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The Abundance and Characteristics of Aquatic Tree Hole Communities In Three German Forests.

Tree holes are a type of phytotelmata found in water-containing depressions that occur between branches, at the base of tree trunks, or occasionally in decomposing tree stumps. Tree holes contain diverse communities of invertebrates that contain bacteria, midges, spiders, mites, and slugs. Tree holes are important in understanding the ecosystem of aquatic organisms. We sampled tree hole communities at three different forests (Schwaebische Alb, Hainich National Park, and Schorfheide) throughout Germany. Within each forest, we sampled twenty-five plots in which trees were identified and surveyed for tree holes at ground level and within the canopy. We measured the dimensions of length, width, and depth so that the potential volume of each hole could be calculated. Water temperature, pH, dissolved oxygen at each hole also was measured. The Hainich forest had the greatest tree species richness of the sampling sites and was dominated by *Fagus sylvatica*, the most abundant tree at all three sites. The standing water depth of tree holes was greatest at Schorfheide (3500 cm³). We found that there was no difference in pH of water in the tree holes between the three sites ($p = 0.80$). However, the average water temperature in Schorfheide (approximately 23°C) was higher than the other two sites. There was no correlation between temperature and pH in Hainich and in Schorfheide, though Schwaebische Alb had a positive correlation between pH and temperature. Understanding

physical and chemical characteristics is important data that could influence resident invertebrate communities of tree holes that are currently being studied.

Keywords: aquatic community ecology, phytotelmata, tree holes, forest ecology