

THE IMPORTANCE OF DRIFTWOOD FOR AQUATIC INVERTEBRATES IN URBAN STREAMS

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Wood, especially large wood, is recognized as a valuable component of natural streams. It shapes the stream channel and provides various microhabitats for stream biota. Small urban streams usually lack natural large wood. The only similar habitats are driftwood accumulations formed by branches and twigs. Such accumulations are still considered inappropriate obstacle of stream flow and aesthetic defect even in restored urban streams.

Aims
The study was focused on the importance of small wood accumulations as a habitat of benthic invertebrates in restored urban streams.

Methods
Samples of stream macroinvertebrates were taken at four localities on small watercourses in the municipality of Prague, Czech Republic (Tab.1). Stream channels of all localities were restored 2-4 years before the sampling into a semi-natural pattern respecting local conditions. At each locality, riffle, glide and wood habitats were sampled by Surber sampler. We took six parallel samples of each habitat within a locality. The only exception was SAR locality, where we took only three samples of wood habitat because of its overall scarcity in the stream.

Tab. 1. Characteristics of sampling sites at small streams in the municipality of Prague, Czech Republic.

locality code	stream name	N_WGS84	E_WGS84	altitude (m)	channel slope (%)	catchment area (km ²)	Strahler order	dominant bottom substrate	wood accumulations (% cover)
SAR	Šárecký	50.11811	14.38052	190.7	8.7	59.0	3	c. gravel	< 1 %
ROKPOD	Rokytká	50.09983	14.52972	199.8	4.5	120.6	4	blocks	< 1 %
DAL	Dalejský	50.03953	14.36056	237.6	17.2	32.3	3	c. gravel	< 1 %
ROKNAD	Rokytká	50.09876	14.51926	203.5	0.7	120.0	4	loam	< 1 %

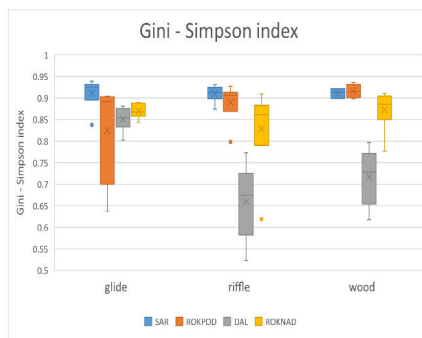
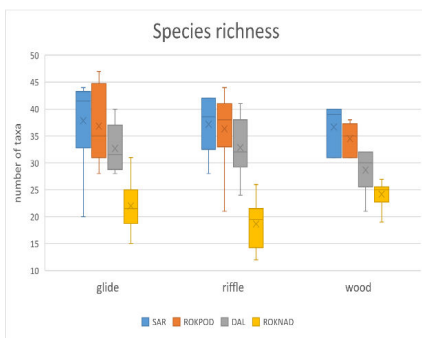
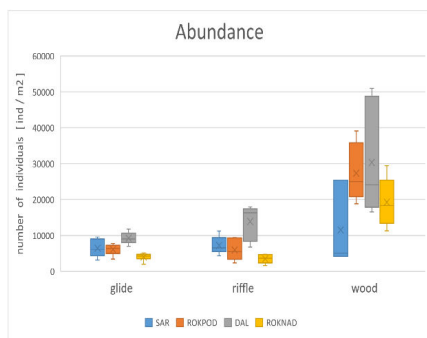
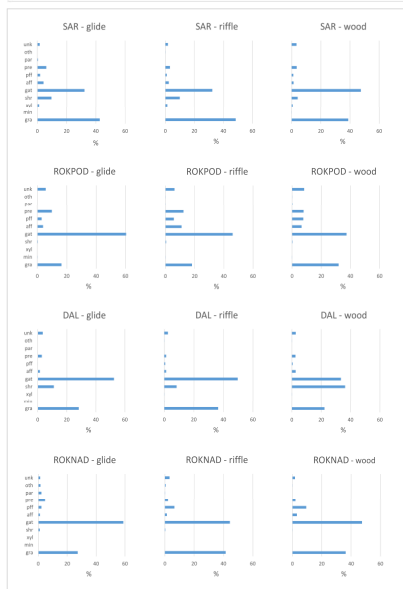


Fig. 1. Boxplots of stream macroinvertebrate abundance, species richness and Gini - Simpson index of diversity from samples taken at three habitats (glide, riffle, wood). Boxplots display median (line), mean (x), interquartile range (box), maximum and minimum (whiskers), outliers (circles).



Results

- Wood accumulations accounted for less than 1% of the stream cover. They mostly consisted of small branches and twigs of driftwood.
- Significantly higher abundance of stream invertebrates was found in wood samples than in other habitats (Fig.1). Within localities, the average abundance of invertebrates in wood samples exceeded the abundance of invertebrates from riffle and glide 2-5 times.
- There was no significant difference in abundance of invertebrates between riffle and glide habitats.
- Concerning species richness, there was no significant difference between habitats within a locality.
- There was no significant difference in functional feeding groups of invertebrates among habitats (Fig.2). Invertebrate assemblage from wood was dominated by common gatherers and grazers. Xylophagous species were quite rare (for example caddisfly *Lype reducta*).
- Finally, wood habitat contributed on average 16% of species which did not occur in other habitats within given locality (Fig.3).

Fig. 2. Distribution of functional feeding groups of stream invertebrates from samples taken at three habitats (glide, riffle, wood). (unk – unknown classification, par – parasites, pre – predators, pff – passive filter feeders, aff – active filter feeders, gat – gathering collectors, shr – shredders, xyl – xylophagous, min – macrophyte mining, gra – grazers, oth – others).

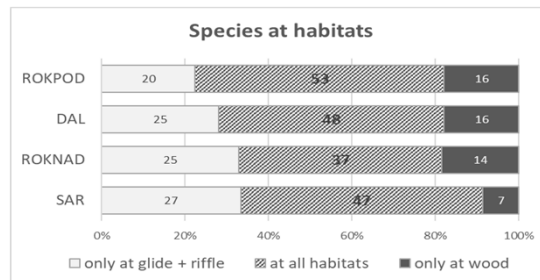


Fig. 3. Total number of species distributed according to their presence at different stream habitats: species found only at glide and riffle / at all habitats sampled / only at wood habitat.

Conclusion

- The results indicate the importance of small driftwood as a complex habitat of aquatic invertebrate.
- Even with a small extent, driftwood is the hotspot of stream invertebrate abundance and contributes to the biodiversity of the watercourse.
- The results also provide an argument for using wood in stream restoration and a challenge for management of urban streams. Stream management should allow presence of driftwood in the stream channel in case it is not a risk for water runoff at high discharges.
- When designing stream restoration or placing large structures (wood, boulders) into streams the benefits of driftwood accumulation should be taken into account.