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THE SURVIVAL AND GROWTH RATES OF WOODY VEGETATION IN THE MAN-MADE RADĚJOV BIOCORRIDOR DURING THE PERIOD OF 1993 - 2012

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Abstract: The first biocorridors were established in the territory of the Czech Republic in the 1990s. One of them, planted on a former agricultural land, was the Radějov biocorridor. This paper deals with the growth and development of trees and shrubs on three permanent research plots in 1993 - 2012. Repeated inventories of trees as well as monitoring of their biometrical parameters were carried out in both tree and shrub layers. The number of trees decreases with the increasing level of stand canopy. Moreover, mean heights, diameters and crown projection areas of selected woody plants were compared. Under the given conditions, the growth of these woody plants can be positively evaluated.

Key words: biocorridor, inventory, growth of woody plants, increment, territorial system of ecological stability, Radejov, the Czech Republic.

Abstract: V devadesátých letech 20. století byly v České republice založeny první biokoridory. Jedním z nich byl i biokoridor Radějov. Na trvalých výzkumných plochách byly mezi lety 1993 a 2012 prováděny opakované inventarizace a sledovány biometrické parametry dřevin, a to jak stromového, tak keřového patra. Příspěvek se zabývá vývojem dřevinné složky biokoridoru Radějov a na vybraných druzích ilustruje vývoj počtu jedinců, změny průměrné výšky, tloušťky a šířky korun. Za daných podmínek můžeme hodnotit růst těchto dřevin pozitivně.

Klíčová slova: biokoridor, inventarizace, růst dřevin, přírůst, územní systém ekologické stability, Radějov, Česká republika.

1. Introduction

In the 1970s and the 1980s, an idea of harmonic cultural landscape originated and was later further developed. Such a landscape was characterized by suitably distributed ecologically more stable near-natural ecosystems in destabilized areas and this concept is known as the design of the territorial system of ecological stability – TSES (Buček, Lacina 1984).

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Structural elements of every TSES are biocentres and biocorridors (Buček, Lacina, Míchal 1995). Biocentres are isles of natural landscape making a long-term existence of a certain ecosystem possible, for example a wetland, forest or a species-rich meadow. On the other hand, biocorridors are to connect particular biocentres and to make migrations of organisms between the biocentres possible and thus to create a really effective network (Löw et al. 1995, Zimová et al. 2002).

The design of ecological networks is not specific only to the Czech Republic. Ecologists throughout the world deal with ecological networks. However, it is necessary to mention that TSES differs from the foreign conceptions. TSES creates an integrated dense network of biocentres and biocorridors, which, in addition to migration, ensures also the increase in ecological stability of cultural landscape. On the other hand, ecological networks are designed above all to ensure migration of organisms. In the majority of cases, biocorridors interconnecting reserves and national networks are designed. Nevertheless, these are much wider and longer compared to our biocorridors (Bennett 2003; Bennett 2004; Fabos, Ahern 1996; Hilty et al. 2006; Jongman, Pungetti 2004).

Fig.1 Establishing of a biocorridor inthe agriculture landscape. Photo L. Úradníček

The implementing regulation related to the Act on nature conservation and landscape protection no. 395/1992 Coll. defines a biocorridor (a biotic corridor) as a territory that does not enable permanent long-term existence for the decisive part of organisms, however, it makes their migration between particular biocentres possible and therefore it creates a network out of separate biocentres. Thus, the biocorridor is, or should be, created on an ecologically important segment of the landscape. Functionality of biocorridors is conditioned by their spatial parameters (length and width), by the state of permanent ecological conditions and by the structure and species composition of biocoenoses.

As a response to the request to increase the ecological stability of the landscape of South Moravia, the first biocorridors were established in this area of the Czech Republic in 1991. The Radějov biocorridor was established among the first.

The initial document for the implementation of the biocorridor was the Study of the TSES Design in the District of the Strážnice Agricultural Farm, prepared by Agroprojekt Brno in 1990. The responsible designer was Ing. E. Zimová. The document was followed by a project that was also created by Agroprojekt Brno in 1990. The actual planting was carried out by the Strážnice Agricultural Farm employees in spring 1991. The biocorridor establishment was primarily financed from conditionally irrecoverable loan from the fund of the agriculture-food complex of the former Ministry of Agriculture and Nutrition of the Czech Republic; a part of the finances was provided by the Strážnice Agricultural Farm (Malý, 1997; Šamánková, 2002). The project determined that the following species should be used for the biocorridor establishment (Malý, 1997): *Acer campestre, Acer platanoides, Alnus glutinosa, Carpinus betulus, Cornus sanguinea, Corylus avellana, Crataegus sp., Euonymus verrucosa, Fraxinus excelsior, Ligustrum vulgare, Lonicera xylosteum, Prunus avium, Prunus spinosa, Quercus petraea, Rhamnus cathartica, Rosa canina, Salix alba, Salix caprea, Salix cinerea, Sorbus torminalis, Staphylea pinnata, Tilia cordata, Tilia platyphyllos* and *Ulmus glabra. Quercus robur* (Pedunculate Oak) and *Tilia platyphyllos* (Large-leaved Lime) were used as "skeleton" species. The data on the growth of trees planted on the former agricultural land are rather sporadic therefore the Radějov biocorridor was used as a model area to evaluate the growth of these species.

2. Material and methods

2.1 Material

The local Radějov biocorridor lies in South Moravia, district Strážnice, cadastral area of Radějov commune. It is situated next to the main road Strážnice - Radějov, about 0.5 km NW of Radějov. It was established in 1991. Since the time, its woody component has been monitored (Úradníček 2001, 2002, 2004; Jelínek 2011). The total length is 1.25 km and the width is 16 m. It was established in an area free of autochthonous vegetation on arable land. Its target community should be of forest environment character.

In the biocorridor, 3 permanent research plots (PRP) were laid out, each of them being 50 m long and 16 m wide (0.08 ha). In each PRP, there are 11 rows of trees of a mean distance of 1.5 m; row spacing is 1.5 - 2 m depending on the tree species. To evaluate the growth, selected tree species on PRP were used. From the climatic point of view, the biocorridor is situated in the warm region T2, which is the warmest region within the CR. The weather is remarkably warm, moderately to slightly humid (mean annual temperature at the Strážnice station is 9.3 °C). The mean annual precipitation at the Radějov station is 583 mm. Higher humidity is caused by the vicinity of the windward slope of the Carpathians. The length of the growing season is around 160 days per year.

The community natural for this selected area was according to Czech geobiocoenology classification *Fagi-querceta tiliae* – code STG 2BD3 (Lime-oak-beech forest). The tree and shrub layers of this community were rich in species. The dominant species were *Quercus petraea* and *Q. robur*, more rarely there was also *Quercus pubescens*. Further, the tree layer included *Tilia cordata* and *T. platyphyllos*, *Carpinus betulus*, *Acer campestre*, *Sorbus torminalis*. Regularly admixed species was *Fagus sylvatica*. The shrub layer consisted of e.g. *Cornus mas*, *Viburnum lantana*, *Ligustrum vulgare*, *Euonymus verrucosa*, *Cornus sanguinea*, *Rhamnus cathartica*, *Crataegus monogyna*, *Corylus avellana* and *Lonicera xylosteum* (Buček and Lacina 2000).

For the establishment of the biocorridor, bare-root plants with various heights of shoots were used and these were planted into former black arable land. Saplings, or exceptionally plants with trained crowns, were used for *Acer platanoides*, *Prunus avium*, *Sorbus aucuparia* and *Tilia platyphyllos*. Plants with 40 - 50 cm shoots were used for the other tree species. Shrub species were planted in two peripheral rows, so that a forest mantle was created, and in two rows inside the biocorridor. The spacing of plants in the peripheral rows was 0.75 - 1 m and 1 - 1.5 m in the internal rows. In contrast to the project, the species composition of the planting was changed to the following species (Bínová et al. 1992; Malý, 1997; Úradníček, 1995): *Acer campestre, Acer platanoides, Carpinus betulus, Corylus avellana, Cornus sanguinea, Crataegus laevigata, Crataegus flabellata, Euonymus europaea, Frangula alnus, Fraxinus*

excelsior, Ligustrum ovalifolium, Ligustrum vulgare, Lonicera korolkowii, Lonicera tatarica, Lonicera xylosteum, Prunus avium, Prunus spinosa, Quercus robur, Rhamnus cathartica, Rosa canina, Salix acutifolia, Salix alba, Sorbus aucuparia, Sorbus intermedia, Tilia cordata, Tilia platyphyllos and *Ulmus laevis.*

The following five-year maintenance included a regular machined elimination of weeds between rows that reduced their development. The plants were not protected against animals. Locally, afterplanting was carried out.

Fig 2. Inner part of the biocorridor. Photo: B. Jelínek

The PRP 1 is situated in the southern part of the biocorridor laid out in the vicinity of the Strážnice - Radějov road, more precisely 215 m north of the road. Altitude: 227 m. Topography: flat ground without obvious unevenness of ground. Soil type: luvic chernozem. Relief: base of slope.

The PRP 2 was established at the distance of 575 m from the southern edge of the biocorridor. Altitude: 240 - 244 m. Topography: gentle slope to SW. Soil type: luvic chernozem. Relief: middle part of slope.

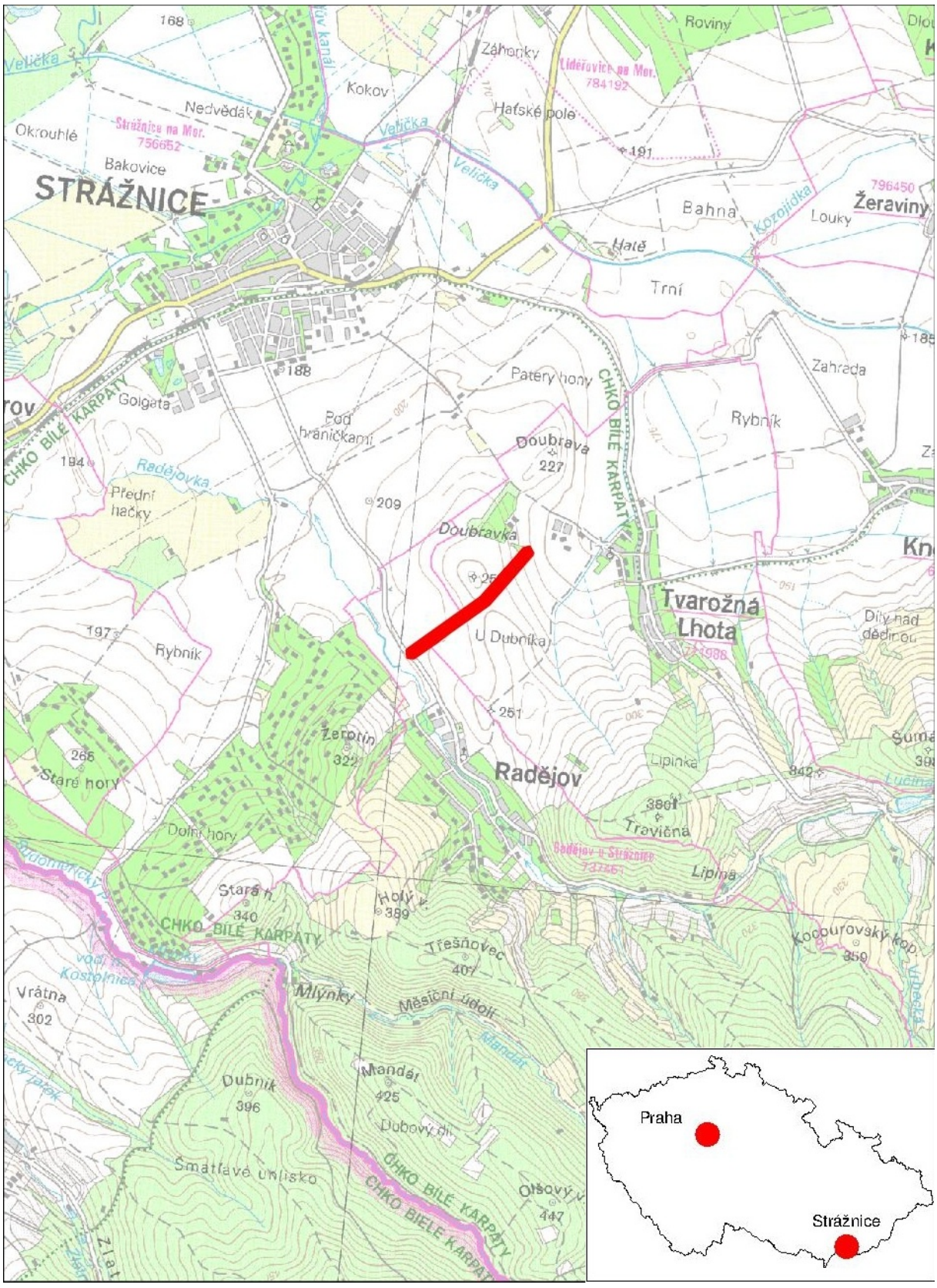

Fig 3. Location of the biocorridor within the Strážnice, scale 1 : 50 000 (BM CZ – map server mapmaker.nature.cz).

