and prescriptions ought to considered as for the sake of fruit quality and of environmental conservation. The management of sour cherry plantations should guarantee the hygienic status of the product as well as of the environment of the orchard.

Sprays against the ***cherry fruit fly*** are effective after swarming, near to fruit maturity. The compounds recommended are poisons of intermediate or high toxicity – from the point of view of human and environmental risk – and are assigned to the „red list". The danger is particularly imminent because it should be applied closely near to harvest,

Table 24. Favourable and unfavourable properties of sour cherry varieties from the point of view of requirements expressed by the users

Varieties (in the sequence of ripening dates)	Favourable properties	Unfavourable properties
'Meteor korai'	for fresh consumption suitable	not for processing, flesh is soft, the time of harvest influences the dry detachment of fruit, it is picked by hand only
'Csengődi'	its juice is strongly dying of high acidity.	cannot be harvested mechanically, peduncle and fruit does not separate, flesh is medium firm, only for fresh consumption
'Érdi jubileum'	the juice is dying, flesh is firm, its colour is maintained well in processing, tastes well, high soluble solids and acidity, favourable acid:sugar ratio, suitable for any purpose: fresh consumption as well as for processing	the colour and dying capacity of juice depends ont he date of harvest.
'Korai pipacsmegy'	for fresh consumption and also for processing at limited conditions, detachment is dry, harvesting by shakers is possible.	mainly for confection, flesh madium firm, peduncles have stipules
'Kőrösi korai'	dying juice	the flesh is soft and taste a little bitter, detachment of fruit is not dry, peduncles have stipules, fruit is small, not adapted to mechanical harvest
'Favorit'	for fresh consumption	the flesh is soft, peduncles have stipules, detachment is not dry, not adapted to mechanical harvest
'Cigánymeggy'	the juice is strongly dying, small fruits, mainly for juice and for concentrate, high acidity and soluble solid content, the fruit is detached from the peduncle is dry when shaken	only for processing, difficult to shake, peduncles have stipues
'Oblačinska'	the skin of fruit is not susceptible to burst, flesh is dark red, very tasty, refreshing, acidulous, ratio od stone is favourable	the flesh is medium firm, for processing only, fruits are small, dry detachmnet depends ont he harvest date, difficulot to shake
'Érdi bőtermő'	for both purposes suitable, as fresh fruit as well as compote is excellent	flesh is medium firm
'Pándy meggy'	excellent for both purposes, fresh consumption and processing, tastes agreable, balanced, dry detachment from the peduncle	not suitable for deep freezing, peduncles have stipules
'Pipacs 1'	for confection	the flesh is medium firm, not for fresh consumption
'Maliga emléke'	for fresh consumption it is harvested during a prolonged period, large fuits, pleasant acidulous taste	the flesh is medium firm, dry detachment of fruit depends on the harvest date, not for processing
'Debreceni bőtermő'	for both purposes, fresh consumption and processing	for deep freezing less suitable, peduncles have stipules, unfa vourable ratio of stones, for canning it should be used without stones
'Kántorjánosi 3'	for both purposes, fresh consumption and processing, flesh is firm, acidity outstandig high	less suitable for deep freezing, peduncles have stipules, stone ratio is unfavourable, for compote without stones suitable
'Újfehértói fürtös'	the flesh is firm, for fresh consumption and for processing, detachment is dry, favourable for mechine harvesting	the skin bursts easily, peduncles have stipules, the stone ratio is unfavourable, fpr compote without stones suitable
'Éva'	moderately dying juice, for both purposes suitable, flesh is firm	the peduncles have stipules, stone ratio is unfavourable, for compote without stones suitable
'Petri'	moderately dying juice, firm fruit, suitable for both purposes, fresh consumption and processing	peduncles have stipules

so the prescribed waiting time for food safety is difficult to keep. The toxic residues may appear in the processed product of all kind as well with deleterious consequences. The forecast based on feromon traps is still ambiguous, but the yellow colour is attractive for the flies, thus sticky traps catch well animals of both sexes. That technique facilitates the forecast of dynamics of swarming, moreover, the population of egg laying females also could be diminished.

The fungus ***monilia*** (*Monilinia laxa*) is remarkable by two different reasons. To prevent infection of flowers, sprays are actual from the phenological phase of white buttons until the fall of petals, while bees are visiting the flowers. To save fruits against rot, the time of approaching harvest is recommended. Damage on bees and other pollinating insects is easy to avoid because the fungicid compounds do not harm insects. Before harvest, the strict prescription of waiting time ought to be observed. A phytosanitary spray around that time is important from the point of view of suppressing infections by other fungi as opportunistic parasites (*Gloeosporium, Penicillium, Aspergillus, etc.*) penetrating the fresh wounds and producing toxins affecting humans too. Monilia of sour cherry also could be controlled by the integrated growing strategy using a combination of different tools, phytotechnical, biological and chemical.

