

DIAGNOSTIC FEATURES OF THE CHARCOAL ASSEMBLAGES ASSOCIATED WITH THE SWIDDEN CULTIVATION

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The slash-and-burn (or swidden) agriculture is the farming technique in which fields are burned and cropped for shorter periods than the follow-up fallow. Presumably, this system was ubiquitous since the Bronze Age, affecting mainly forests on sandy soils. The analysis of sandy forest soils used in the cycle of the slash-and-burn cultivation in 19-th century (Karula National Park, Estonia) allowed us to formulate the diagnostic features of charcoal assemblages associated with the slash-and-burn cultivation (SABC) and morphological features of soils affected by SABC. The swidden layers (Apyr) in sandy soils appeared as 5 to 10cm -thick, dark-colored humus layers with a characteristic scalloped lower boundary, formed by numerous round chambers and tunnels of digging bees, from 1 to 1.7cm in diameter. The Apyr contained up to 30 charcoal fragments per gram in the >1mm fraction of soil, with the median length of 4 to 5mm. The charcoal fragments in swidden layers had a pebbly shape with the average width to length ratio ranging from 0.6 to 0.7; the surface of charcoal fragments in swidden layers was silt-coated. The low proportion of bark (<10% of fragments) and presence of charred buds and foliage clearly differentiate charcoal assemblages of the swidden layers from those originated by the forest fires. Swidden layers contained a remarkably high percentage of phytoliths, ranging from 200 to 50 thousands per gram of soil, with 20 to 50% of them being charred. All swidden layers contained dendritic and/or panicoid phytoliths and cereal glumes and paleas indicative of in situ cultivation of crops. A palinological signature of swiddens was a pollen spectrum consistent with the forest ecosystem (AP up to 100%) with a proportion of fire-dependant taxa, such as Onagraceae pollen and *Marshallia* spores; and a proportion of crop and weed taxa, such as *Cerealia*, *Fagopyrum*, and *Centaurea cyanum*.

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