

ABSTRACT

This work comprises the first study that has been made of the ecology of bat guano. It is divided into sections on the environment outside and inside the cave, and on the physical and chemical properties, energy relations, microflora and fauna of the guano. Throughout the work guano from Insectivorous and Frugivorous Bats are compared both with one another and with soil and litter. The decomposition of guano is described and food-webs are given.

The Frugivorous Bat Guano occurs as Piles below dense colonies of Phyllostomus hastatus. Initially it is wet and consists of fruit and Cecropia peltata seeds. Their contents remain unavailable as the seed-coat resists decomposition and they need light to germinate. The fresh guano is decomposed via bacteria-nematode food-chains, arthropods being rare. Below the surface fungivorous mites dominate occurring in densities up to 268/ml i.e. 19 times the highest recorded density for soil. Guano from the Piles is distributed to the surrounding 'Non-deposition Area' by the tunnelling activity of the cockroach, Eublabeus distanti.

The Insectivorous Bat Guano consists of discrete pellets of insect cuticle from which the unbound protein has been removed in the gut of Natalus tumidirostris. It is eaten by E. distanti which removes most of its fat and some of its protein. The remaining chitin is decomposed by fungi, Penicillium janthinellum being dominant. This is fed on by the mite, Rostrozetes foveolatus, which comprises 81% - 90% of the arthropod population.

Compared with soil, population densities and rates of decomposition are high and number of species low. The former is due to the high rate of addition of energy and the latter to the low number of niches, this being due to the homogeneity of guano and to the constant cave climate.

It is shown how a knowledge of any two of the following - bacterial density, arthropod density and guano respiration rate - can be used to predict the third.