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Thesis of PhD dissertation

**HISTORICAL APPLE AND PEAR VARIETIES WITHIN THE  
CARPATHIAN BASIN FROM THE ETHNOPOMOLOGICAL ASPECT**

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## 1. INTRODUCTION

Our ancestors were respecting and prising the surrounding environment in the full consciousness of being created in the middle of the earthly paradise. This way of thinking led to the formation of a diversity in fruit varieties and a high rate variability in fruit growing. This colourful diversity was a testimony of the wonder of creation in their lives. Nowadays this special tradition is in danger, thanks to the lack of respect for the ancient times and the egocentric and irresponsible modern mentality, which is considering this variegation only as an ignorable result of evolution. The decrease of biodiversity is actually jeopardizing the cultivated fruit varieties too.

The erosion of the gene-resources of apple and pear varieties is a part of the enormous nature demolition of our days, seeming an insolvable social problem. The roots of the problem are leading to the theory of development of the modern humanity. But the practice of production and consumption all around the world is an unsustainable system, on environmental and social field both. We need to re-think and to renew our theories and to elaborate new ways of sustainable development on the base of an overall cultural revival. Solidarity and continence with the environment and among people. We have our base-line: the tradition. The function of the tradition is namely the cumulation and transmission of the experience of proper practice for the goods of the following generations. The changing of paradigms is inevitable.

Ancient fruit varieties need to be protected by the human responsibility and the integration of legal and institutional background. The scientific methodology and update technologies of protection are known. This is a long-term investment, showing but our commitment to the following generations, science and international society instantly. It may compose a part of education and give an example for the community about the harmonic human-nature relationship.

The conclusion is that our responsibility concerning historical and landscape fruit varieties need to be observed and evaluated in the light of human and natural environment.

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to each other. (Berez 1997)

## 2. AIM OF THE STUDY

The final goal of my study was to execute a survey of the hidden, but still existent pomological values of the Carpathian basin. The research for regions, where the occurrence of historical and landscape apple and pear varieties is high and the tradition connecting to these varieties is living and still explorable was a main issue of my work. I was searching for the answers of the following questions.

- Research for pomologic refugium areas.
- Complex research on the pomological tradition and the connecting material and spiritual culture.
- Searching for apple and pear landscape varieties still missing from the pomological literature.
- Examination of the ethnopomological knowledge.
- Research of the factors influencing the use and changing of different fruit varieties in an ethnopomological aspect.

Creation of a database of denomination known and used by the ethnopomological knowledge. I decided to base my work on the guidelines of the PhD school, considered sufficiently consequent and useful. Some difficulties were caused by the speciality of the topic and the adaption of my work to the existent structure and guidelines. I needed to interpret results based on experimentation and observation at the same time and it is not conventional.

The achievements are demonstrated in two main sections. The first section is composed from the results of my own field work and the already existent literature background on the theme of material and spiritual culture of fruit growing. This part is reviewed in the chapter named Literature overview. I decided to report together the information coming from two different sources because it helps a better understanding. The measured and bonitated data and the new database are found in the chapter named Results.



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Asia. 8 of the 15 races, described by (1960) we can find the description of 8 different variants and 33 forms of the *Pyrus pyraeaster* and 3 different variants and 12 forms of the *Pyrus nivalis* from the middle region of the Carpathian basin. On the contrary from the *Malus* genus 25 races are described by REDHER (1984), but only 1 race is considered native in Europe, the others are mostly from North-America and Asia. Accordingly it can be set that the races and variants of the pear genus are present abundantly in the Carpathian basin, in contrast to the apple genus. The biological and ecological evaluation of pear and apple as floral elements was executed by SURÁNYI (2006).

We have archaeological findings proving the practice and importance of fruit collection and consumption in the Carpathian basin from prehistorical ages. The written sources are recollecting the traces of consumption and processing of wild fruits from medieval ages (BELÉNYESY 1955).