The problem of toxins could be handled by traditional as well as integrated technologies according to the indicated possibilities. So the troubles caused by necessity to eliminate suspect fractions of the crop in the processing plant could be avoided. In the case of bioculture, more attention ought to be paid to toxin producing infections even on the sour cherry variety 'Csengődi' being allegedly resistant to fungal rot. By that reason, fruit grown especially in biocultivation should be

treated after harvest with some of those preparates mentioned.

Damage caused by the leaf spot fungus (***Blumeriella jaapii***) may become even more serious than that of monilia. Yellowing and fall of leaves is associated sometimes with the dead of peduncles leading to premature reddening of fruits being worthless for any purpose. The anticipated drop of the foliage has further deleterious consequences, susceptibility to winter frost and incomplete differentiation of flower buds. Last year, heavy damage was caused by blumeriella in the rainy May and June of East Hungary. Primary sources of infection are the dead leaves. Growers are less attentive after the first attac of monilia was over and abandone spraying.

The grubs of **maybeetles** deserve also some care especially at threatened sites, where the insect prefers sour cherry in relation to other fruit species. Chemical means are excluded by environmental as well as by economic reasons. At the station of Újfehértó, experiments have been initiated with nematods as obligate insect-parasites associated with synbiontic bacteria. The most effective bacterium strains have been selected to increase the reliability of the preparates. Enjoying international subventions, the EPN preparate promises an economic use because a dosis of 100 IJ/g will be sufficient for practical utilization. A further advantage of the method that it could be added to the water used for irrigation.

4.3. Development of harvest, storage and preparation of commodities

Up to now, mechanical harvest has been applied in Hungary by means of shaking machines, which could not be used but in orchards planted at adequate spacing only. For the purpose of mechanic shaking, special varieties are suitable with open canopy. Shakers available in Hungary (Kilby, Schauman) are dangerous to trees, which are prone to splitting (e.g.'Érdi bőtermő'), or develop drooping branches (the vaiety types of 'Cigánymeggy'), or grow to weak trees (e.g. 'Oblačinska'). Those types of crowns being represented in Hungarian plantations, other principles of mechanical harvesting are to be explored as for their applicability.

With the problem of alternative types of shakers, the reconstruction of the old machinery also ought to be planned. The existing stock of machines is partly obsolete, has low efficiency and cannot be used in the new plantations. As any technical innovation used to be rather expensive, the planned changes should be extended to all components of production (variety, growing system with technical and organisational details involved). The development should aim solutions favourable to both, mechanised harvest and hand picking, in harmony with plantations producing high yields and turn to fructificate soon after planting, etc. The trees should be small with short trunks because in the Hungarian regions of sour cherry production – in contrast with other stone fruit species – the safety of yield does not require to train large trees with long trunks.

One of the solutions involves a tight spacing (4.5–5 x 4 m), trunks of 40 cm, and harvesting with shakers, which shake the trunks. Four persons at most are necessary to serve the trunk shaker machine of CEPPARO CT TR 2000 type with a screen collector. The screen is easily extended below the crown, and the movement of the construction does not cause problems. The mild shaking is performed by a rotating head, whereas the strength of claws, the intensity and frequency of shaking are easily adapted to the circumstances as the age and load of the tree or the force required to detach the fruits.

In Poland and Germany, grape harvesting combines (vintager machines) are used for sour cherry with success. The advantage of Gregoire Typ G 60 harvesters is based on the fact that no training to develop trunk and crown is needed. The short trunks and free spindle crown with central axis secure good yields and quick returns.

The cooling capacity of the whole country is somewhat more than 200 000 t. Mainly apple cooling was planned, therefore stone fruits especially sour cherry may have a little share in those stores.

Apple is stored in blocks of 4–8 containers put on the top of each other. Sour cherry tolerate 1–2 containers per block, consequently the space needed for a unit volume is three or four fold larger for sour cherry than for apple. Moreover, the maximum storage time for sour cherry is 1–2 weeks, which means that the existing capacity would be sufficient for sour cherry.

Cooling plants should be placed near to the important plantations. The precooling requires high performance. For fresh consumption, the cooling facility should be complemented with outfits, i.e. machines for selecting and packing of the commodity in one complex.

