Educational Tourism in Arboretum – The Case of Borová Hora

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Abstract

Nowadays tourists are increasingly seeking learning and educational experiences while on holidays. This interest has led institutions and organizations that served some years ago predominantly to education purposes to create tourism product with the focus on the general public. These tourism products include learning or education components providing professional information in a way that is acceptable also to non-professional visitors. Arboretums are one of these establishments that provide a wide range of possibilities for the practical teaching of students in primary biological disciplines but also attract visitors because of their natural beauty and relaxing atmosphere. Reflecting versatility of the arboretum, the authors outline primary the forms of educational tourism; they characterize the Arboretum Borová hora (the supply side) and analyze the visitation (demand side) of the arboretum. After reviewing the current state of scientific knowledge in educational tourism, the following research question was formulated: Can guided tours enhance the visitation of the Arboretum? The results of the regression analysis confirmed that the targeted introduction of novelties (or new impetus) for arboretum visitors (guided tours) increased the overall arboretum traffic and awareness of Arboretum Borová hora.

1. Introduction

Tourism as has a positive impact on economic growth and employment in destinations, and it is an essential aspect of the life of people around the world. Tourism helps to raise local awareness of the financial value of natural and cultural sites. It strengthens the preservation and protection of local natural and cultural heritage, stimulates a feeling of pride on nature, culture, and crafts, and strengthens the local community by creating job opportunities.

Nowadays visitors are becoming more experienced, more sophisticated and more demanding; they are continually looking for new experiences, for something more challenging, more exciting. This trend is reflected, among others, for example in demand for short-break intensive vacation in unpolluted destinations with a focus on the new experience, knowledge, rediscovery of traditions (Jarábková et al., 2012).

Due to everyday stressful lifestyle, short-break vacations are expanding global phenomenon. Focus on short vacations is an appropriate competitive strategy of the destinations, given that over the last 20-30 years this market has grown considerably. The

short-break vacation is not planned long in advance, so the internet has become the primary source of information and reservation tool.

Globalization, the growth of tourism, changes in lifestyles, trends towards more flexibility and individualization has led to the development of the number of niches and special interest tourism, including educational tourism (Ritchie et al., 2003; Poon, 2003).

The history of educational tourism dates back to 17th century when it has existed in the form of the 'Grand Tour,' experience in the education of aristocratic males (see, e.g., Feifer, 1985; Gibson, 1998; Holdnak & Holland, 1996; Swarbrooke & Horner, 2007). Despite its history, there is still a gap in research and discussions about educational tourism (Williams, 2010).

Travel for study or acquiring educational services is referred to as educational tourism (Abubaker, et al., 2014). It involves learning experience that requires the active participation of the educational tourists (Pitman, et al., 2010; Packer, 2006).

Educational tourism can vary from a half-day visit to a natural site to a study program undertaken in a foreign country (Poon, 1993).

Bodger (1998, p. 28) argues that educational tourism refers to traveling in groups with "the primary purpose of engaging in a learning experience directly related to the location." Ritchie (2009) states that participants in educational tourism either stays in the destination overnight or undertake an excursion with education and learning as a primary or secondary part of their trip. This statement allows viewing educational tourism not just as a travel arrangement made for scholars, but also for general public. He added that traveling enhanced by the cultural motivation incorporate also learning an element, desire for finding novelty, and education. GWA Training Brokers (2010) characterize educational tourism as a "travel for formal or informal education and lifelong learning in unique natural, historical & multi-cultural environments. It refers to any tourism program or product offering in which participants travel to a location with the primary purpose of engaging in a learning experience. It benefits the local economy and enhances the general population at the same time as educating and enriching the lives of the individuals who participate in these programs." According to Canadian EduTourism Association Cooperative (CETA, 2010) educational tourism is travel undertaken by an individual to a unique location for formal or informal learning in various forms such as work experience, training in a new language, culinary training, medical tourism, cultural tours, and professional development. Sayre and King (2010) add that school and university trips, as well as specialty camps, are also educational travel. Ritchie, Carr, and Cooper (2003) widen the purposes of the educational travel saying that education can be a primary or secondary purpose for the destination visit and include general educational tourism, adult study tours, international and domestic university and school students' travel, language schools, school excursions and exchange programs. Patterson (2006) considers educational tourism as travel with a learning experience.

Ritchie et al. (2003), Pitman, Broomhall and Mcewan (2010, p. 220) state that tourists in educational tourism are motivated by a desire or need to learn; this is typical especially for adults. It refers specifically to "organized recreational tours (usually commercial), aimed at the general public (as distinct from, for example, for-credit study tours for students) which promote an intentional and structured learning experience as a key component. This learning component is explicit, and core, to the delivery of the product."

