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Digestible Energy Content of Diets of Pine Voles
from Different Orchard Habitat Types

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In a previous study at VPI & SU, Servello (1981) developed a technique for predicting the digestible dry matter (DDM) and digestible energy (DE) of the diets of pine voles from a nutritive analysis of their stomach contents. In this nutritive analysis, developed by Goering and Van Soest (1970), feeds are divided into two major fractions: cell soluble and cell wall fractions. The cell soluble fraction is highly digestible while the cell wall (fiber) fraction varies in digestibility. It was found that the highly digestible cell soluble values of the stomach contents were the best predictor of the digestibility of the pine vole's diet.

The objective of the present study was to use the cell soluble values of pine vole stomach contents to determine if there were seasonal or orchard differences in the diet digestibility of pine voles captured from diverse orchard habitat types.

Adult pine voles were snap-trapped from four to five orchards bimonthly for one year and were frozen until necropsy. All orchards were located in Botetourt County near Roanoke, Virginia. Orchards varied from well maintained to abandoned for several years.

Kinzie's maintained apple orchard was mowed and had a ground floor vegetation dominated by grasses (in particular orchard grass) between trees and rows and poison ivy beneath tree canopies. Keith's apple orchard, although abandoned, was still dominated by grasses due to occasional mowing. Corbett's maintained apple orchard was mowed and was dominated by grasses, forbs, and poison ivy, while Feller's abandoned orchard, which was not mowed, was dominated by grasses and forbs. Poison ivy, honeysuckle, and blackberry briars dominated Layman's abandoned apple orchard.

The stomach contents were removed in the laboratory, dried, and ground in a Wiley mill. Cell soluble levels of the stomach contents were then determined on an ash-free dry weight basis. These values were then used in the prediction equations for estimating DDM and DE.

Five bimonthly collections of voles were made in Kinzie's maintained orchard and Keith's abandoned orchard. DDM (%) in Kinzie's orchard ranged from 62 to 71 while DE (%) ranged from 63 to 72. In Keith's orchard, DDM (%) ranged from 58 to 71 while DE (%) ranged from 60 to 72. There was a significant ($P = 0.03$) difference between these two orchards in pine vole diet digestibility. Three bimonthly collections of pine voles were made in Corbett's maintained orchard and Feller's abandoned orchard. There were no significant ($P > 0.05$)

bimonthly differences in diet digestibility between these two orchards. Digestibility values were very similar to the values from Kinzie's and Keith's orchards. Layman's abandoned orchard, for which two bimonthly collections have been analyzed, had diet DDM and DE values very similar to the other four orchards.

During the month of July, there were significant ($P = 0.0001$) differences between orchards. Keith's abandoned orchard was lower in both DDM and DE from the other orchards in July. A combination of high temperatures in July and the location of Keith's orchard on a steep, dry hillside may have caused the quality of the vegetation to be poorer in Keith's orchard than in the other orchards during this month. No other months contained orchards with significant ($P > 0.05$) differences in pine vole DDM and DE values.

To determine if there may be a relationship between the composition of herbaceous vegetation in the orchard and the digestibility of the diets of pine voles, vegetation estimates were made at each tree where a pine vole was snap-trapped.

A 25 x 25 cm frame was tossed to the ground under a tree's dripline four times. All green, living plants at least partially rooted within the frame were placed within the broad categories of forbs, grasses, and woody plants, and their percent cover was estimated. Uncovered ground (including bare ground and ground covered with litter) was also estimated. The stage of maturity of the vegetation within the frame was estimated by a ranking of 1 to 5, where 1 was applied to young, succulent plants and 5 was applied to mature, dying plants. For each toss, the number of fruit within the frame was also counted and tallied in order to get an idea of the fruit concentration. These data are still being analyzed.

These data may aid in explaining pine vole diet digestibility differences already found between orchards and between months or any differences that may be found from analysis of the rest of the data.

LITERATURE CITED

- Goering, H. K. and P. J. Van Soest. 1970. Forage fiber analysis: apparatus, reagents, procedures, and some applications. Agric. Handbook No. 379. USDA 20 pp.
- Servello, F. A. 1981. Nutritional ecology of the pine vole in relation to apple tree root damage. M.S. thesis. Virginia Polytechnic Institute and State University. 153 pp.