
ARACHNOFAUNA OF TREES AND CROWNS IN THE VICINITY OF LINE BUILDINGS

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ABSTRACT

The aim of my thesis was a discovery of what species of spiders are living on the trees growing around line structures in Tišnovsko region. We studied the araneofauna on the tree trunk and tree canopy, and the influence of bark structure (smooth x rough). The spiders were caught by the cardboard traps placed on a different fruit trees (apple-tree, plum-tree, cherry-tree) in several alleys during the year 2012. Totally were caught 634 individuals (thereof 575 juvenile and 59 adult spiders), which were determined a sorted into the 16 species. Fraction of the tree and bark fraction had influence on spiders amount. More spiders were collected on tree trunks (juv. $P = 0.000$, adult $P = 0.004$) and on rough bark ($P = 0.000$ and $P = 0.014$), which provide them more cover. Amount of spiders varied during the year, the most specimen abundance was found in November and most adults were collected during spring moths.

Key words: spiders, tree, fruit trees, cardboard trap, alley.

INTRODUCTION

Trees along roads is an inseparable part of our landscape, it is an important landscape and aesthetic element that constitutes the typical landscape. Trees are well-defined and unique habitats. They are structurally complex and composed from several microhabitats (foliage, branches, trunks). Tree trunks connect forest land to crowns, are characterized by numerous unique biotic and abiotic factors, we can discern a separate group bark-dwellers (Horváth & Szinetár, 1998; Horváth et al., 2005; Szinetár & Horváth, 2005). Spiders living on the bark were classified by Wunderlich (1982) and Szinetár and Horváth (2005) as exclusive, facultative and accidental species.

The species composition and an abundance of spiders are influenced by various factors. The effect a canopy structure and a trunk studied Korenko et al. (2011), Halaj et al. (1998; 2000) or Isaia et al. (2006). Effect of particular locality studied Horváth and Szinetár (1998), Halaj et al. (1998), Horváth et al. (2005). In the last decades there is increasing interest in studies of predatory arthropods, which can be used for biological control of agricultural pests (Marc, 1999). Isaia et al. (2010) studied the potential reduction of damage caused by *Cydia* spp., by increasing numbers of spiders, by using additional winter shelters. The target of my thesis was evaluation of effect of the tree fraction (trunk x crown) and bark structure (smooth x rough) on amount of spiders and evaluate their species composition according these characteristics.

MATERIAL AND METHODS

Spiders were collected in alleys of fruit trees (*Malus domestica* Borkh, *Prunus domestica* L., *Cerasus avium* L.), which lies in the district of Brno-venkov and Žďár nad Sázavou. All together there were sampled 36 trees (always 12 trees from one tree species). The collection was conducted during the year 2012, traps were changed monthly, a total of 36 trees x 12 samples x 2 = 864 traps. The cardboard traps were created from cardboard boxes, by cutting to rectangles with dimensions of 15x25 cm and twisting to roll fastened a wire. Traps were attached on tree by wire; one on a tree trunk at a height of 1.5 to 1.6 m and second into the crown on vertically growing branch up to 1.5-2 m a branching crown.

Used the traps were collected into plastic bags, where the spiders were killed by ethyl-acetate. The spiders were collected layer by layer, and they were stored in plastic tubes with ethanol (74%). The spiders were split on juvenile and adult individuals. Adults were subsequently determined, for the determination was used the following literature: Nentwig et al. (2010), Roberts (1995) and Miller (1971). The presence/absence of spider species/individuals were tested by T-test. The same was also evaluated effect smooth and coarse bark. For this analysis was used level of significance level $\alpha = 0.05$. The evaluation was carried out in Statistica 10.

RESULT AND DISCUSSION

In 57% of the trap was not caught any spider. All together 634 spiders were collected, but only 59 (9.3%) were adult. The similar ration were published by Horváth and Szinetára (1998) and by Isaia et al. (2006), who obtained 7.87% and 11.3% respectively. The Fig. 2 shows the presence of spiders in the traps during the year, there are clearly visible two peaks of incidence, smaller in spring (March and April) and greater in the autumn with the main peak in October. Most adult specimens were caught in April and May, the lowest numbers in the winter months. Increased number of spiders in the traps with the arrival of colder period stated several authors (Bogy, 1999; Isaia et al., 2006, 2008; Pekar, 1999). A higher number of adult specimen at the spring and summer published Isaia et al. (2006).