Ritchie et al. (2003) argue that learning may be either a primary or secondary motivator to travel and learning may occur formally (using an expert or guide), or informally (independently or self-driven).

Universities often promote some form of educational travel for their students with different length of stay aiming to widen the educational experience of the students. Study abroad experiences often enhance the chance of employment of the graduates. Nevertheless, students often travel not only within the chosen country but also to neighboring ones what allows them to gain multicultural skills.

Skill enhancement trip as a part of the educational tourism can cover different skills from learning how to build houses or grew vegetables to how to protect the nature in combination with the travel experience. These trips are also popular because of their de-stressing factor.

Participation in educational tourism is growing every year. It can improve the level of specific as well as the general education and create new economic opportunities for the knowledge acquired to create social value and, also, educational tourism provides knowledge for people without age difference and creates a platform for lifelong learning.

Educational tourists are good educated, have a higher disposable income, and are concerned about the environment and different cultures (Árnason, 2010; Pitman et al., 2010; Richards, 2011). They are wary of the commodification of cultures (Lyons et al., 2012) and seek an authentic experience they can co-create (Richards, 2011; Pitman et al. 2010).

The primary purpose of educational tourism is to obtain knowledge and experience on specific topics, rather than travel itself. Therefore, it is crucial to involve tour guides or experts providing comments and description of the particular topics that can give a tourist a broader perspective on the subject that is being discussed. The role of such guides is particular as beside the knowledge of the topic they must also understand that educational tourism is based around tourists who pay for the information they get, and they do not want to be treated as regular students. The comments and description should engage or captivate the visitors (Moss, 2009); evoke emotions to promote knowledge, awareness, and learning (ibid). Such an education refers to edutainment (ibid). Edutainment include for example museums; art galleries; exhibitions; zoos; aquariums, planetariums, and arboretums.

Arboretums belong to important dendrological objects that provide a wide range of possibilities for the practical teaching of students in basic biological disciplines. The qualified teaching of vocational subjects does not take place at universities and secondary vocational schools of biological, forestry, horticultural and ecological focus without knowledge of a wide range of original (autochthonous) and introduced (allotone) woods. Arboretums are also places to visit by tourists and the general public to learn about nature, its protection and preservation.

In Slovakia, there are four significant arboretums: (1) Arboretum Kysihýbel and botanic garden at the Forestry High School in Banská Štiavnica; (2) Arboretum in Liptovský Hrádok, (3) Arboretum of the Slovak Academy of Science in Mlyňany; and the Arboretum Borová hora in Zvolen (Hrubík, 2000).

The study aims to verify the zero hypotheses that the visitation at the Arboretum Borová hora of the Technical University in Zvolen is unchanged in the time horizon 2008-2017,

specify breakpoints in traffic over the ten-year period, respectively, as well as to assess the impact of climatic factors on the number of visitors.

Material and Methods

Changes or significant breaks in the number of seasonal (March-October) visits were analyzed over the period from 2008 to 2017. The null hypothesis, namely, that the regression coefficient does not change over time and the seasonal visits are stable was tested. A hypothesis was rejected in the case that the breakpoint was detected (based on least squares model parameter estimation). The breakpoint was detected automatically. To test the hypothesis, we estimated two separate linear regression equations; one for the seasonal visit values that are less than or equal to the breakpoint and one for the seasonal visit values that are greater than the breakpoint. Combination of Rosenbrock and Quasi-Newton estimation methods was used to estimate parameters of the Piecewise linear regression model (Hlásny et al., 2014; Shanno & Kettler, 2010; Neter, Wasserman & Kutner, 1990). The significance of the model (correlation coefficient) was tested by t-test.

Residuals of the Piecewise linear regression model to detect the relationship between inter-annual fluctuations in visits and weather were further used. Seasonal March-October precipitation sums were used as the prediction variable and the absolute values of deviations (differences between seasonal visits and the average visits determined by the model in the particular year). The significance of the relationship (correlation coefficient t) was determined by t-test.

To better explain and reveal changes in inter-annual visits we used intra-annual monthly (March-October) visits over the period from 2008 to 2017 as a dependent variable and tested the possible effect of commented excursions and their possible interactions. The effects were tested by using the two-way ANOVA (StatSoft, Inc. (2013).

After reviewing the current state of scientific knowledge in educational tourism, the following research question was formulated: Can guided tours enhance the visitation of the Arboretum?

