
By

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Ebermayer indicates that in a mature, well stocked stand of the north temperate zone there may be over 3,000 lbs. of wood and about the same amount of foliage on a dry basis produced per acre annually. Of this material the total leaf crop and some of the wood such as dead branches and twigs are deposited on the forest floor, forming there a stratum of dead organic material known as the litter. In this litter are incorporated mineral constituents so necessary to maintain soil fertility and plant growth. In this connection Table I shows a few figures given by Ebermayer for a 120 year old beech forest. The data show that, although large amounts of nutrient materials are taken up by the tree, over 80% of it is in the leaves which are annually returned to the soil.

We have, then, in the litter a deposit of organic residues made up mostly of forest leaves having 0.4 - 1.3% nitrogen and 3.0 - 5.0% ash. At least 95% of the material consists of organic compounds of widely differing character - oils, fats, waxes, proteins, sugars, cellulose, hemicelluloses, lignins, etc. - which exhibit great variety in their susceptibility to decomposition. This is a potential natural fertilizer the efficiency of which is determined by the speed of the decomposition of the litter and the completeness of mineralization of such elements as nitrogen, calcium, potassium, and phosphorous.

As decomposition proceeds a much greater complexity ensues because we have a mixture of:

1) Unchanged plant material.
2) By-products of microbial metabolism in all stages of decomposition clear down to carbon dioxide and water.

Table I

Annual production in lbs. per acre dry wt. in mature beech forest.