The most ancient roots of the Hungarian ethnobotany can be discovered by the examination of philological and archaeological sources. Fruit growing cultures of the middle ages are showing two different directions of development, similarly to other different sectors of agriculture. One of them is the ethno-agricultural knowledge of the Conquest-times originating from eastern cultures. The knowledge was spreading with the expansion of the Hungarian population from the central plainland-regions toward the border areas, following the river-valleys and adapting to the local conditions (FRISNYÁK 1996). The villenage continued to use the water and forest habitats possessed by the whole community. ANDRÁSFALVY (1975) was considering fruit yield as the primal use of water habitats. We have similar data regarding fruit growing from the former routes of the migration and living areas of relative nations in the works of ARTOMONOV (1989) and POPOV (1982). RAPAICS (1940) and BELÉNYESY (1955) are the most important authors of the fruit growing cultures of Hungarian people in the middle age.

The other main direction of development in fruit growing was realized due to Hungarian state-foundation, the rebuilding after the Mongol invasion in the XIII. Century and due to the effects of agrar-innovation in Europe. The monastic centrals, the cloisters and the immigrants - especially German and Vallon residents - took the samples and models from Western Europe to the Carpathian basin. The differences in ecological background, the immigration and the interethnic relationships led to a landscape based specification and the division in

labour in fruit growing cultures during the XIV. Century. From the XIX. Century the modernisation and the large-scale cultivation was forced in Hungary. This was a result of the new aim of the state to supply the increasing demand of wholesale fruit market.

To summarize the premises we may describe the agriculture of the medieval Hungary as an extensive culture, uniting both eastern and western cultural influences, adapting continually to the different ecological and social facilities, which led to the development of an intense richness of varieties. The examination of fruit tree stock on the land and the selection of landscape varieties began in the XX. Century. The tree stock of the country was examined by researchers of state institutions. The most important varieties were acknowledged and received a place in the National List. Many of these varieties are still in cultivation in our days. The life work of some great researcher-breeders is considered significant and impressive until today. Some educational institutions own variety-collections. The pear gene bank of Keszthely is attending 250 items (KOCISISNÉ 2005). The Fruit Department of BCE-KTK is collecting and estimating the characteristics of endemic apple varieties of the Carpathian basin in Soroksár under planned experimental conditions (TÓTH 2004).



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varieties are most frequent in the local communities save even the genetical material or the archaic pomological knowledge mainly. The first step was to appoint location for pomological examination within the Carpathian Basin. It based on the pomological and ethnographical literature in the beginning, later I followed the hints of the locals. I made reports with the locals and described the pomological and ethnopomological details.

I carried out examinations within the Carpathian Basin in four lands, in 17 districts, in 43 locations. Moreover I analyzed 30 publication of 22 researcher covered 48 location additionally. I analysed the database of the Ethnographical Museum. I processed the accessible pomological literature regarding the Carpathian Basin. After that I selected the locations with archaic ethnopomological values for detailed research. I forced the documentary approximation of the ethnopomology instead of the typical supervising attitude. Simultaneously I tried to identify the varieties and studied the evolution of the fruit varieties. After that I selected the local varieties and landraces to describe, which fulfil the criteria of the international prescription of variety (DUS) and do not have description yet. I do not describe the well-known varieties because in the frame of field work it is impossible to ensure more punctual documents than the literature. In these cases I documented only the presence of the variety and the ethnopomological knowledge.

I made a variety test according to the international standards, like the UPOV TG/1/63 protocol. Moreover the three basic criteria of the variety I examined the definition on the landraces, as the habit and local knowledge. To summarize, I accepted as landrace only the varieties which are with fulfilled DUS criteria, with unique denomination, maintained with more than one tree by vegetative propagation by humans.

I used the Test Guidelines of the UPOV (International Union for the Protection of New Varieties of Plants) for pear (*Pyrus communis* - TG/15/3) and for the apple (*Malus domestica* TG/14/9). Moreover I used the Test Guidelines of the CPVO (European Union Community Plant Variety Office) for pear (*Pyrus communis* - TP/15/1) and for the apple (*Malus domestica* TP/14/2). However the special conditions of the examination do not allow using directly the UPOV and CPVO methods.

I published the data on measured characteristic like Brózik and Terpó to give any information. Because of the strict rules of the variance analysis I made a basic statistical analysis only, like

the minimum, maximum and average values. Since the extensive technology of the farmers it is limited conclusion on the VCU characteristics (Value for Commercial use). This data based on the local opinion.