Visits of Arboretum Borová hora were evaluated over a period of ten years (2008–2017). The number of visitors was recorded monthly, in different categories: K - kindergartens, PS - primary schools, SS - secondary schools, UNI+ADP - universities and associations of physically and mentally disabled young and retired people. The entrance of accompanying staff (e. g., supervisors, and teachers) is free of charge at all group entries.

The category others includes the free entrance for public events during the official opening of the visiting season (Welcome Birds Delegates of Spring), various competitions with other organizations (Discover and Protect, Fairy Forest, Universities of the Tertiary Age, etc.), it also includes accompanying excursions for Technical University in Zvolen (TUZVO) (national and foreign), individual entries of TUZVO employees and students who have free admission during the entire visiting season. The category special comprises researchers who repeatedly visit the arboretum due to work on their research projects (e.g., phenology, forest mensuration, bioclimatology, mycology). The category of visitors with 1 and 2 € ticket reflects the actual number of tickets sold in a given year, the interest of adults, families, retirees, and students in specific months of the visiting season. Besides this, the number of

excursions and their visitors was also recorded, as well as the number of visits during the Days of Rhododendrons and Days of Roses.

Results and Discussions

Arboretum Borová hora is a scientific and educational institution of the Technical University in Zvolen, established in 1965. The arboretum covers nearly 50 hectares (47.84 ha) within the altitudinal range of 291–377 m above sea level and is one of the most extensive arboreta in Europe.

One of the most important missions of Arboretum Borová hora is education. The professional orientation on the original dendroflora with a particular focus on the tree species of Slovakia allow providing a wide range of lecturers for the Faculty of Forestry e. g. Dendrology, Botany, Bioclimatology, Pedology, Integrated Woods Protection as well as for the Faculty of Ecology and Environmental Studies e. g. Landscape Dendrology, Landscape Design, and Landscape Flower Garden. The arboretum also provides a part of the practical training in Morphology and wood structure and provides facilities for monitoring the degradation of wood in model conditions for Woodworking Faculty. In addition to the students of the Technical University, students from other universities, in particular, the Slovak University of Agriculture in Nitra and the Matej Bel University in Banská Bystrica, also use the arboretum complex, and in recent years also some of the Czech and Polish universities.

For the educational and scientific purposes, the arboretum possesses rich collections of tree species and shrubs, roses, cacti, and succulents.

The collection of Tree species and shrubs are the most extensive and the most important collection of the Arboretum. The main idea behind is to present native tree species of central Europe, and Slovakia in their morphological and geographical variability. Essential populations and rare forms of autochthonous tree species and shrubs are acquired by the arboretum´s or mediated collecting of specimens directly in the forests of Slovakia, respectively, in the areas of their natural distribution. Recorded and archived are also protected and endangered species. The purpose of preserving the autochthonous tree species and shrubs of Slovakia is their initial transfer to the same or partially modified conditions of Arboretum Borová hora. Later, their eventual subsequent reintroduction into the native ecosystems may result in the higher ecological stability of the landscape (Lukáčik et al. 2005, Sedmáková et al., 2018). Currently the collections consist of 4 695 taxonomic (registration) units containing one hundred twenty genera, four hundred eighty-seven species (except species of genus Rosa sp.), 1 036 forms and cultivars of trees and shrubs and 1 512 origins (without significant habit deviations - geographical variability), altogether almost 14 000 registered trees and shrubs. It is a case of a very precious plant material of big importance for preserving the gene pool of tree species of Slovakia. Consequently, in year 1981 the Arboretum was proclaimed a protected area as an expression of the collection value.

The initial aim and the main idea behind The Roses collection were to gather and archive primarily resistant landscape shrub roses with the aim of their utilization in the landscape, which was further expanded with the collection of specimens of roses breeds from the Czech Republic, Moravia, and Slovakia; this closely corresponds with the general concept of arboretum development. At present, more than 800 sorts of roses growth in the Arboretum, from which almost 250 sorts come from Czech and Slovak breeders. The most abundant are

old sorts from Czech breeders Jan Böhm and Josef Urban and world-famous rose breeder Rudolf Geschwind. The Roses collection includes the s more than 80 species of botanical roses, together with more than 800 taxonomic units of the genus Rosa sp., with up to 4 000 specimens.

