

**LifeWatch**

e-Science European Infrastructure  
for Biodiversity and Ecosystem Research



# LifeWatch-Italy Thesauri: metodological approach, use cases, future developments

*Ilaria Rosati*

*Workshop*  
*Thesauri & Semantics*  
*in the Ecological Domain*  
9 – 10 giugno 2016 LECCE







...a hierarchical controlled vocabulary, designed to define a set of key terms and to capture how they are associated with each other in a specific domain of knowledge



## **Biodiversity & Ecosystems**



*Workshop  
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# Why do we need of Thesauri?

Large amounts of relevant data...

.....highly heterogeneous (format, content, semantics)



## Heterogeneity impedes:

- Data Discovery
- Data Integration
- Data Re-usability

## We need:

- Harmonization
- Standardization

in order to share information,  
support and facilitate the research

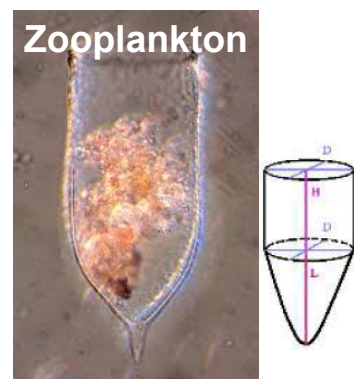
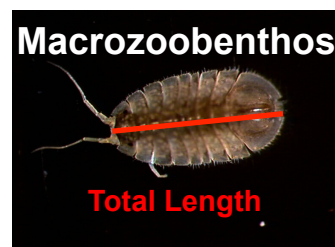
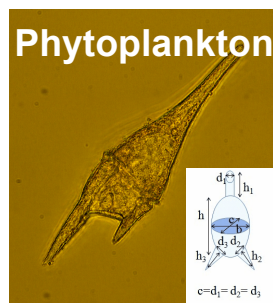




# About LifeWatch-Italy Thesauri

## Functional Traits Thesauri

- ☐ About 250 functional traits
- ☐ Mostly morphological traits



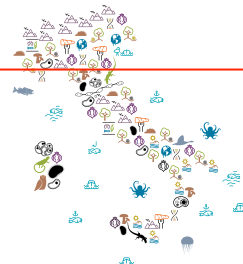
## Alien Species Thesaurus

- ☐ More than 300 Terms

## Genomic and Barcoding Thesaurus


- ☐ About 100 terms

- ☐ Well-defined descriptions agreed by expert community
- ☐ SKOS/RDF thesaurus: stable reference resource
- ☐ Free and open (<http://www.servicecentrelifewatch.eu/catalogue-of-services>)
- ☐ Accessible via web services (SPARQL endpoint and API)





# Methodological Approach

TemaTres Editor   
[Manage](#), [Publish](#), [Share](#), [Re-use](#)

A web based tool, open-source, for the development and management of formal representations of knowledge.

Features:

- Flexible and user-friendly interface
- Sophisticated search capabilities
- Compliant to different standards (e.g. Mads, Skos, Vdex, XTM, Json)

## SKOS

A common data model for sharing and linking knowledge organization systems via Web, using the Resource Description Framework (RDF/RDFS).



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# Methodological Approach

TemaTres Editor



Fish Traits Thesaurus

Home Menu -  Search [Advanced search](#) [About...](#)

### Relations editor

Relation type	Relation sub-type label:	Relation sub-type alias	Orden	
<input type="text" value="BT/NT"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<a href="#">Submit</a>
BT/NT	Partitive	P		<a href="#">Delete relation sub-type</a>
BT/NT	Instance	I		<a href="#">Delete relation sub-type</a>
UF/USE	Spelling variant	SP		<a href="#">Delete relation sub-type</a>
UF/USE	MisSpelling	MS		<a href="#">Delete relation sub-type</a>
UF/USE	Abbreviation	AB		<a href="#">Delete relation sub-type</a>
UF/USE	Full form of the term	FT		<a href="#">Delete relation sub-type</a>
UF/USE	Hidden	H		<a href="#">Delete relation sub-type</a>
7				

### Link type editor

Link type label:	Link type alias	
<input type="text"/>	<input type="text"/>	<a href="#">Submit</a>
broadMatch	broadMatch	<a href="#">Delete link type</a>
closeMatch	closeMatch	<a href="#">Delete link type</a>
exactMatch	exactMatch	8 <a href="#">Delete link type</a>
narrowMatch	narrowMatch	<a href="#">Delete link type</a>
relatedMatch	relatedMatch	<a href="#">Delete link type</a>
5		

A B C D E F G H I L M P S T W

SKOS elements:

- Preferred label
- Alternative label
- Definition
- Preferred unit
- Bibliographic note
- Scope note
- Has broader
- Has narrower
- Has exact match
- Has close match
- ...

