*Acta Ethnographica Hungarica 62(1), 135–162 (2017)*
*DOI: 10.1556/022.2017.62.1.7*

# ‘Innovation from the Past’

## Silvopastoral Systems in Hungary in the Light of Hungarian Ethnographic Literature

Anna Varga
Centre for Ecological Research, Hungarian Academy of Sciences, Vácrátót

**Abstract:** Silvopastoral systems are a crucial part of the European cultural landscape and biocultural heritage. In Hungary, due to the intensification of agriculture and forestry management, silvopastoral practices were nearly totally abandoned during the last decades. In this paper, I review Hungarian ethnographic literature to discover the traditional silvopastoral management of Hungary. The papers were published in Hungarian, mainly in different ethnographic journals and in several books. In Hungary, until the passage of the Forest and Pastureland Separation Act (1853), forest grazing was a free right along with other silvopastoral methods, except pannage. Woodlands were natural shelters and sources of diverse fodder. Collecting leaf-fodder, leaf-litter, wild fruit and acorn were integral and common parts of traditional extensive livestock husbandry. The importance of silvopastoral systems increased during extreme weather conditions. All of them were controlled to avoid overuse and forest damage. Today, wood pasture management and illegal forest grazing is still alive, but the new forest law once again gives permission for regulated forest grazing in some cases. The openness towards silvopastoral managements is influenced by the new agroforestry innovations movement.
**Keywords:** traditional knowledge, agroforestry, Central and Eastern Europe, landscape history, extensive livestock husbandry, herders, forest grazing, acorn, leaf fodder, wild fruits

## INTRODUCTION

Among the many benefits associated with ethnographic research projects, a particularly important role is their availability as resources for posterity. These resources capture intellectual or material cultural heritage, the importance or necessity of which is suppressed or completely forgotten at times (Andrásfalvy 1984; Berkes et al. 2000; Bürgi – Grimmi 2007; Drew – Henne 2006). Hungarian silvopastoral systems belong to these heritage categories, the importance of which was stressed by several authors of ethnographic research, for example: István Tálasi (Tálasi 1939), Tivadar Petercsák (Petercsák 1977), and Bertalan Andrásfalvy (Andrásfalvy 2007; 2009). This extensive form of pastoralism has had a determinant impact on the management of forested

landscapes in Europe, including their natural and cultural heritage (Hartel et al. 2015; Rackham 1998). Silvopastoral systems are currently listed as one of the most important rural development tools (Burgess et al. 2015). They offer a type of agroforestry system where perennial woody plants and animal husbandry are connected in time and space in very diverse manners, as a function of the management needs, legal environment and local landscape conditions (Mosquera-Losada et al. 2009). Regulation (EU) 1305/2013 on support of rural development of the European Union addresses this approach, and this principle is reflected in the Hungarian Forestry Act adopted on 16 May 2017, which grants permission again to grazing in the woodlands of Hungary, after a total ban in place since 1961 (European Commission 2013; Magyar Közlöny 2017). The underlying reasoning is that the role of woody vegetation in extensive grazing practices has once again been recognised as indispensable (Varga et al. 2016). Silvopastoral systems contribute enormously to the continuation of valuable agricultural practices which are protective for nature, are sustainable, provide healthy food and ensure a high nature and cultural value (Fagerholm et al. 2016; Plieninger et al. 2015; Rois-Diaz 2006).

A rich body of references is available from several European regions, describing former and current practices and types of silvopastoral systems (Plieninger et al. 2015). Main categories of the European silvopastoral systems are wood pastures characterised usually by ancient and large trees with wide spreading branches; closed forest grazing; pannage (masting on acorns), and pastures spotted with shrubbery and groves (Hartel – Plieninger 2014; Mosquera-Losada et al. 2009). All these silvopastoral types– subject to the conditions of the site – are closely associated with gathering of foliage and fallen leaves for forage and/or bedding, as well as the gathering of wild fruits (acorns, wild pear) for the purposes of animal feeding and human consumption alike (Bürgi – Grimmi 2007; Hartel – Plieninger 2014).

The interest of ecologists and conservationists, including mine, was drawn first to the significance of forest grazing in Hungary in landscape ecology and nature conservation more than ten years ago, by various works, on landscape history (Molnár 1996; Varga – Bölöni 2009). In part, this led me to review the scientific literature available on the topic. The purpose of my research is to reveal the information contained in Hungarian ethnography on silvopastoral systems. In the course of that work, I reviewed articles and papers on the subject of silvopastoral systems in the entire List of References of the work *Hungarian Ethnography* (Paládi-Kovács 2001) and the Table of Contents of the periodicals *Néprajzi Értesítő* (Ethnographic Bulletin) and *Etnográfia* (Ethnography). Writings published in relation to this topic were collected by reviewing references of additional articles and the bibliography of their respective authors. A large part of the work was conducted in 2007 and 2008 in the National Széchenyi Library, when no electronic search engines were yet available. Additional, supplementary research was carried out in Winter 2016. In the current study, the husbandry methods found in the collected references most closely matching the innovation objectives of agroforestry systems are reviewed mainly from the perspective of vernacular practices (for instance forest grazing, pannage, forage and litter gathering and their control). Based on the sources which were processed, I present here data typically from the 18$^{th}$, 19$^{th}$ and the first half of the 20$^{th}$ century, including, wherever they are available, particulars from the Mediaeval period as well. Forest mowing and the accompanying sociological, folkloristic and folk art research are not covered by the present article. The aim of the paper is

to highlight how silvopastoral practices constitute an integral part of the Hungarian landscape and folk culture. On the other hand, we can also conclude that the knowledge of earlier ethnographic particulars may effectively contribute to the current research and the development of future innovations in agroforestry.

## HUNGARIAN ETHNOGRAPHIC STUDIES RELATED TO THE TOPIC OF SILVOPASTORAL SYSTEMS

As a result of folkloristic studies, the figure of the herder or shepherd grazing in the wood, resting under the wide branching tree at noon, or feeding his livestock on acorns has long appeared on various objects, in folk tales and in songs (Békefi 2011; Herman 1914; Madarassy 1935; Malonyai 1911). Research on animal husbandry practices and the knowledge of pastoralists did not focus initially on the silvopastoral components of grazing systems. This could be explained by the investigative focus on the lowland pastoralism of the treeless, steppe region (Győrffy 1941). Research on silvopastoral systems started with the exploration of land use methods prevailing in hilly and mountainous regions (Ébner 1933; Gunda 1938; Tálasi 1939). Most studies were published around the 1930s and 1940s, and then later between 1960 and 2000. The methodological guideline published in 1959 under the title *Az erdő néprajza* (Ethnography of the forest) dedicated special attention to the issues and references related to this subject (Erdélyi 1959). Silvopastoral systems are mainly covered in the chapters dealing with livestock management or forest use in the monographs concerning specific landscapes or regions. The preponderance of information is available from the environs of Bakony (Hegyi 1978; Herkely 1941; Tálasi 1939; Vajkai 1959;), Belső-Somogy (Takáts 1986), Ormánság (Gunda 1938; Kodolányi 1946), Sárköz (Andrásfalvy 2007), Bereg (Csiszár 1974), Mátra (Petercsák 1984), Bükk (Petercsák 1986; Viga 1988), Zemplén (Szabadfalvi 1968a) and woodland regions of the Great Plain (Bellon 2003; Nagy-Czirok 1959; Penyigey 1980; Szilágyi 1966; Wittner 1978). The majority of the studies available are historical ethnographies, relying on archival and oral history data, but some disclosed contemporary data as well. Scientists mainly used materials from the 18th and 19th century in the course of their research in the archives (Takács 1980), but in certain cases earlier sources from the 14th and 15th centuries were processed (Belényesy 2011). Oral history collections present information from the end of the 19th century and into the first part of the 20th century (Takáts 1986). In addition to published articles, memoirs of peasant and shepherding families are also available (Gaál 2003; Tamás 2009). Exploration of the hand-written materials deposited in data stores of museums may lead to the discovery of further sources (for instance Gábor Máté personal comm.: Takács 1983).

