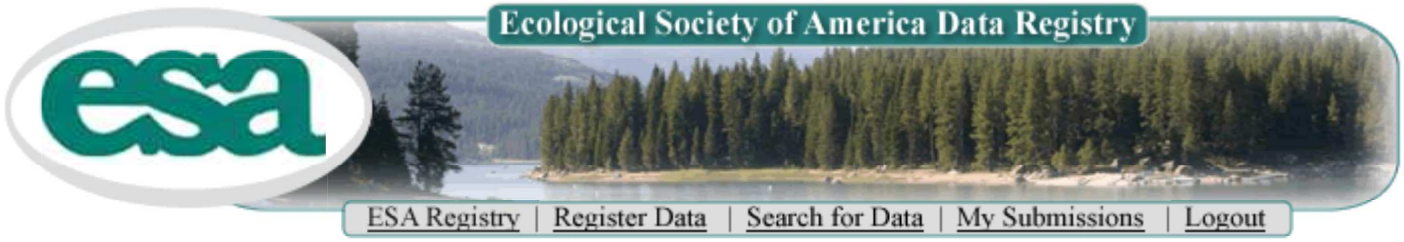

Data Set Citation

National Institute for Public Health and Environment, The Netherlands, Ecological Society of America, and Mulder C of National Institute for Public Health and Environment, The Netherlands.2011.**Nematode Traits and Environmental Constraints in 200 Soil Systems: Scaling within the 60–6,000 µm body size range**.
ESA Data Registry: urn:lsid:esa.org:esa:99:1 (**http://data.esa.org/esa/metacat/esa.99.1/esa**).

Metadata download: **Ecological Metadata Language (EML) File**

Alternate Identifier: Ecology 92:2004. doi:10.1890/11-0546.1

Online Distribution Info:

Download File: **http://esapubs.org/archive/ecol/E092/171**

Offline Distribution Info:

Medium: digital

Data Set Owner(s):

Organization: **National Institute for Public Health and Environment, The Netherlands**
Organization: **Ecological Society of America**
Individual: **Christian Mulder**
Organization: National Institute for Public Health and Environment, The Netherlands
Address: 9, Anthonie van Leeuwenhoeklaan ,
Bilthoven, Utrecht NL-3720BA The Netherlands
Phone: ++31-30-2743148
Phone: ++31-30-2744413 (Fax)
Email Address: **christian.mulder@rivm.nl**

Metadata Provider(s):

Individual: **Christian Mulder**

Associated Party:

Individual: **Christian Mulder**
Role: associatedParty
Individual: **J. Arie Vonk**
Role: User

Abstract:

Soil life is complex, and huge body-size changes of organisms like soil nematodes remain enigmatic along environmental gradients and across ecosystems. Such a knowledge gap is surprising, given the importance of these invertebrates for ecosystem functioning. Moreover, differences in the biological stoichiometry between terrestrial systems are still poorly understood. Within one of the most intensive ecological soil surveys worldwide ever, containing 29,552 individual records, we monitored the nematodes of 200 rural and natural areas in The Netherlands. In addition to the body length, width and estimated mass of nematodes, this data set includes information on taxonomy, life stage, sex, feeding habit, trophic level, geographic location, sampling period, ecosystem type, soil type, and soil chemistry (pH, organic carbon, and total nitrogen and phosphorus contents). Physical, chemical and biological information was organized over different categories regarding 4 soil types and 3 land-use types (resulting in 7 combinations). 70.8% of the soil nematodes were juveniles, 15.9% females, 5.5% males, and 7.8% Dauerlarvae. Our empirical data set shows that the responses of the nematodes' body mass to a 50-fold change in the soil molar C : P ratio were as strong as the same trait responses to a 4 orders of magnitude change in the H+ concentration in the soil. Traits like body lengths are so dependent on the life stage (here, adult vs. juvenile) that they must be taken into careful account for modeling predator–prey relationships, since nematodes are well represented in all feeding levels of the soil food webs. Traits from this novel data set can be helpful in determining habitat–response relationships, predicting effects of biological stoichiometry, and understanding the dynamics of ecosystems.

Keywords:

Thesaurus: None

- Nematoda
- non parasitic nematodes
- trophic level
- predator–prey relationships
- feeding habits
- body size, body mass
- biological stoichiometry, ecological stoichiometry
- soil abiotics, pH, C, N, P, nutrient ratios

- agroecosystem
- The Netherlands
- Europe
- topsoil
- 2004–continuing

Additional Information:

We kindly request that other authors of future publications using this database notify Christian Mulder (contact information above) of publication of their study. This will allow us to make accurate reports to the Dutch Secretary of Environment and to document the usefulness of the data from this study for the scientific community.

License and Usage Rights:

no restrictions

Geographic Coverage:

Geographic Description: Data were collected in The Netherlands at 200 locations under different abiotic conditions.