I made ANOVA analyse on the historical varieties well-described in the literature. I made the digitalisation and evaluation of the apple data in the archive of the Hungarian Central Agricultural Office. The two trials were settled in Pölöske and in Helvécia. The apple variety trial was planted in Pölöske in 1995, on M26 rootstock, with 11,48 ft × 4,92 ft space, in two replication with two trees in each replication, in chance block trial design. I evaluated four sufficient growing cycles from 1999 to 2002. The apple variety trial was planted in Helvécia in 1995, on MM106 rootstock, with 13,12 ft × 4,92 ft space, in two replication with two trees in each replication, in chance block trial design. I evaluated three sufficient growing cycles from 1999 to 2003, like 1999, 2000 and 2003. The other year were excluded because of the late frost. The observation followed the methodology applied at the Department for Variety Trial of Horticultural Crops - Central Agricultural Office. (Rátkai 1997). The digitalisation was made in the Microsoft Office Excel 2007 software, the evaluation was made in the SPSS for Windows 5.0.1. software package. I did not use the ANOVA analysis because the homogeneity and the normality of the samples were not sufficient. The reason could be that I had to contract the annual data on the same replication. Because the annual yields are not independent from each other on the same trees. I calculated the multi-annual average of each replication, but this way the databases concentrated on its 30 percent. However it was necessary because of the above mentioned condition of the independent samples. I Median test showed difference regarding all factors. It can be because of the mathematical weakness of this method. I exclude the Median Test although it put in the focus the presence of the possibly trends. Finally I used the Man-Whitney test. This method evaluates the differences and ranges between the means and medians. This test gives conclusion on the trends, which is sufficient for the present aim. I analysed the database by three factors. These are the next ones. The origin (historical / modern) of the variety. The harvest time (early / middle / late) of the variety. The climatic conditions (humid, hilly area = Pölöske, arid, plain area = Helvécia) of the grower region.

## VARIETY DENOMINATIONS

Generally the denominations refer to the characteristic, which provide a unique distinction for the variety. These characteristics help the recognition simultaneously. I found the above mentioned type of denomination.

- direct acceptance of the official denomination,
- translation of the denomination in Hungarian language,
- distortion of the denomination to make easier the pronunciation,
- the ripening time for harvest or for consumption,
- the ground or cover colour of the fruit skin,
- russet on the fruit skin,
- shape of the fruit,
- size of the fruit
- hypothetical or real origin if the variety,
- former denomination on similar variety -B r almákø
- texture of the flesh,
- smell of the fruit,
- other unique characteristics,
- name of the importer person.

It is necessary to be careful regarding the explanation of denomination's origin. The single meaning of the words in the variety name is not sufficient. The situation during report making with the locals can have a significant impact on the result. I observed several times that the locals try to fit to the supposed expectations of the researcher. However the precipitate revision of the ethnopomological denomination could lead to false conclusion during the research.

## 5.2. AN EXAMPLE ON THE ETHNOPOMOLOGICAL TAXONOMY

I observed ethnopomological taxonomy of the pears in Udvarhelyszék. Along the Nyikó River and along the Gagy River the locals divide the pear varieties in different categories. They used the below mentioned categories consequently:

- Wild pears (švadvörteø),
- field pears (švackorø),
- (noble) pears (škörteø).

Sometimes the locals speak about štrons field pearsø, which means interim form between the field pears and the pears. In the Kászonban region there is a tree called by this name. The meaning of the field pear refers to the quality of the fruit, nor to the location of the tree or to the habit. In this region I found the next variety names for field pears: 'Aszaló vackor', 'Bakb z vackor', 'Balázs vackor', 'Füge vackor', 'Hulló vackor', 'Kásás vackor', 'Korai mézvackor', 'Méz vackor', 'Moldvai vackor', 'Nagyjózsi vackor', 'Nyári füge', 'Palacféreg vackor' and 'Sárga vackor'.

The pears divided into the category of the field pears by the ethnopomological knowledge are independent cultivars of the *Pyrus* genus. I have found the following facts to provide it:

- the varieties are distinguished by denominations,
- propagated by human activity,
- there are a population of the varieties,
- the varietal characteristics are maintained by vegetative propagation,
- the field pears are grown together with the pears in the home garden and in the farmer's orchards.

The vocabulary of the ethnopomology is archaic. The local dialect maintained many archaisms of the species, varieties and equipments. This grammatical practise was common in the pomological literature in the XVIII. Century, like in Lippay's (1667) book.