## A SHORT HISTORICAL OVERVIEW OF THE HUNGARIAN SILVOPASTORAL SYSTEMS

Silvopastoral practices in forested landscapes date back as far as extensive livestock management systems, and extended across the Hungarian landscape (Belényesy 2011; Paládi-Kovács 1993; Szabadfalvi 1970; Tálasi 1939). Looking back to the past

*Figure 1*. Most wood pastures have been developed by the thinning of a closed forest stand of former woodlands, such as the Kasztó wood pasture in Bogyiszló (Andrásfalvy 2007), Bogyiszló, Tolna County, Hungary, 2017. (Photo by Éva Ágics)

millennium, Hungarian silvopastoral systems have undergone their most serious changes mainly in the past 200 years (Tálasi 1942; Hegyi 1978; Petercsák 1984; 1986). The first written data are available from land granting records of the 11th century, in which areas suitable for pannage and masting of pigs are mentioned (Tagányi 1896). The significance of these modes of use is indicated by the fact that forested areas listed as acorn forests were seen as more valuable than other forests up to the first half of the 19th century (Ébner 1933; Csiszár 1974; Hegyi 1978; Szabó 2009; Takács 1983). The use of woodlands for forest grazing is difficult to separate from grazing in wood pastures up to the end of the 19th century and the beginning of the 20th century (Andrásfalvy 2009; Petercsák 1986; 2001). The underlying cause is that forest grazing was a freedom right of serfs (Andrásfalvy 2009; Csiszár 1974). In consequence, the boundaries of forests proper and wood pastures merged into one another and grazing was an additional of forests alongside pannage and gathering of supplementary forage (Andrásfalvy 2007; Hegyi 1978; Imre 1955; Takáts 1986). In relation to the floodplains of the Danube, Bertalan Andrásfalvy formulates this practice as follows:

> "The term pasture was seldom used alone up to the beginning of the 19th century. One of the reasons is that grazing was not limited to definite areas up to that time. In other words, the term pasture did not mean a piece of land with a definite set of conditions and a definite purpose of usage, since any part of the fields could be used for grazing. A number of examples could be seen of the above. When the forests were introduced that in the 18th century and in the beginning of the 19th century the term forest was used not only for areas with a dense stand of trees, but also the wooded areas used as the commons, the common grazing areas of livestock. (…) Up

*Figure 2*. Silvopastoral systems are perfect for keeping traditional livestock breeds. Hungarian Grey Cattle in the wood pasture of Cserépfalu, Borsod-Abaúj-Zemplén County, Hungary, 2015. (Photo by Anna Varga)

> to the end of the 18th century, forests are taken everywhere as land where cattle live and graze. Grazing livestock was excluded only from those parts where young trees shooting up after felling had to be protected from the mouths of the cattle. (…) Additionally, forbidden forests were those dedicated to exclusive use by the landlord, mainly for pannage or producing timber." Andrásfalvy (2007:356–358)

The initial trigger that led to the demolition of this typical agroforestry system in the classical sense of the word, was the Urbarium by Queen Maria Theresa in 1767 (Andrásfalvy 2009). A further undermining occurred with the passage of the Act on the Separation of Pastures and Forests, adopted in 1853 (Petercsák 1977; 1984; 1986). The main point of the Act was to separate the land parcels used by former village serfs from those used by the landlord. The dramatic adverse effect of the latter Act on Hungarian silvopastoral systems and on husbandry and society as a whole is mentioned by almost all studies of ethnography (e.g. Andrásfalvy 2007; Hegyi 1978; Szabadfalvi 1963; Zólyomi 1968). There were forested hillsides and mountain regions where the size of land available as pasture to the former serfs living in the villages was curtailed to a substantial extent overnight. Typically, villagers received 3–10% of previously available pasturage in Zemplén, Mátra and Bükk regions, while it was somewhat higher in Börzsöny, ranging up to approximately 30–40% (Petercsák 1977; 1984; 1986). The significance of husbandry practices of this type was further reduced by the intensification and industrialisation of agriculture and forestry, and changes in transportation modes (Paládi-Kovács 1993; Tálasi 1942). These changes included the use of maize and corn as feed, the emergence of intensive livestock farming, growing needs for timber and declining use of draught

animals (Hegyi 1978; Eperjessy 2006; Máté 2009; Paládi-Kovács 1993). At the end of the 19th century and in the first half of the 20th century, former serfs of the villages continued grazing on pastures cut out from forests during the separation process dictated by the 1853 Act, and on forested areas. On forested land, grazing parcels became wood pastures due to environmental conditions (Andrásfalvy 2007; Bellon 2003) (Figure 1). In manorial areas, the further use of silvopastoral practices was continued subject to the decision of the landlord (Andrásfalvy 2009; Hegyi 1978).

The significance of silvopastoral systems was further reduced at the end of the 19th century and the first half of the 20th century as a consequence of changing husbandry needs, historical events and the restrictions put on them by laws and regulations. Forest grazing and pannage were completely banned under the Forest Act of 1961 (Varga – Bölöni 2009). The measure curtailed this practice legally, but even so it was not eliminated, and in many parts of the country it continued illegally under the framework of extensive grazing practices (Varga et al. 2016).

## PEOPLE IN THE SILVOPASTORAL SYSTEM

Key actors involved in the use of silvopastoral systems include those who carry out grazing operations, and gather forest fodder and litter, as well as those taking active part in the maintenance and control of grazing land (Eperjessy 2006; Hegyi 1982; Petercsák 1983; Tamás 2009; Vajkai 1959). Grazing could be practiced in different ways across regions and even within a given site, or in a mixed system, which accommodated the social and economic needs in place at the time (Paládi-Kovács 1993). Basically, there are three kinds of systems in which grazing operations were carried out: individually, by turns and with contracted herders (Belényesy 2011; Hegyi 1978). Individual grazing practices occurred widely nationally (for instance in the Őrség, Bakony, Baranya, Sárköz, Mátra, Bükk, Bereg) (Andrásfalvy 2007; Csiszár 1974; Hegyi 1978; Imre 1955; Petercsák 1983). In the course of this 'individual' method, elderly or younger members of the family kept watch on grazing livestock, sometimes alone and sometimes in groups of the other similar individual grazers of the village. These individuals either returned home each day, stayed in the forests overnight, or stayed out for longer periods – months, even year – to 'graze in the forests' (Andrásfalvy 2007; Csiszár 1974; Hegyi 1982). The importance of this practice in Hungarian husbandry and society is shown by the repeated legal efforts to restrict the participation of young people in this type of grazing, or to ban their free movement in the fields throughout the 19th century (Hegyi 1978). The practice was largely eliminated only by collectivisation and complete abandonment of grazing (Andrásfalvy 2007; Csiszár 1974; Hegyi 1978). Pasturing geese and ducks, accomplished mainly by the female members of the family, can also be considered as a silvopastoral practice here (Hegyi 1978; Békefi 2011). In grazing by turns, masters of a given community took turns overseeing grazing. They herded their own livestock as well as those of the other farmers in weekly or biweekly shifts (Tamás 2009). For the purposes of grazing by contracted shepherds and herders, separate 'professionals' were hired: '*csordás*' for cattle turned out to graze on a daily basis, '*gulyás'* for the cattle reared in the open air all year round ('*rideg*' cattle). '*Kondás*' (pigmen) cared for swine going out daily, and there were also places where separate

swineherds were hired for the purposes of pannage. Sheep were pastored by shepherds, whether by their owners or hired herders (Eperjessy 2006; Gaál 2003; Paládi-Kovács 1993; Petercsák 2003; Takáts 1986). Gathering foliage, forest litter or wild fruits, an activity constituting an integral part of the silvopastoral systems, took place individually or with the involvement of the whole family (Csiszár 1974; Hegyi 1978). Grazing land was cared for and shrubs cleared by hired farm hands for big estates and by the respective owners of the grazing stock for the village commons up to the end of the 1950s and 1960s, when landed property was nationalised (Petercsák 1984; Takács 1980). After this time, the task was carried out by workers of the agricultural collectives. In sum, the decline observed in the use of silvopastoral systems and reduction of the size and extent of grazing land was accompanied by a decrease in the number persons involved in animal farming. Traditional occupations vanished along with the knowledge necessary for practicing them. As a Somogy pastoralist put it back in 1957: "The old shepherd's pot was shattered to pieces. The shepherds go with the pastures" (Takáts 1986:36).

## LIVESTOCK IN SILVOPASTORAL SYSTEMS

All species kept in extensive husbandry methods in Hungary were and still are grazed using silvopastoral systems (e.g., cattle, sheep, pigs, horse, donkeys, buffalo, goats, geese, ducks, poultry) (Hegyi 1978; Paládi-Kovács 1993; Szabadfalvi 1986). The livestock best adapted to the disadvantages and taking greatest advantage of the benefits of silvopastoral systems are always ancient or native breeds accustomed to the specific conditions of the landscape or region (Belényesy 2011; Eperjessy 2006; Hegyi 1978; Vajkai 1958) (Figure 2). Changes in preferred and promoted breeds starting in the course of the 19th century meant that the native regional Carpathian Basin varieties and races best suited for extensive grazing diminished to a significant extent nationwide by the beginning of the 20th century (Eperjessy 2006; Paládi-Kovács 1993; Zólyomi 1968). Hungarian grey cattle and badger-coloured cattle merit a mention here. The change of breeds was driven mainly by different emerging uses and new feeding methods (Paládi-Kovács 1993; Petercsák 1983; Tálasi 1942). New breeds could not endure the tough conditions of forest and extensive grazing (Andrásfalvy 2007). Pig breeds developed in the Hungarian silvopastoral systems disappeared as early as the mid-19th century. Those pig breeds were famous for its wildness and high tolerance (Ébner 1933; Hegyi 1978). This variety was entirely replaced by the semi-intensive Mangalica by the end of the 19th century (Hegyi 1978; Tálasi 1939; Szabadfalvi 1986). In the 1970s, pig grazing was discontinued overnight and the English breeds – widely used by that time – have become overwhelmingly dominant (Tálasi 1942). Changes in breeds of sheep also started in the 19th century with the propagation of the Merino sheep, which, although it needs stabling, is basically accustomed to extensive grazing (Hegyi 1978; Paládi-Kovács 2003).