Bounding Coordinates:

West:	3.5778 degrees
East:	7.0228 degrees
North:	53.4072 degrees
South:	50.9031 degrees

Temporal Coverage:

Begin: 2004-04-19

End: 2009-10-02

Taxonomic Coverage:

General Coverage: Bongers, T. (1988). De nematoden van Nederland. Een identificatietabel voor de in Nederland aangetroffen zoetwater- en bodembewonende nematoden. Pirola, Schoorl, The Netherlands (in Dutch).

Rank Name	Rank Value	Common Names
Taxon: genus	Achromadora	
Taxon: species	Acrobeles ciliatus, A. complexus, A. mariannae	
Taxon: species	Acrobeloides nanus	
Taxon: species	Aglenchus agricola	
Taxon: species	Alaimus meyli, A. primitivus	
Taxon: genus	Amphidelus	

Taxon: species	Amplimerlinius caroli, A. icarus
Taxon: species	Anaplectus grandepapillatus, A. granulosus
Taxon: species	Anatonchus tridentatus
Taxon: species	Aphelenchoides bicaudatus, A. blastophthorus, A. composticola
Taxon: species	Aphelenchus avenae
Taxon: species	Aporcelaimellus obtusicaudatus, A. paraobtusicaudatus, A. simplex
Taxon: genus	Bastiania
Taxon: species	Bitylenchus dubius, B. maximus
Taxon: species	Boleodorus thylactus
Taxon: species	Bunonema reticulatum
Taxon: family	Cephalobidae
Taxon: species	Cephalobus persegnis
Taxon: species	Cervidellus serratus, C. vexilliger
Taxon: species	Chiloplacus bisexualis
Taxon: family	Chromadoridae
Taxon: genus	Chronogaster
Taxon: species	Clarkus papillatus
Taxon: species	Coslenchus costatus
Taxon: family	Criconematidae
Taxon: genus	Cuticularia
Taxon: morphon	Dauerlarvae
Taxon: species	Diphtherophora obesa
Taxon: species	Diploscapter coronatus
Taxon: genus	Discolaimus
Taxon: species	Ditylenchus myceliophagus
Taxon: family	Dolichodoridae
Taxon: species	Dolichorhynchus lamelliferus
Taxon: species	Dorydorella bryophila
Taxon: genus	Dorylaimellus
Taxon: genus	Dorylaimoides
Taxon: species	Ecumenicus monohystera
Taxon: species	Epidorylaimus agilis, E. lugdunensis
Taxon: species	Eucephalobus mucronatus, E. oxyuroides, E. striatus

Taxon: species	Eudorylaimus centrocercus
Taxon: species	Eumonhystera vulgaris
Taxon: species	Filenchus vulgaris
Taxon: species	Helicotylenchus pseudorobustus, H. varicaudatus
Taxon: genus	Hemicycliophora
Taxon: species	Heterocephalobus elongatus
Taxon: genus	Heterodera
Taxon: family	Hoplolaimidae
Taxon: species	Longidorus elongatus
Taxon: species	Malenchus acarayensis, M. andrassyi, M. bryophilus
Taxon: species	Meloidogyne chitwoodi, M. hapla, M. naasi
Taxon: species	Mesodorylaimus aberrans, M. bastiani, M. derni, M. spengelii
Taxon: species	Metateratocephalus crassidens
Taxon: family	Monhysteridae
Taxon: family	Mononchidae
Taxon: species	Mononchus aquaticus, M. truncates
Taxon: genus	Mylonchulus
Taxon: family	Neodiplogasteridae
Taxon: family	Nordiidae
Taxon: species	Odontolaimus chlorurus
Taxon: species	Panagrolaimus detritophagus, P. rigidus
Taxon: species	Paramphidelus hortensis
Taxon: species	Paratrichodorus pachydermus, P. teres
Taxon: species	Paratylenchus bukowinensis, P. microdorus, P. nanus, P. projectus, P. tateae
Taxon: species	Plectus acuminatus, P. armatus, P. cirratus, P. elongatus, P. longicaudatus, P. parietinus, P. parvus, P. pusillus, P. rhizophilus
Taxon: genus	Pleurotylenchus

Taxon: species	Pratylenchus crenatus, P. fallax, P. neglectus, P. penetrans, P. thornei, P. vulnus
Taxon: species	Prionchulus punctatus
Taxon: species	Pungentus alpinus, P. silvestris
Taxon: family	Qudsianematidae
Taxon: genus	Quinisulcius
Taxon: family	Rhabditidae
Taxon: species	Rotylenchus buxophilus, R. goodeyi, R. robustus
Taxon: genus	Seinura
Taxon: species	Teratocephalus costatus, T. tenuis
Taxon: species	Theristus agilis
Taxon: species	Thonus circulifer
Taxon: family	Thornenematidae
Taxon: species	Thornia propinqua
Taxon: species	Trichodorus primitivus, T. similis
Taxon: species	Tripyla cornuta, T. filicaudata
Taxon: genus	Trophurus
Taxon: family	Tylenchidae
Taxon: species	Tylencholaimus crassus
Taxon: species	Tylenchorhynchus striatus
Taxon: species	Tylolaimophorus typicus
Taxon: species	Wilsonema otophorum
Taxon: species	Xiphinema diversicaudatum