The PRP 3 is situated in the northern part of the biocorridor at the distance of 975 m of the Strážnice - Radějov road. Altitude: 248 - 249 m. Topography: gentle slope to NE. Soil type: luvic chernozem. Relief: near a top of hill.

Fig 4. Localization of the PRPs within the Radějov biocorridor, scale 1:10 000 (orthophoto – map server geoportal.cenia.cz).

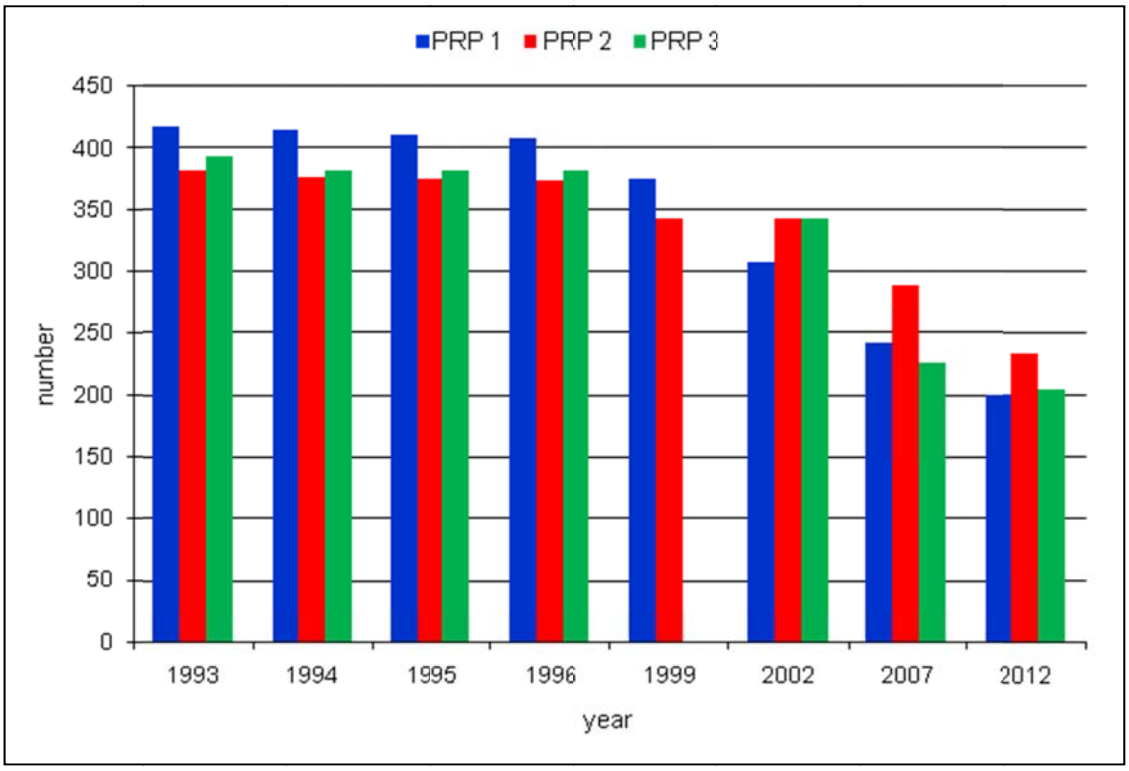

Fig 5. Numbers of plants at the PRPs within the Radějov biocorridor.

2.2 Methods

The artificially established parts of TSES were selected as models for the monitoring of the development of the woody component in man-affected communities. The PRP were chosen so that they captured the differences in the permanent ecological conditions (nutrient and water saturation) and the species composition with respect to a representative nature of the obtained data.

The monitoring of the woody component in the PRP included:

1. Tree inventory
   a. Taxonomic classification was carried out for particular trees.
   b. A complete list of determined trees was made including their quantitative proportions in 1993 - 2012. Scientific names are used according to Kubát et al. (2002).
   c. A draft of the tree layout was carried out for the expected long-term monitoring of trees.
2. Measuring of the basic mensurational parameters

a. Measuring of the tree height (h) in cm up to the height of 1.5 m, to the height of 8 m with accuracy of 5 cm (or 10 cm) and over 8 m with a minimum accuracy of 0.5 m. A folding 5 m (later 8 m) height-measuring rod was used as well as hypsometer Clinomaster.

b. Measuring of the perimeter at breast height in mm in trees over 1.3 m tall or the root collar diameter (rcd) just above the ground; diameter was calculated from the stem perimeter (dbh).

c. Determining of the crown projection area (cpa) – measured at 2 directions perpendicular to each other (in non-closed plantations in 1993 - 1996) where w1 was the crown width in the belt direction, and w2 was the perpendicular crown width.

The parameters were evaluated using descriptive statistics (arithmetic mean, standard deviation, coefficient of variation). To evaluate the significance of the found differences among particular species within a PRP or among PRPs, we used the analysis of variance at a level of significance a = 0.05. The Tukey's HSD test was used as a method of further testing, again at

a level of significance a = 0.05. These methods of statistical evaluation were applied using software Statistica Cz 9.0.

When evaluating the growth of trees in the PRPs, the current periodic increment was determined, mostly in three-year intervals. In this paper we use the term increment, meaning current periodic increment (unless a different one is specified).

Further, we determined the mean periodic height increment (mphi), which served for a comparison of growth of different species. Except for PRP 1, there was a sufficient number of specimens that could be included in the monitoring (we could measure their dbh). The information on the mean periodic increment at PRP1 is of low information capacity as the number of specimens was low.

3. Results and discussion

3.1 Evaluation of Woody Plants at PRPs

3.1.1 PRP 1

Inventory

At the beginning of monitoring, in 1993, there were 418 individuals of 25 taxa of woody plants at the PRP. Out of this amount, 217 were trees (12 taxa) and 201 shrubs (13 taxa). The most abundant species were *Acer campestre* with 156 individuals (37.3%) and *Quercus robur* with 33 individuals (7.9%). The most abundant shrub species were *Prunus spinosa* – 52 individuals (12.4%) and *Crataegus flabellata* – 34 individuals (8.1%).

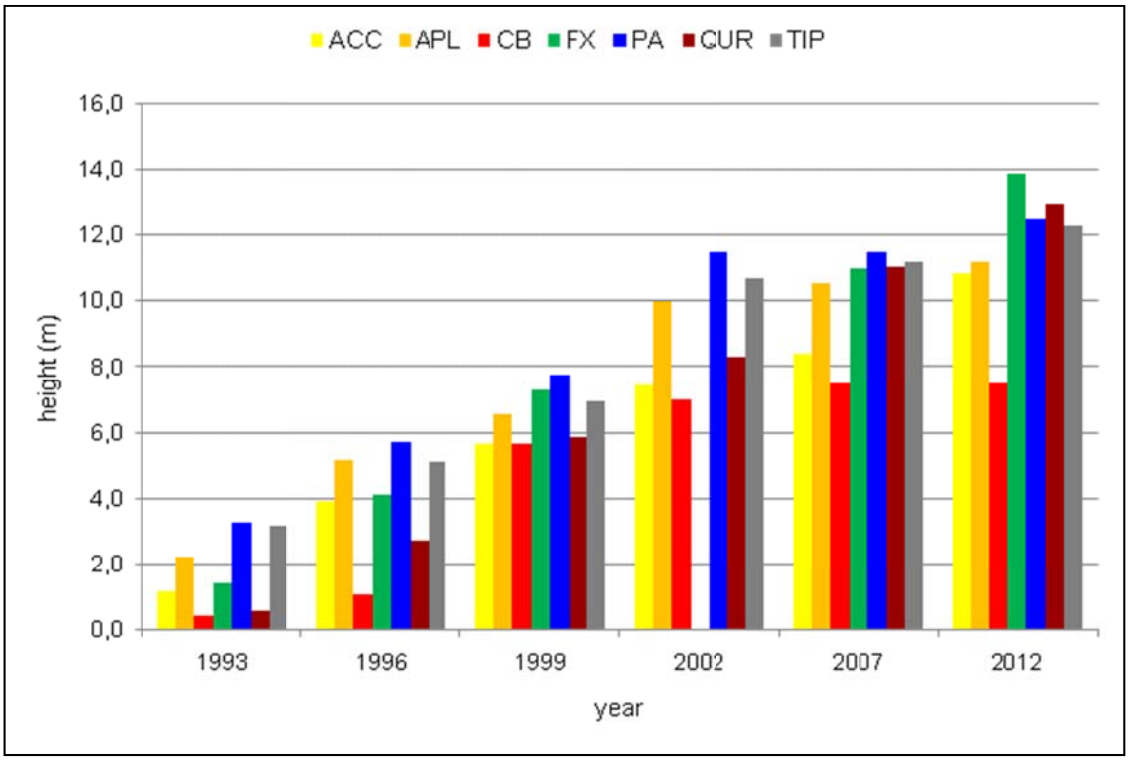

Fig 6. The mean height of selected species at PRP 1 of the Radějov biocorridor.

First, the numbers of individuals slightly decreased. The decrease was more marked after 1996. At the inventory in 1999 there were 375 woody plants, i.e. 43 (10.3%).

Another big decrease in woody plants at the PRP occurred in 1999 - 2002. Their number dropped by 68 (18.1%) to 307. The order of abundance of individual species did not change. The most abundant tree was still *Acer campestre* with 122 individuals (39.7%). There were 18 individuals (5.9%) of *Quercus robur*. The most abundant shrub species was still *Prunus spinosa* – 41 individuals (13.4%). The second most abundant shrub was *Crataegus flabellata*

with 34 individuals (11.1%). The greatest decrease was found between 1999 and 2002 for *Acer campestre* – 20 individuals (14.8%) and *Prunus spinosa* – 10 individuals (19.6%).

Fig 7. The biocorridor as a forest ecosystem. Photo L. Úradníček

At the time of the last inventory (in 2012) there were 200 individuals of 18 taxa. Out of this amount, there were 122 trees (10 taxa) and 78 shrubs (8 taxa). It means the total number of individuals decreased by 218, which is 47.8% during the entire time of monitoring. The most abundant species in 2012 was *Acer campestre* with 91 individuals (45.5%). The second most abundant tree species was *Quercus robur* – 14 individuals (7.0%). The most abundant shrub species was *Corylus avellana* – 21 individuals (10.5%), followed by *Prunus spinosa* with 19 individuals (9.5%).

In the time from the biocorridor establishment, some planted species disappeared completely from the PRP: *Ligustrum vulgare*, *Lonicera xylosteum*, *Rhamnus cathartica*, *Rosa canina*, *Salix acutifolia*, *Sorbus aucuparia* and *Staphylea pinnata*. Out of the species that remained, the biggest decrease was recorded for *Acer campestre*, whose number dropped by 65 specimens (41.7%). Other species with big decrease were *Quercus robur* – 19 individuals (57.6%) and *Prunus spinosa* – 33 individuals (63.5%). Out of the species that survived at the PRP, the biggest relative decrease was recorded for *Crataegus flabellata* – 76% (26 individuals). Due to shading, mainly the shrubs planted in the internal rows among trees died. Hardly any of these survived.