## THE VEGETATION OF THE SILVOPASTORAL SYSTEMS

During a year of the extensive grazing management there was a continuous migration between forest pastures, grass producing areas in the valleys, fallow land parcels,

*Figure 3*. Wild pear tree. Marcali, Somogy County, Hungary, 2014. (Photo by Anna Varga)

uncultivated land and land under crop (Andrásfalvy 2007; Belényesy 2011; Eperjessy 2006; Tálasi 1939; Viga 1988).

There were no regions where animal husbandry would not have been connected to some components of the silvopastoral management (Eperjessy 2006; Imre 1955; Paládi-Kovács 1993; 2001; Szabadfalvi 1970). There were forests under whose canopy the ground was trodden hard by animals, and others under which stock merely passed across. Some were used only for pannage, others, into which livestock was driven in only in times of great need, and some were the location of regular or occasional gathering of livestock. In forested landscapes this seems to be apparent, substantiated by the merger of the nomenclature of forest and pasture land documented by Andrásfalvy (Andrásfalvy 2007) as a trait typical of the area along the Danube. Furthermore, the general importance of forests is also confirmed by the statement made by Imre Hegyi concerning the Bakony: "No treeless pasture existed in the Bakony up to the first decade after the turn of the [20th] century" (Hegyi 1978:122). The almost continuous forest cover between Lake Balaton and the area along the Dráva River was also grazed (Hosszú 2009; Takács 1982), while Petercsák (1984) wrote a study on the role of forests in folk cattle breeding in the Zemplén, the Northern part of the country. Notwithstanding, it is important to note that areas covered by woody vegetation constituted a fundamental and basically indispensable part of even the pasturing systems of the plains. For instance, livestock grazing in the Steppe of the Hortobágy throughout the year was wintered in the Great Forest (Nagyerdő) belonging to the city of Debrecen (Penyigey 1980), while other animals were driven to farther regions to be fed on acorns and winter in the forests there (Balassa 1973; Csiszár

1974; Szabadfalvi 1968a; 1968b). On the other hand, an important role was given to shelter groves, woodlots around farmsteads, and the forest belts along roads (Balogh 1958; Nagy Czirok 1959). Ethnographers mention silvopastoral husbandry methods in the case of woodlots and groves consisting of oak, beech, sand poplar, wild fruit trees, denser stands of trees and gallery forests made up of soft wood or hard wood in the floodplains (Andrásfalvy 2007; Belényesy 2011; Petercsák 1977; Szabadfalvi 1963; Takács 1980). It should be noted that in vernacular terminology, the lesser or greater clearings surrounded by dense forest stands are also referred to as forest pastures (Paládi-Kovács 2011; Takács 1980). However, detailed description of the habitat types used occurs only in a few cases (e.g. Andrásfalvy 2007; Belényesy 2011).

In the development of a silvopastoral system, the greatest challenge was represented by the establishment and maintenance of specific ratios and quality of woody, perennial and herbaceous, and annual vegetation. In forested landscapes this meant suppression of woody plants, while in treeless regions planting trees was required (Csiszár 1974; Szabadfalvi 1963; Tálasi 1942). A dominant component of grazing systems is the grass meadow, which can only be created and maintained by human interventions in a naturally forested area (Andrásfalvy 2007; Takács 1980). This operation was accomplished using the methods of swidden agriculture. Each farmer had to present himself for a predetermined number of days for pasture clearing, in proportion to his grazing rights. The days dedicated for clearing might vary. Family members participated; every now and then even children joined. Axes, hammer picks, prong hoes, and hoes were used. Thorny species were collected, weeds were burnt. The activity was a community effort lasting from early morning until late in the evening. It also happened that farmers were granted the right to graze additional livestock because of having spent a greater number of days of pasture clearing (Petercsák 1983; Takács 1980). But also the herders were responsible to keep the pastureland clear and suitable for the livestock as well (Hegyi 1978). If grazing intensity declined, or the regular clearing operations were omitted, parts of pastures were easily overgrown by bushes (Andrásfalvy 2007; Takács 1980).

## BASEMENT OF THE EXTENSIVE LIVESTOCK MANAGEMENT: OUTDOOR LIVESTOCK KEEPING IN THE FOREST THROUGHOUT THE YEAR

When silvopastoral systems are considered, it is important to note that extensive livestock management was encouraged by the larger areas and forest conditions under which grazing was possible (Andrásfalvy 2007; Eperjessy 2006; Petercsák 1977; 1984; Tálasi 1939).

A master could pasture livestock in two groups depending on their age and type of use, a possibility that proved of great help to peasants in their everyday lives. Some animals returned home daily, such as milk cows and home-going pigs (Csiszár 1974; Hegyi 1978; Petercsák 1983). On the other hand, there were animals reared in the open air, which were not used on a daily basis and which did not have to be kept in stables. Such livestock included young beef cattle, porkers, sheep and colts. Outdoor holding could be maintained out throughout the year (such as forest raising of pigs) or seasonally from springtime to autumn (for instance the outdoor cattle herd) as well as from autumn

through to spring (pigs driven out for pannage), but it could also be shorter, for a night or two (for instance, draught animals) (Andrásfalvy 2007; Belényesy 2011; Ébner 1933; Eperjessy 2006; Hegyi 1978; Petercsák 1977; 1984; 1986; Szabadfalvi 1963; 1968b; 1970; Takács 1983; Takáts 1986; Tálasi 1939; Vajkai 1959).

Forest pasture vegetation provided the resources and shelter for the animals. The silvopastoral system components are determining factors in both cases, but may be even more important in the case of outdoor rearing. Farmsteads were set up to accommodate shepherds and herders in simple huts, with livestock driven mainly into pens surrounded by thorny bushes to stay there overnight during extended forest pasturing (Balassa 1973; Eperjessy 2006; Hegyi 1978; Takács 1982; Takáts 1986).

Benefits of outdoor management of livestock in the period ranging from springtime up to autumn included relieving the farmer of the need to deal with animals which could not be set to work or be milked (for instance, youngstock, infertile individuals or those designed to be fattened) (Hegyi 1978). Extensive management also reduced the pressure and burden on the grazing land close to the settlement.

> "We had two or three sows which farrowed out in the woods. We made a hedge for the flock using thorns. A little part was covered with straw, so that when the rain came, the livestock could retire there. Piglets came over to me as well, when they were of the size of a porkling. By the time they got home, they rated a pen. You were very glad about the nice little pigs coming home with their mother." (Szabó Ferenc, Abara, 1991 quoted by Bellon 2003:105–106)

This kind of keeping was typical throughout the country, for example: in the floodplain forests of the Danube (Andrásfalvy 2007) and Tisza (Bellon 2003), in the oak and/or beech dominated forests in the Bakony (Hegyi 1978; Tálasi 1939), in the Bükk and Zemplén countryside (Petercsák 1983) and in the oak forests of the Great Plain (Penyigey 1980). Farmers visited outdoor livestock in every week or two weeks and brought salt to them (Bellon 2003; Szabadfalvi 1963; Vajkai 1959). This act also served to remind the animals who their master was and permitted owners to visually review their livestock.

In the autumn the animals kept outdoors over the summer were joined or replaced by others turned out to pannage (see in more detail below). Supplying winter forage has always required high energy investment on the part of farmers, so grazing in winter had high importance (Andrásfalvy 2007; Belényesy 2011; Penyigey 1980; Petercsák 1977):

> "As long as snow did not fall, the part of the forests used for regular grazing provided the feed to outdoor animals. However, as the snow fell and covered up the nibbled off short grass, pawing it out from underneath the snow would be a more difficult task. It seemed to be more advisable to drive outdoor livestock to a location where grass was kept with a longer stem and snow could not cover it up, as was the case with the flat pastures. For this purpose, less intensively exploited forests were best suited, as well as groves and boggy land, where grass grew longer under the trees, protected by bushes and thus was accessible in snow as well. The long grass of the forest floor, which had dried out by winter, thus became an important auxiliary means of wintering." (Takács 1980:40).

Patterns of grazing across the entire landscape in association with outdoor livestock keeping constitutes an integral component of traditional extensive animal husbandry. Livestock was driven to better grazing sites, richer forage, acorns, or just as part of driving livestock on their feet to the marketplace (cattle, sheep, pigs) through wood and meadows at lesser or even several hundred kilometre distances (Hegyi 1978; Szabadfalvi 1968a; 1968b; Viga 1988). During these drives, forests could serve both as final destinations or as resting places (Tálasi 1939). A number of ethnographic findings describe the arrangement and itinerary of such drives (Császár 1974; Hegyi 1978; Paládi-Kovács 1993; Petercsák 1978; Szabadfalvi 1972; Viga 1986).

The migration with livestock and the year-round outdoor keeping were started to dramatically abandoned after the collectivisation and disappeared from some regions (Máté 2009; Petercsák 1983; Szabadfalvi 1972).

