



World Database of Free-Living Marine Nematodes Editor workshop

Flanders Marine Institute (VLIZ) – Oostende, Belgium
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REPORT

Participants:

Nematoda Editors: Jan Vanaverbeke, Dmitry Miljutin, Daniel Leduc, Alexei Thesunov, Jyotsna Sharma, Tânia Nara Bezerra, Oleksandr Holovachov, Nic Smol, Vadim Mokievsky, Gustavo Fonseca

WoRMS Data Management Team (DMT): Leen Vandepitte, Wim Decock, Aina Trias-Verbeeck, Bart Vanhoorne

In 2014 the Nematoda database hosted at the University of Ghent was transferred to the World Register of Marine Species (WoRMS) hosted at the Flanders Marine Institute.

With the inclusion of NeMys in the WoRMS system, a call to generate an editor community was launched. This workshop was organized to set up this group of interested experts and get them started in the on-line management of the database.

*The objectives of the workshop were: (i) to **identify gaps and assign tasks** that need to be tackled to bring the data up to date. (ii) To discuss ways to **maintain the database** as an ongoing project. And (iii) to set lines for further **outreach options and future perspectives** for NeMys.*

❖ This report includes:

- I. VLIZ background
- II. WoRMS: background and evolution
- III. NeMys background
- IV. 2014: Integration NeMys – WoRMS
- V. The editor's community in WoRMS and possibilities for NeMys
- VI. A work plan for NeMys
- VII. Good practices and agreements for editing in NeMys
- VIII. NeMys outreach
- IX. Start editing
- X. Concrete actions

As introduction to the workshop, three presentations were given to explain the background of the Flanders Marine Institute –hosting the workshop-, the NeMys database and the Aphia-WoRMS system:

I. VLIZ background (Leen V.)*

An explanation on the background and current role of the Flanders Marine Institute was given.

Ostend Innocean site

History (1st Belgian marine station)

VLIZ since 1999 + local, European & international organization and institutes at the site. All working around and about the sea.

VLIZ: non-profit organization, funding from government and projects.

VLIZ divisions: role of data centre.

[* full presentation available in pdf]

II. WoRMS: background and evolution (Leen V.)*

As NeMys is now hosted and fed by Aphia, a presentation about the World Register of Marine Species (WoRMS) and the data system behind it (Aphia) was given.

The aim of WoRMS is to provide the most authoritative list of names of all marine species globally, ever published.

It is an expert-based taxonomic database: with ca. 400 editors; an elected Steering Committee (SC), a Data Management Team (DMT), relies on a permanent host institute (not depending on a temporal project), is web based and follows international standards.

The Aphia - WoRMS structure and website was also explained in order to understand how NeMys has been integrated in it, and where the information is to be found.

The data flow among international databases in the LifeWatch taxonomic backbone framework is also highlighted.

[* full presentation available in pdf]

III. NeMys background (Jan V.) *

Jan Vanaverbeke explained the background and evolution of the NeMys database.

Before 1998:

The information needed to identify marine free-living marine nematodes was compiled in folders, maintained per genus. Each folder held relevant species information, copied from the taxonomical literature. The folders were ordered following the classification used in the Bremerhaven checklist of

free-living marine nematodes, published in the 70's. An index card system was associated with the folders to keep track of possible taxonomical changes. The folders, located in the "Nematode Filing Cabinet" of the Marine Biology Research Group were one of two complete collections of literature on free-living marine nematodes in the world, available for marine ecologists. Access to this information for scientists from elsewhere required travelling to Gent.

1998 → digital version:

In 1998, the Marine Biology Research Group started exploring the possibilities to open this collection to the world, while complementing it with ecological information, distribution records.... A private company was hired to complete the first steps, until Tim Deprez started his PhD on taxonomy and biogeography of Mysida. Tim Deprez, a biologist with a strong programming background, developed a generic biodiversity information system that could hold multiple types of information on different taxonomic groups. As the bulk of the data in the system were on nematodes and mysids, the platform was baptised NeMys.

The nematode part of NeMys became a very important tool for benthic ecologists around the world, as it contained keys to genera and species (for some genera), and the information collected in the Nematode Filing Cabinet. In a later stage, complete PDF papers, and ecological papers were added to NeMys, and linked to nematode species.

