IMPROVEMENT OF FRUIT PRODUCTION AND PRECISION HORTICULTURE OPORTUNITIES IN ROMANIA

Gabriela TEODORESCU,
Daniela ALEXANDRESCU

Universitatea Valahia din Targoviste
e-mail: theo_0200@yahoo.com, danaalex@yahoo.com

One of the aim is to improve the fruit growing management, to introduce a series of theoretical, methodological and, most important, practical aspects and aims for the maximization of fruit growing activity by using management activities which are specific to this field along with their impact in the economical and ecological performances. The principal aim of specialists in Romania is to develop the harvesting machinery, initiate statistical and mapping methodologies to allow growers, to view and interpret the annual productivity of each tree in their orchards. In secondary, it's important to develop the research of new resistant apples varieties and to develop an integrated fruit growing system. Regarding to the first point, the specific objective of precision horticulture must be understand by the specialists: to create a precision horticulture management available for Romanian growers; to develop an informational system. Information requirements include spatial and temporal data on the crop, soil, pests, topography, and weather during the field production phase; to develop technology to allow large-scale, tree-to-tree yield analysis; to utilize this technology to determine the factors that contribute to yield variability including development of statistical, mapping, and biological interpretations; to conduct a demonstration research project utilizing these technologies; to develop the dissemination workshops to demonstrate the technology.

The start of the new varieties research, in special for apples, was made in Voinesti for Generos, Voinea, Pioenier, Florina with genetically resistance at diseases. It is important to promote all these varieties on international markets in special for the low number of chemical treatments and second for quality of fruits.

Keywords*: fruit quality growing management precision horticulture.*

Sustainability and competitiveness have become key words to horticultural crop producers. Growers need to be efficient in production to stay competitive and they need to conserve and protect soil and water to be sustainable.

A sustainable using of genetic resources is the best way for a secure conservation. For breeding work wild species with specific resistances will be used more and more. On the other hand old cultivars are evaluated to find new sources of polygenic resistances (scab, mildew, fire blight) for breeding of new resistant cultivars with a stable and durable field resistance.

This was the first step to create the apple varieties with genetically resistance at diseases and to find a way for fruit production improvement and quality in Romania/5/.

The origin of the cultivated apple is not definitely known, but the centre of origin is probably in the area containing the Caucasus, Central Asia and the Himalayas. The modern cultivated varieties probably derive from the central Asian Malus pumila, perhaps with incursions of genes from other species present in the area of origin, such as Malus sieves.

Aplles are a unique fruit in that they have a variety of flavors, degrees of sugar and acid, different flesh textures, and differing juiciness. The number of resistant varieties is big, but only a very few are produced commercially like Generos, Voinea & Pioneer varieties. Some of the less commercially acceptable varieties are smaller, less juicy, more acid, have very 'hard' dense flesh, and probably have a great deal more fibber than more 'melting' fine fleshed commercial cultivars. Apples vary from a 'fairly good' to a 'very good' source of vitamin C, as there are significant differences between the varieties. Apples are a good source of the B vitamin 'biotin'. Apples are also a good source of a variety of minerals-magnesium, iron, chromium, and manganese.

MATHERIAL AND METHODS

Regarding the fruit production quality in Romania it reveals the necessity of enhancing the efforts of both competent public institutions, local institutions and producers, in order to accomplish some demands written in the Protocol elaborated at the ending of the discussions regarding Romania's integration in the European Union in the year of 2007. These demands contribute to the overcome or improvement of some negative aspects which describe the situation of our country regarding the fruit growing field, the distribution and selling of fruit and fruit products, in order to approach and then reach the European Union standards./1/

One of the method is to improve the fruit growing management, to introduce a series of theoretical, methodological and, most important, practical aspects for the maximization of fruit growing activity by using management activities which are specific to this field, along with their impact in the economical and ecological performances.

As a result, the consideration of horticultural production in the context of its supply chain offers some challenging requirements for precision horticulture technologies for all specialists in horticulture in Romania.

In this way, the Romanian growers have more opportunities to produce optimised fruit quality. Using the key elements of information, technology, and management practices such as field scouting, field mapping, variable rate control, yield mapping, and post harvest processing we can improve the quality of crop production. In Romania much of this technology is still in its infancy. More research will be necessary to develop this technology. These techniques include using GIS database structures, handheld data capture devices, remote sensing equipment, database management at different levels in the supply chain.