### *Tree buds and mistletoe*

A source of feed in the winter months and primarily during early springtime was provided by the woody vegetation mainly in the form of tree buds, or, as it was called in many places, twig tips or sprouts (Paládi-Kovács 1983; Takács 1980; Tálasi 1939; Viga 1988). Such buds were cut by the person tending the livestock, sometimes even entailing the felling of the whole tree. But the animals themselves readily fed on trees and bushes directly: "Sheep ate the delicate young shoots in springtime, they looked for a better life, yearned for the forest" (Tálasi 1939:17). There were places where tree sprouts were used regularly, such as in the floodplain region of the Danube and in the Mecsek where "mountainside oxen kept on straw only were strengthened in springtime by driving them to the fringe of the forest and people cut swelling buds for them using axes" (Paládi-Kovács 1983:196; Andrásfalvy 2007:362–368). Favourite tree sprouts were those of oaks, hazelnut and beech. Pussy willows were liked for their fragrance. Buds were fed to livestock shredded and mixed with straw (Petercsák 1986).

The significance of animal feeding using tree buds is shown by the great number of written pleadings and document on forest rules referring to their gathering or prohibition, mainly from the 18th century (Takács 1980; Tálasi 1939). This activity could easily cause considerable losses in younger stands from the forest management perspective. The practice of collecting tree buds was recorded by Lajos Takács: "Less affluent people who ran out of feedstuff cut tree tips from the bushes of the Mátra forests and fed these to their starving animals" (Takács 1980:42).

Additional supplementary feed was provided by mistletoe (*Loranthus europaeus* Jacq.) in winter periods, though its use had effectively disappeared by the second half of the 20th century. It was collected for sheep and cattle, but primarily for pigs (Herkely 1941; Hegyi 1978; Paládi-Kovács 1983; Vajkai 1959). Mistletoe was cut usually from older oak trees using a special curved knife (Herkely 1941; Takács 1980).

*Figure 4*. The best resting places are under the large trees. Kasztó, Bogyiszló, Tolna County, Hungary, 2016. (Photo by Anna Varga)

*In the heat – Resting places at noon: shadowy trees, forest outskirts*

From late spring up to the cooler days of autumn, grazing was basically conducted on areas dominated by open, grassland dominated habitats. Even so the woody vegetation had a major role during this time as well. Freestanding, scattered trees were consciously selected on the open pastureland, mainly wild pears or oak trees, and saplings promising the most beautiful leafy crowns were spared (Hegyi 1978; Takács 1980; Bellon 2003). Trees and clumps of trees stood in more open areas scattered throughout the landscape, or they connected to the fringes of the forests (Eperjessy 2006; Takáts 1986, Tálasi 1942; Andrásfalvy 2007).

Multiple benefits were attributed to these spreading, large trees and resting places, contributing mainly to the well-being of the grazing stock and their masters. Such a tree could ensure shelter and shade for animals and people; its fruits could be eaten by livestock, or, in the case of wild fruit trees, by humans as well; it also provided scratching substrates for livestock; secured a habitat for beneficial birds which fed on the horseflies and other flies disturbing the animals (Bellon 2003; Eperjessy 2006; Hegyi 1978; Paládi-Kovács 1982; Petercsák 1983; Tálasi 1939; 1942) (Figure 3). The best resting places were situated in locations exposed to the wind, which was even more helpful in cooling off and removing annoying insects from the stock. Another important component of resting places were water sources suitable for watering the

animals. Therefore a streamlet, creek, spring or well with a watering trough beside it were usually also present (Eperjessy 2006; Hegyi 1978). As a rule, noon rest started at around eleven or twelve o'clock and finished by two or three in the afternoon, when the stock was watered again (Eperjessy 2006; Hegyi 1978). During the noon rest the animals were usually not enclosed. However, several records exist for pigs that describe spreading trees surrounded by a fence consisting of thorny bushes. At noontime, the herders also took a rest. Usually they were delivered lunch, had a nap or passed their time by wood carving or playing the herders's pipe, or, if it was necessary, treated the animals. Younger herder boys gathered things, fowled or cut handles for implements in the forest (Eperjessy 2006; Takáts 1986).

### *Leaf fodder*

Uses of leaf fodder was widespread in all Hungary, but the importance of this forage decreased with intensification of the livestock keeping and the growing ability of the hay (Andrásfalvy 2007; Paládi-Kovács 1983). In regions with more rigorous climates, however, its use was part of the regular silvopastoral activities until the middle of the 20th century (Paládi-Kovács 1982; 1983; Takács 1980). Data from the Medieval and the Early Modern period are known mainly from written pleadings and forest rules. Herders willingly cut foliage for the livestock, sometimes even excessively, in forest managers estimation, such that in places it was forbidden to carry axes or hatchets (Belényessy 2011; Tagányi 1896; Takács 1980).

Feeding of cattle, sheep, and goats on leaves is referred to most often in the literature, but pigs ate them with pleasure as well. The most popular tree species giving leaf fodder included oaks, lime trees, ash trees, hazelnuts, poplars, honey locusts, alders and willow (Andrásfalvy 2007; Paládi-Kovács 1983; Petercsák 1986). Leaf fodder was collected by pruning, beating and pollarding (Paládi-Kovács 1983; Szabó 2002; Takács 1980). As a result, characteristic leafy crowns were created. Pruning was accomplished by the use of cutting, pruning, and trimming implements. A typical leaf cutting implement is the round-ended large knife, which could be used to fell branches up to the diameter of one's arm (Takács 1980). In certain areas climbing irons were used – permitted by the Forest Act in winter only. Cut leafy branches and leaves were dried and stored in dry places such as the loft of stables, or put in sheaves or stacks. If dried heedlessly, leafy fodder could go mouldy quite readily (Paládi-Kovács 1983). In other instances, the leaves were scalded, shredded and given to animals mixed with bran or hay (Petercsák 1983). Besides peasant farms, foliage was collected on the manorial estates as well. Benefits and disadvantages are reported in agrarian professional periodicals from the end of the 19th century and beginning of the 20th century. In Környe community, which belonged to the Esterházy estate, 5176 leafy branches were granted to the sheep farmstead in 1834 (Paládi-Kovács 1983).

Leafy branches held sacred meanings in animal husbandry, as was reported by the Bakony shepherd woman Vilma Kis-Tóth Károlyné Tamás:

> "The branch of a leafy oak tree was cut on 20 October and put into the loft of the sheep-fold. When the sheep were first fed, this branch was broken up into as many pieces as the number of the

> mangers. Each manger got some of it and to the branch was attributed strength that would protect livestock from perishing in the hard winter times. Saint Wendell preserves it." (Tamás 2009:30)

### *Leaf litter*

Livestock pick up fallen and dried leaves by preference on their own. "The leaf of the wild pear was very good once the hoarfrost nipped on it, if the beast chews on it half raw and drinks deep, its belly would grow neatly" (Tálasi 1939). The same is reported by the shepherd woman Tamás (2009):

> "If they got to the bushes, they gnawed on twig tips and dry leaves as well. Lambs from the previous year, in other words the 10–11 months old young sheep nipped on them bleating, 'firnyákolva'. But the shepherd understood the complaint well. He or she could hear that 'its tip pricks, baa…'. When the much-experienced ewe – usually the mother of the young sheep, since they grazed together for a long time – replied: 'Leaf it is, baa, have it down, baa'." (Tamás 2009:30–31)

In some regions and in times of straw shortage, fallen leaves were gathered mainly for bedding, but, should the need arise, they could be fed to starving livestock (Hegyi 1978; Petercsák 1983; Szabadi 1960). Oak leaves were good primarily for bedding, while the leaves of maple and elm-trees were mostly fed to calves. Oak leaves were the favourite for they were larger, prolific and less fragile than the others (Petercsák 1986). Before gathering, you had to negotiate with the local forester in the Bakony and you had to join the forest works (gathering acorns, tending seedlings) in return. Carrying away the duff layer from under the young trees was not allowed (Hegyi 1978). The best time for collecting forest litter was the dry autumn season. Leaves were collected exclusively by using rakes. Collected leaves were mostly transported in a big hemp bag, or in bulk on a cart with the sides heightened by planks or sticks, with the leaves inside trodden down (Paládi-Kovács 1971; Petercsák 1986). Litter was stored in a dry place. When the forest floor was used as a stable bedding, it was mostly put in front of the livestock so that it would not be soiled as much and remained suitable for feeding (Herkely 1941).

It is also noted that moss was gathered and used like leaf litter, as bedding and as fodder (Hegyi 1978; Herkely 1941; Tálasi 1939).

### *Wild fruits*

The most popular tree species in silvopastoral systems, chosen deliberately for the wood pastures, are those which could also be used as feedstuff, such as wild pear, crab apple, and European cornel (Hegyi 1978; Szabadfalvi 1963; Takács 1983) (Figure 4). However, oak species and beech providing acorns and beechnuts can also be listed here (Ébner 1933; Hegyi 1978; Szabadfalvi 1963). The fruits of these trees were picked up by the animals themselves during grazing, but they were also gathered by humans (Hegyi 1978; Vajkai 1959). Livestock, not only pigs, but cattle, sheep and the others were so fond of wild fruits and acorns that it was difficult to control them when the fruits were ripe (Andrásfalvy 2007; Tálasi 1939; Vajkai 1959; Viga 1986). "When the herd depleted the

hay meadow, it would sense the smell of the forest after the birthday of the Blessed Virgin Mary (…) Livestock was first driven to the more forested areas and fed on the falling fruits and acorns in the beginning of September (September 8)" (Tálasi 1939:17–18).