During the inventory in 2012 we could observe seedlings and advance regeneration. Most abundantly there were specimens of *Acer platanoides* and *Acer campestre*, further *Prunus avium*, *Tilia platyphyllos*, *Cornus sanguinea*, *Crataegus monogyna*, *Euonymus europaea*, *Ligustrum vulgare*, *Prunus spinosa* and *Rosa canina*. Some shrub species propagated by root suckers – these were mainly *Cornus sanguinea* and *Prunus spinosa*.

species	1993	1996	1999	2002	2007	2012
Acer campestre - ACC	156	154	142	122	93	91
Acer platanoides - APL	4	4	4	3	3	3
Carpinus betulus - CB	7	6	2	2	2	2
Corylus avellana - COR	27	27	27	27	22	21
Cornus sanguinea - COS	26	23	19	13	17	14
Crataegus monogyna - CRA	10	9	8	8	8	4
Crataegus flabellata - CRF	34	35	35	34	18	8
Euonymus europaea - EU	4	4	4	3	4	4
Fraxinus excelsior - FX	1	1	1	1	1	1
Ligustrum vulgare - LIGV	20	20	20	12	3	0
Lonicera korolkowii - LOK	2	2	2	7	2	2
Lonicera tatarica - LOT	13	12	12	?	9	6
Lonicera xylosteum - LOX	1	1	1	?	0	0
Prunus avium - PA	2	2	2	2	1	1
Populus nigra - PON	1	1	1	1	1	1
Prunus spinosa - PS	52	52	51	41	33	19
Quercus robur - QUR	33	31	21	18	14	14
Rhamnus cathartica - RH	2	2	2	2	0	0
Rosa canina - ROC	6	6	5	0	0	0
Salix acutifolia - SAC	1	1	1	1	1	0
Salix alba - SAL	2	2	2	2	2	2
Sorbus aucuparia - SOA	2	2	1	1	0	0
Staphylea pinnata - STA	4	4	4	0	0	0
Tilia platyphyllos - TIP	7	7	7	7	7	6
Ulmus laevis - ULA	1	1	1	1	1	1
Total number	**418**	**409**	**375**	**308**	**242**	**200**

Tab 1. Abundance of particular species at PRP 1 (pcs).

Height

During the first inventory, in 1993, the greatest mean height was found for *Prunus avium* – 3.25 m. As regards the skeleton species, the greatest mean height was found for *Tilia platyphyllos* – 3.15 cm and *Acer platanoides* – 2.20 m (planted as saplings). The most abundant species at the PRP – *Acer campestre* had a mean height of 1.13 m. The smallest tree species were *Carpinus betulus* with a mean height of 0.39 m and *Quercus robur* with a mean height of 0.56 m. Out of shrubs, a great mean height was found for *Prunus spinosa* – 1.28 m and *Rosa canina* – 1.11 m.

The tallest species in 2002 was *Prunus avium* with a mean height of 11.50 m. Its increment was 8.25 m (253.8%). The skeleton species that reached the greatest mean height and the greatest increment was *Tilia platyphyllos* – 10.71 m (increment 7.56 m, 240.0%), followed by *Acer platanoides* – 10.00 m (increment 7.80 m, 354.5%). The most abundant species at the PRP – *Acer campestre* with an increment of 6.32 m (559.3%) reached a mean height of 7.45 m. The smallest mean height out of the tree species was found for *Carpinus betulus* – 7.00 m (increment 6.61 m, 169.5%). The tallest shrub species was *Rhamnus cathartica* with a mean height of 650.0 cm. Its increment was 4.90 m (306.3%), which was also the highest relative increment of the shrub species. It was followed by *Prunus spinosa* with a mean height of 5.38 m and an increment of 4.10 m (320.3%).

Fig 8. Measuring of woody layer in biocorridor. Photo L. Úradníček

In 2012 the mean height of skeleton species was balanced and ranged between 12.28 and 13.90 m. *Acer campestre*, which was the most abundant at the PRP, had a mean height of 10.86 m. The tree with the smallest mean height was *Carpinus betulus* – 7.48 m. The shrub with the greatest mean height was *Crataegus flabellata* – 6.20 m, followed by *Corylus avellana* with a mean height of 5.85 m and *Crataegus monogyna* with a mean height of 4.94 m. The lowest shrub was *Lonicera korolkowii* with a mean height of 2.36 m.

Between 1993 and 2012 *Quercus robur* reached the highest absolute increment – 12.41 m (2216.1%); at the same time this was the highest relative increment. Also the other skeleton species manifested a great increment: *Ulmus laevis* 12.67 m (1526.5%), *Fraxinus excelsior* 12.48 m (878.9%). Out of shrub species, the highest increment was reached by *Crataegus flabellata* – 5.22 m (532.7%), followed by *Corylus avellana* with an increment of 4.94 m (542.9%).

The tallest specimen of skeleton species was *Quercus robur* – 14.50 m. The tallest specimen of *Acer platanoides* was 13.25 m tall, the tallest *Tilia platyphyllos* was 13.20 m tall and the tallest *Acer campestre* was 12.01 m in height. Also some individuals of shrub species reached considerable heights. The tallest was an individual of *Crataegus flabellata* with 10.25 m in height. The tallest *Crataegus monogyna* was 8.25 m, *Prunus spinosa* 6.80 m, *Corylus avellana* 7.80 m and *Cornus sanguinea* was 5.30 m tall.
In 2012 the stand acquired a layered structure. The skeleton species – *Quercus robur*, *Acer platanoides*, *Fraxinus excelsior* and *Tilia platyphyllos* had low proportions and did not form a closed canopy – the main layer. The main layer was formed by the most abundant tree species – *Acer campestre*. Skeleton species formed the dominant layer. However, in each species there were individuals lacking in growth, as the standard deviations show. The standard deviation was σ 2.35 m for *Acer platanoides*, 1.62 m for *Quercus robur* and 0.53 m for *Tilia platyphyllos*. Within the *Acer campestre* species, there were individuals characterized as dominant trees as well as subdominant trees – σ was 11.86 m. Another layer was the shrub layer. However, that was formed only in the peripheries of the biocorridor where it created the forest mantle. Nearly all shrubs planted in the internal parts of the biocorridor went dry. The greatest height variability within shrubs was found for *Crataegus flabellata* – σ = 2.36 m, followed by *Crataegus monogyna* – σ = 2.39 m. This variability was caused by the fact that some individuals suffered from a lack of light and were of low growth. On the other hand, there were individuals whose branches grew through crowns of the surrounding trees to reach light and thus achieved considerable heights.

species	1993	1996	1999	2002	2007	2012			
	Ø	Ø	Ø	Ø	Ø	min.	max.	Ø	σ
ACC	1.13	3.88	5.67	7.45	8.38	2.57	12.01	10.86	11.86
APL	2.20	5.14	6.55	10.00	10.56	7.90	13.25	11.18	2.35
CB	0.39	1.03	5.65	7.00	7.50	7.20	7.75	7.48	0.28
COR	0.91	3.13	4.70	5.26	5.50	1.70	7.80	5.85	1.25
COS	0.53	1.72	2.84	4.11	3.74	2.00	5.30	4.06	1.13
CRA	1.12	3.37	5.12	5.07	4.99	1.50	8.25	4.94	2.39
CRF	0.98	3.28	5.06	5.84	6.10	1.10	10.25	6.20	2.36
EU	0.31	1.68	2.18	2.67	3.11	2.20	4.50	3.40	0.98
FX	1.42	4.10	7.30	-	11.00	13.90	13.90	13.90	0.00
LIGV	1.02	2.64	3.48	3.18	1.91	-	-	-	-
LOK	0.50	2.36	3.10	2.77	2.62	1.80	3.35	2.36	0.46
LOT	0.47	2.08	2.55	2.58	2.56	-	-	-	-
LOX	1.30	2.50	3.00	-	-	-	-	-	-
PA	3.25	5.68	7.75	11.50	11.50	12.50	12.50	12.50	0.00
PON	3.95	7.50	9.30	15.50	18.00	15.40	15.40	15.40	0.00
PS	1.28	3.34	4.74	5.38	4.92	0.50	6.80	4.31	1.87
QUR	0.56	2.70	5.85	8.31	11.05	7.50	14.50	12.97	1.62
RH	1.60	3.45	5.05	6.50	-	-	-	-	-
ROC	1.11	2.49	2.84	-	-	-	-	-	-
SAC	3.10	4.10	8.30	8.84	9.75	-	-	-	-
SAL	0.16	5.30	8.70	11.33	16.60	14.00	15.50	14.75	0.75
SOA	3.23	5.40	7.00	9.00	-	-	-	-	-
STA	0.33	1.94	1.94	-	-	-	-	-	-
TIP	3.15	5.10	6.94	10.71	11.22	11.50	13.20	12.28	0.53
ULA	0.83	3.90	6.80	10.50	11.40	13.50	13.50	13.50	0.00

Tab 2. Height of woody plants at PRP 1 (m).

Diameter at breast height

At the first inventory in 1993 the greatest mean diameter at breast height (dbh) was reached by *Tilia platyphyllos* – 4.23 cm. The second greatest mean dbh was found for *Prunus avium* – 3.50 cm. The most abundant species at the PRP – *Acer campestre* – had a mean dbh of 0.51 cm. However, there were also individuals with height not exceeding 1.3 m. The mean root collar diameter (rcd) of these was 2.43 cm. *Quercus robur* had a rcd of 1.79 cm.

In 2002 the greatest mean dbh was found for *Prunus avium* – 23.10 cm (increment 19.6 cm). The second greatest mean dbh was recorded for *Tilia platyphyllos* – 15.20 cm, with an increment of 10.97 cm.

At the time of last inventory *Prunus avium* still had the greatest mean dbh – 30.90 cm – and *Tilia platyphyllos* was still the skeleton species with the greatest mean dbh – 21.07 cm. *Quercus robur* had a mean dbh of 15.68 cm and *Acer campestre* 11.21 cm. The mean increment of *Quercus robur* was 7.98 cm (103.6%) and *Acer campestre* 5.01 cm (80.8%).

In some species there were only such individuals whose dbh was measured already at the first inventory in 1993; therefore, their diameter increment for 1993 - 2012 could be evaluated. The greatest increment out of the monitored species was recorded for *Prunus avium* – 27.4 cm (782.9%). The increment of *Tilia platyphyllos* was 16.84 cm (98.0%) and *Acer platanoides* had an increment of 15.82 cm (1068.9%). The diameter increments of *Quercus robur* and *Acer campestre* from 1999 (the first inventory when there were only specimens taller than 1.3 m) to 2012 were 11.27 cm (255.5%) and 6.91 cm (135.4%), respectively.

Tilia platyphyllos reached a maximum dbh of 25.5 cm, *Quercus robur* 25.8 cm, *Acer platanoides* 24.8 cm and *Acer campestre* 22.3 cm. Also this parameter manifests high variability (see Tab 3). The highest variability was found for *Acer platanoides* – σ = 5.86 cm. A high variability is also found for *Acer campestre* – σ = 5.02 cm and *Quercus robur* – σ = 4.54 cm.

