

A PAPER CHROMATOGRAPHIC
APPROACH TO THE PROBLEM OF
"SOIL ENRICHMENT" BY
EARTHWORMS

Since Darwin¹ carried out his study of earthworms in relation to soil enrichment, various approaches to this topic have been made.²⁻⁴ Satchell² and Barley and Jennings³ in their reviews have pointed out that worms select better soil rather than enrich it. It is only recently that Barley and Jennings³ found that 6% of the non-available nitrogen ingested by worms is excreted in forms available to plants but there is no change in soluble amino-nitrogen, during the conversion of leaf protein into nitrogenous material on passing through the earthworm intestine rich in microflora. In case of a millipede, Bock^{5,6} has found a similar result.

These data are confirmed in the present work based on a different, i.e., paper chromatographic approach.

A comparative study was made for detecting ninhydrin positive material in worm casts, ordinary soil and subsoil. The material was collected from the Institute garden at Calcutta in the month of June. About 30 g. of soil (or cast) was heated for about 24 hours to drive the moisture and then treated with distilled water. The filtered extract was evaporated to a few drops in order to concentrate the solution. A one-dimensional ascending paper chromatogram, developed with two solvent systems separately, showed 4 different spots in worm casts as well as in the ordinary top soil. The solvent systems were (1) 70% ethanol and (2) n-butanol: glacial acetic acid: water

(4:1:1). (Sub-soil from a depth of 18 inches exhibited no such ninhydrin positive material.) Thus it is seen that the passage through worm intestine does not increase the number of amino-nitrogen components in the soil. However, sub-soil from a depth of about 6 inches exhibited three such components, i.e., three spots in the chromatogram. As the worms transport part of the sub-soil to the top-soil, a slight enrichment in amino-nitrogen is probably brought about.

The experiments were repeated in September which was a rainy month this year. The amino-acid contents seemed to have very much decreased in quantity and resolution of the spots was very poor, probably due to the presence of salts. A further series of investigations with more soil samples is being undertaken.

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