

ABSTRACT OF THE THESIS

The Importance of Food in the Breeding System

of the Rufous-sided Towhee,

Pipilo erythrophthalmus (L.)

by JON STANLEY GREENLAW, Ph.D.

Thesis director: Professor Jeff Swinebroad

The interaction between food supplies and certain parameters of the breeding system of the Rufous-sided Towhee, Pipilo erythrophthalmus, in two contrasting habitats in New Jersey was investigated from April to July, 1966 to 1968. The parameters studied were: (1) size and dispersion of territories and heavily utilized areas within them, (2) population size, (3) clutch-size, (4) diet and foraging behavior, and (5) temporal budgeting of maintenance and reproductive activities. One population was in a closed mesic habitat (W. L. Hutcheson Memorial Forest, HMF) and the second was in an open, xeric habitat (Lebanon State Forest, LSF).

A collection method and an inspection method both showed that densities of the meso- and macrofauna of the litter, where towhees obtain most of their food, were about two times greater in HMF than in LSF.

Territories were larger at HMF than at LSF, but heavily utilized areas, especially in foraging, were smaller at HMF. Population density was higher at LSF (32 males per 100 acres) than at

HMF (21 males per 100 acres). Over-all territory size was correlated with population density but the size of heavily frequented sections within them was correlated with relative food densities in the two study areas. The mean clutch-size of early nests was larger at HMF than at LSF. However, the productivity in the former population may not have been higher.

The higher population density at LSF and in the surrounding area may be the result of differential mortality in the two populations (LSF and HMF) immediately following the breeding cycle when resident adults and young-of-the year are still present. At this time, fruits of Vaccinium and Gaylussacia are abundant in LSF and the towhees feed heavily on them. A comparable food store is not present at HMF.

A variety of food-getting maneuvers were used by towhees foraging on the ground and occasionally above the ground in both study areas. In general, the foraging repertoire of towhees was more diverse at LSF than at HMF. Differences in the foraging repertoire of towhees in the two areas were correlated with differences in food density and dispersion.

After the pre-incubation phase at least, towhees performed more potential food-capture maneuvers per minute of foraging at HMF than at LSF.

In general, towhees at HMF spent less time foraging and more time in reproductive activities than towhees at LSF. Foraging was the most frequent activity in both study areas. Seasonal

patterns of activity budgeting within the habitats and the differences between habitats are best explained by the differences in food levels in the two areas, though such factors as photoperiod, temperature, etc. probably contribute as well.

Available evidence on territory structure and populations does not support the idea that territoriality regulates population density of towhees.

A time-energy model can be devised which predicts the ecological distribution of a species. The basic assumption of the model that different patches of the environment offer different potentials for a species to accumulate net energy per unit of foraging time is supported by the present study and information in the literature.