The collection of cacti and succulents is aimed at the botanical family *Cactaceae* and less on succulents. The collection was compiled to show the variability of the species. At present, the collection comprises representatives of seventy-four genera of cacti with 550 taxons and forty-seven genera of succulents with one hundred and fifty taxons. In the arboretum collection, 1500 specimens of xerophilous flora are growing, especially from Mexico, North and South America, with a significant focus on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) listed plants.

The Arboretum is open to the public on working days from 15 March to 31 October. In the winter season (1 November - 14 March) the arboretum is closed for the public. Entrance fee for the public is different for adults (2 €); children over six years, students, and retired visitors (1 €); children up to 6 years and mentally and physically challenged visitors have free entrance. Additionally, there are following annual public events organized:
- Welcome Birds - Delegates of Spring (since 2009);
- Days of Rhododendrons (since 2004);
- Days of Roses (since 1994);
- Autumn in the Arboretum (since 2012).

The number of visits of Arboretum Borová Hora was evaluated from several aspects. The basic overview of the number of visitors in the last decade is given in Graph 1.

From the values obtained for the 2008–2017 visiting seasons, it can be seen that the number of paying visitors varies according to the total number of visits. The proportion of paying visitors is ranging from 30% to 34%. The exception is the number of visitors in 2010 and 2012 when the number of paying visitors accounted for only a quarter of the total (26%) and respectively in 2017, where the number of paying visitors reached 38% of the total number. Most visitors (around 70%) come to the Arboretum for research and teaching, or because of beneficial free entrance.

Given the general public interests in visiting the Arboretum, the intra-annual monthly numbers of Arboretum visits (March–October) were analyzed. The findings confirm that the plant collections (tree species, roses) are the most attractive for the public in May and June. This finding is valid for all years under the study. To verify the impact of intra-annual fluctuations in number of visits, a model of two-way analysis of variance were used, where the first influencing factor is the month of the year, and the second factor is commented excursions, which has the highest importance during the two important public events: Rhododendron Days (May) and Roses Days (June).

Number of visits in the seasons 2008–2017   Graph 1
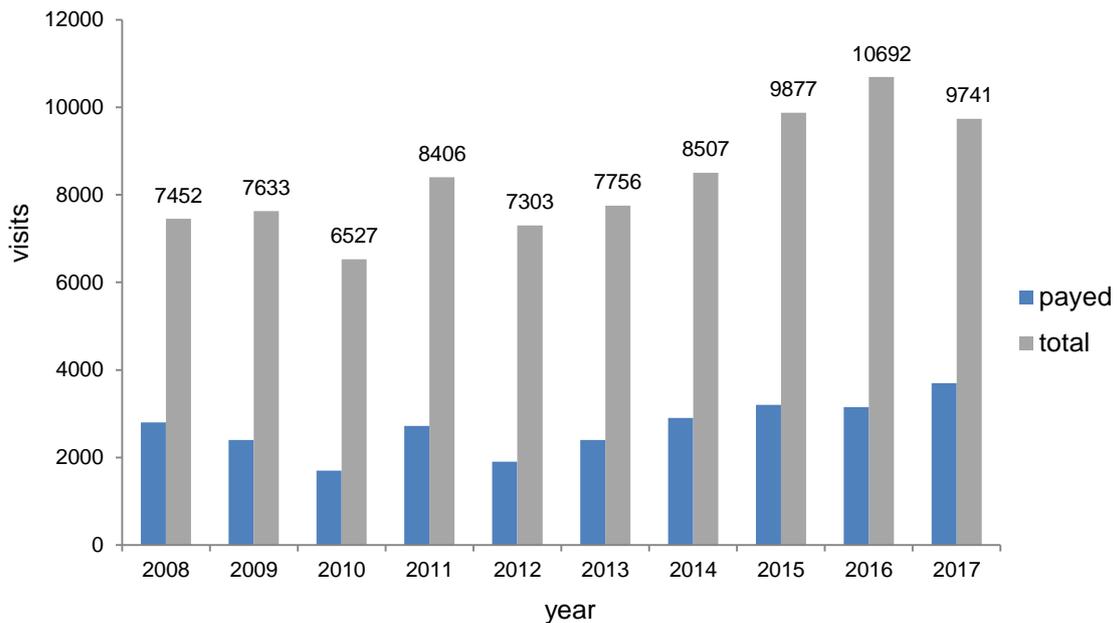
Source: Authors´ Processing

The results of two-way factor analysis (Table 1) confirm the statistically significant importance of the two factors investigated for the impact on Arboretum visits – the calendar month and the commented excursions. The calculated F-test values of the investigated factors and their interaction significantly exceeded the tabular value ($F_{tab0.01(7.64)=}$3.23, (1, 64) $F_{tab0.05(1.64)=}$ 3.98) at the significance level α = 0.01 (month, interaction) and α = 0.05 (commented excursions). Therefore, their mean values can be considered to be affected by the calendar month, commented excursions, or by their interaction.