	1993		1996		1999	2002	2007	2012			
								dbh			
	Ø dbh	Ø rcd	Ø dbh	Ø rcd	Ø dbh	Ø dbh	Ø dbh	min.	max.	Ø	σ
ACC	0.51	2.43	2.93	1.16	4.30	6.20	9.55	3.20	22.30	11.21	5.02
APL	1.48	-	5.33	-	7.73	11.90	12.50	10.50	24.80	17.30	5.86
CB	-	1.24	1.70	0.90	-	3.70	4.55	4.10	4.10	4.10	0.00
CRA	-	-	-	-	-	-	8.32	4.10	14.30	8.28	4.23
CRF	-	-	-	-	-	-	9.64	5.40	14.60	11.21	2.56
FX	0.90	-	4.70	-	8.40	-	18.30	20.40	20.40	20.40	0.00
PA	3.50	-	12.00	-	19.00	23.10	28.00	30.90	30.90	30.90	0.00
PON	4.20	-	18.00	-	35.00	42.00	35.00	87.90	87.90	87.90	0.00
QUR	-	1.79	2.26	1.11	4.41	7.70	12.26	5.70	25.80	15.68	4.54
SAC	1.60	-	1.60	-	0.50	18.10	11.00	-	-	-	-
SAL	-	1.45	6.00	-	17.50	-	31.30	26.40	50.60	38.50	12.10
SOA	4.00	-	10.00	-	11.90	14.50	-	-	-	-	-
TIP	4.23	-	8.80	-	13.97	15.20	17.53	17.20	25.50	21.07	2.66
ULA	-	3.20	3.10	-	7.30	11.40	18.30	22.30	22.30	22.30	0.00

Tab 3. Diameter at breast height at PRP 1 (in cm). Abbreviation of the species see table 1.

Crown projection area

In 1993 the greatest crown projection area (cpa) was recorded for *Prunus avium* where the mean cpa was 1.88×1.66 m. *Tilia platyphyllos* was the skeleton species with the greatest mean cpa – 1.14×1.23 m. Another skeleton species – *Quercus robur* – had a cpa of 0.38×0.34 m. As regards shrubs, the greatest cpa was recorded for *Ligustrum vulgare* – 1.14×1.00 m. Similarly, *Rosa canina* – 1.11×0.81 m. The mean cpa of the other monitored shrub species was 0.50-0.90 m.

The crowns grew substantially before the following inventory in 1996. *Prunus avium* had a mean cpa of 3.98×3.83 m. Its increment from 1993 was 2.10×2.17 m (112.0×130.7%). The second was *Tilia platyphyllos*, whose mean crown had a size of 2.56×2.86 cm. As regards shrubs, the greatest mean cpa was recorded for *Ligustrum vulgare* – 2.14×2.28 m, 1.00×1.29 m (87.8×129.5%).

The crowns further increased before 1999, although the increments are not as high as before due to the created closed canopy. In this year only crown areas of shrub species were recorded. The greatest cpa was found for *Prunus spinosa* – 2.53×2.94 m. The increment was 0.38×0.58 m (17.7×24.6%), followed by *Crataegus monogyna* with a mean crown projection area of 2.58×2.84 m.

At the time of the next inventory, in 2002, a dense closed canopy had been created, which had led to drying and dying of some shrub branches or the whole shrubs. This was manifested in the mean cpa of particular species. The mean cpa of most species changed only slightly. For example, *Prunus spinosa* had an increment of 0.17×0.16 m, *Lonicera tatarica* 0.28×0.23 cm. The greatest mean cpa was found for *Corylus avellana* – 3.29×3.89 m. As regards the skeleton species, the greatest mean projection area was recorded for *Acer platanoides* – 3.93×4.55 m.

During 1993 - 2002, the skeleton species with the greatest absolute crown increment was *Acer platanoides* – 3.08×3.81 m (362.4×514.9%). The most abundant tree – *Acer campestre* – had an increment of 1.78×2.02 cm (181.6×246.3%).

species	1993		1996		1999		2002	
	w1	w2	w1	w2	w1	w2	w1	w2
ACC	0.98	0.82	2.19	2.21	-	-	2.76	2.84
APL	0.85	0.74	2.11	2.04	-	-	3.93	4.55
CB	0.16	0.17	0.41	0.36	-	-	1.78	1.55
COR	0.67	0.65	1.94	2.18	1.94	2.18	3.29	3.89
COS	0.62	0.56	1.11	1.19	1.88	2.12	2.30	2.50
CRA	0.79	0.66	2.13	2.05	2.58	2.84	2.21	2.12
CRF	0.86	0.67	2.08	2.01	2.20	2.25	-	-
EU	0.31	0.26	0.98	0.85	1.51	1.51	1.50	1.98
FX	0.10	0.12	1.90	1.90	1.90	1.90	4.35	4.13
LIGV	1.14	1.00	2.14	2.28	2.36	2.95	2.28	2.51
LOK	0.55	0.50	2.33	2.15	2.75	2.70	-	-
LOT	0.56	0.53	1.69	1.94	1.98	2.25	2.26	2.48
LOX	1.50	1.30	2.00	2.55	2.00	2.55	-	-
PA	1.88	1.66	3.98	3.83	-	-	5.70	6.80
PON	1.05	1.10	4.60	4.25	-	-	8.75	8.15
PS	0.99	0.90	2.15	2.36	2.53	2.94	2.70	3.10
QUR	0.38	0.34	1.11	1.08	-	-	2.27	2.30
RH	1.43	0.98	3.38	2.78	-	-	2.65	2.63
ROC	1.11	0.81	2.18	2.10	2.30	2.00	-	-
SAC	1.85	1.85	2.50	1.80	-	-	2.71	5.90
SAM	0.00	0.00	2.87	2.13	-	-	-	-
SOA	1.13	1.04	2.33	2.13	-	-	3.10	3.05
STA	0.20	0.19	0.61	0.64	0.75	0.68	-	-
TIP	1.14	1.23	2.56	2.86	-	-	4.11	4.11
ULA	0.26	0.30	2.65	1.50	-	-	3.10	2.50

Tab 4. The mean crown projection areas of species at PRP 1 (in m). Abbreviation of the species see table 1.

3.1.2 PRP 2

Inventory

At the first inventory (1993) there were 381 individuals of 25 taxa at PRP 2. Out of this, there were 192 trees (11 taxa) and 189 shrubs (14 taxa). The most abundant tree species was *Acer campestre* – 143 individuals (37.5%), followed by *Quercus robur* – 28 individuals (7.3%). The most abundant shrub species were *Ligustrum vulgare* – 29 individuals (7.6%), *Prunus spinosa* – 27 individuals (7.1%) and *Crataegus flabellata* – 26 individuals (6.8%).

In 1994 it was found out that the total number of individuals had decreased by 5. The proportions of particular species had not changed. Also in further years the number of individuals at the PRP decreased. In 1995 and 1996, the number of individuals decreased by 1.

A larger decrease came between 1996 and 1999. The total number of individuals dropped to 32 (by 8.6%). It is a question whether this figure is right because the list of species lacks the information on the number of individuals of *Prunus* × *fruticans*, and this information is also missing in the following inventories.

The number of individuals at the PRP in 2002 was the same as in 1999. However, the number included a high proportion of shoots of *Prunus spinosa*, probably 45 individuals. If we excluded these individuals, the number of woody plants would decrease from 342 individuals to 297, i.e. by 13.2%. The order of proportions of particular species did not change.

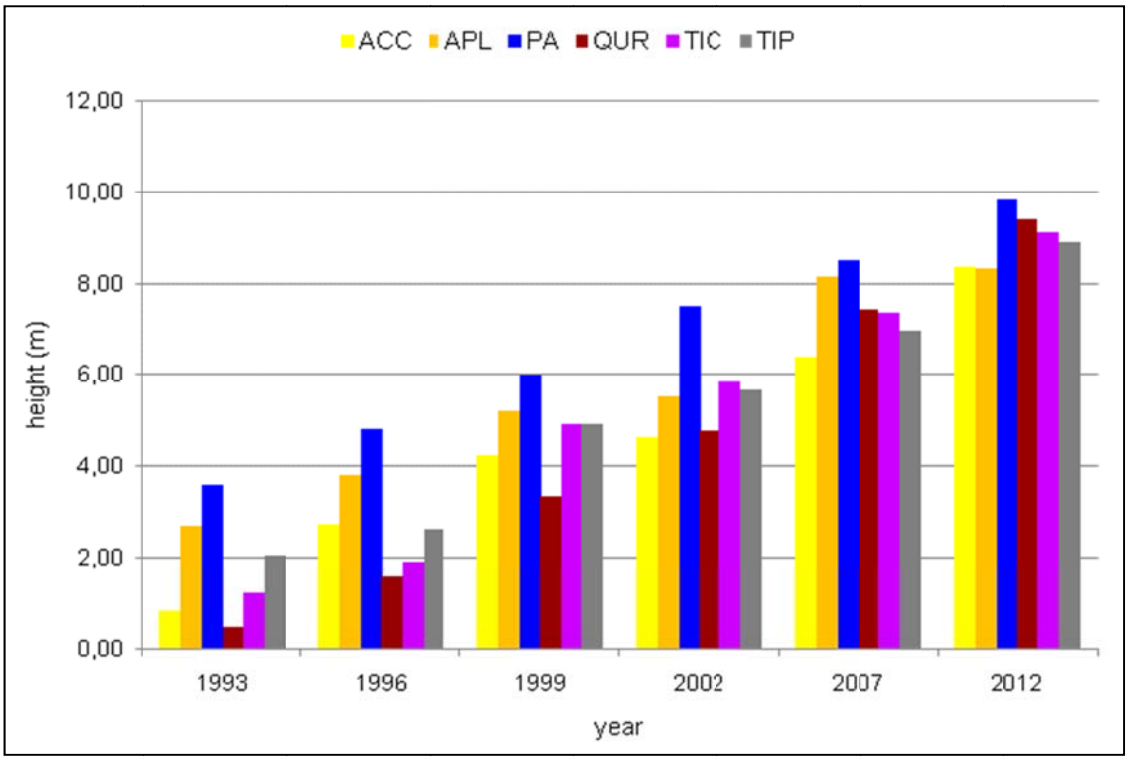

Fig 9. The mean height of selected species at PRP 2 of the Radějov biocorridor.

In 2012 there were 234 individuals of 18 taxa at the PRP. Out of this, there were 140 trees (8 taxa) and 94 shrubs (10 taxa). The total number of individuals decreased by 147, i.e. 38.6% within the entire period of monitoring. The most abundant species was the same as at the beginning – *Acer campestre* with 118 individuals (proportion of 50.4%). The second most abundant species was *Quercus robur* – 13 individuals (5.5%). The most abundant shrub species was *Prunus spinosa* – 25 individuals (10.7%), followed by *Corylus avellana* with 17 individuals (7.3%).

The following species completely disappeared from the PRP in the period from the biocorridor establishment: *Carpinus betulus*, *Frangula alnus*, *Ligustrum ovalifolium*, *Lonicera xylosteum*, *Rhamnus cathartica* and *Salix acutifolia*. The greatest decrease in the species that remained was recorded for *Acer campestre*, whose number dropped by 25 individuals (17.5%). The other species with a large decrease were *Quercus robur* – 15 individuals (53.6%) and *Crataegus flabellata* – 19 individuals (73.1%).

During the last inventory seedlings and advance regeneration were recorded. The most abundantly there were *Acer platanoides* and *Acer campestre*. Natural regeneration was ascertained also for *Prunus avium*, *Cornus sanguinea*, *Crataegus monogyna*, *Crataegus flabellata*, *Euonymus europaea*, *Lonicera xylosteum*, *Lonicera tatarica*, *Ligustrum vulgare*, *Prunus spinosa* and *Rosa canina*. *Cornus sanguinea* and *Prunus spinosa* propagated by root suckers as well. Due to the dense closed canopy and lack of light, most seedlings die soon. Only a small percentage remains several years. The increment of these individuals is minimal and eventually they also die.

species	1993	1996	1999	2002	2007	2012
Acer campestre - ACC	143	143	143	129	123	118
Acer platanoides - APL	1	1	1	1	1	1
Carpinus betulus - CB	6	4	2	0	0	0
Corylus avellana - COR	24	23	23	24	20	17
Cornus sanguinea - COS	17	16	16	12	7	2
Crataegus monogyna - CRA	11	11	11	11	11	9
Crataegus flabellata - CRF	26	26	23	19	16	7
Euonymus europaea - EU	3	3	3	3	4	3
Frangula alnus - FRAN	2	2	2	1	0	0
Ligustrum ovalifolium - LIGO	3	3	2	1	0	0
Ligustrum vulgare - LIGV	29	29	27	23	17	12
Lonicera tatarica - LOT	16	15	14	12	12	10
Lonicera xylosteum - LOX	1	1	1	1	0	0
Prunus avium - PA	2	2	2	2	2	2
Prunus spinosa - PS	27	28	27	28	40	25
Prunus x fruticans - PF	17	17		44	14	8
Quercus robur - QUR	28	29	27	18	15	13
Rhamnus cathartica - RH	6	5	5	3	0	0
Rosa canina - ROC	7	5	4	1	1	1
Salix acutifolia - SAC	1	1	1	1	0	0
Salix alba - SAL	2	2	2	2	2	2
Sorbus aucuparia - SOA	2	2	2	2	0	0
Tilia cordata - TIC	3	2	1	1	1	1
Tilia platyphyllos - TIP	3	3	2	2	2	2
Ulmus laevis - ULA	1	1	1	1	1	1
Total number	**381**	**374**	**342**	**342**	**289**	**234**

Tab 5. Abundance of particular species at PRP 2 (pcs).

