Nematodes as indicators of biological structure

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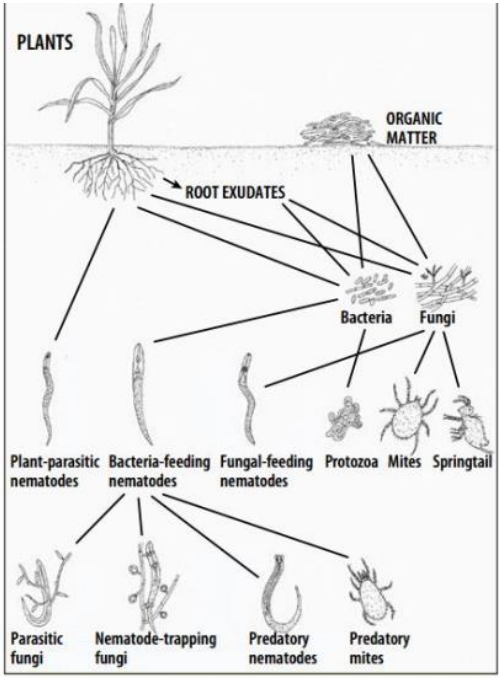
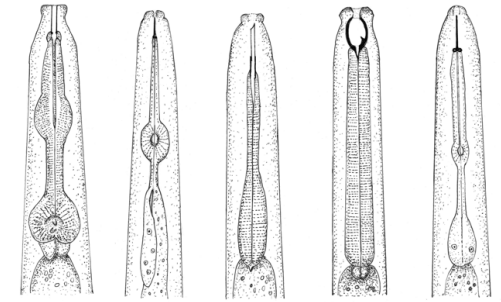
Free Living Nematodes as Indicators of Soil Biology

- Indicators of a soil's biological status as their composition reflects:
  - changes in the soils structure
  - presence of their food sources (soil microbes)
  - physical and chemical environments in response to inputs and disturbances

- Based on major nematode feeding types which have different sensitivities to soil disruptions and changes



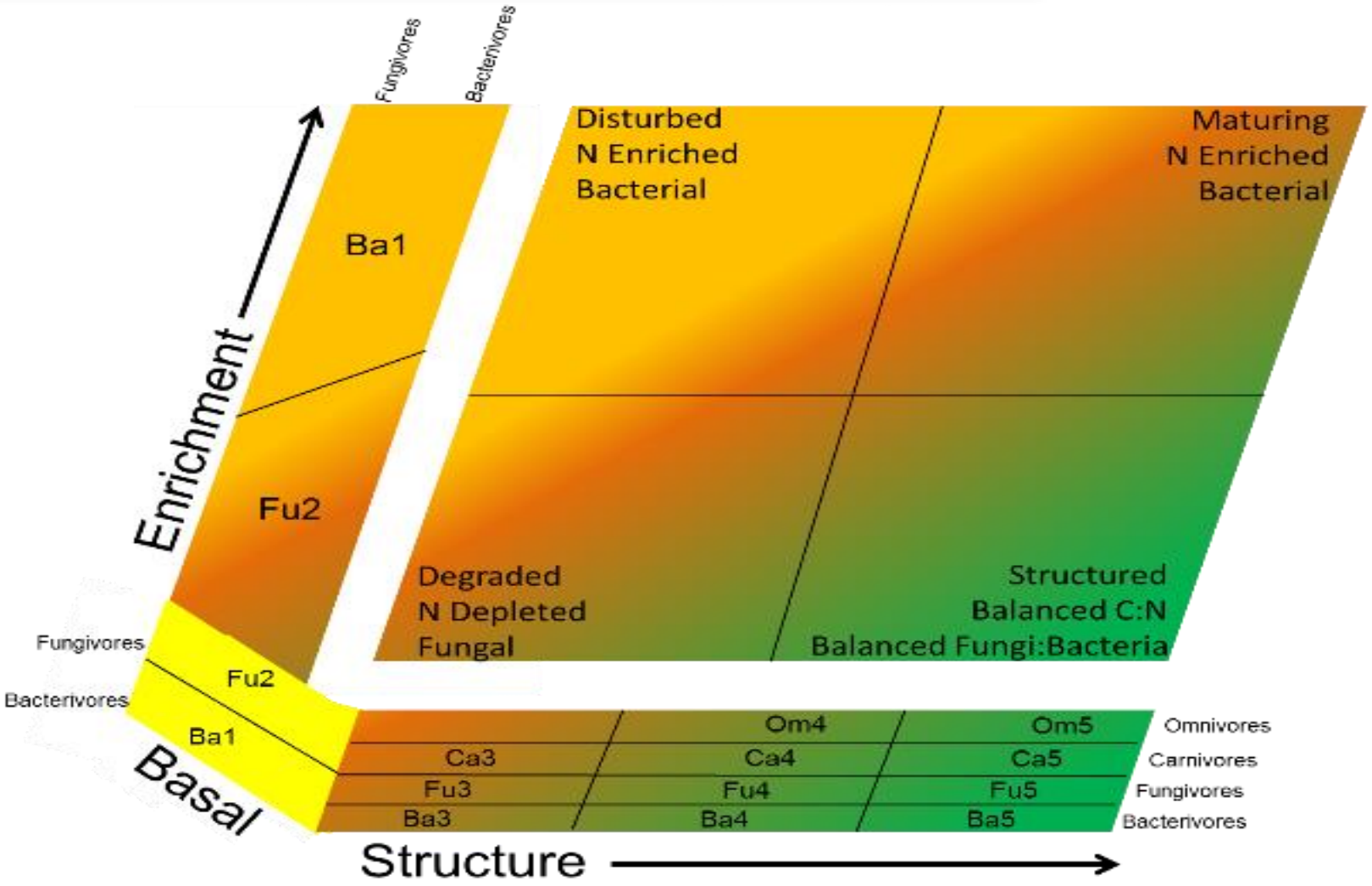
The principal food sources of a nematode can be determined by observing its mouth parts