Other method, for fruit production and quality improvement, is to reduce the pesticide use. One of the way is the breeding and growing of resistant at diseases apple cultivars. Equipment designed for accurate control and delivery of crop chemicals makes modern variable-rate applications possible. In addition, the global

positioning system (GPS), geographical information systems (GIS), and computers are key building blocks in this foundation.

RESULTS AND DISCUSSIONS

In order to find ways to reduce pesticide use, research was started in 1985 by the VOINESTI Research Station to develop a system for integrated fruit growing. The aim of this research was to create new resistant apples varieties and to develop an integrated fruit growing system as an economical production of high quality fruit that safeguards the environment and human health. Through this research it became clear that a substantial reduction of pesticide use could only be achieved with a reduction of fungicide use. Reducing fungicide use causes big economical losses because of high incidence of apple scab. A way to reduce fungicide use without high scab infestation is the breeding and growing of scab resistant apple cultivars. As a growing system with only resistant cultivars is treated with little fungicide, it is completely different from the current growing system. It is therefore necessary to develop a growing system for it.

On the other hand, using the precision horticulture methods is a challenge for the growers in Romania. Precision horticulture can be used to increase production efficiency, improve product quality, improve the efficiency of crop chemical use, and protect the environment.

Precise information is important in every phase of production, from initial planning to post harvest. Information requirements include spatial and temporal data on the crop, soil, pests, topography, and weather during the field production phase. During the post harvest phase, temperature, humidity, moisture, and a host of other parameters are of importance. Some of this information can be gleaned from previous crop records.

Technology is the second critical component of the system. Production equipment and systems must be compatible with the operational requirements of precision agriculture. The foundation of precision agriculture, from the mechanization perspective, is traced to the development of precision seeding and chemical-application equipment. GPS, with differential correction, has proven to be an effective tool to georeference features or data in the field. GIS provides the ability to organize data by georeferenced position. Computers have given us the analysis and control capabilities to develop the comprehensive system needed in site-specific and post harvest process management/4/

Soil and plant testing will be used to determine the cause of the yield variability and experimental manipulations will be conducted to optimize yield and management efficiency.

The determination of quality at present is primarily based on firmness and visual attributes. The development of new technologies means the requirements will expand to include various flavor and storage capability attributes. The variability in quality on out-turn is one of the major complications for the supply chain. This can be attributed to a range of post harvest factors (storage time, location on ship, pack type, etc). On top of this system induced variations there are

a large range of orchard factors, which produce variation in the initial fruit quality as well as its inherent storage and eating quality/3/

Variability in quality attributes such as size, colour, shape, flavour, sweetness and firmness all detract from the value proposition at the point of sale. Improved (more detailed) information of on-orchard variation of these factors will help to manage fruit quality /6/

CONCLUSIONS

Best management practices for orchards include attention to: site preparation, soil management, water management including irrigation and drainage, nutrient management and pest management. For that, its also important the promotion on national and international market of resistant at diseases fruit varieties.

To be considered a best management practice, an action must maintain or increase crop production while minimizing impact on the environment. In the case of many crops, this means using good management so that the crop is well established and healthy. This allows growers to reduce treatments such as pesticides that may affect the environment

Soil is vital to all crop production, whether sod, vegetables or fruit. Healthy and productive soil helps crops develop good root systems and reduces crop stress caused by drought or excess rainfall. Intensive production of horticultural crops creates some unique challenges in soil management/2/

BIBLIOGRAPHY

1. Iosif D., 2005. Ways to grow the economical efficiency of fruit production in Romania (Doctoral Dissertation), Economical Science Academy, Bucharest.
2. Omafra staff, 2007. Horticultural crops. Best management practices, Ministry of Agriculture, Ontario, Report of january 15th.
3. Praat, J-P., Bollen A.F., Yule, I.J. 2001. Product tracking for profit In: Precision Tools for Improving Land Management, Proceedings of the 14th Annual Workshop, Fertiliser and Lime Research Centre, p24-28.
4. Robertson G.,T., 2000. Precision Agriculture Technology for Horticultural Crop Production. HortTechnology, july/sept, 10(3).
5. Teodorescu G., 2003. Culturi fructifere. Ed. Macarie
6. Whitney, J.D., et all, 1999. Precision farming applications in Florida citrus. In*:* Applied Engineering in Agriculture*.* 15(5):399-403.