4.4. Processing and development of commodities

Demands for sour cherry juice are expected to increase in Hungary, though most likely, consumers will prefer orange, apple and peach juices, continuously. Sour cherry will have more chances in preparing special refreshing drinks. The general trend promises an increase of consumption in all kind of drinks. The industry manufacturing fruit juices experiences a never felt boom of innovations offering extremely new preparates as well as functional drinks, which should help to expand the utilization of sour cherry as well.

The export of sour cherry juice will have minor importance in the future as well by two reasons: 1) local fruit is everywhere processed preferably, 2) for preparing drinks imported concentrates are used. By that reason, the export of concentrates of excellent quality will have more chances. The market of sour cherry concentrates is in North- and Western Europe, where sport- and energy-drinks are popular. In South Europe, fresh fruit consumption prevails and for juices and nectars their own grown fruit is used.

The raw sour cherry juice could be delivered preferably as a concentrate because the tarnsport is easier and cheaper. The manufactures perform the concentration by distillation of several grades, which causes, however, irreversible

changes in the taste, fragrance and colour of the concentrate. The end product will be, consequently, of lower quality than the original juice. New technological tricks are able to avoid this decline, especially some procedures applying membranes are promising alternatives.

In the current year it was the eight opportunity of a series of professional exhibitions called „Foodapest", which proved on the international level the importance and competitiveness not only of highly sophisticated commodities but rather that of the specialities, which may meet individual requirements. European fruit markets having the character of buyer's market, will be interested in specialities of the mentioned kind. Sugarless items, biomarmalades and other „bio"products will become soon standard items of the food supply, whereas the manufacturers will offer new specialities. It is anticipated that semi-finished fruit products will gain of importance as being utilized according to prepare manyfold end products (containing fruits only or partly, more or less processed ingredients of fruit). From this point of view desiccated fruit and powders are of interest. Dried fruit of different kind appeared already on the market. Powders and their respective special derivatives have not got attention yet, but in the near future, we shall, certainly, witness a break through as soon as the manufacturing capacity has developed. Sour cherry will enjoy special esteem as for its outstanding dietic and medicinal functions. The flavonoid (quercetin) content of sour cherry is outstanding, many fold if compared with other stone fruits. Sour cherry powder could be utilized for many purposes. Observing the development of market, a combined preparate with sweet and sour cherry powder would be a new item to be elaborated. It would be worth while to explore the possibilities of combining the Hungarian honey (being equally a „hungaricum") of special quality with sour cherry products of any kind.

Whatever kind of sour cherry products, their success and competitiveness on the market depends solely on the Hungarian trademark. A survey of the Amway Corporation prove that Hungarian sour cherry concentrates contain more anti-oxydants and 4–5 times more anthocyanin than those of the 'Montmorency' variety. This calls our attention to the fact that Hungarian sour cherry should not praised for its sweet-sour, agreeable taste and rich fragrance, only. A successful and competitive marketing ought to be realised by an offer of a profusion of products with parameters of special quality. Trademarks and patented products are suitable to earn the fruits of a well organised production. In the USA, the quality of Hungarian sour cherry varieties received already patented protection.

The stone of sour cherry contains also about 2–3% amygdalin, which could be hydrolysed enzymatically and produces benzaldahyd. This is a handicap in processing. The canned seedless sour cherry is more precious because of its lower content of benzaldahyd. The flesh contains only traces of that compound, but during processing, a fraction of stones used to be broken, consequently, more benzaldahyd may get into the respective commodity. In some commodities, which contain the stone of the fruit (e.g.deep frozen and desiccated fruits) or in those, where the process cannot avoid the break of some stones (juice, concentrate, powder) certain varieties should be preferred known of their lower content of amygdalin in the kernels (e.g. 'Meteor korai', 'Piramis', 'Csengődi', 'Érdi jubileum'), as far as the rest of their characters are advantageous for being processed for the respective purposes. Examinations proved that some of the varieties contain even higher doses of amydalin than average (e.g. 'Érdi bőtermő', 'Maliga emléke', 'Pándy meggy', 'Cigánymeggy').

In concordance with the processing companies of the region, a strategy should be developed to assess what capacities should be increased and at what extent taking into account the demands of the market of sour cherry and of respective products. An exact survey should decide which technologies are bound to become obsolete or what are the chances to maintain the present capacity for a set term without or with adequate changes being actual on the short or even long run. Decisions are to be made upon the developments requiring co-operative efforts. A mapping of the divers procedures of processing as for their conformity to prescriptions of food-safety and the grading of the individual processes should be made conscientious. The ability of the individual processing plants to select and eliminate toxic or suspect items should be generally known.