I give a conclusion based on my research, that the Udvarhelyszék region is unique refuge area of the European pomology. Its main importance is that the material and intellectual pomological culture over lived together the last centuries and it has been saved medieval values of the pomological vocabulary and varieties.

Originally described pears based on my research and according to the UPOV Test Guideline 15/3 is given in the annex, supplemented with other sources to promote the comparison.

#### **Fügevackor (*Fig field pear*)**

**Origin, spreading, literature:** This variety is known along the Gagy River in Medesér and in Firtosvárálja based on my research. N.TÓTH (2006) refer to the variety denomination 'Füge körte' cited Szávai Márton from Énlaka without description. I identified this variety with the pear illustrated on the 95th illustration of Kraft's Austro-Hungarian Pomology printed in 1792. Although this work does not contain detailed descriptions, my opinion is verified by the short description and by the picture. The 'Feigenbirne' denomination is the metaphor of the 'Fügekörte'. **Value for commercial use:** The public opinion prefers the attractive appearance rather than the very small fruit size. The yellow cover colour of the fruit skin is flushed by red cover colour on the sunny side. The other disadvantage is the unequal ripening on the two fruit sides. Local farmers do appreciate their delicious flavour and early ripening time just after the wheat harvest in this region.

#### **Mézvackor (*Honey pear*)**

**Origin, spreading, literature:** This variety occurred early in the written sources. The first reference is known as 'Mézkes körte' dated to 1427. The first written reference from Transylvania is kept up since 1595 (SZABÓ T. 1995). LIPPAY listed it as 'Mézkes körtvély'. Afterwards this denomination has been spread within the Carpathian Basin. The name is common in Europe. In the German language area are many forms of the 'Honigbirne' like the 'Große Sommer Honigbirne', the 'Liegels Honigbirne', the 'Mittlere Honigbirne' and 'Runde Gelbe Honigbirne'. Other nationals living together with the Hungarians use this name also. TERPÓ (1958) made note of the 'Hainigbirne' in local German dialect in Felsőlő, near of Keszeg. In Farkaslakán the 'Mézvackor' is distinguished from the 'Mézkörte' consistently. N.TÓTH (2006) refer to the above mentioned last denomination from Énlaka based on local pomologist's information. I identified this variety with the 'Sommerhonigbirne'. It is well-known along the Gagy River and along the Nyíko River. The 'Mézvackor' seems to be similar to the pear mentioned by TERPÓ (1958) in the near of Keszeg. However the short reference does not allow more comparison. Regarding the pomological literature the 'Graue Honigbirne' is similar nevertheless their fruit skin is covered by less russet. **Value for**

**commercial use:** The early ripening time is it, what do appreciate on this variety. The disadvantages are the weak ability to post harvest handling. The 'Mézkörte' has high quality content, good adaptability based on the study of VARGA, IVÁNCISICS, KOCSISNÉ (2006). It could be sufficient as industrial or collection enlarger variety.

#### **Moldvai vackor (*Field pear from Moldva*)**

**Origin, spreading, literature:** The first written reference remained from Transylvania dated at 1786. It wrote about 'šegy Nagy Molduvai Term. Körtvély fátó' (SZABÓ T. 1995). In spite of that fact, Szávai Márton thinks that Bíró Mihály imported the grafting shoots from Moldva in 1811 (N.TÓTH 2006). This date confirms the active commercial connection between the Székely land and Csángó minority in Moldva accompanied by exchange of fruit varieties till the 1960s years. The two different climatic regions had been exchanged their agricultural products. N.TÓTH (2006) regard this variety to be similar to the 'Boiere ti' (BORDEIANU 1964) landraces in Moldva. I found differences in the depth of the eye basin and in the crowing at eye basin. This landrace is highly similar to the 'Champagner-Bratbirne'. The 'Moldvai vackor' has longer fruit stalk and stronger crowing at eye basin. Its parent could be the 'Champagner-Bratbirne' based on the phenotype. **Value for commercial use:** 'Noble field pear' said after its larger fruit size and good storability.

#### **Nagyjózsi vackor (*Field pear of Big Joseph*)**

**Origin, spreading, literature:** I did not find a similar denomination in the literature. It is grown in Farkaslaka only. There are many trees. The origin is unknown. The denomination could hide the name of the introducer probably like in similar cases. **Value for commercial use:** Its advantages are the high productivity and the excellent flavour according to the common opinion. Harvest time in September, eating maturity till December. Used as fresh market as in the distillation home industry. The fruit size is considered at most middle, the ground colour of the skin bright yet acceptable. The tree has one of the most vigorous growths within the pears.