Height

At the time of the first inventory (in 1993) *Prunus avium* was of the greatest mean height – 3.60 m. *Tilia platyphyllos* was the tallest skeleton tree with a mean height of 2.03 m. The most abundant species at the PRP, *Acer campestre*, reached a mean height of 0.82 m. The mean height of *Quercus robur* was 0.47 m. As regards shrub species, the tallest was *Prunus* × *fruticans* – 1.19 m.

The greatest mean height in 2002 was found for *Prunus avium* – 7.50 m, whose mean height increased by 3.90 m (108.3%). The tallest skeleton tree was again *Tilia platyphyllos*. The greatest increment within the skeleton species was measured in *Quercus robur* – 4.28 m (910.6%), which is also the greatest relative increment in the monitored period.

The increment of *Acer campestre* was 3.79 m (462.2%); it reached a mean height of 4.61 m. The shrub with the greatest mean height was *Crataegus monogyna*, reaching 4.70 m of mean height. The second came *Corylus avellana* with a mean height of 3.83 m. The increment of this species was 3.19 m (498.4%). Nearly the same mean height was found for *Rhamnus cathartica* – 3.77 m, with an increment of 3.24 m (611.3%).

The tallest species in 2012 was *Prunus avium* with a mean height of 9.80 m. The mean height of skeleton species was even. *Quercus robur* had a mean height of 9.37 m and *Tilia platyphyllos* 8.90 m. The most abundant species *Acer campestre* reached a mean height of

8.33 m, which was one of the smallest mean height among the tree species. *Crataegus monogyna* with a mean height of 4.89 m was the tallest shrub species, followed by *Corylus avellana* with a mean height of 4.70 m and *Crataegus flabellata* with a mean height of 4.52 m. The smallest mean height was recorded for *Cornus sanguinea* – 2.00 m.

The greatest absolute increment between 1993 and 2012 was found for *Quercus robur* – 8.90 m (1893.6%). The shrub species with the highest increment was *Crataegus monogyna* – 4.34 m (789.1%), followed by *Prunus x fruticans* with an increment of 4.32 m (1893.6%).

The tallest skeleton tree was *Quercus robur*, reaching the maximum height of 11.00 m, followed by *Prunus avium* with a height of 10.00 m. The tallest individual of *Acer campestre* reached a height of 11.90 m, *Tilia platyphyllos* 10.00 m. Shrubs grew to considerable heights as well. The tallest individual was *Prunus x fruticans* with a height of 9.00 m. The tallest individual of *Corylus avellana* and *Crataegus flabellata* was 6.90 m tall, *Crataegus monogyna* was 7.10 m tall and *Prunus spinosa* 6.50 m.

	1993	**1996**	**1999**	**2002**	**2007**	**2012**			
	Ø	Ø	Ø	Ø	Ø	min.	max.	Ø	σ
ACC	0.82	2.74	4.24	4.61	6.37	2.00	11.90	8.33	2.06
APL	2.70	3.80	5.20	5.50	8.13	8.30	8.30	8.30	0.00
CB	0.41	0.51	0.35	-	-	-	-	-	-
COR	0.64	2.20	3.57	3.83	4.52	2.57	6.90	4.70	1.10
COS	0.92	0.83	1.09	1.22	1.71	0.40	3.60	2.00	1.60
CRA	0.55	1.92	3.48	4.70	4.75	2.20	7.10	4.89	1.69
CRF	0.63	1.83	3.03	4.16	4.58	1.40	6.90	4.52	1.77
EU	0.19	0.96	1.86	1.90	2.01	1.85	3.80	2.78	0.80
FRAN	0.22	0.50	0.70	0.40	-	-	-	-	-
LIGO	0.23	0.85	0.25	2.84	-	-	-	-	-
LIGV	0.71	1.76	2.62	2.84	2.20	1.70	3.20	2.49	0.54
LOT	0.38	1.65	2.47	3.09	3.67	1.30	4.10	3.34	0.81
LOX	1.44	2.40	3.20	3.27	-	-	-	-	-
PA	3.60	4.80	6.00	7.50	8.49	9.60	10.00	9.80	0.20
PF	1.19	2.98	3.54	3.73	4.11	3.52	9.00	5.51	1.49
PS	0.76	2.20	3.28	3.21	3.73	1.30	6.50	3.83	1.54
QUR	0.47	1.57	3.33	4.75	7.40	6.30	11.00	9.37	1.41
RH	0.53	1.54	2.52	3.77	-	-	-	-	-
ROC	0.39	1.41	2.18	3.30	3.80	1.10	1.10	1.10	0.00
SAC	2.05	4.20	5.40	6.22	-	-	-	-	-
SAL	0.16	4.10	5.65	6.40	7.76	8.90	9.20	9.05	0.15
SOA	2.88	3.63	4.95	5.40	-	-	-	-	-
TIC	1.20	1.91	4.90	5.83	7.36	9.10	9.10	9.10	0.00
TIP	2.03	2.62	4.90	5.67	6.96	7.80	10.00	8.90	1.10
ULA	0.42	0.96	4.40	4.80	7.23	8.30	8.30	8.30	0.00

Tab 6. Height of woody plants at PRP 2 (in m). Abbreviation of the species see table 5.

In 2012 the stand acquired a layered structure. The skeleton species – *Quercus robur*, *Acer platanoides*, *Prunus avium* and *Tilia platyphyllos* had low proportions and did not form the main layer. The main layer was formed by the most abundant tree species – *Acer campestre*. The above mentioned species formed the dominant layer. The *Quercus robur* individuals were of quite a balanced growth, as proved by the standard deviation – 1.41 m. The *Acer campestre* species included both dominant and subdominant individuals – σ was 2.06 m. Then there was the shrub layer but this was formed only in the edges of the biocorridor where it created the forest mantle. Nearly all shrubs planted in the internal part of the biocorridor died from lack

of light. The shrub species with the greatest height variability was *Crataegus flabellata* – σ = 1.77 m, followed by *Crataegus monogyna* – σ = 1.69 m. This variability is caused by the fact that some individuals suffered from lack of light and were low. In contrast, there are individuals whose branches grow through the crowns of surrounding woody plants and these reach considerable heights.

Diameter at breast height

Prunus avium reached the greatest mean dbh in 1993 – 5.30 cm. The second greatest mean dbh was recorded for *Tilia platyphyllos* – 3.70 cm. The most abundant species at the PRP – *Acer campestre* – had a mean dbh of 0.41 cm. The mean root collar diameter (rcd) of individuals with height not exceeding 1.3 m was 2.31 cm. The mean dbh of *Quercus robur* was 0.3 cm and its mean rcd was 1.66 cm.

In 1999 all specimens of all tree species exceeded 1.3 m of height so only the dbh was determined.

In 2002 the greatest mean dbh was found for *Prunus avium* – 20.00 cm (increment 14.9 cm). The second greatest mean dbh was recorded for *Tilia platyphyllos* – 11.00 cm, with an increment of 7.30 cm.

The species with the greatest mean dbh in 2012 was *Prunus avium*. Its increment was 7.00 cm (132.1%) and it reached a mean dbh of 27.20 cm. *Tilia platyphyllos* had a mean dbh of 15.10 cm. *Quercus robur* achieved a mean dbh of 10.88 cm and *Acer campestre* 9.70 cm. The increments of *Quercus robur* and *Acer campestre* were 5.88 cm (196.2%) and 4.80 cm (1171.1%), respectively.

species	1993		1996		1999	2002	2007	2012			
								dbh			
	Ø dbh	Ø rcd	Ø dbh	Ø rcd	Ø dbh	Ø dbh	Ø dbh	min.	max.	Ø	σ
ACC	0.41	2.31	1.91	2.51	3.53	4.90	7.42	1.00	17.80	9.70	3.84
APL	2.40	-	4.90	-	8.00	11.40	14.70	19.70	19.70	19.70	0.00
CB	-	1.22	-	1.88	-	-	-				
PA	5.30	-	10.70	-	15.35	20.20	24.30	26.40	28.00	27.20	0.80
QUR	0.30	1.66	1.00	1.97	3.10	5.00	8.09	4.10	21.00	10.88	5.11
RH	-	3.50	1.43	1.00	-	-	-				
SAC	1.10	-	3.00	-	-	-	-				
SAL	-	-	5.25	-	-	12.50	13.30	15.00	19.40	17.20	2.20
SOA	0.28	-	0.54	-	8.25	9.80	-				
TIC	1.70	2.80	3.90	-	7.20	9.38	13.00	14.60	14.60	14.60	0.00
TIP	3.70	2.80	6.60	1.10	8.90	11.00	13.80	12.10	18.10	15.10	3.00
ULA	-	0.36	4.60	-	2.80	4.10	6.30	8.00	8.00	8.00	0.00

Tab 7. Diameter at breast height at PRP 2 (in cm). Abbreviation of the species see table 5.

The dbh of *Prunus avium* was determined as soon as in 1993; therefore, we can evaluate its diameter increment for the period of 1993 - 2012. The mean diameter increment of *Prunus avium* in this period was 21.90 cm (413.2%). The mean diameter increments of *Quercus robur* and *Acer campestre* were 7.78 cm (259.5%) and 6.17 cm (150.5%), respectively, from 1999 (the first inventory where only individuals taller than 1.3 m were represented) to 2012.

The individual with the greatest dbh was *Prunus avium* with 28.0 cm in diameter. The second greatest dbh was reached by an individual of the *Quercus robur* species – 21.0 cm. *Tilia platyphyllos* reached a maximum of 18.10 cm and *Acer campestre* 17.80 cm. There was a high variability in this parameter (see Tab 7). It was the highest in *Quercus robur*, where σ achieved 5.11 cm. A high variability was also found for *Acer campestre* – σ = 3.84 cm.

Crown projection area

At the first inventory conducted in 1993, the greatest crown projection area (cpa) was found for *Prunus avium* – 2.09×1.80 m. The skeleton species with the greatest cpa was *Tilia platyphyllos* – 0.84×0.95 m. As regards shrubs, the greatest cpa was reached by *Prunus* × *fruticans* – 1.05×0.98 m, followed by *Ligustrum vulgare* – 0.86×0.74 m.