### *Feeding on acorns*

Acorns have been a prominent source of feedstuff for grazing stock kept extensively in Hungary for millennia (Csiszár 1974; Hegyi 1982; Paládi-Kovács 1993; Tagányi 1896; Takáts 1986). The Latin denomination '*glandiferra Pannonia'*, acorn bearing Pannonia, reflects the suitability of South Transdanubia for pannage (Plinius Secundus 2012). The important role of this practice is substantiated by a number of documents from the Mediaeval period and later ages, and by the fact that forests fit for pannage were kept in especially high esteem up to the end of the 19th century (Balassa 1973; Takács 1983). Pannage was more profitable in the 18th and 19th centuries than grain crops (Hegyi 1978, 1982). The importance of acorns in animal feeding diminished as maize and corn took over and it was almost completely forgotten by the end of the 20th century (Andrásfalvy 2009; Balassa 1973).

Feeding on acorns was implemented in three fundamental forms: 1.) free ranging grazing and consumption at will (see above); 2.) feeding on collected acorns in stables; and 3.) grazing on acorns in places designated for this purpose (Csiszár 1974). The last practice is called pannage (Petercsák 1986; Takács 1983). Acorns were consumed with pleasure by the cattle, sheep, horses and goats as well (Szabadfalvi 1963). In Hungary, oak species for acorns included mainly English oak, Cornish oak, downy oak, Turkey oak and beside them, beech. Opinions differ which of these was best (Balassa 1963; Eperjessy 2006; Szabadfalvi 1968a; Petercsák 1977; Tálasi 1939). Turkey oak acorn was most reliably predicted, yet not favoured, because the animals got heartburn from it (Tálasi 1939). Animal fat became softer from oak acorns and harder from beech mast. Sometimes a deliberate effort was made to have both (Petercsák 1977). Eating acorns had the most dramatic influence on the quality and amount of bacon and fat: the bacon of the mast-fed pigs is yellower and softer. Its fat is also yellowish and thin like goose fat, it hardens only granulously. Its taste better than the corn-fed pigs (Szabadfalvi 1968a).

Acorns did not provide a steady and safe staple food for livestock rearing and fattening. It was collected for years of scarcity during times of abundance and in such periods livestock ate almost exclusively acorns, even out on the fields. Sometimes three to five years or even ten years pass before a heavy mast year occurs again (Balassa 1978). Acorns started to fall initially at the beginning of the autumn season, first the worm-eaten ones and later, when they were nipped by hoarfrost, healthy fruits fell easily as well.

Acorns were gathered and put aside for times of need and they were also used as a 'delicacy' supplement to feedstuffs. Both men and women went out to gather acorns. When not enough were found, acorns were knocked off the trees with long poles. They were transported back home in bags and dried in properly ventilated places, or put in the oven after baking bread to let them dry. Livestock would get them scalded or ground (Szabadfalvi 1963). There were locations where acorns dedicated for feeding were stored in pits, covered with straw and watered to get them to germinate because pigs liked them better this way and their teeth did not wear away from the hard shells (Balassa

*Figure 5*. Outdoor forest pig grazing is still living silvopastoral management in the floodplain forest of the Sava river in Serbia. Morović, Srem, Serbia, 2014. (Photo by Anna Varga)

1973; Bellon 2003; Hegyi 1978; Szabadfalvi 1963). Data on feeding animals with gathered acorns are available from the 1960s and 1970s from different locations across the country (for instance Zemplén, Bükk, Hajdúság, Bakony) (Hegyi 1978; Szabadfalvi 1963; Viga 1986). Acorns were collected not only for livestock but for sale to forestry companies (Csiszár 1974).

Pannage is a special kind of forest grazing both in terms of legal control and practical implementation (Balassa 1973; Takács 1983; Paládi-Kovács 1993). It is almost the only area in silvopastoral practices that has always been controlled by the owner of the land, so it could be freely conducted in exceptional cases only (Szabadfalvi 1963). Pannage was scheduled in a similar way throughout the country. Persons appointed by the land owner (for instance, the magistrate or chief counsellor for cities) estimated the yield of the given year and decided how many livestock could be allowed to feed on them. If they were able to receive outside herds on top of their own, the possibility was announced by the beating of a drum or, later on, more frequently in newspaper advertisements (Balassa 1973; Csiszár 1974; Filep 1989; Kodolányi 1942; Szabadfalvi 1968a; Szabadfalvi 1968b; Takács 1983; Wittner 1978).

Relatively little information is available on the practical implementation of pannage in ethnographic references. Swine herds and flocks of sheep set for pannage spent the nights in the forest and a special farmstead was set up for the herders and for the livestock (Szabadfalvi 1963, 1968a,b; Takács 1983; Takáts 1986). Iván Balassa describes on an example from Bodrogköz that pannage had two rules of procedure: “herds were set off

radially from the farmsteads and visited a drinking place or spring en route. The other solution was to graze around the farmstead and to return for watering the stock" (Balassa 1973:73). It was pointed out several times that good places for pannage were sites where watering could also be accomplished, because animals desire water strongly after feeding on acorns. In practical terms pannage was continued from end of August, September up until the first major snowfall or freezing of the water sources dedicated for watering, albeit the law permitted feeding on acorns up to March of the next year (Balassa 1973; Kodolányi 1942; Szabadfalvi 1963; 1968). Special permits were sometimes granted for pannage in springtime, for instance in the Great Forest of Debrecen (Penyigey 1980). The grazing schedule was agreed upon by the masting herders pasturing on the same area (Szabadfalvi 1968a). Drive of livestock was determined mostly by the extent the acorns were consumed (Szabadfalvi 1968a).

Like gathering acorns, the last data on pannage come from North-Eastern Hungary, dated in the 1970s (Viga 1986).

## BENEFITS OF FOREST GRAZING AND PROHIBITIONS

Most information on former silvopastoral operations are available from written pleadings and rules and regulations, since generally these were recorded in written form (Andrásfalvy 2007; Filep 1989; Takács 1983). Silvopastoral activities were more strictly controlled and regulated by forest rules since the 19th century on, about which many archival sources are available.

In contrast, few details are known concerning forest grazing. Bertalan Andrásfalvy states that grazing of forested areas was initiated only when seedlings grew higher than what the grazing cattle could destroy (Andrásfalvy 2007:363–365). This had to be observed as fresh shoots were a favourite delicacy for cattle, which could be fatal for younger trees. No grazing was permitted in thickets during winter, either. As for goats, they were banned from virtually everywhere (Hegyi 1978).

Forest rules required bans on silvopastoral activities before and after felling. The length of the prohibitions might have been subject to change depending on regions and forest stands. Data refer to 7, 14 and 25 year-long prohibitions (Petercsák 1984; Viga 1988). Forests in the 19th century were still grazed almost without limits. Therefore so-called alternating pastures were introduced to reduce the pressure on and associated damages to individual pastures, and to secure replenishment of tree stands. The areas grazed this way were periodically renewed. Trees were painted white at a man's height at the boundaries of areas that were and were not allowed to be grazed. Eventual damages were the responsibility of the herders, while grazing was controlled and regulated by the forest inspectorate (Viga 1988). Beside the adverse impacts forest grazing exerted on the landscape and the environment, benefits were also reckoned, for instance in the case of the Hajdúság forests Imre Szabadi asserts:

> "Beside caring for the livestock, grazing had an important role in forest management. On the one hand, livestock fertilised forest grounds and hence trees grew better, and on the other the forest was rid of too much grass, which frequently dried out from spring winds and sunshine, causing forest fires in many cases." (Szabadi 1960:305)

*Figure 6.* Herder and the nature conservation ranger are meeting at one of the renewed wood pastures in Marcali. Marcali, Hungary, 2012. (Photo by Anna Varga)

## OUTLOOK

From the available references and resources found in ethnographies, the dominant, fundamental role, functioning and history of the silvopastoral systems from the 18th century to the first half of the 20th century are reviewed here. It showed that the silvopastoral systems were crucial part of the Hungarian cultural landscape and biocultural heritage. The management of the silvopastoral practises decreased and some of them disappeared nearly totally. Essentially the wood pastures and illegal forest grazing are representing the silvopastoral systems in Hungary nowadays (Varga et al. 2016; Varga – Molnár 2014).

Similar tendencies can be observed with respect to the traditional silvopastoral systems of the already forested parts of Europe, only across different time scales (Hartel et al. 2015; Johann et al. 2012). There are regions where this kind of land management is entirely abandoned (for instance in Germany or Czechia), while in other countries they are still continuously applied (for instance, forest pig raising by the Sava river in Croatia and Serbia) (Forejt et al. 2017; Gugić 2009; Hartel – Plieninger 2014) (Figure 5). In spite of all this, silvopastoralism is still the most widely used agroforestry method in Europe up to the present day (Herder et al. 2017).