#### **Nyakaskörte (*Neck pear*)**

**Origin, spreading, literature:** In the pomology edited by BORDEIANU (1964a) are included on the basis of VERESS's research made at Bikfalva in 1955. Veress described it as widely spread variety in the Eastern part of Transylvania, within the former Maros Hungarian Autonomy, in the Udvarhely county. He called it 'Kicsi nyakas nyári körte' as author, later published in Romanian metaphor like 'Gitluite'. N.TÓTH (2006) think it to be similar to the



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**Origin, spreading, literature:** The fig was a popular eponymous in the European pear breeding. The background was the similar shape of fruit. BERECZKI described 4 Fig pear, like the *Alengoni füge*, the *Horváth füge körtéje*, the *Nagy fügekörte* and the *Hollandi fügekörte*. The present Summer Fig pear differs clearly from them. I found it in Firtosváralja. The fruit is very similar to the *Fügevackor*. The *Nyári Füge* is distinguished by the earlier harvest time mainly. **Value for commercial use:** The main advantage is the early ripening time. The fruit size is small, with high sugar content, covered in 50% percent by cover colour on the sunny side.

#### **Palacférög vackor (Bug pear)**

**Origin, spreading, literature:** The variety spread along the Nyikó River. The denomination covers literary remains of languages and dialectal remains simultaneously. The *špalackféreg* is an ancient form of the *špoloska*. It is written in the first Hungarian scientific medical book, published in Transylvanian in 1577 (KESZLER 2005). The *špalackféreg f ö* (*Xyris spatula foetida*) was a well-known herbs (CSAPÓ 1775) by that time. But the association based not on this fact. The analogy based on the damage of the bug, like the dense, little fault. In this way the local potter home industry use this word also. In my opinion the variety name points to the stone cells in the fruit flesh and to the high density of small fruits on the tree. The *Bakb zvackor* is similar local variety. However the fruits are similar, the *Palacférög* ripens later than the *Bakb zvackor* over other morphological characteristics. **Value for commercial use:** The productivity is very high. The fruit size is small. The fruit flesh is sweet and delicious. It has a favourable harvest time, covered the late summer agricultural work peak.

#### **Sárgakörte (Yellow pear)**

**Origin, spreading, literature:** The denomination is one of the most frequent variety name in the early documents and later too. The first written reference was made in 1258 as *Sár* pear. Lippay listed it also. BERECZKI (1886) explain the *Gelbe Frühbirn* German landrace under the translated name of *Korai sárga* (Ber.I/205). It is a similar variety to the present one, but it differs based on some fruit and stalk characteristics. Silvestru has described two pears with

similar denomination. However these are not identical with the *Sárgakörte*. The *Nyári sárga körte* or *Sárga körte* (in Romanian languages: *Galbene de var*) had been spread within the all area of Transylvanian and Moldva. The *Sárga muskotály* or *Sárga körte* (in Romanian languages: *Tmtioase galbene*) is the local variety of *Györfyalva* in the Kalotaszeg land. N.TÓTH (2006) mentioned this denomination from Énlaka based on the reports of locals. **Value for commercial use:** The variety has a unique flavour. It is considered as highly productive variety with short storage term.

#### **Sárgavackor (Yellow field pear)**

**Origin, spreading, literature:** This landrace is very similar to the *Sárga körte* regarding the general data and the literature.

#### **Szürkevackor (Grey field pear)**

**Origin, spreading, literature:** I identified this variety with the *Gute Graue* pear. Its origin is unknown, although it had appeared in the written sources since the XVII. Century with many synonyms. (Petzold 1982). The literature is controversial, perhaps France or Dutch is the origin. Kraft (1792) is the first author in his work called *Austro-Hungarian Pomology*. He published two synonyms, like *őó szürke* and *Nyári ámbra körte*. Berecki used the first mentioned denomination in the *Gyümölcsészeti Vázlatok IV.* (BERECZKI 1887a). **Value for commercial use:** In spite of its small fruit size, its good resistance and very high productivity are got high value on. The fruit appearance is unique; the fruit skin is covered approximately in 100% with russet. The denominations refer to this characteristics in many languages, example given: *Graue Herbstbutterbirne* (*Szürke szikörte*) or *Beurré Gris* (*Szürke kedvelt*). Not for long term storage but popular because of its sweet taste.