The tree species with the greatest mean cpa in 1996 was *Prunus avium* – 3.03×2.78 m, which represented an increase by 0.94×0.98 m (45.0×54.4%). The skeleton species with the greatest mean cpa was *Tilia platyphyllos* – 1.40×1.29 m. The shrub species with the greatest mean cpa was *Prunus* × *fruticans* – 1.97×2.06 m; it increased by 0.92×1.08 m (87.7×110.6%) from 1993. Crowns of most species at the PRP had grown to such dimensions that they started to form a canopy.

species	1993		1996		1999		2002	
	w1	w2	w1	w2	w1	w2	w1	w2
ACC	0.69	0.65	1.69	1.72	-	-	2.44	2.60
APL	0.51	0.52	1.20	1.17	-	-	3.20	2.90
CB	0.19	0.15	0.39	0.33	-	-	-	-
COR	0.59	0.54	1.32	1.42	1.70	2.01	2.18	2.65
COS	0.37	0.36	0.79	0.76	0.99	0.99	0.87	0.76
CRA	0.53	0.52	1.13	1.09	1.65	1.56	2.13	2.30
CRF	0.66	0.62	1.27	1.21	1.65	1.38		
EU	0.17	0.21	0.57	0.50	0.95	0.77	1.10	1.07
FRAN	0.06	0.02	0.26	0.36	0.38	0.45	0.20	0.20
LIGO	0.06	0.07	0.42	0.38	N	N	2.58	2.55
LIGV	0.86	0.74	1.56	1.45	1.94	1.96		
LOT	0.27	0.28	1.09	1.10	1.63	2.00	2.41	3.07
LOX	1.50	1.45	2.30	2.30	2.50	N		
PA	2.09	1.80	3.03	2.78	-	-	5.18	5.05
PF	1.05	0.98	1.97	2.06	N	N	2.38	2.71
PS	0.75	0.69	1.63	1.48	2.02	1.95		
QUR	0.38	0.38	0.80	0.82	1.15	2.50	2.10	2.19
RH	0.42	0.38	1.36	1.15	2.03	0.60	2.45	2.22
ROC	0.32	0.29	1.08	1.02	1.65	1.05	1.51	1.56
SAC	2.70	0.90	2.65	2.50	-	-	4.08	3.72
SAM	0.00	0.00	3.15	3.10	-	-		
SOA	0.79	0.89	1.45	1.51	-	-	3.05	3.40
TIC	0.58	0.63	0.67	0.65	-	-	3.65	3.30
TIP	0.84	0.95	1.40	1.29	-	-		
ULA	0.25	0.27	1.02	0.94	-	-	1.60	1.85

Tab 8. The mean crown projection areas of species at PRP 2 (in cm). Abbreviation of the species see table 5.

The crowns further increased before 1999, although the increments were not as high as before due to the created closed canopy. In this year only crown areas of shrub species were recorded. The greatest mean cpa was found for *Prunus spinosa*, whose increment was 0.39×0.47 m (23.9×31.8%), so its mean crown reached dimensions of 2.02×1.95 m. The second came *Ligustrum vulgare* with a mean crown of 1.94×1.96 m.

In 2002 a dense closed canopy had been formed and the mean cpa did not change as substantially as in the previous years. The greatest cpa was recorded for *Prunus spp.* – 2.38×2.71 m. The skeleton tree with the greatest mean cpa was *Tilia platyphyllos* – 3.65×3.30 m.

The greatest absolute increment in crown within the period of 1993–2002 was found for *Prunus avium* – 3.09×3.25 m (147.8×180.6%). The skeleton species with the greatest absolute crown increment was *Tilia platyphyllos* – 2.81×2.35 m (335.9×248.2%). The increment of the most abundant tree – *Acer campestre* – was 1.75×1.95 m (252.2×302.3%).

3.1.3 PRP 3

Inventory

In 1993 there were 394 individuals of 23 taxa at the PRP. Out of this, 197 were trees (11 taxa) and 196 were shrubs (12 taxa). The most abundant species was *Acer campestre* – 143 individuals (36.4%), followed by *Quercus robur* – 31 individuals (7.9%). The most abundant shrubs were *Crataegus monogyna* – 38 individuals (9.7%) and *Prunus spinosa* – 36 individuals (9.1%).

The number of individuals at the PRP decreased by 51 individuals (12.9%) between 1993 and 2002. *Acer campestre* was still the most abundant species; its number dropped by 26 (18.2%) to 117 (proportion of 34.1%). The second most abundant tree was *Quercus robur*. The original 31 specimens in 1993 dropped to 13 (proportion of 3.8%). The most abundant shrub species were *Prunus spinosa* – 66 individuals (19.23%) and *Crataegus monogyna* – 33 individuals (9.6%). The inventory included self-seeded individuals of *Prunus spinosa*; therefore, the total number of individuals at the PRP increased.

In 2012 there were 204 individuals of 15 taxa. Out of this, there were 107 trees (6 taxa) and 97 shrubs (9 taxa). The total number of woody plants decreased by 190 individuals which representing 48.2% during the time of monitoring. The most abundant species at the end was the same as at the beginning – *Acer campestre* with 91 individuals (28.8%). In 2007 some specimens were looked like dead but they sprouted in next years. The second most abundant tree was *Quercus robur* with 7 individuals (3.4%). The most abundant shrub species were *Prunus spinosa* represented by 31 individuals (15.2%) and *Crataegus monogyna* with 15 individuals (7.3%).

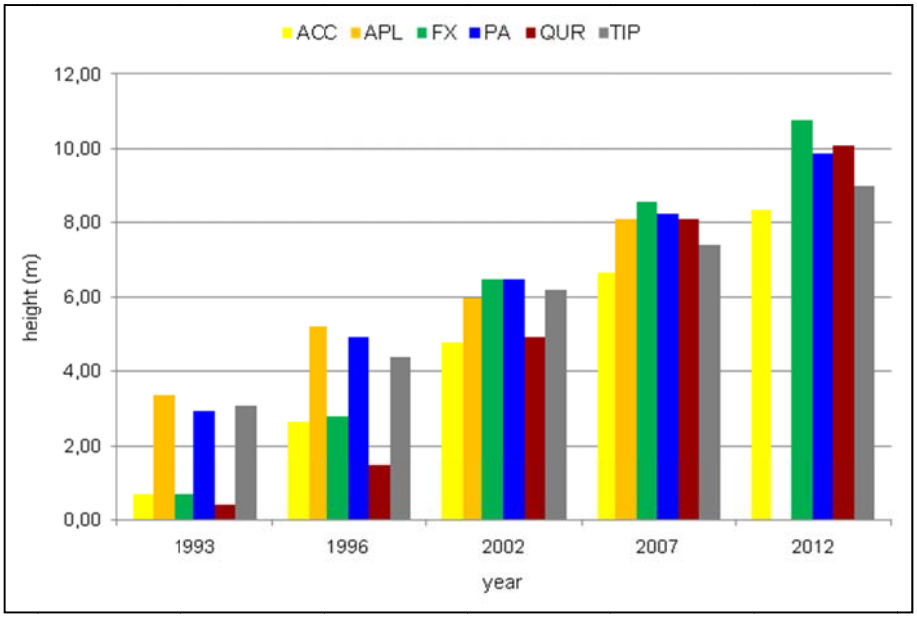

Fig 10. The mean height of selected species at PRP 3 of the Radějov biocorridor.

The species that disappeared from the biocorridor establishment from the PRP were *Carpinus betulus*, *Frangula alnus*, *Ligustrum ovalifolium*, *Rhamnus cathartica*, *Sorbus aucuparia*, *Sorbus intermedia* and *Tilia platyphyllos*. The greatest decrease in the species that remained was recorded for *Acer campestre*. Its number dropped by 78 individuals (54.5%). The other species with a large decrease were *Quercus robur* – 24 individuals (77.4%) and *Crataegus monogyna* – 23 individuals (60.5%).

During the inventory in 2012 seedlings and advance regeneration were observed. The most abundantly there were *Acer platanoides* and *Acer campestre*, further *Prunus avium*, *Ligustrum vulgare*, *Lonicera tatarica*, *Sambucus nigra* and *Rosa canina*. *Prunus spinosa* propagated by root suckers. Shrubs, especially those planted in the internal rows, were dying. Hardly any of the internal ones survived and those that did suffer and it is certain they will die soon.

species	1993	1996	2002	2007	2012
Acer campestre - ACC	143	139	117	65	91
Acer platanoides - APL	1	1	1	1	0
Carpinus betulus - CB	5	4	0	0	0
Corylus avellana - COR	25	24	22	18	14
Cornus sanguinea - COS	25	25	23	22	11
Crataegus monogyna - CRA	38	36	33	27	15
Crataegus flabellata - CRF	3	3	3	2	1
Euonymus europaea - EU	6	6	6	6	6
Frangula alnus - FRAN	1	1	1	0	0
Fraxinus excelsior - FX	1	1	?	1	1
Ligustrum ovalifolium - LIGO	2	2	0	0	0
Ligustrum vulgare - LIGV	24	21	20	6	5
Lonicera tatarica - LOT	21	19	15	17	13
Prunus avium - PA	1	1	1	1	1
Prunus spinosa - PS	36	38	66	42	31
Quercus robur - QUR	31	30	13	9	7
Rhamnus cathartica - RH	6	6	4	0	0
Rosa canina - ROC	9	9	7	1	1
Salix alba - SAL	5	4	3	2	2
Sorbus aucuparia - SOA	2	2	3	0	0
Sorbus intermedia - SOI	1	1	?	0	0
Tilia cordata - TIC	1	1	0	0	0
Tilia platyphyllos - TIP	6	6	5	6	5
Viburnum lantana - VL	1	1	0	0	0
Total number	**394**	**381**	**343**	**226**	**204**

Tab 9. Abundance of particular species at PRP 3 (pcs).

Height

At the time of the first inventory (in 1993) the tallest species was *Tilia platyphyllos* with a mean height of 3.08 m. The only specimen of *Prunus avium* was 2.95 m tall. The most abundant species at the PRP, *Acer campestre*, reached a mean height of 0.69 m. The smallest mean height of the monitored tree species was recorded for *Quercus robur* – 0.39 m. The shrub species with the greatest mean height was *Prunus spinosa* – 1.16 m. The species with the smallest mean height included *Cornus sanguinea* – 0.23 m.

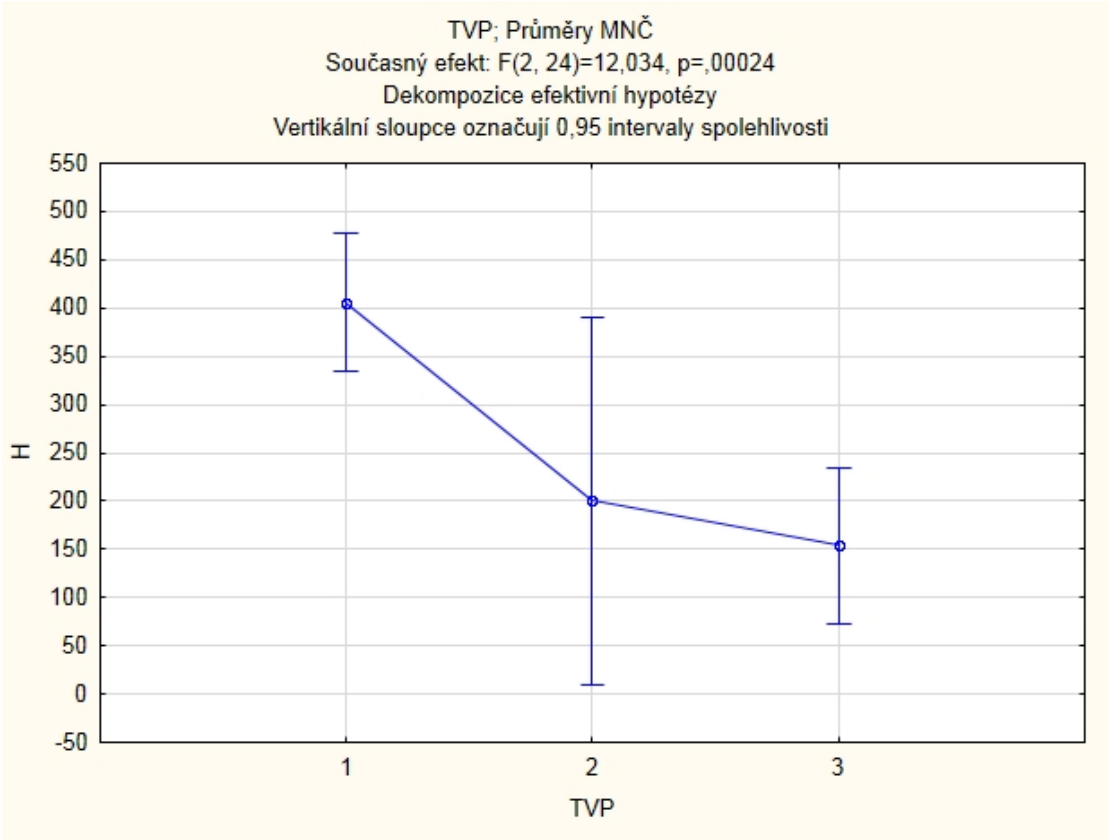

Fig 11. The analysis of variance for height of Cornus sanguinea. (TVP means PRP and H means height.)