Table 1

The results two-way analysis of variance of Arboretum Borová Hora visits (2008–2017)

characteristic	SS	df	MS	F	p-level
month	39127067	7	5589581	38,0371	**0.000000**
commented excursions	710941	1	710941	4,8371	**0.031473**
interaction (commented excursions* month)	5425121	7	775017	5,2731	**0.000086**
error	9406425	64	146975	-	-

Source: Author´s processing
* SS - Sum of squares, df – degree of freedom, MS - MS Effect, F - values of F-test, p- level, level of significance

The impact of the calendar month as a factor of natural vegetation growth (the majority of tree species in the temperate zone open leaf buds and flowers in May and June) has the

profoundly positive impact in May and June. During the summer months (July and August), the number of visitors is the lowest in comparison to other months in the visiting season (Graph 2). This finding can be explained by the fact that during the holiday season the Arboretum area is not visited by the most numerous groups of visitors such as visitors from kindergartens, primary schools, and universities. An increase in the number of visits is recorded in September, October, which is related to the enrolment of pupils and students back into schools and universities, as well as to the launch of a public event Autumn in the Arboretum.

The number of Arboretum visits is significantly (with 95% probability) influenced by the factor commented excursions, resp. accompanying excursions; this proves that the visitors of the Arboretum do not enter facility only with interest to relax, but also with the aim to educate themselves actively, through experience. With a probability of more than 99%, it can also be claimed that the interaction between factors (calendar month * commented excursions) has a profoundly positive impact on the number of Arboretum visits when the highest demand for accompaniment (commented entries, advising by experts) is in May and June.

To better illustrate the mean values of monthly visits, the 95% confidence interval was used. The monthly numbers of visits in the 10-year period 2008–2017 were divided into the two datasets, 2008–2011 and 2012–2017, with the mean monthly numbers of visits as it is shown in Graph 2.

Graph 2

The effect of starting the expert commented excursions (the season 2011) on the number of visitants.
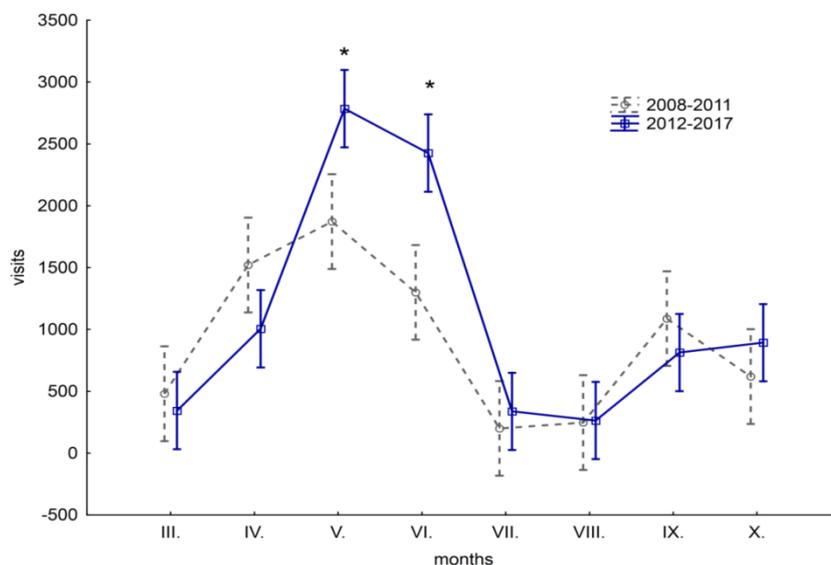
Source: Authors´ processing

