

# Nematode Microfaunal Analysis

## Three Russell Ranch Wheat Plot Treatments

William L. Goss



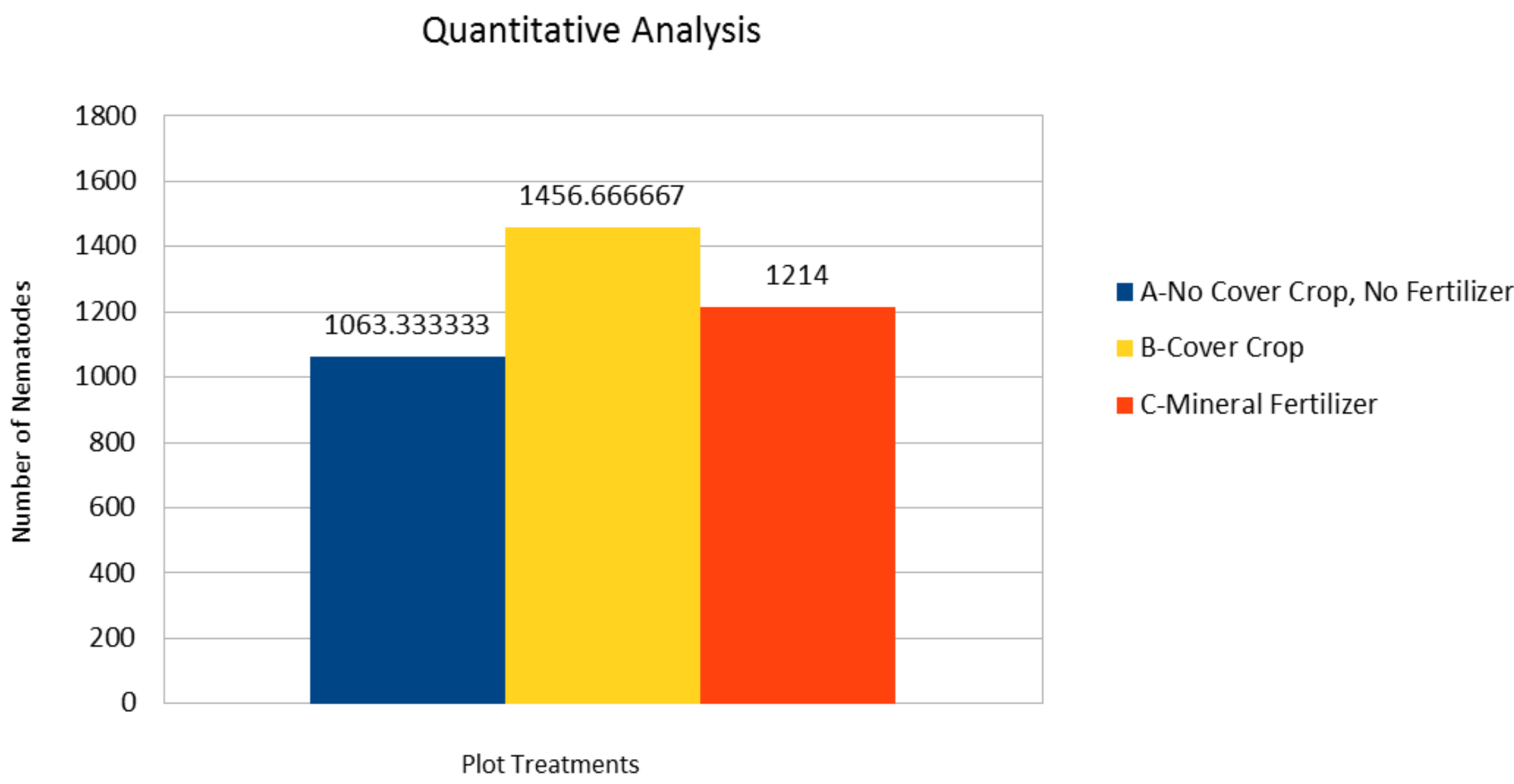
Agricultural Sustainability Institute: Russell Ranch  
University of California, Davis, 95616