Just as in many other countries in Europe, silvopastoral systems, especially wood pastures, have been revitalised in recent years in Hungary in connection with conservation-focused forest management practices, agricultural subsidies and the rising interest in

extensive livestock management itself (Molnár et al. 2016; Roellig et al. 2016). It is hoped that the process will be promoted by the expected renewal of permission for forest grazing. Growing numbers of renewing and rethinking silvopastoral farming include some farmers and livestock keepers, for instance a cattle farmer, *Mozsi farm*, in Somogy, who fattens calves on acorns as an innovative approach, or another family, *Váczakő farm* in Bakony, who rejuvenated an overgrown wood pasture by clearing and leaving wild fruit trees in place deliberately to process and market their fruits or an another family farm in Bakony, *Tűzkövesbörc farm*, where renewing traditional outdoor livestock keeping in silvopastoral system. Furthermore, it is possible to identify a number of conservation management practices that are intended to renew and maintain wood pastures in national parks in Hungary (Varga et al. 2017) (Figure 6). Many examples could be cited from across Europe: the renaissance of pannage in the oak woods of the Iberian peninsula (Olea – San Miguel-Ayanz 2006), or the efforts made to revitalise leaf-fodder gathering in Transylvania (Hartel et al. 2016) could both be highlighted here. All this is supplemented by the reform of the agroforestry strategy in the European Union as a whole, wherein innovation on silvopastoral systems is given special attention (Burgess et al. 2015; European Commission 2013; Plieninger et al. 2015).

All in all, the findings of ethnographic research studies conducted in the past century contribute significantly to understanding traditional land use forms, but to be able to provide a definite answer to questions of the ecological implications of these practices, further research will be needed.

## ACKNOWLEDGEMENT

I am deeply indebted to my supervisors Zsolt Molnár and Attila Borhidi, as well as to János Bölöni, Gábor Máté, Sándor Béres, Tibor Hartel, Mariann Biró, Judit Bódis, Dániel Babai, Borbála Végh and last but not least, Bertalan Andrásfalvy and Antal Filep, whose lifework greatly influenced me. Furthermore, I would like to express my gratitude to all the shepherds, herders, farmers and conservationists, whose stories and practical example called my attention to the current importance and innovation potential of silvopastoral systems. My thanks to Béla Borsos for translating this text into English and thanks to Susannah McCandless for improving the English of this text.

This work was partly funded through the AGFORWARD Project from the European Union's Seventh Framework Programme for Research, Technological Development and Demonstration under Grant Agreement no. 613520. It benefitted also support from OTKA K, 119478 – Effects of extensive grazing on vegetation in non-conventional pasture-lands, Hungarian Scientific Research Fund.

## REFERENCES CITED

Andrásfalvy, Bertalan
1984 Mit jelenthet a néphagyomány a jövő műveltségében [What Folk Tradition May Mean in the Culture of the Future]. *A Janus Pannonius Múzeum Évkönyve* 28:241–251.
2007 *A Duna mente népének ártéri gazdálkodása* [Floodplain Management of the People along the Danube River]. Budakeszi: Ekvilibrium Kiadó.
2009 Bevezetés – A gazdálkodás következtében végbement földfelszínváltozások vizsgálata a Kárpát-medencében [Introduction – Assessing the Geomorphological Changes the Carpathian Basin Has Undergone as a Consequence of Husbanding]. In Andrásfalvy, Bertalan – Vargyas, Gábor (eds) *Antropogén ökológiai változások a Kárpát-medencében* [Anthropogenic Ecological Changes in the Carpathian Basin], 9–20. Budapest: L'Harmattan – PTE Néprajz – Kulturális Antropológia Tanszék.
Balassa, Iván
1973 Makkoltatás a Kárpát-medence északkeleti részében a XVI–XIX. században [Pannage in the North-Eastern Part of the Carpathian Basin in the 16th to 19th Centuries]. *Ethnographia* 84(1-2):53–79.
Balogh, István
1958 Pusztai legeltetési rend Debrecenben a XVIII–XIX. században [Grazing Arrangements on the Plains in Debrecen in the 18th to 19th Century]. *Ethnographia* 69:537–563.
Békefi, Antal
2011 *Munkaritmus, munkarigmus, munkadal. Állattartás I–II* [The Rhythm of Work, the Rhyme of Work, the Work Song. Animal Husbandry I–II]. Budapest: Hagyományok Háza.
Belényesy, Márta
2011 Az állattartás és pásztorkodás a 14–15. században Magyarországon [Livestock Management and Pastoralism in the 14th and 15th Century in Hungary]. In Báti, Anikó (ed) *Fejezetek a középkori anyagi kultúra történetéből I* [Chapters from the History of Material Culture in the Middle Ages I], 69–134. Budapest: L'Harmattan Kiadó – MTA Néprajzi Kutatóintézet. (Documentatio Ethnographica 26.)
Bellon, Tibor
2003 *A Tisza néprajza* [Ethnography of the Tisza]. Budapest: Timp Kiadó.
Berkes, Fikret – Colding, Johan – Folke, Carl
2000 Rediscovery of Traditional Ecological Knowledge as Adaptive Management. *Ecological Applications* 10:1251–1262.
Burgess, Paul – Crous-Duran, Josep – den Herder, Michael – Dupraz, Christian – Fagerholm, Nora – Freese, Dirk – Garnett, Kenisha – Graves, Anil – Hermansen – John, Liagre – Fabien, Mirck, Jaconnette, Moreno, Gerardo – Mosquera-Losada, Rosa – Palma, João. – Pantera, Anastasia, Plieninger, Tobias – Upson, Matthew
2015 AGFORWARD Project Periodic Report: 2014. Cranfield University: AGFORWARD.

Bürgi, Matthias – Gimmi, Urs
2007 Three Objectives of Historical Ecology. The Case of Litter Collecting in Central European Forests. *Landscape Ecology* 22:77–87.
Csiszár, Árpád
1974 Sertésmakkoltatás az északkeleti erdővidéken [Pannage of Pigs in the North-Eastern Forest Country]. *Agrártörténeti Szemle* 16:234–246.
Drew, Joshua – Henne, Adam
2006 Conservation Biology and Traditional Ecological Knowledge. Integrating Academic Disciplines for Better Conservation Practice. *Ecology and Society* 11:34.
Ébner, Sándor
1933 Zselici kanászélet [Life of the Pig Herders in Zselic]. *Ethnographia* 49:192–219.
Ecsedi, István
1914 *A Hortobágy puszta és élete* [The Hortobágy Puszta and Its Life]. Debrecen: Csáthy Ferenc.
Eperjessy, Ernő
2006 *Puszták népe a Zselicben (1900–1950)* [People of the Puszta in the Zselic]. Budapest: Mikszáth Kiadó.
Erdélyi, Zoltán
1959 *Az erdő néprajza. Útmutató füzetek néprajzi adatgyűjtéshez V* [Ethnography of the Forest. Guide Books for Collecting Ethnographic Data V]. Budapest: Magyar Néprajzi Múzeum.
European Commission
2013 Regulation 1305/2013 of the European Parliament and of the Council of 17 December 2013 on Support for Rural Development by the European Agricultural Fund for Rural Development (EAFRD) and Repealing Council Regulation 1698/2005.
Fagerholm, Nora – Torralba, Mario – Burgess, Paul – Plieninger, Tobias
2016 A Systematic Map of Ecosystem Services Assessments Around European Agroforestry. *Ecological Indicators* 62:47–65.
Filep, Antal
1989 Adalékok Békés város erdőgazdálkodásához [Contributions to the Forest Management by the City of Békés]. In Filep, Antal (ed) *Történeti-néprajzi források a XVIII–XIX. századból* [Historical-Economical Sources from the 18th and 19th Centuries], 93–138. Budapest: MTA Néprajzi Kutató Csoportja.
Forejt, Michal – Skalos, Jan – Pereponova, Anna – Plieninger, Tobias – Vojta, Jaroslav – Šantrůčková, Markéta
2017 Changes and Continuity of Wood-Pastures in the Lowland Landscape in Czechia. *Applied Geography* 79:235–244
Gaál, József
2003 *Pásztorvilág gazdaszemmel. Gaál József intéző bugaci emlékei 1928–1936* [The Shepherds' World through the Eyes of a Bailiff]. Kecskemét: Kiskunsági Nemzeti Park Igazgatósága.