Note: Marked months (May and June) correspond with the commented excursions and reveal significant differences in number of visits between two studied time periods. Error bars represent 95% of confidence intervals.
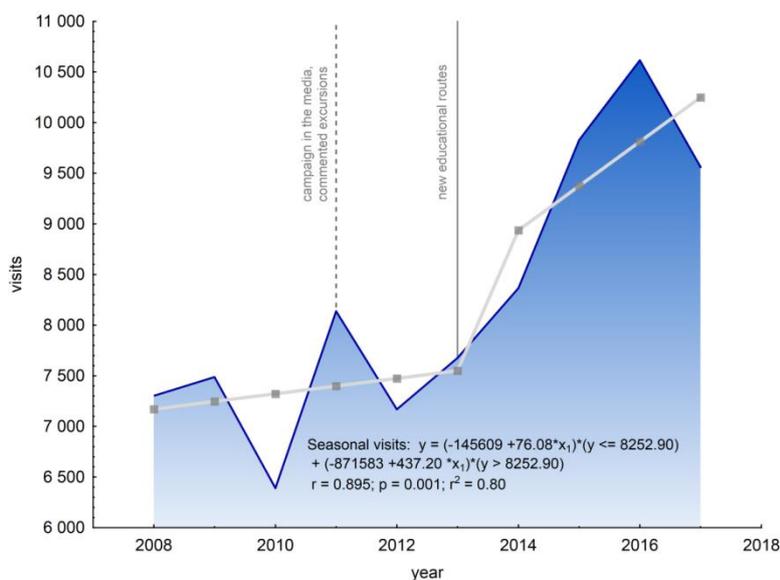
Expression using the confidence intervals of the average monthly number of visits shows highly positive changes in the number of visits, especially in May and June following the launch of commented excursions during Rhododendron Days and Roses Days in 2011 (Graph 2, Table 1). In the period 2012–2017, the number of Arboretum visits in May increased by an

average of 1,000 compared to period 2008–2011 and in June (2012–2017) by an average of 1,500 compared to period 2008–2011.

The results of Piecewise linear regression confirmed the overall increasing trend in the number of visits since 2008 (Graph 3). The abrupt change in the number of Arboretum visits occurred in 2011 when the actual number of visitors exceeded the breakpoint determined by the regression analysis. In that year, a massive campaign to promote two major events organized by Arboretum employees in May and June in mass media (Slovak Radio and Television) were conducted. By e-mail, the tourist information centers of the district towns and the regional cities within 50 km and the spa Sliač, Kováčová and Dudince were notified. In 2011 a novelty was introduced during the Rhododendron Days and Roses Days, which together with the better promotion attracted more visitors. Both events last throughout the whole week when the Arboretum is opened to the public even during the weekends. On Saturdays and Sundays, from 2011, thematically commented excursions with no admission fee two times per day during the Rhododendrons and Roses Days were introduced. Through visiting over rhododrons (a specially marked rhododendron walkway) and Rosarium, visitors learn about rhododendrons and roses from many points of view (a natural area of distribution, breeding, environmental demands, cultivation, sectioning, diseases, and pests).

<div align="right">Graph 3</div>

Yearly seasonal (March-October) visits with the corresponding breakpoint (vertical full line)

Seasonal visits: $y = (-145609 + 76.08 \cdot x_1) \cdot (y \leq 8252.90)$
$+ (-871583 + 437.20 \cdot x_1) \cdot (y > 8252.90)$
$r = 0.895; p = 0.001; r^2 = 0.80$

Source: Authors´ processing

Note: The average visits before and after the breakpoints are given by the grey curve. Vertical dashed line, the year of a massive campaign in the media and start of regular expert commented excursions (2011); breakpoint corresponds with an opening of new educational routes (2013).

A similar event aimed at deciduous and coniferous tree species, Autumn in the Arboretum, was introduced in 2012. Since then the Arboretum is opened to the public on second October Saturday with an expert commented excursion free of charge in the afternoon. The content of excursion is focused, among others, on tree species, and also on their cultivars, growth forms, their determination, environmental demands. The breakpoint of the Piecewise linear regression analysis corresponds with the year 2013 when three educational routes were opened to the public in the autumn. According to Graph 3, the predicted number of visits in the year 2014 (gray dot line) slightly exceeds the real number of visits with a deviation of

1,100 visitors (blue line). Routes with educational panels devoted to tree species (green route 1.5 km; blue route 2 km) and roses (red route Rosarium 0.5 km) were additionally complemented by yellow route (1.3 km) in 2016. The yellow route is exceptional thanks to the unique natural conditions of the Arboretum, where on a relatively small area, visitors approach two diametrically different exhibitions of tree species associations; namely, trees representing forest steppes (naturally occurring water deficient ecosystems) and trees of floodplain forests (ecosystems with higher groundwater levels).

In 2017, there is a decrease in the actual number of visits, evident from Graph 1 and 3. Based on the primary records this fact can be documented by a lower number of secondary and university students (demographic population decline). At the same time, the number of visitors with purchased tickets (3,700 visitors, Graph 1) has increased which points to increasing awareness of the general public about the enhanced possibilities of education and recreation in the Arboretum Borová hora.