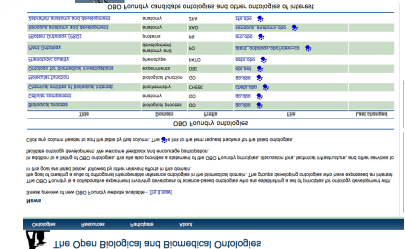
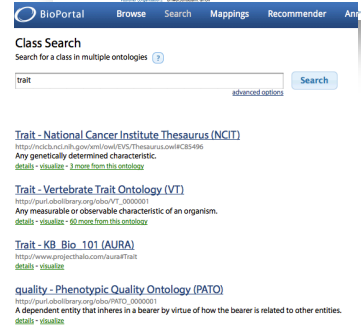
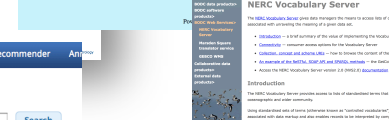
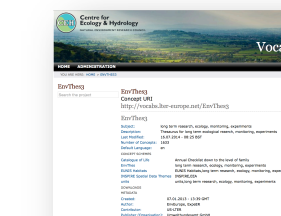
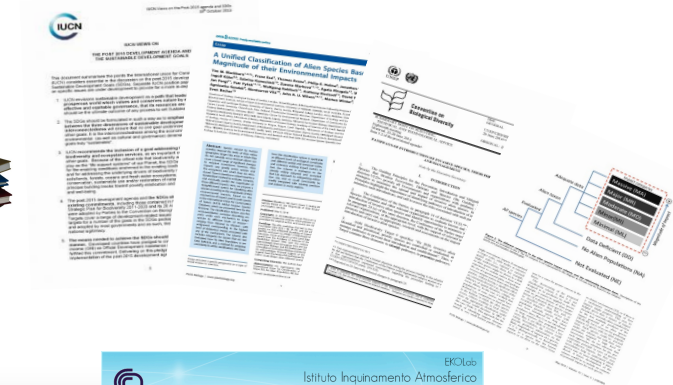




# Methodological Approach

## Thesaurus development: 1. selection phase

Trait				
.	Fish Trait			
.	.	Functional Trait		
.	.	.	Morphological Trait	
.	.	.	.	Body Parts
.	.	.	.	Anal Fin Depth
.	.	.	.	Anal Fin Length
.	.	.	.	Caudal Fin Aspect Ratio
.	.	.	.	Caudal Fin Depth
.	.	.	.	Caudal Fin Length
.	.	.	.	Caudal Fin Surface
.	.	.	.	Dorsal Fin Depth
.	.	.	.	Dorsal Fin Length
.	.	.	.	Eye Diameter
.	.	.	.	Eye Position
.	.	.	.	Gut Length
.	.	.	.	Gut Length-Standard Length Ratio
.	.	.	.	Head Depth
.	.	.	.	Peduncle Caudal Depth
.	.	.	.	Peduncle Caudal Length
.	.	.	.	Pelvic Fin Length
.	.	.	.	Prenatal Length
.	.	.	.	Predorsal Length
.	.	.	.	Snout Length
.	.	.	.	Body Shape
.	.	.	.	Anguilliform
.	.	.	.	Combination of Shapes
.	.	.	.	Compressiform



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# Methodological Approach

## Thesaurus development: 2. edition phase

Home | Menu | About... | Adv...