Gugić, Goran
2009 *Managing Sustainability in Conditions of Change and Unpredictability. The Living Landscape and Floodplain Ecosystem of the Central Sava River Basin.* Krapje, Croatia: Lonjsko Polje Nature Park Public Service.
Gunda, Béla
1938 Földrajzi megfigyelések az Ormánságban [Geographic Observations in the Ormánság]. *Földrajzi Közlemények* 66:30–52.
Győrffy, István
1941 Állattartás. In Győrffy, István – Viský, Károly (eds) *A magyarság néprajza II* [Livestock keeping, Ethnography of the Hungarians II]. 83–147. Budapest: Királyi Magyar Egyetemi Nyomda.
Hartel, Tibor – Plieninger Tobias (eds)
2014 European Wood-Pastures in Transition. A Social-Ecological Approach. Earthscan: Routledge.
Hartel, Tibor – Plieninger, Tobias – Varga, Anna
2015 Wood-Pastures in Europe. In Kirby K. – Watkins C. (eds) *Europe's Changing Woods and Forests. From Wildwood to Managed Landscapes,* 61–76. Wallingford: CAB International.
Hartel, Tibor – Craioveanu, Cristina – Réti, Kinga Olga
2016 Tree Hay as Source of Economic Resilience in Traditional Social-Ecological Systems from Transylvania. *Martor* 21:53–64.
Hegyi, Imre
1978 *A népi erdőkiélés történeti formái* [Historical Forms of Forest Exploitation by the People]. Budapest: Akadémiai Kiadó.
1982 Fejezetek a Bakony erdei állattartásának történetéből [Chapters from the History of Forest Livestock Management in the Bakony]. In: Módy, György (ed) *Néprajzi Tanulmányok Dankó Imre tiszteletére* [Ethnographic Studies in the Honour of Imre Dankó], 253–169. Debrecen: Hajdú-Bihar Megyei Múzeumok Közleményei.
den Herder, Michael – Moreno, Gerardo – Mosquera-Losada, Rosa – Palma, João – Sidiropoulou, Anna – Freijanes, Jose Santiago – Crous-Duran, Josep – Paulo, Joana A. – Toméd, Margarida – Pantera, Anastasia – Papanastasis, Vasilios – Mantzanas, Kostas – Pachana, Pachanaa – Papadopoulos, Andreas – Plieninger, Tobias – Burgess, Paul
2017 Current Extent and Stratification of Agroforestry in the European Union. *Agriculture, Ecosystems & Environment* 241:121–132.
Herkely, Károly
1941 Népi erdőgazdálkodás Veszprém vármegyében [Forest Management by the People of Veszprém County]. *Ethnographia* 52:54–58.
Herman, Ottó
1914 A magyar pásztorok nyelvkincse [The Wealth of Words Held by Hungarian Herders]. Budapest: K. M. Természettudományi Társaság.

Hosszú, Csaba
2009 Adalékok a határhasználat és tájalakulás történetéhez a somogyi Nagy-berek területén [Contributions to the History of Land Use and Landscape Development in the Area of the Nagy-berek in Somogy County]. In Andrásfalvy, Bertalan – Vargyas, Gábor (eds) Antropogén ökológiai változások a Kárpát-medencében [Anthropogenic Ecological Changes in the Carpathian Basin], 163–184. Budapest: L'Harmattan – PTE Néprajz – Kulturális Antropológia Tanszék.
Imre, Sándor
1955 Erdő- legelőgazdálkodás Kisrákoson [Forest and Pasture Management in Kisrákos]. *A Néprajzi Múzeum Adattárának Értesítője* 1-2:71–73.
Johann, Elisabeth – Agnoletti, Mauro – Bölöni, János – Erol, S.C. – Holl, Kate – Kusmin, Jürgen – Latorre, J.G. – Molnár, Zsolt – Rochel, X. – Rotherham, Ian D. – Saratsi, E. – Smith, M. – Tarang, L. – Benthem, M. – Laar, J.
2012 Europe. In: Parrotta, John – Trosper, Ronald (eds) Traditional Forest-Related Knowledge. Sustaining Communities, Ecosystems and Biocultural Diversity, 203–249. Dordrecht: Springer Science + Business Media B.V. (World Forests 12.)
ifj. Kodolányi, János
1946 Adalékok az ormánsági Vajszló és környéke néprajzához. Makkoltatás [Contributions to the Ethnography of Vajszló and Its Surroundings in the Ormánság]. *Ethnographia* 57:73–77.
Madarassy, László
1935 *A magyar művészkedő pásztorok* [Herdsmen as Artists in Hungary]. Budapest: Magyar Könyvbarátok.
Magyar Közlöny
2017 Az erdőről, az erdő védelméről és az erdőgazdálkodásról szóló 2009. évi XXXVII. törvény és egyéb kapcsolódó törvények módosításáról szóló 2017. évi LVI. törvény [Hungarian Forest Act 2009 and the Modification of this Act, 2017, LVI]. Magyar Közlöny 75:7778.
Malonyai, Dezső
1911 *A Balatonvidéki magyar pásztornép művészete. A magyar nép művészete III* [Art of the Hungarian Shepherd Folks in Balaton Country]. Budapest: Franklin-Társulat.
Máté, Gábor
2009 A kultúrtáj változásának aspektusai Kárászon [Aspects of the Changes to the Cultural Landscape in Kárász]. In Andrásfalvy, Bertalan – Vargyas, Gábor (eds) Antropogén ökológiai változások a Kárpát-medencében [Anthropogenic Ecological Changes in the Carpathian Basin], 163–184. Budapest: L'Harmattan – PTE Néprajz – Kulturális Antropológia Tanszék.
Molnár, Zsolt
1996 Interpreting Present Vegetation Features by Landscape Historical Data. An Example from a Woodland-Grassland Mosaic Landscape (Nagykőrös Wood, Kiskunság, Hungary). In Kirby, Keith – Watkins, Charles (eds) The Ecological History of European Forest, 241–263. Cambridge: CAB International.

Molnár, Zsolt – Kis, József – Vadász, Csaba – Papp, László – Sándor, István – Béres Sándor – Sinka Gábor – Varga, Anna
2016 Common and Conflicting Objectives and Practices of Herders and Nature Conservation Managers. The Need for the 'Conservation Herder.' Ecosystem Health and Sustainability 2(4)
Mosquera-Losada, Rosa – McAdam Jim – Romero-Franco, R. – Santiago-Freijanes, Jose Javier – Riguero-Rodríquez, Antonio
2009 Definitions and Components of Agroforestry Practices in Europe. In Rigueiro-Rodríguez, Antonio – McAdam, Jim – Mosquera-Losado, Rosa (eds) *Agroforestry in Europe. Current Status and Future Prospects*, 3–19. Dordrecht: Springer Science + Business Media B.V.
Nagy Czirok, László
1959 Pásztorélet a Kiskunságon [Life of the Herders in Kiskunság]. Budapest: Gondolat.
Olea, L. – San Miguel-Ayanz, Alfonso
2006 The Spanish *Dehesa*. A Traditional Mediterranean Silvopastoral System Linking Production and Nature Conservation. *Grassland Science in Europe* 11:3–13.
Paládi-Kovács, Attila
1977 A gömöri magyar pásztorkodás [Hungarian Pastoralism in Gömör]. *Ethnographia* 88(2-3):392–441.
1982 *A Barkóság népe* [People of the Barkóság]. Miskolc: Herman Ottó Múzeum.
1983 A lombtakarmány a magyar állattartásban [Leaf-Fodder in Hungarian Animal Husbandry]. *Népi kultúra – népi társadalom* 13:193–209.
1993 *A magyarországi állattartó kultúra korszakai* [Ages of Livestock Culture in Hungary]. Budapest: Akadémiai Kiadó.
2003 A magyarországi állattartó kultúra korszakai [Ages of Livestock Culture in Hungary]. Budapest: MTA Néprajzi Kutatóintézet.
Penyigey, Dénes
1980 Debrecen erdőgazdálkodása a XVIII. században és a XIX. század első felében [Forest Management in Debrecen in the 18th Century and in the First Half of the 19th Century] *Agrártörténeti tanulmányok* 7:283–303.
Petercsák, Tivadar
1977 Az erdő szerepe a Hegyközi állattartásban. [The Role of Forests in Livestock Keeping in the Hegyköz]. *A Herman Ottó Múzeum Évkönyve* 16:295–310.
1983 *Népi szarvasmarhatartás a zempléni Hegyközben* [Cattle Farming by the People in the Hegyköz, Zemplén County]. Miskolc: Herman Ottó Múzeum. (Borsodi Kismonográfiák 17.)
1984 Erdőhasználat Gyöngyösön és környékén a XVIII–XX. században [Forest Use in Gyöngyös and Surrounding in the 19th to 20th Centuries]. In Havassy, Péter – Kecskés, Péter (eds) *Tanulmányok Gyöngyösről* [Studies on Gyöngyös], 457–506. Gyöngyös: Gyöngyös Város Tanácsa
1986 Az erdő szerepe Felsőtárkány életében [The Role of the Forest in the Life of Felsőtárkány]. In Petercsák, Tivadar (ed) *Az életmód változása egy bükki faluban* [Changing Lifestyles in a Bükk Village Community], 128–136. Budapest – Eger: Heves Megyei Múzeumi Szervezet

2001 Népi állattartás Hevesen [Folk Animal Husbandry in Heves]. In Petercsák, Tivadar – Szabó, T. József (eds) Tanulmányok Hevesről [Studies on Heves Country], 367–407. Heves: Heves város önkormányzata.