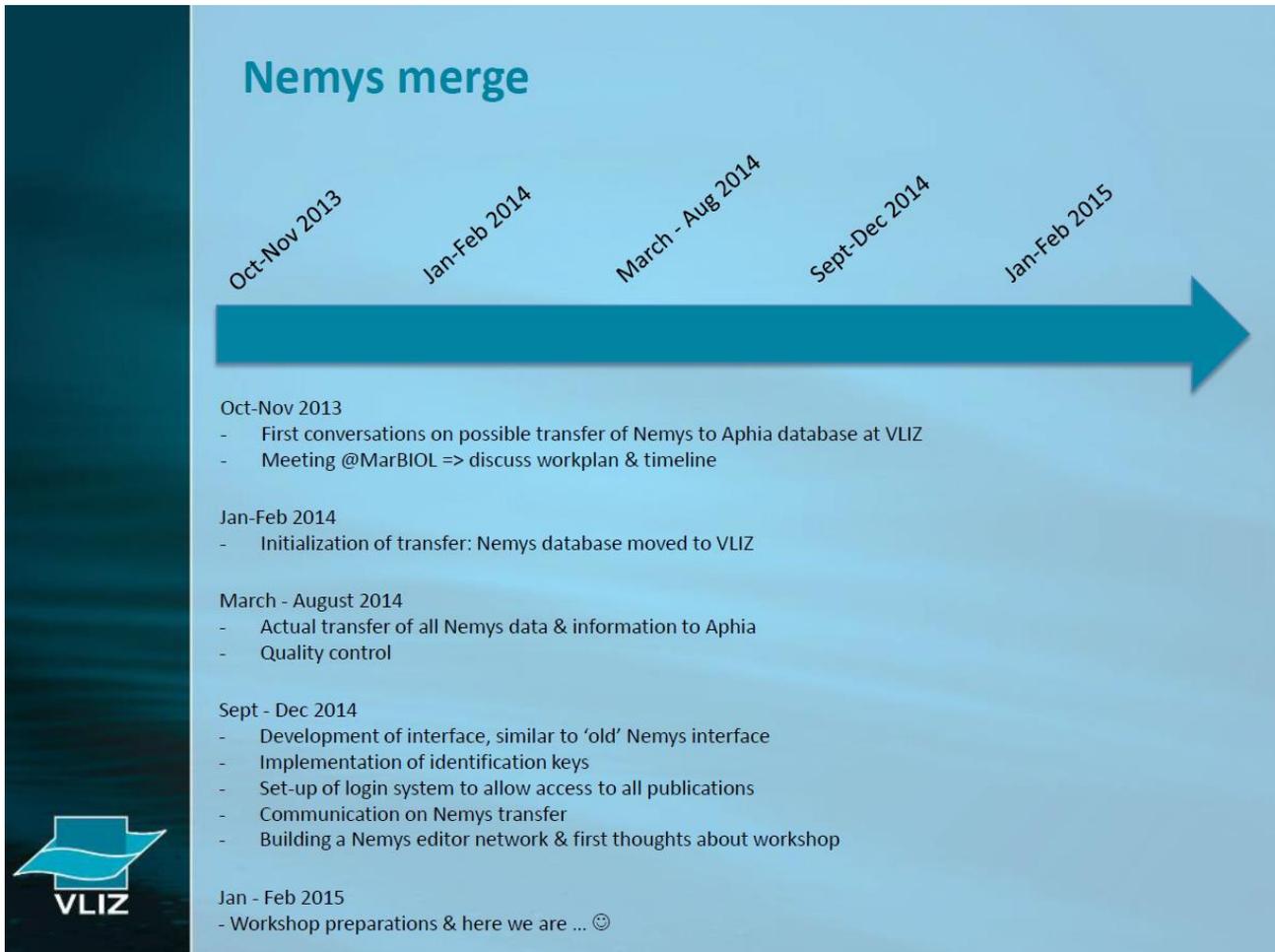
NeMys was intensively used for educational purposes (university training in identification of marine nematodes, international workshops in the framework of European research programmes), until problems with the software (lack of personnel for maintenance, hacking) forced Ghent University to take the system offline.

At that moment, WoRMS was developed, and contacts between VLIZ and the Marine Biology Research Group lead to the incorporation of the NeMys-nematode information in WoRMS, including the "look-and-feel" of the original website, the identification tools and the available literature information.