Contact:

Individual: **Christian Mulder**
Organization: National Institute for Public Health and Environment, The Netherlands
Address: 9, Anthonie van Leeuwenhoeklaan ,
Bilthoven, Utrecht NL-3720BA The Netherlands
Phone: ++31-30-2743148
Phone: ++31-30-2744413 (Fax)
Email Address: **christian.mulder@rivm.nl**

Methods Info:

Step 1:

Nematode extraction using the Oostenbrink method

Description:

Here we present a novel database that combines physical, chemical and biological information on the soil nematodes occurring in 200 agroecosystems across The Netherlands. Since 2004 this project – from here on referred to as the Biological Stoichiometry Project – has been studying the multitrophic interactions within and between the nematode taxa with related traits, and the autecological response of the nematofauna to changes in ecosystem and soil types. Research at the Biological Stoichiometry Project was initiated in 2004 by Drs. Christian Mulder, Michiel Rutgers, and Anton J. Schouten. This set spans 2004–2009 for all core groups and is part of our national survey, the Dutch Soil Quality Network (DSQN: 1993–continuing). In a further attempt to build consistent ontologies for all data, we focused on cross-disciplinary soil abiotics within the so-called Data Mining Project (supported by the Netherlands Ministry of Housing, Spatial Planning, and Environment). Final aim is a tool helpful to parameterize detrital food web models. Additional information about the podzol core group can be found in Mulder et al. (2008, 2009, 2011a, b).

Sampling Area And Frequency:

The body length and width of the approximately 150 identified nematodes were measured to the nearest 1 µm with an eyepiece micrometer. Subsequently, their fresh weight (body mass) was derived at individual level with the volumetric function of Andrássy (1956) that is based on the cylindrical elongate morphology of nematodes, and converted to dry body mass using a weight ratio of 0.20 (Petersen and Luxton, 1982: p. 303). For all individual records (193 taxa, mostly at genus level), feeding habits (hence, diet and trophic level) were assigned based on the functional feeding group as defined in Yeates et al. (1993). The preferred feeding habit as ranked in Yeates et al. (1993) was kept consistently in our data set. In few cases, like for "unicellular eukaryote feeding" nematodes (Yeates, 2010), the yeast-feeding and hyphal-feeding habits were merged together into the "fungivorous type" (Mulder et al., 2008, for Achromadora). In particular, the actual feeding habit of the Achromadoridae remains controversial, as confirmed by recent molecular studies (Holterman et al., 2011), and therefore further assessments of the various feeding habits of soil free-living nematodes have to be based on the perceived predominant food resource available (Yeates, 2010).

Traits of 29,552 individual soil nematodes were recorded in 200 (agro)ecosystems across The Netherlands. In addition to the body size (length and width) and body mass of soil nematodes, this new data set includes information on taxonomy, life stage, sex, feeding habit, trophic level, geographic location, sampling period, ecosystem type, soil type, and basic chemistry (pH in water, organic carbon, total nitrogen and phosphorus contents, and soil nutrient ratios). All the physical, chemical and biological information were accumulated and organized over different environmental categories regarding soil and land use (4 soil types and 3 land-use types resulting in 7 combinations). We envisage that our data will be of interest to researchers dealing with applied soil ecology, as well as those interested in allometry, biological stoichiometry, and soil food webs. Given the data paucity to address the relationships among habitat and nematode growth and size reported by Yeates and Boag (2003), these data can provide empirical more evidence for such investigations.

Sampling Description:

In each agroecosystem, one bulk sample was mixed from the soil randomly collected in 320 cores (2.3 × 10 cm) all over the investigated site. The bulk of 500 g was kept in glass containers and stored at 4 ºC prior to extraction. The nematode extraction from around 100 g of soil was performed using the Oostenbrink method (Oostenbrink, 1960). All the individual nematodes within two clean 10 ml water suspensions were screened and approximately 150 randomly-chosen specimens per site were identified under a light microscope. Besides the nematological analyses, the environmental conditions (i.e. soil pH and macronutrients) were assessed in the laboratory.

Access Control:

Auth System: knb

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ALLOW: [all] uid=esaadmin,o=NCEAS,dc=ecoinformatics,dc=org

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ALLOW: [all] cn=esa-moderators,dc=ecoinformatics,dc=org

ALLOW: [read] [write] uid=mulder,o=unaffiliated,dc=ecoinformatics,dc=org