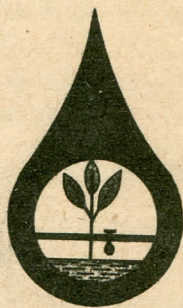


**PROCEEDINGS OF THE SYMPOSIUM ON DRIP IRRIGATION IN
HORTICULTURE WITH FOREIGN EXPERTS PARTICIPATING**

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SKIERNIEWICE, POLAND

FRUIT PRODUCTION IN POLAND

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Poland is situated in central Europe. The country covers a surface area of 312 000 km² and is inhabited by 36 million people. The climate is intermediate between maritime and continental. Annual precipitations are from 500 mm to 600 mm on most of the country's area. Average July temperature is from 17.0°C to 18.8°C and that of January from -0.9°C to -4.1°C.

Data on fruit production are given in a table below. The production was very low directly after the war, since even during the last few years before the war its yearly average did not exceed 400 000 tons. During the postwar years it increased steadily, especially during the last four years.

Orchards and berry plantations covered, in 1975, a surface area of 350 000 ha, in 1980 - 334 000 ha. The surface area decreased by 16 000 ha whereas, fruit production increased greatly. This trend continues. It is expected that fruit production will reach 2 400 000 tons by 1985 and the surface area taken by fruit plantations will decrease by another 15 - 20 000 ha.

Out of 334 000 ha of fruit plantations only 27 000 ha are found on large government farms. These orchards occupy usually an area between 100 ha and 200 ha, rarely more. Orchards on private farms amount to 307 000 ha. They are mostly very small. As much as 180 000 ha are taken by orchards and plantations between 0.1 ha and 1 ha. These are usually oversized home orchards which are not taken care of and which give very low yields.

The trend is to either increase the size of these orchards to at least 2 ha, or better to 5 ha, or to grub most of the trees leaving a home orchard of the size 500 m² to 1000 m². We realize that an orchard of 2 ha or even 5 ha will be too small in the future to bear the costs of necessary investments. That is why a new form of simple cooperation was introduced in the middle sixties. Several farmers whose small farms, let us say - averaging 5 ha, lie one alongside the other, decide to plant an orchard of 30 or 40 ha belonging to 6 or 10 owners. They share in the cost of investment but they preserve the ownership of their lots and each harvests his own fruit and sells it separately.

Since the late fifties a rather close specialization developed in fruit production. The best fruit farmers produced on their farms only fruit and nothing else. This was a novelty in Poland. Polish farmers believed firmly that fertilization of the soil with farm manure is the necessary condition for obtaining high yields. Clean cultivation was practised with cover crops in summer and farm manure was applied once every three years.

We developed a new soil management system similar to that followed for a long time in America and Western Europe. It consists of herbicide strips in the rows and permanent grass between the rows. This system was found to give good results in the countries with high rainfall, or irrigation. The annual precipitation in central Poland amounts to about

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Fruit production in Poland in 1 000 tons

| Fruit species | Average yearly production in 1950-55 | Average yearly production in 1960-65 | Average yearly production in 1970-75 | Production in 1976 | Production in 1977 | Production in 1978 | Production in 1979 |
|-------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------|--------------------|--------------------|--------------------|
| Apples | 414 | 639 | 1 160 | 904 | 1 030 | 1 051 | |
| Pears | 83 | 88 | 103 | 137 | 86 | 109 | |
| Plums | 111 | 125 | 211 | 147 | 176 | 145 | |
| Tart cherries | 51 | 24 | 41 | 36 | 35 | 37 | |
| Sweet cherries | 32 | 20 | 45 | 33 | 24 | 32 | |
| Other tree fruits | 4 | 5 | 11 | 13 | 12 | 12 | |
| Strawberries | 60 | 133 | 154 | 183 | 202 | 193 | |
| Raspberries | 5 | 16 | 18 | 21 | 24 | 25 | |
| Currants | 38 | 65 | 94 | 131 | 111 | 152 | |
| Gooseberries | 20 | 25 | 27 | 23 | 30 | 35 | |
| Total | 463 | 818 | 1 140 | 1 864 | 1 628 | 1 730 | 1 791 |

500 mm and, practically speaking, very little irrigation is available. We proved that even in such conditions the trees in herbicide - grass strips give yields comparable to trees in clean cultivation - cover crops and no farm manure is needed. This soil management system, practised at this time by the best fruit growers, allows them to specialize and to do away with animal husbandry.

Apples are the most important fruit in Poland. They account for more than 50 % of the fruit produced in the country. Their importance in Poland is underlined by the fact that we do not import much citrus or banana fruit, not more than 150 000 tons a year. Apples are, thus, the only fresh fruit that is consumed throughout the late autumn and winter months.