#### **Tüskéskörte (Thorn pear)**

**Origin, spreading, literature:** I did not find similar variety in the literature. GÖNCZI (1914) wrote about it as common landrace in the Göcsej and Hetés region. SZENTMIHÁLYI (1950) studied 17 locations in Zala County, and registered it in 9 communities. Today it is widely spread in the *rség* and Zala hilly areas with many variations. The variations are distinguished by adjectives. Example given: *Early-*, *Late-*, (*Szani*), *Winter-* (*Szentmihályi*), and *Giant Thorn Pear* (*Kovács*). **Value for commercial use:** It is regarded as traditional variety by the locals SZENTMIHÁLYI (1950). It was the most common variety within Zala County according to Szentmihályi's report. I found the same opinion in same communities nowadays also. This variety is known there as the highest productivity pear. The very early



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TAKÁTS (1979) found in the archival of Batthyányiné Bánffy Kata óHungarian aristocrat - that she sent to Czech King of Miksa in 1556-ban a grafting shoot from a pear bearing three-times a year. She wrote that this pear flowers four-times a year. . KRAFT (1792) described it in the Austro-Hungarian Pomology as øDer jährlich zweimal Früchte tragende Birnbaumø OBERDICK (1860) inferred its German origin based on hint of French pomologists, whom country imported it from Germany. I have found a living tree I Medesér with the same denomination: øKétszerterm körteø The locals informed me, that in favourable year its flowers three-times although only the first two flowering result fruit. This example confirms the process mentioned by Rapaics. Rapaics found that several Hungarian fruit varieties were imported to West Europe during the Middle-aged. Some centuries later these was considered as west European varieties and re-imported. **Value for commercial use:** It is handled as curiosity because of its multi flowering time. I observed that the second flowering time starts when the fruit reach the 30-40 mm size from the first flowering. The first fruit is tasty, middle juicy, with thin skin. The second bearing fruit is less valuable than the first on.

#### **Szentiványi zöld alma (Green Saint Ivan apple )**

**Origin, spreading, literature:** The above mentioned literatures refer to the early growing of the *Green Saint Ivan apple*. LIPPAY wrote in 1667 about this variety as the important variety of the Csallóköz region. RAPAICS (1940) identified it with the øEleveér almaø because both name hint on a very early ripening time. SZENTMIHÁLYI collected it in 1951 along Zala County in much location. I found it as sparsely known apple in this region today. It presents in the Balaton high field also. In these districts the Saint Ivan apple covers a green fruit skinned landrace.. Tóth collected in the North part of Hungary a red variant of the Saint Ivan apple. These facts confirm Lippay, who described two forms of the Saint Ivan apple, a red and the green ones. To have a safe identification, I suppose using the Green Saint Ivan apple for this form. Its former importance is provided by its symbolic in the ethnographical belief. According to the publication of ANDRÁSFALVY (1989) the parents lost their child did not eat apple till the Saint Ivan day. They throw this apple through the Saint Ivan night fire to the group of celebrating children. Parallel tradition can be observed within the surrounding ethnics and it belongs to the archaic layer of the European culture. **Value for commercial**

**use:** Its valuable characteristic is the very early ripening time. It is ready for consumption just after the sweet cherry season according to the opinion of the locals from Zala County. The very small fruit size makes it unable for commercial use.

#### **Pamuk alma (Pamuk apple)**

**Origin, spreading, literature:** BEREZCKI described about this variety in 1896 as Pamut alma. The locals around Pécs city call it consequently as Pamuk alma. The őPamutő denomination can be considered as the explanatory distortion of the original, regional variety name. Bereczki published the original variety name also as ethnical synonym. The variety is present along tee Drava River till today, like Bereczki described it as the landrace of Pécs. Although I did not found direct connection to the ethnographical traditions, the importance of red apple is well-known in the regional traditions. The red apple was an important symbol in the arrangement a marriage between the small communities within the nearly Southern Slav ethnics (DANKÓ, 2001.). I described the varieties in the Ormánság. **Value for commercial use:** The ripening time is very early. Its unique and freshening flavour is known within the locals still now. The fruit is small and not firm. It is recommended only for home gardens. It needs a special growing conditions, this variety prefer the wet grower areas.