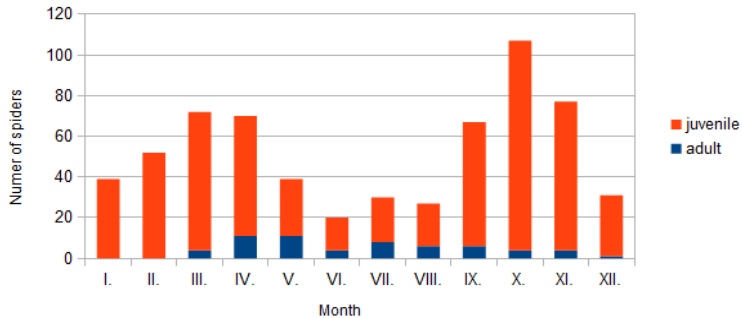


Fig. 2: Distribution of spiders in the during year

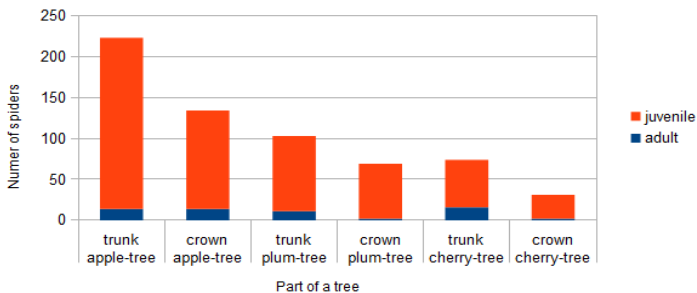


Fig. 3: Distribution of spiders on tree species and their parts

The Fig. 3 shows the number of spiders on different types of trees, results are further divided between the trunk and crown. The graph shows that on all three species of trees predominated spiders on the trunk. This is confirmed by the mean number of juvenile and adult spiders in the trunk and the crown, which is statistically significantly different (juv. $P = 0.000$, adult $P = 0.004$). The structure of the bark is also significant ($P = 0.000$ and $P = 0.014$), the species abundance was higher on rough bark.

Adult individuals (59) belong in 16 species of seven families (Theridiidae, Linyphiidae, Dictynidae, Araneidae, Clubionidae, Gnaphosidae, Salticidae). On apple tree was caught 56.3%, on plums 27.1% and only 16.6% on cherries. The 28 adult specimens collected on apple trees belong to 14 species, although this ratio was 18 adults/3 species on cherries and 13 adults/6 species on plumps (Tab. 1).

Based on data of Czech arachnological society (2013) are some of trapped species rare (*Haplodrassus cognatus*, *Lathys humilis*, *Micaria subopaca*, *Meioneta innotabilis*, *Moebelia penicillata* and *Pseudicius encarpatus*). According Szinetár and Horváth (2005) three recorded species belongs among randomly occurring species, six species belong to occasional and seven between exclusive bark residents. The outweigh of exclusive bark residents in direct contradiction with the results of Szinetár and Horváth (2005), where 65% of the species were randomly occurring.

CONCLUSIONS

We studied areneofauna of fruit trees in allays by cardboard traps. The traps were collected and changed monthly in year 2012. In the districts of Brno-venkov and Žďár nad Sázavou. All together 634 individuals (including 575 juvenile and 59 adult spiders) were caught, which belong to 16 species. We found, that the structure of bark has a significant effect, significantly more adult and juvenile spiders were found on the trunks of trees and the on the rough bark. The rough bark is providing more shelters for spiders. The amount of spiders caught during the year varied, the highest abundance was recorded in October, and most adult in the spring months. Highs occurrence of spiders was recorded form the apple trees. Also several species of rare spiders were recorded (*Haplodrassus cognatus*, *Lathys humilis*, *Micaria subopaca*, *Meioneta innotabilis*, *Moebelia penicillata*, *Pseudicius encarpatus*). The traps provide the shelter for spiders, most of individuals were caught in autumn when they are looking for overwintering shelter. Therefore it would be useful to assess their natural pest control potential during winter time.

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