Bacterivore | Fungivore | Omnivore | Predator | Plant parasite

Five major groups of soil nematodes

Nematode community test in action – soil structure



Testing based on nematode morphology

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1. Ability to identify all unique components of the nematode community
2. Requires experienced and patient morphological specialist
3. Tests available from a range of reputable laboratories in Australia

Nematode community test in action – results

BIOLOGICAL CROP PROTECTION

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SWCC
south west catchments council

Sampling time

Property	Spring 2017	No. nematodes/200 g soil								Carbon
		Plant Parasitic nematodes					Total Plant parasitic nematodes	Total free living nematodes	Omnivores + Predator nematodes	Nematode channel ratio	% C
		Root-lesion	Cyst	Stubby	Spiral	Pin					
1. Extensive – grazed	Pasture	189	50	19			258	1440	171	0.80	**1.44**
2. Intensive – pre-potatoes	Fallow (potatoes)	44		5	8		57	931	25	0.77	**2.15**
3. Intensive – post-potatoes	Biofumigant mustard	57		86		57	200	3630	4	0.72	**1.99**

Testing based on qPCR tests for key FLN indicators

DNA TESTS FOR FREE LIVING NEMATODE COMMUNITY ANALYSIS DAS00111 AND BWD00245

KATHERINE LINSELL
Graham Stirling, Marcelle Stirling, Herdina, Di Hartley, Anthony Cheshire, Alan McKay & Kathy Ophel Keller

1. Performs nematode community analysis on a large scale, routine basis
2. Does not require nematode taxonomic speciality
3. Under development – available to research. Coming soon commercially

15 qPCR assays

qPCR Assay	Feeding Group	Classification
Dorylaimida	Omnivore	Order
Mononchida	Predator	Order
Aphelenchidae	Fungivore	Family
Aphelenchoididae	Fungivore	Family
Cephalobidae	Bacterivore	Family
Mesorhabditinae	Bacterivore	Sub family
Rhabditinae 1 and 2	Bacterivore	Sub family
Panagrolaimidae	Bacterivore	Family
Tylenchinae 1 - 6	Plant associate	Sub family

Free Living Nematode testing is a tool that can be utilised in conjunction with others

Indicates soil biological structure

- Testing is simple
- Time specific
- Easily interpretable

Thank you

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