## TRIAL 6 PÖLÖSKE

sortiment to study the range of differences between the two groups in objective, mathematical way. The result of the Mann-Whitney test is given in the Table 2. I could not provide any significant difference between the historical varieties and the modern assortment. It confirms the fact, that the modern technology reduces the plant size by dwarfing rootstocks. However the range of new varieties becomes richer towards the lower values referring to the appearance of less vigour varieties. Regarding the phenological characteristics the historical varieties are more variegated than the modern ones. Although it is not any significant difference between the cultivars of the two ages, the flower phenological characteristics are more homogeny within the modern varieties, as the beginning of the flowering, peak of the flowering, end of the flowering, density of flowers and days from flowering to maturity. This concentration reflects to the breeding integrated on international level, which replace the spontaneous, local variety outbreak. From this aspect some very early apple seems to be extreme, like *ØVista Bella* in Helvécia. The yield differs clearly between the two groups. I proved significant difference regarding to the density of fruits, to the yield and to all kind of yield efficiency. The modern varieties replaced the historical apples own higher productivity in a recent orchard. The *ØParker pepin* had very high yield in Pölöske. This fact explains us the former popularity oh this variety in the regions with milder climate. Regarding the fruit weight I could not prove any significant differences between the varieties of the two periods. Similar fruit size were reckon as optimal. However the historical varieties shown more wide range from the very small fruit size to the very large size. It confirms the presence of the globalisation in the apple-consumption trends. The high volume apple production prefers more unique sortiment than the local growing and the local market. The distinct fruit size is disadvantageous today. In my trial the *ØNyári fontos* had the largest fruit size, and the *ØParker pepin* the smallest one. The Zala hilly area provided to be more convenient for the fruit growing because of its favourable climatic conditions. It verifies the importance of the climate on the evolution of the production areas. The size of the tree was obviously determined by the regional conditions. All attributions of the crown and trunk were significantly higher in the hilly areas than in the plain. The more vigorous rootstock variety used in Helvécia could not counterbalance this effect. The site has a similar strong influence on the flowering time. In the plain the flowering started later, it was shorter with lower density. Moreover the days from flowering to maturity turned out to be constant characteristics, I did not observe any differences between the two trial stations.

The measured data on the fruit weight and on the yield was more favourable in Pölöske. The yield efficiency has different stage. Although in the plain area the yield was lower, the yield efficiency II and yield efficiency III were similar like in the hilly area.

1. Table: The apple variety trial by age group of the variety. Mann-Whitney test. Pölöske, 1999-2002, Helvécia 1999-2003.

Characteristic	Significant difference based on Mann-Whitney test				
	Age	Site	Maturity group 1-2	Maturity group 1-3	Maturity group 2-3
Basic area of crown (m <sup>2</sup> )	-	+	-	-	-
Volume of crown (m <sup>3</sup> )	-	+	-	-	-
Trunk cross section (dm <sup>2</sup> )	-	+	-	-	-
Beginning of flowering (number of days from 1 <sup>st</sup> Jan.)	-	+	-	+	-
Peak of flowering (number of days from 1 <sup>st</sup> Jan.)	-	+	-	+	-
Duration of flowering (number of days)	-	+	-	-	-
Ripening time (number of days from 1 <sup>st</sup> Jan.)	-	-	+	+	+
Days from flowering to maturity (number of days)	-	-	+	+	+
Density of flowers (1-5 point)	-	+	-	-	-
Density of fruits (1-5 point)	+	+	-	-	-
Fruit abscission before picking	-	+	-	-	-
Fruit weight (dkg/pc)	-	+	-	+	-
Yield (kg/tree)	+	+	-	-	-
Yield efficiency I. (kg/m <sup>2</sup> )	+	+	-	+	-
Yield efficiency II. (kg/m <sup>3</sup> )	+	-	-	+	-
Yield efficiency III. (kg/dm <sup>2</sup> )	+	-	-	+	-
Remarks: +: significant difference -: no significant difference					