We cannot evaluate the increments of all species as of 2002 as the inventory author recorded heights of genera *Crataegus* as a whole, without distinguishing between species. The tallest species in 2002 was *Prunus avium* – 6.50 m (only one individual at the PRP). Its height increased by 1.60 m (32.7%). The most abundant species at the PRP, *Acer campestre*, had an increment of 2.11 m (79.6%) and reached a mean height of 4.76 m. *Quercus robur* had a mean height of 4.91 m and its increment was 3.45 m (236.3%). The shrub with the greatest mean height was *Rhamnus cathartica*. Its increment was 2.34 m (131.5%) and it reached a mean height of 4.12 m. It was followed by *Corylus avellana* with a mean height of 4.00 m and an increment of 1.66 m (70.2%). The species with the smallest mean height was *Cornus sanguinea* – 0.94 m. The greatest increment of skeleton species between 1996 and 2002 was recorded for *Quercus robur* – 3.45 m (235.3%), which is the greatest relative increment within the monitored period. The shrub species with the greatest absolute increment was found for *Rhamnus cathartica* – 2.34 m.

The tallest tree species in 2012 with a mean height of 10.1 m was *Quercus robur*. The most abundant skeleton tree species *Tilia platyphyllos* reached a mean height of 9.0 m. *Acer campestre* reached a mean height of 8.35 m, which was the smallest mean height of a tree species. The tallest shrub species with a mean height of 5.46 m was *Corylus avellana*, followed by *Crataegus monogyna* with a mean height of 4.99 m. The smallest mean height was found for *Cornus sanguinea* – 1.54 m.

Between 1993 and 2012 *Quercus robur* had an increment of 9.7 m (2487.2%). Also *Acer campestre* manifested a substantial increment – 7.66 m (1110.1%). The increment of the most abundant skeleton tree *Tilia platyphyllos* in the monitored period was 5.92 m (192.2%). The greatest increment in shrub species was found for *Corylus avellana* – 4.82 m (753.1%). *Crataegus monogyna* also manifested a considerable increment – 4.19 m (523.8%). The shrub with the smallest increment was *Cornus sanguinea* – 1.13 m.

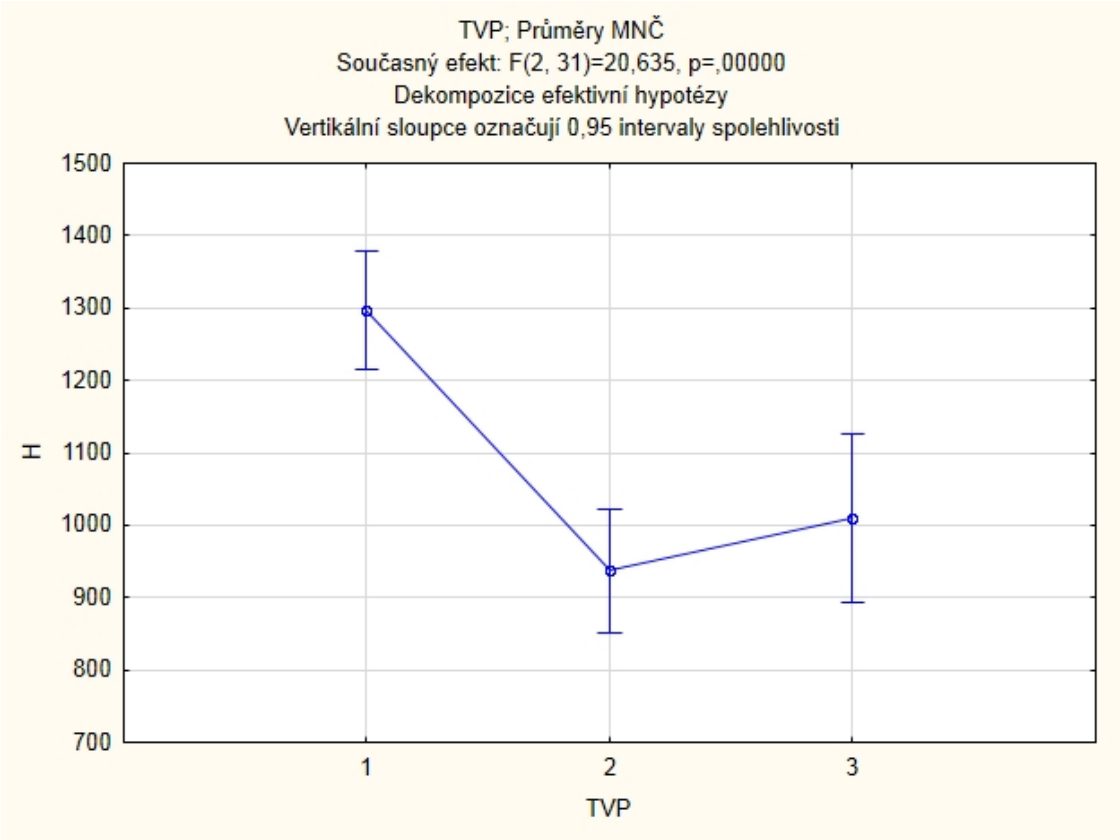

Fig. 12 The analysis of variance for height of Quercus robur. (TVP means PRP and H means height).

The tallest tree at the PRP was *Acer campestre* with a height of 11.60 m. It was followed by *Quercus robur* 11.60 m tall. The tallest *Tilia platyphyllos* reached a height of 9.70 m and *Prunus avium* 9.90 m. Shrubs also grew to substantial heights. The tallest was an individual of *Corylus avellana* 8.40 m tall. The tallest *Prunus spinosa* manifested a height of 8.30 m and *Crataegus monogyna* 6.80 m.

In 2012 the stand acquired a layered structure. The skeleton species – *Quercus robur*, *Tilia platyphyllos* and *Prunus avium* had low proportions and did not form the main layer. The main layer was formed by crowns of *Acer campestre* (the most abundant tree species) at a height of about 7 m. The above mentioned species formed the dominant layer. The height increment of *Quercus robur* individuals was even, which is manifested by the standard deviation, which was 1.13 m. The species of *Acer campestre* was represented by dominant individuals as well as subdominant individuals – σ was 1.88 m. Another layer was formed by shrubs. However, this was only formed at the peripheries of the biocorridor where it created the forest mantle. Most shrubs planted in the internal part of the biocorridor died due to a lack of light. The shrub species with the greatest height variability was *Prunus spinosa* – σ = 1.83 m, followed by *Corylus avellana* – σ = 1.50 m. This variability was caused by the fact that some individuals suffered from a lack of light and were of low growth; on the other hand, there were individuals whose branches grew through the crowns of the surrounding plants and thus reached substantial heights.

species	1993	1996	2002	2007	2012			
	Ø	Ø	Ø	Ø	min.	max.	Ø	σ
ACC	0.69	2.65	4.76	6.66	1.70	11.60	8.35	1.88
APL	3.35	5.20	6.00	8.09	-	-	-	-
CB	0.34	0.92	-	-	-	-	-	-
COR	0.64	2.35	4.00	4.77	3.10	8.40	5.46	1.50
COS	0.23	0.69	0.94	1.36	0.20	3.70	1.54	1.26
CRA	0.80	2.56	3.93	5.10	2.45	6.80	4.99	1.33
CRF	0.45	1.58		4.85	3.90	3.90	3.90	0.00
EU	0.36	1.31	1.86	2.19	1.05	4.20	2.86	1.11
FRAN	0.58	0.37	-	-	-	-	-	-
FX	0.67	2.80	6.50	8.56	10.80	10.80	10.80	0.00
LIGO	0.06	0.59	-	-	-	-	-	-
LIGV	0.79	2.17	2.82	3.19	0.80	3.40	2.46	0.88
LOT	0.48	1.42	2.49	3.15	1.78	4.70	3.31	0.78
PA	2.95	4.90	6.50	8.23	9.90	9.90	9.90	0.00
PS	1.16	2.95	3.20	3.82	1.10	8.30	4.17	1.83
QUR	0.39	1.46	4.91	8.10	7.65	11.60	10.09	1.13
RH	0.95	1.78	4.12	–	-	-	-	-
ROC	0.63	1.83	2.43	2.38	2.85	2.85	2.85	0.00
SAL	1.33	3.66	6.17	7.96	9.70	11.00	10.35	0.65
SOA	2.63	3.58	5.33	-	-	-	-	-
SOI	2.75	3.20	-	-	-	-	-	-
TIP	3.08	4.38	6.20	7.40	8.40	9.70	9.00	0.46
VL	0.27	1.22	-	-	-	-	-	-

Tab 10. Height of woody plants at PRP 3 (v m). Abbreviation of the species see table 9.

Diameter at breast height

In 1993 *Prunus avium* had the greatest dbh – 4.30 cm (there was only one specimen at the PRP). The skeleton species with the greatest mean dbh was *Tilia platyphyllos* – 4.03 cm. The most abundant species at the PRP *Acer campestre* had a mean dbh of 0.44 cm. However, there were also individuals whose height did not exceed 1.3 m. The mean root collar diameter (rcd) of these was 2.10 cm. The mean rcd of *Quercus robur* was 1.74 cm. There were no *Quercus robur* specimens with a dbh at the PRP.

From 1996 to 2002, the dbh of *Prunus avium* increased by 10.60 cm (89.1%) to 22.50 cm. *Tilia platyphyllos* reached a mean dbh of 14.60 cm. which was an increment of 6.55 cm (81.4%). The increment of *Quercus robur* was 4.11 cm (258.5%) and it reached a mean dbh of 5.70 cm. *Acer campestre* reached a mean dbh of 5.20 cm, its increment being 3.29 cm (172.3%).

At the last inventory (in 2012), the greatest dbh was recorded for the only specimen of *Prunus avium* – 29.60 cm. Its increment from 1993 was 25.30 cm (588.4%). The mean dbh of *Tilia platyphyllos* was 18.64 cm, which means the increment from 1993 was 14.61 cm (362.5%). *Quercus robur* reached a mean dbh of 11.24 cm and its increment from 2002 was 5.54 cm (97.2%). The most abundant species at the PRP – *Acer campestre* – reached a mean dbh of 9.74 cm. The increment of this species from 2002 was 4.54 cm (87.3%).

As it has been stated, the tree with the greatest diameter was the only specimen of *Prunus avium*. This was followed by a specimen of *Tilia platyphyllos*, whose dbh was 23.90 cm. *Quercus robur* reached a maximum dbh of 16.60 cm and *Acer campestre* 18.80 cm. This characteristic also manifested a high variability (see Tab 11). The highest σ was found for *Tilia platyphyllos* – σ = 3.93, *Acer campestre* – σ = 3.55 cm, and *Quercus robur* – σ = 3.48 cm.

species	1993		1996		2002	2007	2012			
							dbh			
	Ø dbh	Ø rch	Ø dbh	Ø rch	Ø dbh	Ø dbh	min.	max.	Ø	σ
ACC	0.44	2.10	1.91	1.70	5.20	7.44	0.00	18.80	9.74	3.55
PA	4.30	-	11.90	-	22.50	27.00	29.60	29.60	29.60	0.00
QUR	-	1.74	1.59	2.68	5.70	8.26	5.10	16.60	11.24	3.48
TIP	4.03	-	8.05	-	14.60	16.12	14.00	23.90	18.64	3.93

Tab 11. Diameter at breast height at PRP 3 (v cm). Abbreviation of the species see table 9.