As a result of changes undertaken towards the general public in 2011, there is also an increase in the number of guided excursions, respectively commented entries. The graphical course of the number of guided excursions is illustrated in Graph 4.

Graph 4

Number of experts commented excursions (2008–2017) in Arboretum Borová hora, Technical University in Zvolen
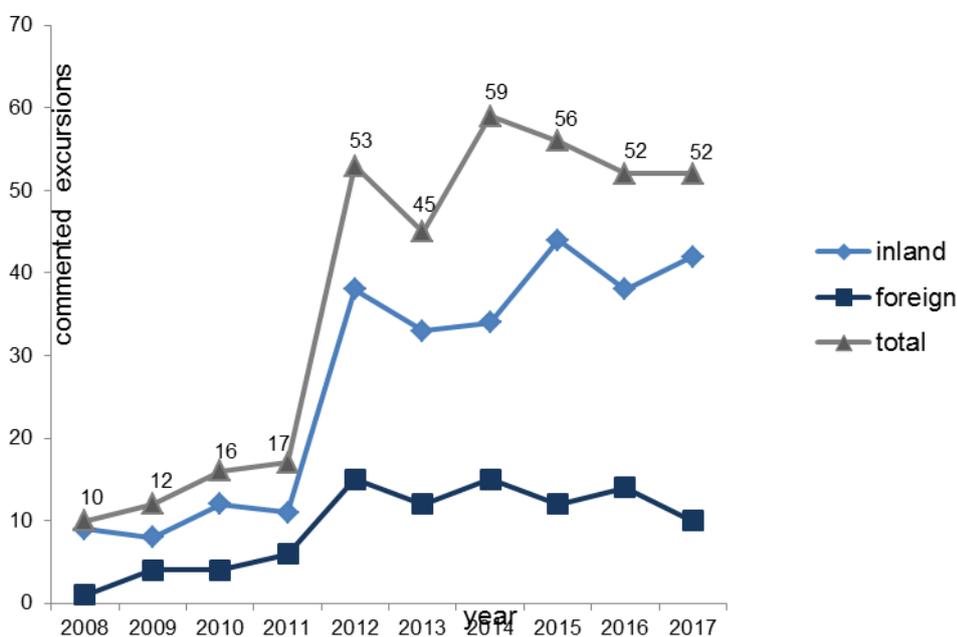
Source: Authors´ processing

The Graph 4 shows that the number of guided excursions for a general public, experts as well as scientifically-oriented attendants increased after 2011. It is necessary to confirm that measures undertaken to increase Arboretum visits were primarily directed towards the population of Slovakia. Number and expert commented excursions organized for foreigners, respectively for the guests of the Technical University in Zvolen can only be considered as being secondarily affected by the above mentioned measures, or that an incentive to visit the

Arboretum has originated abroad. Visits of this kind include multiple excursions organized for Finnish, German, Croatian, Hungarian foresters, German, Finnish and International Dendrology Society, or a World Federation of Roses Societies. A special group represents foreign scientists with a direct or with only informative interest in Arboretum collections. The average number of commented excursions to foreigners for the period 2012–2017 is thirteen, with an average of two hundred twenty-five foreign visitors per year.

The interest in expert commented excursions in the Slovak language ranges from thirty-three to forty-two excursions in the period 2012–2017, and represents on average 38.17 excursions per year, with an average annual number of 1 409 visitors. This is in particular adult lifelong education (forestry organizations), children's university of forestry, biological excursions of primary schools, scholarly excursions of secondary schools, excursions of university students, Universities of the Third Age, excursions for gardening associations, other public organizations or similar.

In spite of the measures that aim to show the visitors of Arboretum Borová hora as much as possible of their collection fund, to clarify the significance and uniqueness of the native tree species and their morphological and geographical variability, the number of Arboretum visits heavily depends on the weather, especially on the number of rainy days (Graph 5).