Nematodes are the most populated metazoans on earth, inhabiting water films surrounding soil particles. They are categorized into functional groups responding to several trophic levels of the soil food web, as fungivores, bacterivores, predators, ecto and endo-parasites on plants. Nematode faunal analyses demonstrate the role of various functional groups as “bioindicators” for the condition of soil food webs, nutrient cycling, enrichment, and disturbance. We examined 3 wheat plot treatments: A) fallow rotation, no synthetic fertilizer, B) cover crop rotation and C) synthetic fertilizer, at Russell Ranch, for a quantitative measurement of the entire nematode population and a qualitative representation of the food web using functional Nematode clades. We found that the wheat plot in rotation with the cover crop had a larger overall quantity of nematodes, and had the largest proportion of fungivores and the stunt nematode plant parasite, Tylenchorhynchus. Within each sample treatment we found a clear a fungivore majority. The mineral fertilizer treatment yielded the largest variance for the quantitative analysis and lowest for the qualitative analysis, and the samples of the treatment with neither fertilizer nor cover crop yielded the lowest variance for the quantitative analysis and highest for the qualitative analysis.

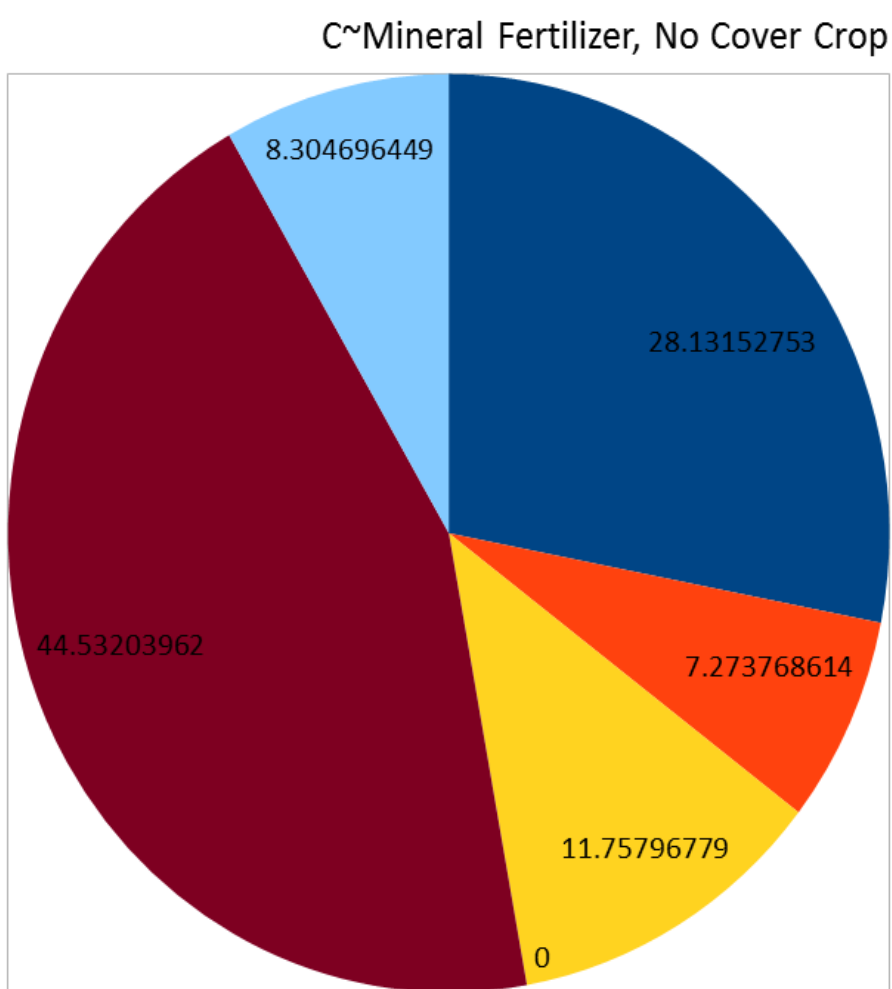
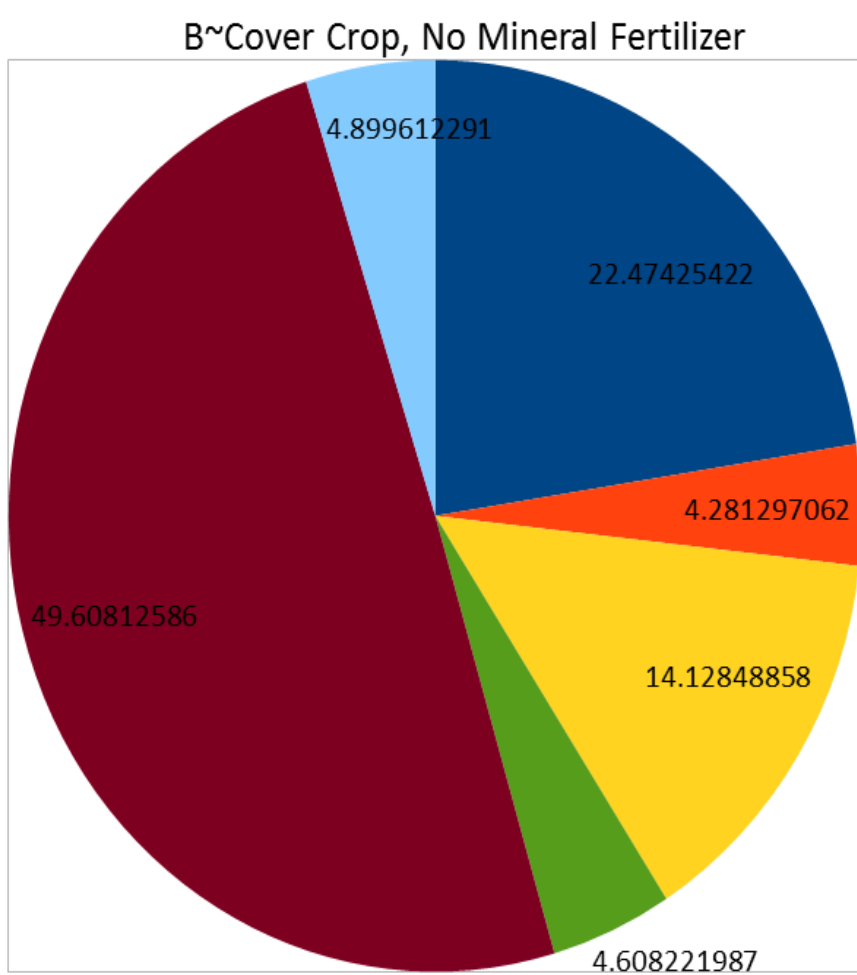
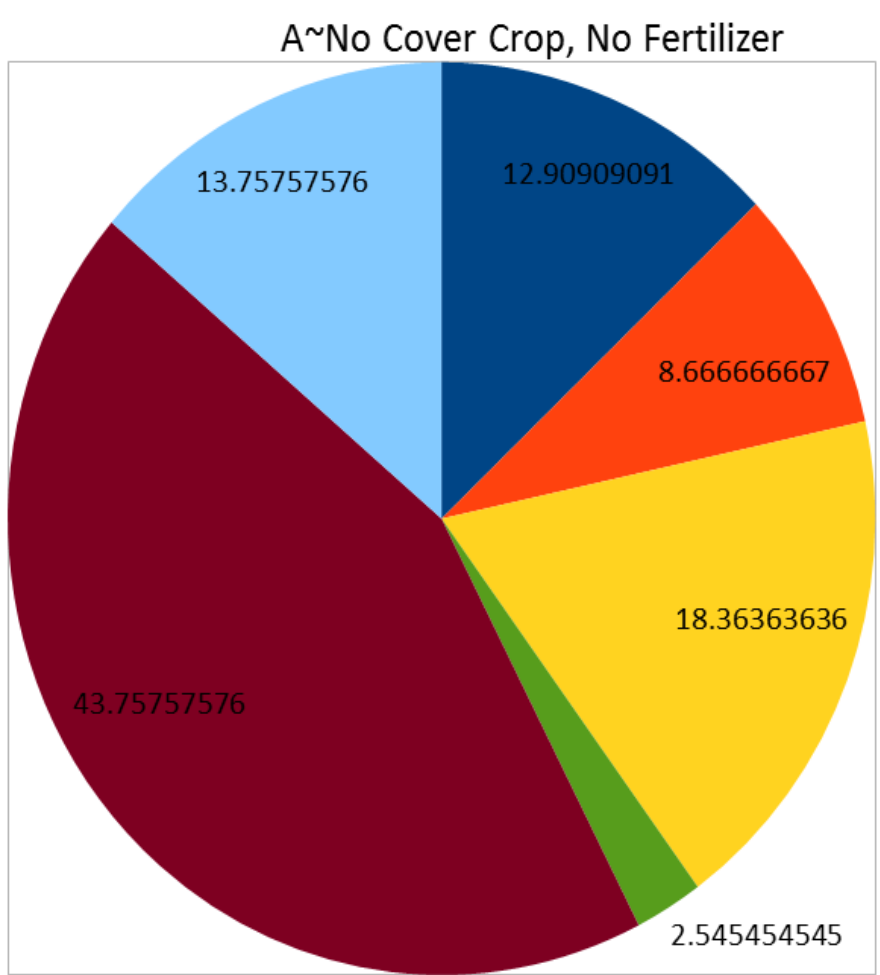
### Treatment Operations