Crown projection area

The greatest crown projection area (cpa) in 1993 was reached by *Prunus avium* – 1.55×1.66 m (there was only one specimen of this species at the PRP). The mean cpa of *Tilia platyphyllos* was 1.09×1.25 m. A shrub species with the greatest mean cpa was *Prunus spinosa* – 1.09×1.01 m. followed by *Ligustrum vulgare* with a mean cpa of 1.01×0.90 m.

The tree species with the greatest mean cpa in 1996 was *Prunus avium* – 3.50×3.90 m. The skeleton tree with the greatest mean cpa was *Tilia platyphyllos* – 1.89×1.97 m. Its crown increment was 0.80×0.71 m (73.4×56.6%). The shrub with the greatest mean cpa was *Prunus spinosa* – 2.07×2.12 m, its increment being 0.98×1.11 m (89.7×110.0%). The second greatest mean cpa was found in *Ligustrum vulgare* – 1.99×2.08 m. Crowns of most species at the PRP had reached such dimensions that a canopy was created.

species	1993		1996		2002	
	w1	w2	w1	w2	w1	w2
ACC	0.62	0.57	1.69	1.57	2.47	2.60
APL	0.85	1.40	2.20	2.30	3.90	4.75
CB	0.15	0.11	0.59	0.71	-	-
COR	0.53	0.51	1.53	1.63	2.41	3.29
COS	0.34	0.34	0.77	0.73	0.90	0.84
CRA	0.86	0.80	1.64	1.65	2.31	2.17
CRF	0.67	0.61	1.31	1.14		
EU	0.23	0.23	0.59	0.61	1.10	1.33
FRAN	0.18	0.22	0.23	0.19	-	-
FX	0.39	0.51	1.50	1.30	4.10	4.00
LIGO	0.08	0.06	0.46	0.44	2.46	2.76
LIGV	1.01	0.90	1.99	2.08		
LOT	0.40	0.41	1.01	1.10	1.91	2.00
PA	1.55	1.66	3.50	3.90	6.50	5.30
PS	1.09	1.01	2.07	2.12	2.64	3.28
QUR	0.40	0.39	0.90	0.84	1.94	1.76
RH	0.73	0.45	1.56	1.48	2.24	2.36
ROC	0.66	0.60	1.67	1.88	1.99	2.04
SAM	0.90	0.79	2.75	2.68	3.15	3.17
SOA	0.68	0.77	1.28	1.35	2.66	2.87
SOI	0.46	0.51	1.80	1.70		
TIP	1.09	1.25	1.89	1.97	3.64	3.89
VL	0.22	0.28	0.66	0.80	-	-

Tab 12. The mean crown projection areas of species at PRP 3 (m). Abbreviation of the species see table 9.

As in the other dendrometric data, we cannot evaluate the increment of crowns at this PRP within 1999 - 2002 because the data for 1999 are not available.

The tree species with the greatest mean cpa in 2002 was *Tilia platyphyllos* – 3.64×3.89 m. Its increment was 1.75×1.92 m (92.4×97.3%). *Acer campestre* had a mean cpa of 2.47×2.60 m and its increment was 0.77×1.02 m (45.5×64.7%). The mean cpa of *Quercus robur* was 1.94×1.76 m and its increment was 1.04×0.92 m (116.1×110.0%). As regards shrubs, the greatest mean cpa was reached by *Prunus spinosa* – 2.64×3.28 m. Crowns of most species grew to such dimensions that they created a canopy.

In 1993 - 2002 *Prunus avium* (represented by one specimen only) manifested the greatest absolute increment of the crown – 4.95×3.64 m (319.4×219.3%). The skeleton tree with the greatest absolute increment of the crown was *Tilia platyphyllos* – 2.55×2.64 m (233.9×211.2%). The crown increment of the most abundant tree species at the PRP – *Acer campestre* – was 1.85×2.03 m (298.4×356.1%). The shrub species with the greatest absolute increment of the crown was *Corylus avellana* – 1.88×2.78 m (354.7×545.1%).

3.1.4 General Evaluation

According to the project, 24 species of woody plants were designed to be planted in the biocorridor. In reality, 27 species were used with a relatively high proportion of introduced species – *Crataegus flabellata*, *Ligustrum ovalifolium*, *Lonicera korolkowii*, *Lonicera tatarica*, *Salix acutifolia* and *Sorbus intermedia*. The most abundant tree species was *Acer campestre*, The proportion of skeleton species *Acer platanoides*, *Fraxinus excelsior*, *Quercus robur*, *Tilia cordata* and *Tilia platyphyllos* was very small as soon as during planting and it was further reduced due to their decrease. In 2012 these were rather sporadic. The shrub species with high abundance were *Prunus spinosa*, *Corylus avellana*, *Cornus sanguinea*, *Crataegus flabellata* and *Ligustrum vulgare*. All the used species grew well. The only tree species that disappeared completely was *Sorbus aucuparia.* The shrub species that disappeared were *Frangula alnus* and *Staphylea pinnata*. These species had low proportions from the very beginning. The smallest decrease was recorded at PRP 2, where the mortality of *Acer campestre* was lower in comparison with the other PRPs. 41.7% and 36.3% of *Acer campestre* individuals died at PRP 1 and PRP 3, respectively, while only 25.0% died at PRP 2.

The greatest decrease as regards shrubs was found for *Crataegus flabellata*, *Cornus sanguinea*, *Ligustrum vulgare* and *Prunus spinosa*. This was caused by shading and the consequent death of individuals growing in the internal rows. This process started at the turn of millennium and gradually accelerated. The greatest decrease was recorded between 2002 and 2007. For example, at PRP 3 the number of *Ligustrum vulgare* individuals dropped by 14 individuals (70.0%) between 2002 and 2007. Naturally, all shrub species manifested a high mortality (see Tab 1, Tab 5 and Tab 9). On the other hand, natural processes of regeneration started in the stand. Many species regenerated naturally, either by root suckers or by seeds. All species, except *Quercus robur* and *Ulmus laevis*, bloomed and bore fruit. Regeneration needs to be paid a lot of attention so that propagation of introduced species can be prevented. For the comparison of number of species at particular plots, see Fig. 3.

The Radějov biocorridor was established in the former black arable land and then maintained by machinery for five years. The protection against browsing or other damage inflicted by animals was neglected; therefore the damage to woody plants was substantial. The worst situation occurred in winter 1995/96, when 99% of individuals were damaged. As the seedlings and plants used for planting were not of the same height, the impact of browsing was not the same either. The used saplings suffered less – only their lateral branches and not leading shoots were damaged and so the growth was not affected. The growth of lower seedlings was affected substantially in the first years after planting and their mean height in 1993 did not exceed 1 m.

All planted species grew well with regular increments. As it has been stated, the growth and mainly the size of crowns were affected by browsing to a high extent. Most plants acquired such height that the leading shoot was out of the range of browsing and the height increment accelerated after 1993. The growth of skeleton species at particular PRPs was even and no statistically significant differences were found among individual species. However, comparing

the particular PRPs. we can see that plants at PRP 1, which is located at a slope foot, grew best. Trees there are about 3 m taller than at the other PRPs. The differences are statistically significant. The mean height of *Quercus robur* (in 2012) at PRP 1 was 12.97 m (Tab. 2 and Fig. 4), at PRP 2 it was 9.37 m (Tab. 6 and Fig. 5) and at PRP 3 it was 10.09 m (Tab. 10 and Fig. 6). The mean height of *Tilia platyphyllos* at the three plots was 12.28 m, 8.90 m and 9.0 m, respectively. Similar results were found for the mean periodic height increment (mphi). The highest mphi was found at PRP 1, where the mphi of *Quercus robur* was 65.3 cm and 48.1 cm for *Tilia platyphyllos*. At PRP 2 and 3, the mphi of *Quercus robur* was 46.8 cm and 51.1 cm, respectively, and the mphi of *Tilia platyphyllos* was 36.2 cm and 31.2 cm, respectively.

The difference in the mean height of shrub species was about 1 m and there were no statistically significant differences among their mean heights. An exception was *Cornus sanguinea*: its mean height was 2 m larger at PRP 1 than at PRP 2 and 3. This difference is statistically significant (Fig 7).

The skeleton species have low proportions and thus they do not create the main layer. The main layer is created by individuals of *Acer campestre* instead. The skeleton plants grow in the dominant layer.

The ascertained height increments corresponded to diameter increments. Also in this regard, skeleton trees at PRP 1 had a greater mean dbh. In the case of *Quercus robur*, the differences in the mean dbh were large (15.68 cm, 10.88 cm and 11.24 cm) and statistically significant (Fig 8). The whole time of monitoring, *Prunus avium* had the greatest mean dbh at all PRPs, followed by *Tilia platyphyllos*. In 2012 *Prunus avium* at PRP 1 had a dbh of 30.90 cm (one specimen only), the two individuals at PRP 2 had a mean dbh of 27.20 cm and the only individual at PRP 3 had a dbh of 29.60 cm. The mean dbh of *Tilia platyphyllos* in the same year was 21.07 cm, 15.10 cm and 18.64 cm at the three PRPs.

Crowns of plants were small in 1993 and the crown projection area of most species did not exceed 1×1 m. Exceptions were the species that had been planted as saplings (e.g. *Acer platanoides*, *Prunus avium* and *Tilia platyphyllos*). The crowns expanded considerably during the following three years. The mean crown area was often doubled and a canopy started to be created. By 1999 a closed canopy had been formed and became denser in the years to follow. In consequence, branches went dry and the mean crown did not change or was even reduced. The shrubs in the internal part of the biocorridor started to die. The species with the largest crown was *Prunus avium,* whose mean crown in 2002 at PRP 3 was 5 to 6 m wide. The mean crown of the other skeleton species was 3 to 4 m. An exception was *Quercus robur*, whose mean crown was around 2 m. This dendrometric parameter also manifested differences between PRP 1 and the remaining two PRPs.

Fig 13. View on the biocorridor. Photo L. Úradníček

Just as in the case of other biocorridors, the final reports of the Radějov biocorridor recommended improvement cutting. However, this was never done. If this recommendation had been implemented, skeleton species, especially *Quercus robur* could have been released and their decrease could have been lower. Undoubtedly, that would help the biocorridor because the proportion of skeleton species is very low. However, this situation cannot be changed now and future efforts should be directed to the maintenance of the current proportion of skeleton species. This mainly concerns the release of the skeleton species individuals that lag behind.

Silvicultural measures should include the elimination of introduced species – *Crataegus flabellata*, *Lonicera korolkowii* and *Lonicera tatarica*. These species were planted by mistake in establishing of biocorridor. These measures need to be implemented very sensitively as the proportion of *Crataegus flabellata* is large and at many places this is the only plant forming the stand edge. Therefore, the treatment should proceed in several steps of lower intensity and these should substantially reduce the proportion of this species.

Because there are no sufficient data in literature on the growth of the tree species on agricultural land, it is virtually impossible to compare the results obtained. Also in forestry practice, attention is not paid to the evaluation of the growth of young plantations. Therefore, the results obtained can be evaluated for guidance, as a material for further comparisons in the future. Perhaps, it will be possible to use the findings obtained in the construction of growth models at the early stage of the plantation development.

4. Conclusion

Based on the results obtained we can state that species of the biocorridor tree layer grow very well. Although the number of individuals gradually decreases, their number is sufficient for a successful development of a forest community to be guaranteed.

The noted reduction of the shrub layer in the biocorridor internal part does not display a fundamental effect on its further development and function. Thus, mean heights and dbh reached by particular trees can be evaluated positively.

Currently, the stands are vital, plants manifest regular increments and they have started to perform their expected function.

Biocorridor serves as a windbrake now (Fig. 9). It also acts against air and water erosion. It may contribute to the supply of food for different species of fauna and serves as their hiding place, becomes a migration path. It can be a source of fuel in future too. This means that it becomes a useful part of the landscape.

Fig 14. View on Radějov biocorridor (2012).

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