[* full presentation available in pdf]

IV. Integration NeMys - WoRMS

Starting late 2013, a workplan to transfer of NeMys to Aphia has been discussed and accomplished:



> 2015: Future challenges: solve remaining problems, share work, think of products (papers, etc).

V. The editor's community in WoRMS and possibilities for NeMys

WoRMS has different models and strategies of editor communities, each one fitting the demands and necessities of the taxonomic group and their experts. Different options may oscillate from a strict hierarchical organization, pyramidal way of working to a totally horizontal commitment where everyone shares responsibilities. There is no magic formula and all options have pros & cons. The Nematoda editors will have to decide which working method is best for their case.

A merge of both options will be implemented for the NeMys community. Jan Vanaverbeke will be the chief editor having a coordination role to keep the editor's community engaged and alive.

All editors will have edit rights to all Nematoda groups, but based on a trust agreement that everyone will focus on the group of own expertise.

Nevertheless, adding information to someone else's group when coming across it is allowed as long as it is communicated and new information is sent for the editor in charge to check/complete the entries. This will help to keep the database as up-to-date as possible, especially regarding access possibilities to publications in different languages by different editors (language skills and/or translation contacts).

Besides, geographical variety of the editor network will permit to keep track of regional publications and studies. Recommendation is to add the new source to NeMys and circulate the link.

Each editor will be in charge of one or more groups of Nematoda, mainly at Order level –in some cases family-, as follows (excel file available):

- Order Benthimermithida Tchesunov, 1995: [Miljutin, Dmitry M.](#)
- Order Rhaptothyreida Tchesunov, 1995: [Miljutin, Dmitry M.](#)
- Order Enoplida Filipjev, 1929: [Smol, Nic](#) and [Sharma, Jyotsna](#); [Mokievsky, Vadim](#) for Family Ironidae de Man, 1876 and [Leduc, Daniel](#) for Suborder Trefusiina.
- Order Triplonchida Cobb, 1919: [Holovachov, Oleksandr.](#)
- Order Dorylaimida Pearse, 1942: [Tchesunov, Alexei V.](#)
- Order Mononchida Jairajpuri, 1969 [no marine spp]
- Order Mermithida: [Tchesunov, Alexei V.](#)
- Order Marimermithida Rubtzov 1980, emend. Tchesunov 1995: [Miljutin, Dmitry M.](#)
- Order Desmoscolecida Filipjev, 1929: [Tchesunov, Alexei V.](#) and [Fonseca, Gustavo.](#)
- Order Chromadorida Chitwood, 1933: [Tchesunov, Alexei V.](#) for Families Chromadoridae Filipjev, 1917 & Neotonchidae Wieser & Hopper, 1966; [Miljutin, Dmitry M.](#) for Family Cyatholaimidae Filipjev, 1918; [Mokievsky, Vadim](#) for Family Ethmolaimidae Filipjev & Schuurmans Stekhoven, 1941 and [Leduc, Daniel](#) for Family Selachinematidae Cobb, 1915 [Family Achromadoridae Gerlach & Riemann, 1973 is freshwater].
- Order Desmodorida De Coninck, 1965: [Miljutin, Dmitry M.](#) for Superfamily Microlaimoidea Micoletzky, 1922 (4 families); [Tchesunov, Alexei V.](#) for Families Draconematidae Filipjev, 1918 & Epsilonematidae Steiner, 1927 and [Mokievsky, Vadim](#) for Family Desmodoridae Filipjev, 1922.
- Order Monhysterida Filipjev, 1929: [Bezerra, Tania Nara](#) and [Fonseca, Gustavo.](#)
- Order Araeolaimida De Coninck & Schuurmans Stekhoven, 1933: [Bezerra, Tania Nara](#) and [Fonseca, Gustavo](#); [Leduc, Daniel](#) for Families Comesomatidae Filipjev, 1918 & Diplopeltidae Filipjev, 1918.
- Order Plectida Gadea, 1973: [Holovachov, Oleksandr.](#)
- Plectida incertae sedis: (including Paramicroloaimidae Lorenzen, 1981, Aegialoalaimidae Lorenzen, 1981, Haliplectidae Chitwood, 1951 & Aulolaimidae Jairajpuri & Hopper, 1968) [Holovachov, Oleksandr.](#)
- Order Tylenchida: [Tchesunov, Alexei V.](#)
- Order Rhabditina: " Rhabditidae": [Holovachov, Oleksandr.](#)

In order to facilitate communication and information exchange among the editors (for the cases mentioned below and other NeMys related issues) a mailing list has been created including all editors present at the workshop and the WoRMS DMT.