Treatment	Date	Operation	Application rate
C	Nov.: 2nd week	Plant Cover Crop Seed	Oats 25 lbs + 20 lbs Vetch+ 90 lbs Bell Bean/acre
All	February: 3rd week	Spray Herbicide	Puma .66 pt and Butracil 1 pt/acre
B	March: 4th week	Fertilizer	100 lbs N (NH4NO3), 50 lbs N (urea)
All	July: 1st week	Harvest	
All	July: 4th week	Mow Straw	
All	July: 4th week	Disc	
All	August: 2nd week	Disc	
All	August: 3rd week	Disc	
All	Sept.: 1 week	Disc	
All	Sept.: 2nd week	GPS Leveling	
All	Oct.: 2 week	GPS Bed Listing	
All	Oct.: 3 week	Disc	
All	Nov.: 1st week	Perfecta, Field Cultivator	
All	Nov.: 2nd week	Plant Wheat Seed	Cal Rojo: 120 Lbs/acre

### Data



Fungivore



Monochidae, predatory

### Methods

Microplots were established within 9 wheat plots, 3 treatments with 3 replicates. Random samples were taken from microplots, containing 800 mL of soil, with wheat plants for mycorrhizal root colonization measurements.

Mix 800 mL soil sample and pass through coarse sieve to remove rocks, roots, etc.

Place soil in one of the 2 liter pitchers; half fill with water.

Sieving and decanting process (various combinations of the following):

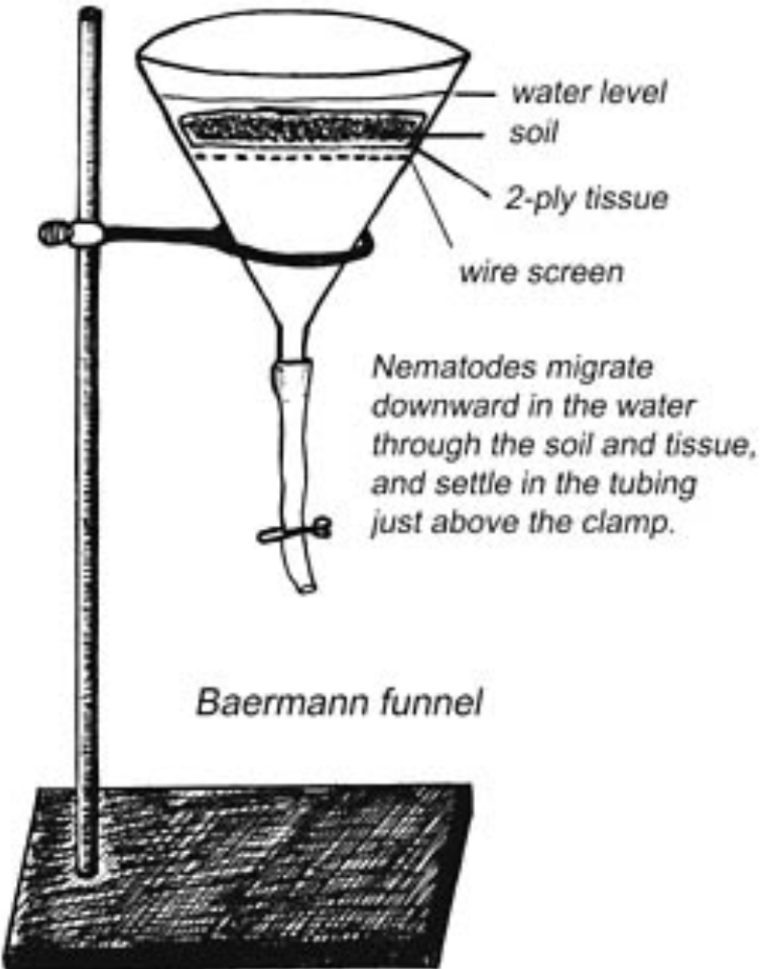
- Mix soil and water by stirring.
- Pour the soil and water slurry back and forth between the two 2-liter pitchers five times to separate nematodes from soil particles.
- Pour all but heavy sediment through 60-mesh sieve into the 3-liter pitcher.
- Half-fill the 2-liter pitcher with water and repeat steps b and c twice.
- Stir material in 3-liter pitcher; allow to stand until water almost stops swirling.
- Pour all but heavy sediment through 325-mesh sieve into first bucket; discard residue in pitcher.
- Backwash material caught on 325-mesh sieve into 250-ml beaker.

