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Earthworm diversity, density and distribution under shifting (Jhum) cultivation in a tropical hilly terrain of Mizoram, North East India

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Abstract

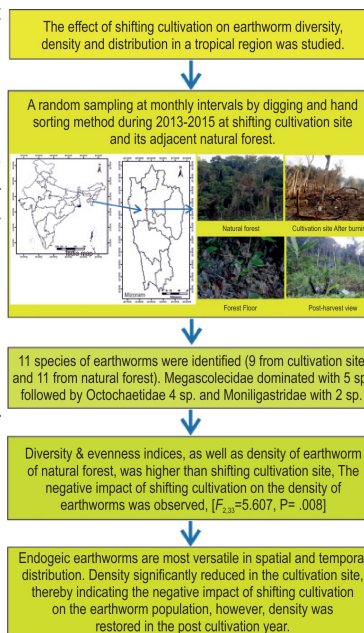
Aim : To investigate the earthworm community and its interaction with traditional shifting cultivation to find the effect of traditional shifting cultivation on diversity, density and distribution of earthworms.

Methodology : Earthworm was sampled from five random sites located at least 20 m apart at monthly intervals by digging and hand sorting method during January 2013 to October 2015 in an experimental plot of one acre of natural forest, demarcated into natural forest (control, CTRL) and traditional shifting (slash and burn) cultivation site (Experimental, EXPTL) at Khawrihnm, Mizoram, North-east India.

Results : A total of 11 species of earthworms belonging to five genera under three families were recorded. Family Megascolecidae dominates with five species (*Perionyx excavatus*, *P. macintoshi*, *Metaphire houlleti*, *Amyntas alexandri* and *A. cortices*) followed by Octochaetidae with four species (*Eutyphoeus gigas*, *E. assamensis* and two unidentified species) and Moniligastridae with two species (*Drawida nepalensis* and one unidentified *Drawida* sp.). Diversity and evenness indices of earthworm at CTRL were higher as compared to EXPTL site. Earthworm density in CTRL (1353.6 ind.m⁻²) was significantly higher than EXPTL (857.6 ind.m⁻²) site [t = 2.039, df = 66, P = .045]. Thus, negative impact of shifting cultivation on earthworms density was observed [F_{2, 33} = 5.607, P = .008]. Vertical distribution showed significant (P > .05) decrease in earthworm population with an increase in soil depth in both CTRL and EXPTL sites. The endogeic *Drawida* sp. was the most versatile earthworm in temporal distribution.

Interpretation : The study clearly indicates that the land use system in the form of traditional shifting cultivation adversely affects earthworm density and diversity. The destructive effect of shifting cultivation on earthworm is mainly attributed to habitat disturbances, reduced food availability and changes in soil physico-chemical properties. However, the spatial distribution pattern of an earthworm is not significantly affected by shifting cultivation. The temporal distribution followed a general pattern where there is a rapid population increase of earthworm after the onset of the rainy season.

Key words: Diversity, Earthworms, Endogeic, Shifting cultivation



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