Fish Traits The


[-] Trait

- [-] Fish Trait
  - [-] Functional Trait
    - [-] Morphological Trait
      - [-] Body Parts
      - [-] Body Shape
      - [-] Body Size
        - [-] Body Depth
        - [-] Body Length
          - Fork Length
          - Standard Length
          - Total Length
        - [-] Body Weight
        - [-] Body Width

A B C D E F G H L M P S T W


## Fork Length

Home ▶ Trait ▶ Fish Trait ▶ Functional Trait ▶ Morphological Trait ▶ Body Size ▶ Body Length ▶ Fork Length

 Alternative label:

FL


2015-03-11 15:37:13

 Definition:

1: Length of a fish from the tip of the snout to the end of the middle caudal fin rays (Source: ATOL:0001658).

2: Length of a fish measured from the tip of the snout to the posterior end of the middle caudal rays. This measurement is used instead of standard length for fishes on which it is difficult to ascertain the end of the vertebral column, and instead of total length in fish with stiff, forked tail, e.g., tuna. Mostly used in fishery biology and not in systematics (Source: Fishbase).

2015-03-11 15:36:50

 Preferred unit:

cm


2015-09-04 16:34:17



# Methodological Approach

## Thesaurus development: 3. validation phase

Home | Menu | About... | Advanced search

**Fish Traits Thesaurus**

Trait

Fish Trait

Functional Trait

Morphological Trait

Body Parts

Body Shape

Body Size

Body Depth

Body Length

Fork Length

Standard Length

Total Length

Body Weight

Body Width

A B C D E F G H L M P S T W

**Fork Length**

Home > Trait > Fish Trait > Functional Trait > Morphological Trait > Body Size > Body Length > Fork Length

Alternative label:

FL

2015-03-11 15:37:13

Definition:

Length of a fish from the tip of the snout to the end of the middle caudal fin rays.

2015-05-12 11:09:13

Preferred unit:

mm

2015-05-12 11:07:57

Possible Relationships

- broader & narrower (hierarchical)
- related (associative)

Links to external resources

- broadMatch
- closeMatch
- exactMatch
- narrowMatch
- relatedMatch

BT Body Length


Options

Fork Length

ExactMatch [http://bioportal.bioontology.org/ontologies/ATOL/?p=classes&conceptid=http%3A%2F%2Fpurl.org%2Fobo%2Fowl%2FATOL\\_0001658](http://bioportal.bioontology.org/ontologies/ATOL/?p=classes&conceptid=http%3A%2F%2Fpurl.org%2Fobo%2Fowl%2FATOL_0001658)

Preferred unit: mm.

2015-08-11 16:10:03





# Thesaurus Search Options



## Fish Traits Thesaurus

Home Menu  Search [Advanced search](#) [About...](#)

### Term Hierarchy

- ▼ Trait
  - ▼ Fish Trait
    - ▼ Functional Trait
      - ▼ Morphological Trait
        - Body Parts
        - Body Shape
        - Body Size

A B C D E F G H L M P S T W



## Fish Traits Thesaurus

Home Menu  Search [Advanced search](#) [About...](#)

### Advanced search

What search?

Term

Search term

☐ Exact phrase

Has this top term

All

Note type

All

Created on or after

All

Is located in deep level

All






# Use Cases













































.....for data annotation

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Lifewatch Data Standard

Name	Unique Name
    Anal fin depth	analfindepth
    Anal fin length	analfinlength
    Caudal fin aspect ratio	caudalfinaspec
    Caudal fin depth	caudalfindepth
    Caudal fin length	caudalfinlength
    Caudal fin surface	caudalfinsurfac
    Dordal fin depth	dorsalfindepth
    Dorsal fin length	dorsalfinlength
    Eye diameter	eyediameter
    Eye position	eyeposition
    Gut length	gutlength

Lifewatch Data Standard

Each parameter presents information which are imported by LifeWatch Thesauri.