Sample in 250 ml beaker will probably be too dirty for direct viewing; sample is placed on Baermann Funnel for 45 hours. The combined procedure allows extraction of nematodes from larger volumes of soil.

Total nematode population was counted and 100 nematodes from each sample were identified to functional groups.



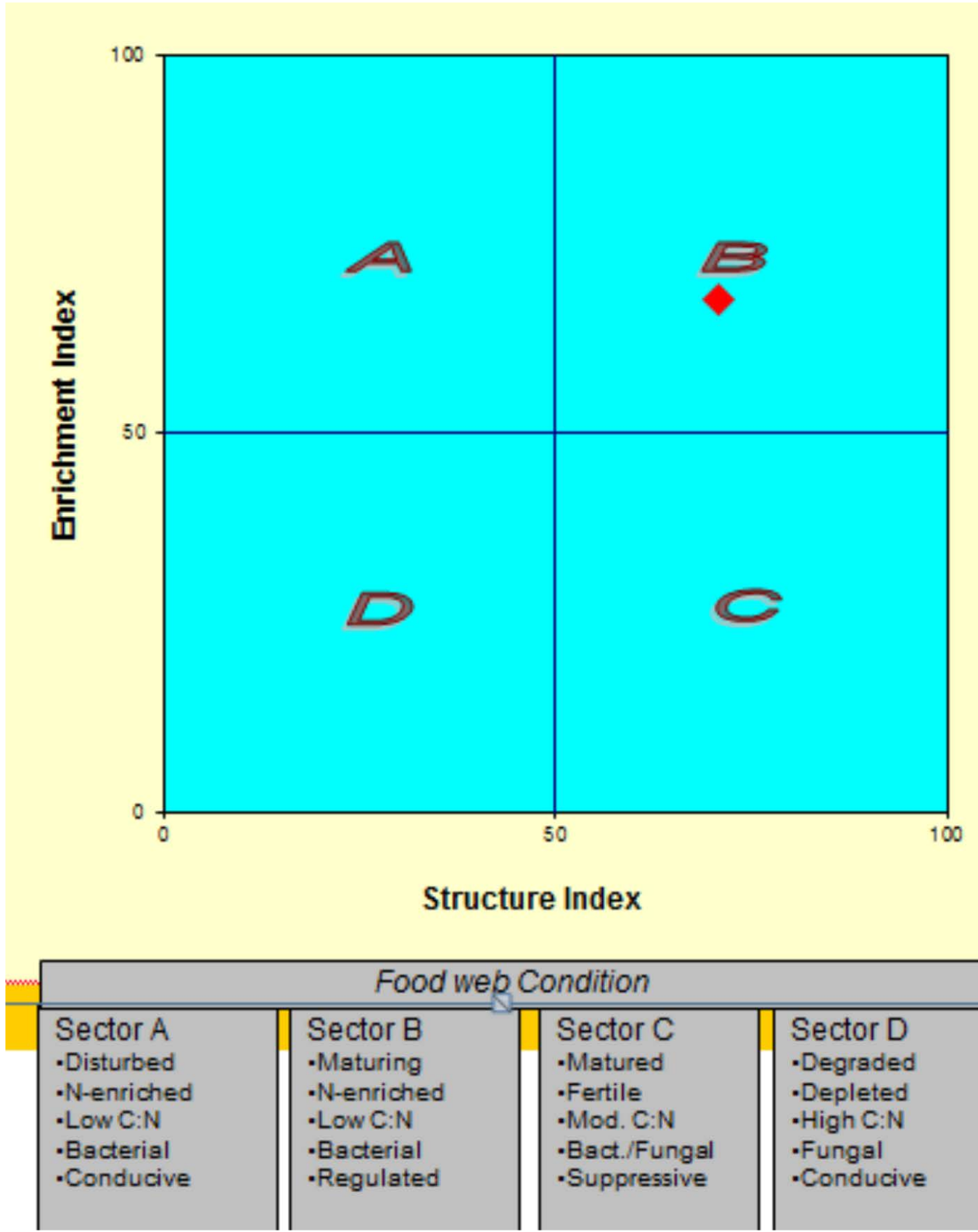
Microplot sampling: 800 mL of soil



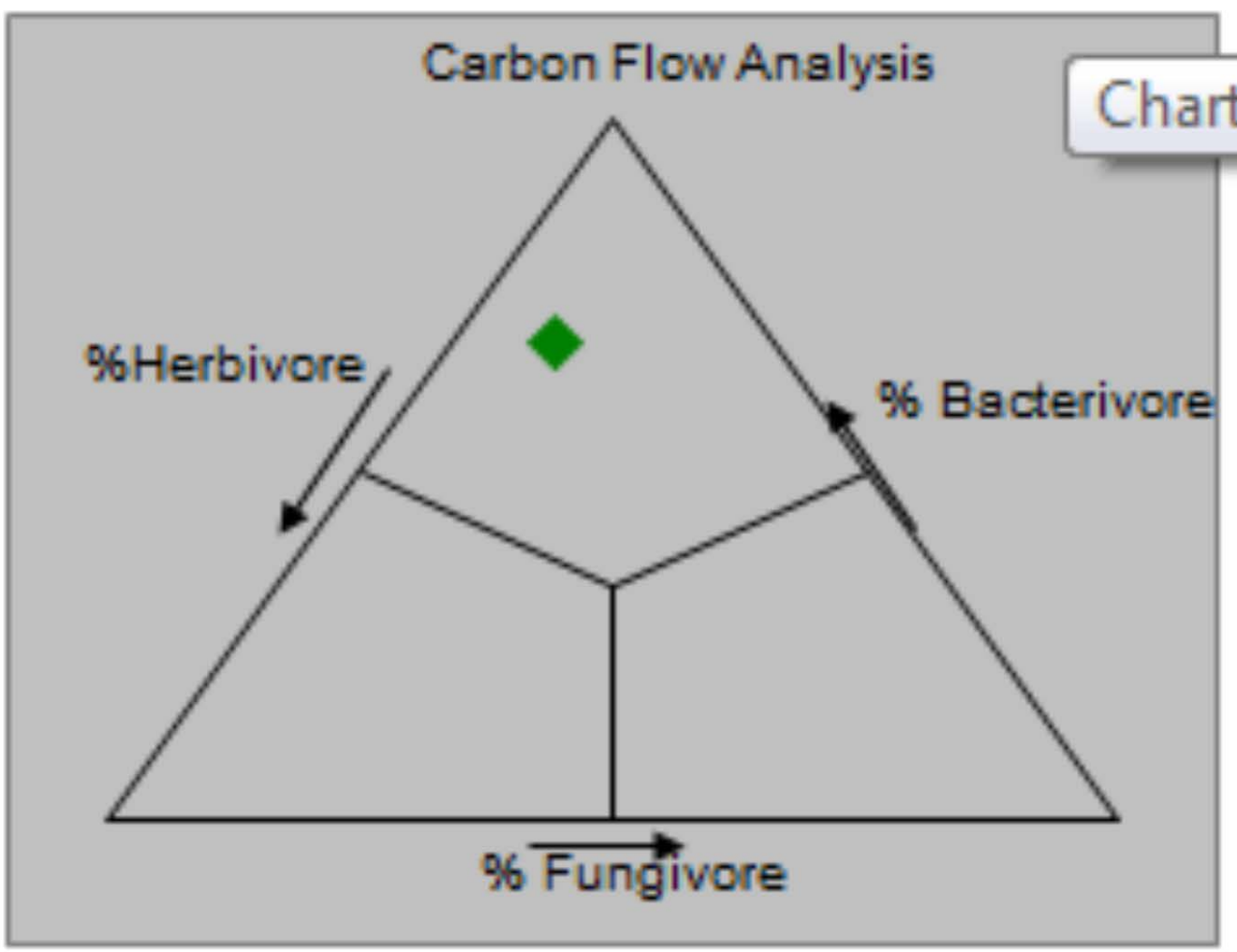
Baermann Funnel Extraction



Condensing extraction product using centrifuge.



Source: Nemaplex, Nematode Faunal Analyzer Spreadsheet



### ACKNOWLEDGMENTS

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