The maturity groups express their profile mainly in the phenological characteristics. The three maturity groups, called early, middle and late differ from each other clearly in the Days from flowering to maturity. The early varieties have smaller fruit than the others. Moreover early varieties have earlier flowering time despite of the other two groups. I described the vegetative profile of the varieties based on the basic area of crown, on the volume of crown and on the trunk cross section (1. Table Hiba! A hivatkozási forrás nem található.). The



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parameters of the yield and yield efficiency. The early varieties showed more vigorous vegetative growth. It was much more vigorous regarding all the three vegetative parameters of the rootstock. Overall the early varieties produced stronger vigour on the hilly areas and on the dwarfed rootstocks both. In Helvécia the modern varieties, however in Pölöske the historical varieties provided to be more vigorous regarding all the three vegetative parameters. The early varieties showed more vigorous growth than the later varieties. The historical varieties produced higher yield efficiency in the less ideal region, the modern varieties were more favourable under the optimal condition. This difference was not observed within the late varieties. All variety had higher flower density in Pölöske, like the fruit density. The modern varieties had higher yield regarding all maturity groups than the historical varieties. Extraordinary the in the middle group, the historical varieties had higher yield than the modern ones. The historical varieties had larger fruit within the early and middle varieties. We observed the opposite trend within the late varieties. To give a conclusion the historical varieties provided to be more vigorous in the two locations within the early and middle groups. In the late group I observed smaller differences in the basic area of crown in the volume of crown and in the trunk cross section. The differences between the historical and modern varieties were expressed much showily in Pölöske.

The fruit weight showed similar trends regarding the maturity groups. The differences become smaller within the late varieties regarding the fruit weight. Even I observed opposite trend within the late varieties. The highest differences were measured in the early group between the two sites. The yield was higher in the hilly area, which own more favourable climate. The regional conditions had less significant impact on the fruit size within the historical varieties.

The yield efficiencies calculated on the basic area of crown, on the volume of crown and on the trunk cross section had different trend in the two site within the historical and modern varieties. The modern varieties produced higher yield efficiencies under better condition. The historical varieties produced higher yield efficiencies under less optimal condition except of the late varieties. Based on the above mentioned facts we can conclude on the relation between the varieties characterised by different genetical background and the history of the Carpathian-basin's fruit growing. During the early period of the fruit growing the less productive varieties with higher adaptability were more efficient. The interregional division of labour was accompanied by the evolution of traditional fruit growers region and outbreak of the landraces. At that time the economical factor has been become as important then the

ecological ones. This trend has been being constantly still now. In this way it can be considered as the germ of the modern, intensive fruit growing. The fruit had been moved from the fundamental foods produced in self-sufficiency to the consumption-enlarging foods produced for the market. It meant changing the variety assortment. The varieties characterised by strong vigour, large or small fruit size had been become out of growing gradually.

gy. I found sources to three well-  
and 'Pónyik'.

2. I have given a conclusion based on my research, that the Udvarhelyszék region is unique  
refugee area of the European pomology. Its main importance is that the material and  
intellectual pomological culture over lived together the last centuries and it has been saved  
medieval values of the pomological vocabulary and varieties.

3. I publish the variety descriptions of 11 pear varieties and 2 apple varieties on non-described  
or partially described cultivars in accordance with the international standards. The note tables  
of characteristics are given in the annex, supplemented with other sources to promote the  
comparison.

4. I confirmed that the economical and social factors have a significant impact on the  
evolution of apple and pear landraces. I prepared the map of the differentiation of endemic  
apple local varieties within the Carpathian Basin dated back to the XIX century.

5. I registered 1100 apple and pear denomination. It includes 235 apples with 673 different  
variety names, and 189 pears with 427 different variety names.

6.

I have included in databases the collected ethnopomological denomination. I analysed the  
written collection of the Ethnographical Museum. I found 438 accesses on apple varieties and  
289 accesses on pear varieties. I enriched the database with 5543 access from the pomological  
literature. The total amount reached the 6644 access. It is given in an Excel table on the  
attached CD.

7. I have provided objective difference between the sortiment of historical and the sortiment  
of modern apple varieties by statistical analysis. I manifested the closed relation between the  
genetical background and the trend of the fruit growing within the Carpathian Basin. I  
determined the balanced fruit size and the productivity as the main reason of the change of the  
apple sortiment.

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#### **Research projects**

CPVO co-funded R&D project CPV. 8648: Management of peach tree reference collections