Dataset Field Name \*

anal fin length

Description

distance between the anteriormost and posteriormost edges of the anal fin base, including the shortest first ray and the point where the fin membrane meets the body behind the last ray. this length is also called

Unit of Measure

mm

Thesaurus Name

fish traits thesaurus

Thesaurus URI

http://thesauri.lifewatchitaly.eu/fishtraits/

Dataset Field DataType \*

DOUBLE

Dataset Field Type

record

Dataset Field Category \*

----Body Parts

Dataset Field Standard

Lifewatch

☐ Required


☒ Numerical check



# Use Cases

.....for data annotation

DashboardContacts CenterMicroblogsMessagesMy DocumentsTasksWelcome



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Submit Your Files

Step 2 of 4 - Map your dataset fields with Lifewatch standard fields

Need help for mapping? Check the Lifewatch standard guide

Dataset fields	Lifewatch fields
ID totale	Select a field
Phylum	phylum
Class	class
Order	order
Replicate	eventid
EventDate	eventdate
Taxa	scientificname
Length (mm)	totallength
Dry weight (mg)	dryweight
Biomass	ashfreedryweight

Previous

Lifewatch Standard guide

Search...

total length

Data type: double   Category: body length   Unit of measure: mm   Thesaurus: fish traits thesaurus

total length is the distance between the most anteriorly projecting part of the head (jaws closed) and the most distant tip of the caudal fin. in europe for measurement the caudal fin has to be spread into a natural position; i.e., the two lobes of fishes with a forked tail fin are not pressed together.

ash free dry weight

Data type: double   Category: body weight   Unit of measure: g   Thesaurus: fish traits thesaurus

the weight of organic material obtained as difference between the dry weight and the ash weight. ash weight is determined after muffle furnace combustion at 450-500 °c for 6/12 hours or longer for larger quantities. ash weight is determined by subtracting the tare weight. ash weight is often expressed as a percentage of dry weight or wet weight.

ash weight

Data type: double   Category: body weight   Unit of measure: %   Thesaurus: fish traits thesaurus

the weight of inorganic material obtained after muffle furnace combustion at 450-500 °c for 6/12 hours or longer for larger quantities. ash weight is determined by subtracting the tare weight. ash weight is often expressed as a percentage of dry weight or wet weight.

dry weight

Data type: double   Category: body weight   Unit of measure: g   Thesaurus: fish traits thesaurus

the weight of a whole organism without internal water after drying in an oven at 60 °c for 12/24 hours.

body width

Data type: double   Category: body size   Unit of measure: mm   Thesaurus: fish traits thesaurus

the maximum horizontal distance from side to side of the body, perpendicular to the axis along which depth is measured.

wet weight

Data type: double   Category: body weight   Unit of measure: g   Thesaurus: fish traits thesaurus


the weight of a whole fresh organism.



# Use Cases

.....for populating a given field in a metadata model

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Submit Your Files

### Step 3 of 4 - Insert Dataset Metadata

**Dataset identifier** ?

**Dataset title** \* ? 🔍

**Dataset abstract** \* ? 🔍

**Dataset keywords** \* ? 🔍

#### Lifewatch Metadata Standard

Metadata Descriptive Name (e.g. taxonomic terms) \*

Metadata Type

Free Text

Metadata Reference (e.g. http://...)

☒ Required

Metadata Category \*

General information

Metadata Description \*

Provides a set of related keywords describing the content of the dataset derived from the controlled vocabularies implemented by LifeWatch-ITA, EnvThes3 - thesaurus for long term ecological research, monitoring, experiments and other environmentally related thesauri as INSPIRE Spatial Data Themes, ecc...

The keywords from the following thesauri can be selected:

- <http://thesauri.lifewatchitaly.eu/PhytoTraits/index.php>
- <http://thesauri.lifewatchitaly.eu/FishTraits/index.php>
- <http://thesauri.lifewatchitaly.eu/alienspecies/index.php>
- <http://vocabs.ceh.ac.uk/evn/tbl/envthes.evn>
- <http://eunis.eea.europa.eu/species-groups.jsp>



# Future Developments

- ☐ Improve and extend existing thesauri;
- ☐ Implement and publish thesauri on other specific domains of knowledge needed for LifeWatch or other research community;
- ☐ Integrate with other Thesauri
  - EnvThes
  - BODC Vocabularies ?
  - Other SKOS /RDF vocabulary ?
- ☐ Finally, thesauri will be used as building blocks for the LifeWatch ontology.



CENTRI TEMATICI & PIANO DELLE ATTIVITA' 2016-2017  
CNR | Aula Bisogno Sede Centrale  
15-17 febbraio 2016 ROMA

