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Sampling efficiency for earthworms diversity survey

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Earthworms play an important role in the soil ecosystem and it is important to identify the level of earthworm diversity (at least the most close to the real) to decypher the relations between those organisms with the anthropogenic impact in the environment. So the aim this study was to compare the efficiency of the TSBF method and qualitative sampling for earthworms diversity surveys. The study was carried in the Santa Catarina (SC) State in Brazil and is part of the SisBIOTA SC Project. Five land-use systems (LUS) were sampled (forest - F, eucalyptus plantation - RE, pasture - PA, no-till - PD and crop-livestock integration - ILP) in three counties of each one of the two regions (West and Plateau). Nine points for hand shorting sampling (monoliths from 25 x 25 cm x 20 cm - TSBF) and over 20 points for randomly qualitative sampling were defined for each site, in the winter (July and August of 2011) and summer (December of 2011 and January of 2012) seasons. Rarefaction curves of the earthworms diversity were derived for each method and the total (qualitative + TSBF method), using the results of identification for adult, subadult and juvenile (with accurate identification to the species level) earthworms. The rarefaction curve of the TSBF method show a lower number of species and the stability of the curve never achieved the qualitative sampling rarefaction curve. In other words, even if a greater sampling effort using TSBF is made, this method will never reach the same level of biodiversity, obtained from the qualitative sampling. The observed and estimated species richness are closer for the qualitative sampling and the combination TSBF method and qualitative sampling (total) than only for the TSBF method. In the TSBF method 17 species were found (*Urobenus brasiliensis*, Ocnerodrilidae sp.1, Ocnerodrilidae sp.2, Ocnerodrilidae sp.3, *Glossoscolex* sp.1, *Glossoscolex* sp.2, *Glossoscolex* sp.3, *Glossoscolex* sp.4, *Fimoscolex* sp.1, *Fimoscolex* sp.3, *Fimoscolex* sp.4, *Amynthas gracilis*, *Amynthas corticis*, *Metaphire californica*, *Octolasion tyrtaeum*, *Bimastus parvus* and *Dichogaster gracilis*) whereas in qualitative sampling 26 species were identified (all those found in the TSBF plus Ocnerodrilidae sp.4, Ocnerodrilidae sp.5, *Glossoscolex* sp.5, *Glossoscolex* sp.6, *Fimoscolex* sp.2, *Andiorrhinus* sp.1, *Andiorrhinus* sp.2, *Andiorrhinus* sp.3 and *Metaphire* sp.1). So to achieve a higher diversity in earthworm sampling, the use of qualitative sampling showed to be the best option.