According to our estimates, the 40–55 thousand tons of sour cherry processed in the region is distributed according to the following figures taking in account the demands of the foreign and internal markets:

Type of utilization	In the following 5 year		5–10 years later	
inland fresh consumption	5%	2000 t	7%	3850 t
fresh fruit going to be exported (for fresh consumption and processing as well)	35%	14000 t	15%	8250 t
processing by the canning industry	25%	10000 t	30%	16500 t
manufacturing juice	5%	2000 t	5%	2750 t
cooling industry for deep freezing	5%	2000 t	8%	4400 t
distillation	5%	2000 t	5%	2750 t
fruit powder	10%	4000 t	15%	8250 t
fruit concentrate	3%	1200 t	5%	2750 t
other types of utilization (liqueur, sour cherry in spirit, dried cherry, confection, etc.)	7%	2800 t	10%	5500 t

According to our calculations, volumes processed by the canning industry as well as exported as fresh fruit will tend to diminish. Cooling and fermentation will require slightly more than at present. New forms of utilization will appear: concentrates and powder by gradually increasing rates. The latter two products will mean points of outbreaks in improving competetiveness. As the relative importance of fresh consumption and of the diverse types of processing may change markedly by the variation of booms and downs of demands, the best policy seems to keep open the possibility of an easy and dynamic permeability from one to

the other type of utilization always according to the changing chances of the current markets. The most important condition of the presented strategy is a tight and thoughtful co-operation of the actors in the sour cherry path of products, within the respective region. The lack of consent may endanger deadly the competitiveness, i.e. the mere existance of the whole sour cherry path of products.

Cherry concentrate is a significant item on the world's market except in Hungary, where the extremely variable prices on the one hand and the relatively low acidity and dye content of fruits grown in Hungary on the other hand prohibit an extended manufacturing. Sour cherry products preserved in alcohol would have little chances because of the poorly differenciated rigour of the Hungarian law regulating inland revenues.

4.5. Development, building out of markets, marketing and sales

During the last ten years, sour cherry consumption of Hungarian families declined due to the trend of increasing exports with favourable producer's prices. In the future, changes are expected because:

- possibilities of sales on export markets will decline,
- more fresh fruit will appear on the market,
- the choice of traditional and special sour cherry commodities will increase,
- sour cherry will gradually gain recognition as a sanitary food.

It is accepted generally that the ration per head of fresh sour cherry should approach 4 kg, which means 4% of total fruit consumed in Hungary. There is scarcely any fruit, which could be recommended for consumption without restriction than sour cherry.

Our traditions and trademarks are to be transformed to advantages in the competition. It is just a sign of our awkward marketing policy that the excellent deep frozen Hungarian sour cherry achieved cheaper prices on the international markets than the products of much inferior quality delivered by the concurrent states (Poland, Serbia, Turkey).

The Northern Great Plain Region may boast of a good reputation on the European market, therefore the participants of the path of sour cherry products should consider the reformed system of market regulations in the EU concerning vegetables and fruits ¯ CMO. It sees the strengtening of the concentration of supply in special products as the most actual co-operative strategic task to meet the challenges of increasing competition of countries belonging to the third world. Moreover, promotion of all measures helping to develop a healthy regime of nutrition has been decided. The most urgent interest of the Hungarian sour cherry production is to achieve balanced prices in order to become calculable recorded furnishers of the EU market.

The increasing figures of sour cherry production in all concurrent countries and in Hungary promise further concerns in sales of the future. In the next years, no chances are awaiting for extensive plantings. As considerable areas of old plantations are about to be extirpated, a slight regression of the total sour cherry area is impendent. The concentration of growing is in progress. Plantations of larger pace are expected on sites, where high yields are promised, moreover, integrator organisations (PO) are ready to help growing and where the processing plants are in the neighbourhood.

Supplies of sour cherry, both for fresh consumption and for processing, are gradually shifted to supermarkets, chains of retail commerce and discount shops. The interests of growers as well as of processors suggest unequivocally the organisation of a tight co-operation with representants of the trade. Mutual co-ordination of the two parties should help a dynamic adaptation to the demands of the market with the type of commodity, packing, quality, quantity and timing of delivery.

In the trade, a joint appearance and building out of adequate representation is of prime importance. A promising change was in 2004 the formation of the Alliance of Hungarian Sour Cherry Growers for Safegarding Interests (MMÉSZ). The trading organisations of growers (Producing Organization) should be strengtened as an absolute condition of having access to the interventions of the EU supporting development. Processing plants should be owned by the growers themselves, so the harmonisation of growing and processing has the best chances. Any failure of collaboration among members of the sour cherry path of products strengten the position of competitors.