The email address for all communications regarding NeMys is

nemys@marinespecies.org

VI. A work plan for NeMys

The first goal will be to clean and update the current status of NeMys. Different agreements were made and actions listed:

- Boundaries of NeMys:

It has been decided that, as a start, NeMys will include the **marine and brackish free-living nematodes**. The main focus will be taxonomy: the objective is to be taxonomically precise –including all groups- but will focus on adding information for the marine/brackish free-living species.

Information on parasitic species of invertebrates can be included when known or found, but won't be a priority.

Information on vertebrate parasites will not be included.

Consult working scope of editor –Shokoofeh Shamsi- of parasitic nematodes (anisakids) and willingness to contribute further – in parallel to NeMys-. [Action point DMT]

- Nematoda classification:

Consensus among the present editors to update the higher hierarchy for the Nematoda based on two handbooks: De Ley & Blaxter, 2004

(<http://www.marinespecies.org/aphia.php?p=sourcedetails&id=179093>) and Schmidt-Raesa, 2014 (<http://www.marinespecies.org/aphia.php?p=sourcedetails&id=196152>). These changes are already implemented and an informative note will be added to the website stating which publications the classification is based on.

- Literature:

All taxonomic papers should be kept updated by the responsible editors.

Jan Vanaverbeke will keep track of ecological publications, as well as all editors focusing in their region/network. Non-taxonomic information shall be added when available to have the taxonomic record as complete as possible.

Contact with other thematic editors can be broader (Jan will contact Agnes Muthumbi to have someone based in Africa).

- Identification keys:

The keys actually present in the NeMys interface are not updated. An informative note should indicate that keys in NeMys are only updated up to until 2005-2007 (thus, with limitations), only (and include a proper “based on” field may be added).

The DMT will work further with the editors to improve the creating and updating tools for keys. A start will be set in the coming months with Tania Nara Bezerra, willing to update the *Rynchonema* key in collaboration with DMT who will provide support and guidelines for this process.

- News feed:

News/activity tracking on news page in NeMys will be possible.

DMT has added news section to the site. How to feed this news items will be discussed further.

Currently, if something should be posted, Jan V. will coordinated it and communicate with the DMT to bring it online.

- #NematodeMonday, #NeMo ...

In order to keep the editor community active in a virtual mode, the possibility of defining one collective NeMys working day every month was proposed. Further details will be discussed.

- Identified gaps:

Different issues have been identified and discussed:

- missing/newly described species
- missing authorities
- Likely duplicate entries
- Lack of type species information
- Lack of environment flags
- Non-matches originated in OBIS database harvest

- How to organize it?

It has been decide that every editor will go through the literature and provided excels to solve the records related to the groups they are responsible for.

- Special considerations:

DMT will provide a list of names without type species.

A call for a student-internship regarding the assignation of environment flags has been made (in cooperation with MarBiol at UGent).

Some OBIS non-matches records have been solved 'in situ'.

Main deadline: March 2016

Coinciding with the MEIOFAUNA conference in 2016, the goal is to have all groups cleaned and up-to-date by March 2016. Jan V. will send 'gentle' reminders.

- Accordingly, the transfer of information to Catalogue of Life will wait until 2016.

VII. Good practices and agreements for editing in NeMys

- **Use NeMys interface so all added/changed information is automatically added to WoRMS interface (and gets NeMys context).**
- Names in a PhD's dissertation/thesis usually not considered as published, but there can be exceptions.
- Current debate regarding online publications should be kept in mind. A recent opinion article (Cranston et al, 2015 in Systematic Entomology journal) summarizes the polemic: validity of electronic publications i.e. Early View and can imply conflicts around date-sensitive nomenclature issues, though ICZN code made a statement on it. NeMys editors have decided to wait for the paper publication to include a name as a preventive way to avoid temporary names accumulating in the system.
- The literature module in Aphia allows to add one file for each reference. If sources are in i.e. Russian, Chinese, etc. and when a translation is available, it is recommended to merge both versions (original and translation) to upload ONE FILE containing all the information.
- Authority format '(original author, yyyy) emended, yyyy' will be adopted when appropriate to ensure traceability.
- In general, all issues on taxonomic standards and nomenclature will be resolved referring to ICZN nomenclature code. For instance: Use of "alternate representation": Rarely in Nematoda, 12 subgenus in NeMys or Use of the terms 'original combination' instead of 'basionym'.