2003 Heves megyei pásztorok. (A paraszti állattartás új forrása) [Shepherds in Heves County (A Novel Source of Peasant Animal Farming)]. In S. Lackovits, Emőke – Viga, Gyula (eds) *Kéve. Ünnepi kötet a 60 esztendős Selmeczi-Kovács Attila tiszteletére*, 225–237. Debrecen – Veszprém: Ethnica.

Plieninger, Tobias – Hartel, Tibor – Martín-López, Berta – Beaufoy, Guy – Bergmeier, Erwin – Kirby, Keith – Montero, Maria Jesús – Moreno, Gerardo – Oteros-Rozas, Elisa – Van Uytvanck, Jan

2015 Wood-Pastures of Europe. Geographic Coverage, Social-Ecological Values, Conservation Management, and Policy Implications. *Biological Conservation* 190:70–79.

Plinius Secundus, Gaius

2012 *Caii Plinii Secundi Historiae naturalis libri XXXVII Volume 3, p. 3*. RareBooksClub.com.

Rackham, Oliver

1998 Savannah in Europe. In: Kirby, Keith – Watkins, Charles (eds) *The Ecological History of European Forests*, 1–24. New York: CAB International.

Rois-Diaz, Mercedes – Mosquera-Losoda, Rosa – Rigueiro Rodríguez, Antonio

2006 *Biodiversity Indicators on Silvopastoralism across Europe*. European Forest Institute, EFI Technical Report 21.

Roellig, Marlene – Sutcliffe, Laura – Sammul, Marek – von Wehrden, Henrik – Newig, Jens – Fischer, Joern

2016 Reviving Wood-Pastures for Biodiversity and People. A Case Study from Western Estonia. *Ambio* 45(2):185–195.

Szabadfalvi, József

1963 Juhmakkoltatás az északkelet-magyarországi hegyvidéken [Pannage of Sheep in the North-Eastern Hungarian Mountain Areas]. *Műveltség és Hagyomány. A debreceni Kossuth Lajos Tudományegyetem Néprajzi Intézetének Évkönyve* 5:131–143.

1968a Makkoltatás a Zempléni hegységben [Pannage in the Zemplén Mountains]. *Ethnographia* 79:62–75

1968b Migráció és makkoltatás az Alföld keleti peremvidékén [Migration and Pannage in the Eastern Borderland of the Great Hungarian Plain]. *Műveltség és Hagyomány. A debreceni Kossuth Lajos Tudományegyetem Néprajzi Intézetének Évkönyve* 10:55–80.

1970 Az extenzív állattenyésztés Magyarországon [Extensive Animal Farming in Hungary]. *Műveltség és Hagyomány. A debreceni Kossuth Lajos Tudományegyetem Néprajzi Intézetének Évkönyve* 12.

1972 Pásztormigráció Felső-Tiszántúl és az Északi-Középhegység között [Pastoralist Migration between the Upper Tiszántúl and the North Hungarian Mountains]. *A Miskolci Herman Ottó Múzeum Közleményei* 11:128–133.

1986 A sertéstenyésztés néprajzi kutatása Magyarországon [Ethnographic Research of Pig Farming in Hungary]. *Herman Ottó Múzeum Évkönyve* 24:293–302.

Szabadi, Imre
1960 Legeltetés és makkoltatás a hajdúböszörményi erdőkben [Grazing and Pannage in Forests around Hajdúböszörmény]. *Műveltség és Hagyomány. A debreceni Kossuth Lajos Tudományegyetem Néprajzi Intézetének Évkönyve* 1–2:305–311.
Szabó, Péter
2002 „Mert a fának van reménysége…" Csonkolt fák Magyarországon ['…Cause the tree has hope…' Truncated Trees in Hungary]. *Korall* 9:155–172.
2009 Hagyományos erdőgazdálkodás a Kárpát-medencében [Traditional Forest Management in the Carpathian Basin]. In Andrásfalvy, Bertalan – Vargyas, Gábor (ed) *Antropogén ökológiai változások a Kárpát-medencében* [Anthropogenic Ecological Changes in the Carpathian Basin], 129–144. Budapest: L'Harmattan – PTE Néprajz – Kulturális Antropológia Tanszék.
Tagányi, Károly
1896 *Magyar erdészeti oklevéltár I–III* [Databasis of the Hungarian Forestry Regulations and Archival Documents I–III]. Budapest: Pátria.
Takács, Lajos
1966 Berki pásztorok a Kis-Balaton szigetein [March-Grove Herders in the Islands of the Little Balaton]. *Néprajzi Közlemények* 11(1–2):3–24.
1980 Irtásgazdálkodásunk emlékei [Memories of our Slash and Burn Agriculture]. Budapest: Akadémiai Kiadó.
1983 Erdei sertéstartás a Dunántúlon [Forest Swine Keeping in Transdanubia]. Budapest: Manuscript. Néprajzi Múzeum Ethnológiai Archívum (Ethnological Archives of the Museum of Ethnography) 10/2003. 51. d
Takáts, Gyula
1986 *Somogyi pásztorvilág* [Shepherds' World in Somogy County]. Kaposvár.
Tálasi, István
1939 *A bakonyi pásztorkodás* [Pastoralism in the Bakony]. *Ethnographia* 50:9–39.
1942 *Változásvizsgálatok a népi állattenyésztés köréből* [Assessment of Changes in Folk Animal Farming]. *Néprajzi Értesítő* 34:203–220.
Tamás Károlyné Kiss-Tóth, Vilma
2009 *Juhászok a Bakonyban* [Shepherds in the Bakony]. Szentgál: Horváth Nyomda Kft.
Torralba, Mario – Fagerholm, Nora – Burgess, Paul – Moreno, Gerardo – Plieninger, Tobias
2016 Do European Agroforestry Systems Enhance Biodiversity and Ecosystem Services? A Meta-Analysis. *Agriculture, Ecosystems & Environment* 230:150–161.
Vajkai, Aurél
1958 Szelíditett vaddisznókonda a Bakonyban [Tamed Wild Boar Herd in the Bakony]. *Veszprémi Szemle* 2(1):81–82.
1959 *Szentgál: Egy bakonyi falu folklórja* [Szentgál: Folklore in a Bakony Village]. Budapest: Akadémiai Kiadó.

Varga, Anna – Bölöni, János
2009 Erdei legeltetés, fáslegelők, legelőerdők tájtörténeti kutatása [Landscape History of Forest Grazing and Wood-Pastures in the Carpathian Basin]. *Természetvédelmi Közlemények* 15:68–79.

Varga, Anna – Heim, Anita – Demeter, László – Molnár, Zsolt
2017 Rangers Bridge the Gap. Integration of Traditional Ecological Knowledge Related to Wood Pastures into Nature Conservation. In Roué, Marie – Molnár, Zsolt (eds) *Knowing Our Land and Resources. Indigenous and Local Knowledge of Biodiversity and Ecosystem Services in Europe & Central Asia*, 76–89. Paris: UNESCO. (Knowledges of Nature 9.)

Varga, Anna – Molnár, Zsolt – Biró, Marianna – Demeter, László – Gellény, Krisztina – Miókovics, Eszter – Molnár, Ábel – Molnár, Krisztina – Ujházy, Noémi – Ulicsni, Viktor – Babai, Dániel
2016 Changing Year-Round Habitat Use of Extensively Grazing Cattle, Sheep and Pigs in East-Central Europe Between 1940 and 2014. Consequences for Conservation and Policy. *Agriculture Ecosystems & Environment* 234:142–153.

Viga, Gyula
1986 Az állattartással kapcsolatos migráció [Migration Related to Animal Farming]. In Viga, Gyula *Tevékenységi formák és javak cseréje a Bükk-vidék népi kultúrájában* [Forms of Activity and Exchange of Goods in the Folk Culture of the Bükk-Country], 28–54. Miskolc: Herman Ottó Múzeum.
1988 Legeltetés és pásztormigráció a Bükk hegységben [Grazing and Shepherd Migration in the Bükk Mountains]. In Bereznai, Zsuzsanna – Viga, Gyula (eds) *Fejezetek a Bükk-vidék népi kultúrájából* [Chapters from the Folk Culture of the Bükk-country], 38–48. Eger – Miskolc: TIT Borsod-Abaúj-Zemplén Megyei és Heves Megyei Szervezete. (Néprajzi tájkonferenciák Heves megyében 6.)

Wittner, Ferenc
1978 Tiszacsege és Egyek községek erdeinek története a helynevek tükrében [The History of Forests in Tiszacsege and Egyek Communities in the Light of Toponyms]. *Országos Erdészeti Egyesület Erdészettörténeti Szakosztály Közleményei* 11-12:119–120.

Zólyomi, József
1968 Észak-Cserhát állattartásának másfél százada. [One and a Half Century of Animal Farming in the North of the Cserhát]. *Agrártörténeti Szemle* 10:439–475.

**Anna Varga** is an ethnobiologist-ecologist, assistant research fellow of the Traditional Ecological Knowledge Research Group at the Centre for Ecological Research, the Hungarian Academy of Sciences, and a PhD candidate of the University of Pécs. She was a board member of the International Society of Ethnobiology between 2012 and 2014 as a student representative. She researches landscape history, ethnobiology, vegetation and innovations of the silvopastoral systems in the Carpathian Basin.