Interdisciplinary organisations and alliances to protect the interests of growers and processors should co-operate in order to liquidate the chain-trafficking of the goods. The co-operation of the growers in not sufficient because other participants of the path of sour cherry products, dealers, processors, etc. should agree as parties of equal rank for the sake of success. The possibility of cartell formation against the interest of the growers should be eliminated. The product path of sour cherry will be efficient only on conditions that new markets were found for fresh fruit as well as for the processed products, in other words, its formation and extension of markets became successful increasingly. Without that the number of organisations may multiplicate vainly unless they are not obliged to share the existing market capacity only.

All participants of the path of products are interested to keep the rules of the contractual discipline, which guarantees prices as well as terms of quality between the parties.

According to the regulation of the ECM Council No. 2200/96, the price of products in six fruit species (apricot, peach, pear, apple, sweet cherry and plum) the current prices in Hungary will be promulgated weekly, unfortunately, sour cherry is not included. The commodities produced in Hungary are obligately reported. The elaborated prescriptions of the WTO as for the introductory prices for imports, which cannot be bidded lower than indicated, are not referring to sour cherry, but its import prices are to be announced. The declared aim is to secure the balance of the market beween May 21 and August 10.

The serious trouble of sales experienced during the last two years were a constructive lesson. The season of 2003 started with empty stores, the demand was booming,

consequently, prices became excessively high, which was misleading. The owners of less productive plantations believed that they will earn well also in the future. Canned sour cherry was accumulated in the stores without being exhausted until 2004. Many tradsmen and processors forced down the prices by retail sale because they did not consider the laws of the market also of processed sour cherry.

The only advantage of the loss was a revelation for the growers that the main condition of a positive balance of trade or of competitiveness is a high yield of the plantation. The last years made it clear to the participants of the market that an agreement on prices (price center) of a three-year-period with the main foreign partners (Germany and Poland), processors and market chains is unavoidable. Without it – the lack of introductory prices – the sour cherry growing EU countries will be exposed to the market-distorting effects of dumping coming from third countries.

In 2004, the importers of Germany referred to the excessive purchases of processors in 2003, and did not buy Hungarian sour cherry or at very low prices only. They paid half as much for the Hungarian fruit than for the German 'Schattenmorelle' of much lower quality. It means that the information of Hungarian sour cherry saturated the market was false. The producer's prices of the German growers did not decline in spite of the presence of Hungarian imported fruit offered at very low prices. The moral of happenings in the last year is the necessity of handling the crisis of overbidding with retention of goods if necessary. This latter is only effective in an organised form, with a wide scale alliance of grower's organisations. The importance of marketable semi-finished products (e.g. fruit powder), which are suitable as buffers should be recognised because in case of temporary difficulties of selling are avoided by manufacturing these products for delayed finishing or sales.

As expected, technical development in the future will favourise plants of competitive production. Up to date and technically equipped growers (or grower's organisations) will produce at lower costs, become more competitive with cheaper supplies, finally the consumers will be more content with the prices. Everything being advantageous from the point of view of competitiveness will benefit the consumers too. The system of subventions of fruit production will favourise this latter idea as well as the technical development will follow the same principles.

5 The following strategic endeavours are suggested:

1) Modernization of utilization of varieties: earlier maturity, the suitability to mechanical harvest and to multipurpose processing should be preferred, moreover, varieties with excellent quality parameters should be considered more intensely.

2) The integrated production of sour cherry should be based on the integrated phyosanitation and the organisation as well as technological and quality control systems, which should be elaborated and realised in the region.

3) For the sake of an economically feasible mechanical harvest the machine pool should be restored with special reference to the training systems used in Hungary.

4) Corresponding to the new concepts of processing, target-plantations should be established at the best growing sites with the technologies, which promise the highest and most secure yields.

5) The most urgent task is to raze the old, obsolate plantations, which impair the competitiveness of the whole sour cherry growing branche in Hungary.

6) All participants of the sour cherry verticum should be organised in a tight alliance to co-operate for the common purpose. The organisation and function of the grower's trading co-operatives should be strengtened and formation of PO-alliances promoted.

7) Initiate programs promoting the consumption of fresh sour cherry fruit.

8) The production and marketing of special sour cherry commodities (powder, concentrate, dried fruit, etc.) should be examined and the necessary organisations and technical means are to be prepared.

9) The extension service operated by the sour cherry verticum as well as the development and activity of the gene bank are to be supported with high priority.

10) The planning and studying the conditions of introducing a geographic trade mark representing the Region ought to be initiated.

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