We grew during the first, post-war years different local, East and West European varieties. Most of them were biennial. The biennial bearing of apples was so severe that the differences in apple production between on and off years amounted to 100 % or even 200 %. They did not exceed, during the last 14 years, 15 % or 20 % because we introduced new varieties with a tendency for annual bearing, and now the orchards are given better care than before.

Our most important apple variety is McIntosh accounting for 25 % of the apple production. McIntosh is winter hardy, annual, and a prolific bearer, the fruit is of very high quality. McIntosh hybrids - Bancroft, Spartan, Cortland and Lobo, are also important, giving close to 15 % of apple production. Other important varieties are: Jonathan /15 %/, the Red Delicious group /7%/, and Idared /5%/.

Until the end of the sixties, seedlings of Antonovka, a very hardy Russian variety, were used almost exclusively as rootstocks for our apple trees. English, size controlling, vegetatively propagated apple rootstocks, especially M 9, were tried many times but they gave repeatedly poor results. The root system was easily injured in winter. During the last 15 years we found that a newer English dwarf rootstock M 26, a Russian B 9 used as an intermediate, and two dwarfing rootstocks P 2 and P 22 bred by Professor Zagaja at Skierniewice, are resistant to winter frosts. Thanks to that, more than 50 % of the newly planted apple trees are now on dwarf rootstocks or dwarf intermediates.

Our new apple orchards are of medium density, with 600 to 1000 trees per hectare. These are intensive orchards bringing 20 or 30 tons of fruit per hectare, with record yields reaching 70 tons. Such orchards are obviously in need of irrigation.

Poland is not a country of pears. Until very recently only summer and autumn varieties were grown with success - Colorée de Juillet, Clapp's Favorite, Williams /Bartlett /. Only recently a winter variety Conference was introduced. It is hoped that with the building of more refrigerated, and especially CA storages, more winter pears will be grown.

Plums are traditional Polish fruits. Both prunes and gages are produced with Common Prune and Italian Prune /Fellenberg/predominating in prunes and Oulin Gage /Reineclode/ in gages. Plum pox or the sharka virus disease keeps the production of prunes from rising.

Sweet and tart cherries are produced in about equal quantities. Tart cherries, especially the variety Schattenmorelle, are gaining in importance. They are highly valued by fruit processors for juice, jam and other products. The sweet cherry industry is on a decline on account of a very serious disease — the bacterial canker caused by *Pseudomonas*. Neither we nor the cherry growers in other world regions know the means of easy and successful control of the disease.

Neither peaches nor apricots are grown commercially in Poland. They cannot withstand our severe winters. Their growing is limited to home gardens. Walnuts are propagated only by seeds, since spring grafting in our climate does not bring good results. Autumn grafting is being tried. Commercial walnut production will not develop unless orchards composed of vegetatively propagated varieties are established.

Berries are a Polish specialty. We say that Poland is a „superpower” in the production of berries, and we can easily prove it. Poland is first in world production of currants, gooseberries and raspberries, second in the world production of strawberries. Strawberry production from 8 000 tons in 1950 rose to 150 000 tons, that means 18 times more, in 1965. Currant production increased from about 20 000 tons in 1950 to 152 000 in 1979, raspberry production from 3 000 tons in 1950 to 25 000 tons in 1979.

The spectacular rise in strawberry production in Poland was brought about by the introduction of virus free high yielding varieties and by an ample supply of hand labor in our agriculture. Virus free varieties are grown in other countries, but the costs of growing are higher because of the necessity of producing virus free plants. There is no such need in Poland because we have no strawberry virus vectors. The strawberry aphid cannot survive severe winters and our local aphids do not transfer the strawberry virus diseases.

As far as the availability of hand labor is concerned, over 60 % of the Polish population in the pre war years were employed in agriculture. The percentage fell during the 35 years after the war to 27 but it is still high in comparison with western Europe. That is why not only the production of strawberries but also the production of raspberries and other berries could be developed to such an extent.

Senga Sengana accounts for 80 % of our strawberry production. This is too much for one variety because picking and processing of such quantity of a perishable fruit during a short period is difficult. This variety outyields all other varieties, hence its popularity. In raspberries almost 80 % of the fruit is produced by Malling Promise. In currants and gooseberries no variety is so predominant. Blacksmith, Mendip Cross and Roodknop are the most important black currant varieties, Red Dutch, Rondon, Jonkeer van Tets and Erstling aus Vierlanden are the most popular red currant varieties while White Smith and Lady Delamere are the favourite gooseberry varieties.