VIII. NeMys outreach

During the workshop, brainstorming about possible outputs for NeMys occurred. The ideas of possible outputs for short, mid and long term are listed below. Some will need more discussing and elaboration.

As a beginning, a news item has been post on WoRMS/NeMys sites, and will circulate among the WoRMS editor community. It will be sent to nematology journals, sites (Psammonalia, Nematologist Society, Facebook site (?), ...).

Together with this, a call may be launched to ask for available literature for input in NeMys.

Other discussed possibilities:

- Publish NeMys as updated check list (PlosOne, Biodiversity Data Journal, ZooTaxa...)
→ Publication fees will need to be checked, Open Access publications are preferred.

- Publish through WoRMS PLOS one collection started in 2012 and still open.: reviews and state of the art of the group and/or ongoing research.
- Database paper, a nematode review or research article.
- Include the history of NeMys. Start, evolution, problems to get where we are now.
- Highlight the biggest gaps (taxa and regions), taxa with most species richness, ...
- Possible analyses: taxa vs habitat or region; Analyse depth, rate of discovery/description...
- Should be a paper so it can be cited [i.e. updated checklist or what has been described after 1973]
- Paper + supplementary online material (paper referring to the online data).
- Publish as book (VLIZ+ university special publication?)

Agreements:

- Jan V. will sketch/make a poster to take to the EMBS conference (September 2015) and other upcoming events where editors may attend and can promote NeMys (EMBS deadline: March 15th; Nic Smol: deadline before April 1st 2015).
- Jan will coordinate the writing of a paper which will be presented along with an updated checklist of Nematoda. (Meiofauna conference, 2016)

Deadlines:

Application deadline for EMBS: 15th March 2015 (poster).

Application deadline for conference Nic Smol: April 1st 2015 (poster).

General deadline to clean and update NeMys and have a paper + checklist:

MEIOFAUNA conference 2016 (expect apply around March 2016) and looking forward to May 2018 World Conference Marine Biodiversity in Quebec.

IX. Start editing!

Designed as a workshop, there was time scheduled for a 'hands-on' session. Firstly, it was shown 'live' how to add a new species to the system.

Having this demonstration as starting point, all editors started working online aided by the DMT in order to solve the problems and doubts they encountered while getting to know the system.

More than 120 species were added during the working sessions, and no major problems were detected regarding the working performance.

A general scheme on **how to add a new species**:

1. Log in (through NeMys interface: nemys.ugent.be)
2. Add source
3. Add taxon
 - a. Authority (desirable format: Name1, NameX, & NameY, yyyy). *Correct use of brackets will be part of the check!
 - b. Status
 - c. Flag(s)
4. Link source to taxon (Original Description when possible).
5. Add other literature (specify use type of the source)
6. Add distribution
7. Add specimen information
8. Other information (not main focus for now, can be future projects):
 - a. Add specimen information
 - b. Add feeding type information
 - c. Add images
9. Links and LSID are generated automatically!

A manual for the editors is permanently online and kept updated by the DMT:

<http://www.marinespecies.org/tutorial.php>

and also accessible through the “My Aphia” interface when logged in.

**Any other doubts or issues that may arise can be consulted to the Data Management Team at:
info@marinespecies.org**

X. Concrete actions

- DMT: Update higher classification in Aphia. [done]
- DMT: add news section to the website. [done]
- DMT: consult S. Shamsi about her parasite nematode work (anisakids).
- Jan V.: provide text to add about higher classification and about identification keys.
- Jan V.: makes poster for conferences.
- ALL: look for targets in own network to distribute NeMys information, call for input, etc.
- ALL: keep track of new information and publications, add it to the literature module and circulate link via mailing list.
- ALL: clean and updated assigned groups –before March 2016!-.
- ALL: further discussion on news section (currently posting via Jan V. / DMT).
- ALL: further discussion on open issues regarding working methodology, output products, etc.
- Jan V.: coordinates the writing of paper.