Graph 5

The impact of weather fluctuations (March–October precipitation sums) on the differences in number of visits

$$y = 2061.02 - 4.17 \cdot x$$
$$r = -0.70, \ p = 0.02$$
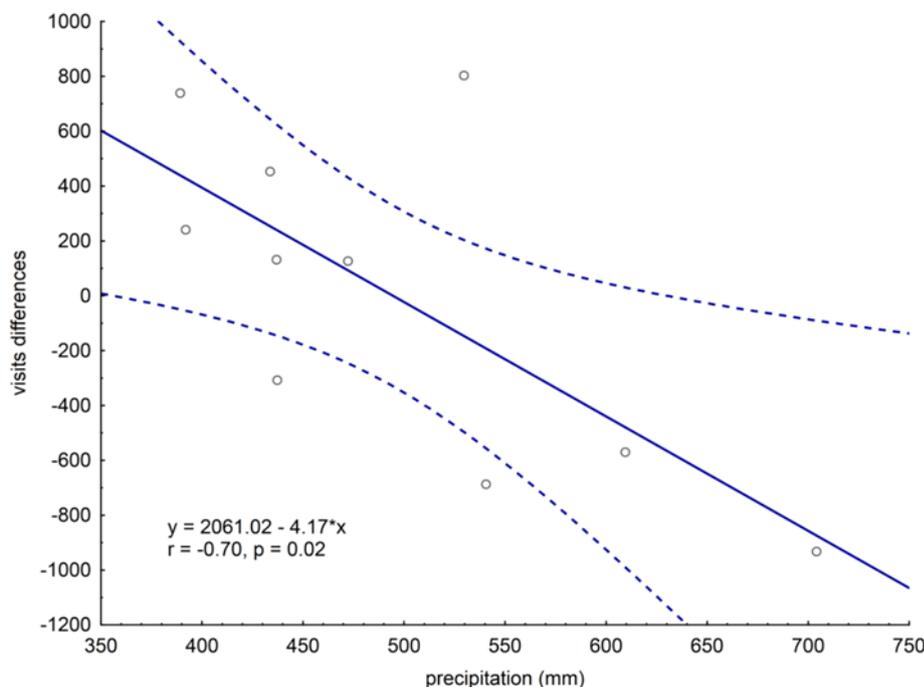
Source: Authors´ processing
Note: Differences are calculated as deviations of visits in the season from the average modeled visits in that season.

For the calculation of the precipitation impact, the data obtained from the meteorological station in Arboretum Borová hora, specifically monthly precipitation sums during the visiting season (March–October) in the studied period 2008–2017 was used. Differences in the

number of visits were calculated as the absolute seasonal deviations in some visits from the average modeled number of visits in a particular season (Graph 3) and were related to the precipitation sums in the studied period (March– October) of the corresponding calendar year. Chart data demonstrates the substantial negative impact of precipitation on the number of Arboretum visits (r = −0.70). Positive residuals (deviations) represent the higher number of visits than mean modeled number of visits and the negative deviations (in the bottom right area of Graph 5) lower number of visits.

The number of Arboretum visits was not negatively affected by precipitation in the observed 10-year period when the precipitation in the visiting season varied around the long-term average sum of precipitation in the vegetation period (400 mm). The visible difference in the number of visits was in 2010 and 2012 (Graph 1 and 3) when the precipitation had a profoundly negative impact on the number of Arboretum visits. The year 2010 is among the rainiest seasons from the beginning of the meteorological measurements in the Arboretum (since 1978), when the precipitation sum in March–October exceeded the annual long-term average precipitation sum (704.1 mm, the annual sum in 2010 was 973.4 mm), similarly as it was in 2012. The impact of precipitation was significantly reflected in the number of paying visitors when in 2010 only 1,700 visitors purchased the ticket and similarly 1,900 visitors in 2012.

Conclusion

Educational tourism that is one of the fastest growing areas of the travel and tourism has a wide variety of forms, but all of them have many in common, e. g., self-improvement, learning while having fun, agelessness.

The results of the study give a positive answer to the research question Can guided tours enhance the visitation of the Arboretum? It can be stated that the number of Arboretum visits is significantly influenced by the offer of guided excursions especially in the month of May and June. Substantial negative impact of the precipitation on the visitation could not be approved for the studied period as a whole; however it had negative impact in particular years. The null hypothesis that the regression coefficient does not change over time and the seasonal visits are stable was disproved.

The results of the regression analysis confirmed that the targeted introduction of novelties (or new impetus) for arboretum visitors (commented free excursions during the Rhododendrons and Roses Days weekends commenced in 2011) increased the overall arboretum traffic and awareness of Arboretum Borová hora.

In 2018, the smartphone application "Arborétum Borová hora" was introduced to the experts and public from the beginning of the new visiting season. The visitor learns everything about arboretum collections and educational routes. The advantage of the application is the possibility to use an interactive map and bee cons located directly in the terrain. The application based on a booted Bluetooth connection on the smartphone, points out the current position of the visitor and highlights the plant species, trees and shrubs in that particular place in the Arboretum.

The future studies should include the influence of introduction the smartphone application on Arboretum visitation.

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