

Taxon Concept Standard (TCS) term list

Title: Taxon Concept Standard (TCS) term list

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Abstract: The Taxon Concept Standard (TCS) is the TDWG standard specifically for sharing taxonomic and nomenclatural data. TCS provides `TaxonConcept` and `TaxonName` classes for information about taxon concepts and taxon names, respectively, as well as a `TaxonConceptMapping` class for taxon concept alignments and a `NomenclaturalType` class for information on typification of taxon names. TCS offers a semantic framework for, and facilitates more accurate exchange of, taxonomic and nomenclatural data.

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1. Introduction

1.1. Status of this document and its content

While TCS is in public review everything in this document is preliminary. Once ratified, this **Introduction** will be informative and the **Namespace** and **Borrowed terms** sections normative. Within the **Vocabulary** section the Identifier, Type, Definition and Usage for terms are normative. For borrowed terms Usage is normative only in the sense that it specifies how the term should be used within TCS. All other parts, including Label, Comments and Examples, are informative.

1.2. RFC keywords

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#).

1.3. Structure of TCS

TCS has four main classes, **TaxonConcept**, **TaxonConceptMapping**, **TaxonName** and **NomenclaturalType**.

The **TaxonConcept** class provides terms to share information about taxon concepts and is the class everything else in TCS revolves around. We have defined a **TaxonConcept** as:

An **identifiable** taxonomic position that can be **aligned** to other such positions through TCS concept mapping relations

The change from the earlier 'a name plus a description of a taxon' was necessary because TCS has to deal with a wider variety of taxon concepts and today's taxon concepts do not necessarily have a formal scientific name or a description. In order for a taxon concept to be identifiable, however, it needs to have some kind of label and it has to have some sort of treatment, so the `taxonName` and `accordingTo` properties on the `TaxonConcept` are required.

The `TaxonConceptMapping` class is almost identical in structure to the Darwin Core `ResourceRelationship` class. As a taxon concept mapping is a very specific type of resource relationship and because Darwin Core does not define IRI properties for `dwc:ResourceRelationship`, TCS defines its own class. The `subjectTaxonConcept`, `mappingRelation` and `objectTaxonConcept` are required on a `TaxonConceptMapping`. The value of `mappingRelation` has to be one of the mapping properties from the `TaxonConcept` class.

The `TaxonName` class encapsulates all information about taxon names. Only the `nameString` property is required. Currently, TCS only has the one class that can be used for all types of names, including scientific named and vernacular names, but it is envisaged that in future TCS will also have classes for specific categories of names, e.g., 'ScientificName' and 'VernacularName'. The use of the `TaxonName` class is not currently required in TCS: it can be replaced by a `SKOS-XL Label` or `GBIF VernacularName` (or any other label object) if considered more appropriate.

The `NomenclaturalType` class can be used to share information about nomenclatural types of names. It also shows similarity to the Darwin Core `ResourceRelationship` class in the sense that a nomenclatural type is a resource relationship between a `tcs:TaxonName` and either another `tcs:TaxonName` or a Specimen (for which we use the Darwin Core `PreservedSpecimen` or `MaterialCitation` in the examples). The `typifiedName`, `typeOfType` and either the `typeSpecimen` or `typeName` properties are required.

In contrast to Darwin Core, TCS does not define 'ID' and 'Remarks' properties on its classes. In accordance with the Darwin Core RDF Guide (Darwin Core and RDF/OWL Task Groups 2015 [[darwin_core_and_rdfowl_task_groups_darwin_2015](#)]), instances of TCS classes SHOULD have a `rdf:id` and MAY have a `rdfs:comment`.

Information on **synonymy** can be shared using the `synonym` property of the `TaxonConcept` and the `basionym` and `replacedName` properties of the `TaxonName`. TCS does not use the terms 'homotypic synonym' and 'heterotypic synonym' because these terms are rather strictly defined in the nomenclatural codes, which makes them less useful for data exchange, but `synonym` can be used for heterotypic synonyms and `basionym` and `replacedName` for homotypic synonyms. The `synonym` property can be used for all synonyms and it is up to data providers or application profiles whether or not synonyms are split into homotypic and heterotypic synonyms.

The mapping properties in the `TaxonConcept` class, `isCongruentWith`, `includes`, `isIncludedIn`, `partiallyOverlaps`, `intersects` and `isDisjointFrom` can be used to align taxon concepts. These properties are equivalent to topological properties in spatial analysis and can be used in reasoning. Taxon concept mappings are currently not used very often in taxonomic treatments but, besides being more expressive and more generally applicable than nomenclatural relationships, they have the advantage that they can be made by third parties, so they can be used to add information to the analysis that is not already present in the data.

1.4. Examples

Examples are provided for most TCS terms. As almost all TCS properties are IRI properties, significant context has been added to make the examples as useful as possible. As because of this the examples take up a lot of space only one example per term has been reproduced in this document. Links are provided for other examples.

The examples in this document are in TurTLe. This format has been chosen because it is very terse and still easy to read and, most importantly, allows comments. The fact that the examples are in a serialization of RDF should not be taken to mean that TCS data has to be RDF, just that it can be RDF. All examples are also provided in JSON-LD.

The following namespace aliases are used in the examples:

alias	namespace
tcs	http://rs.tdwg.org/tcs/terms/
address	http://schemas.talis.com/2005/address/schema#
bibo	http://purl.org/ontology/bibo/
dcterms	http://purl.org/dc/terms/
dwc	http://rs.tdwg.org/dwc/terms/
dwciri	http://rs.tdwg.org/dwc/iri/
dsw	http://purl.org/dsw/
foaf	http://xmlns.com/foaf/0.1/
gbif	http://rs.gbif.org/terms/1.0/
oa	http://www.w3.org/ns/oa#
rdf	http://www.w3.org/1999/02/22-rdf-syntax-ns#
rdfs	http://www.w3.org/2000/01/rdf-schema#
skosxl	http://www.w3.org/2008/05/skos-xl#

2. Namespace

The namespace for TCS terms is <http://rs.tdwg.org/tcs/terms/>. The recommended alias for this namespace is **tcs**.

3. Borrowed terms

As much as possible TCS uses already existing terms rather than define new terms. Thus, many terms have been borrowed from Darwin Core and Dublin Core.

standard	namespace	alias
Darwin Core	http://rs.tdwg.org/dwc/terms/	dwc
Dublin Core	http://purl.org/dc/terms/	dcterms

4. Index of terms

Taxon Concept

[tcs:TaxonConcept](#) | [tcs:accordingTo](#) | [tcs:taxonName](#) | [tcs:synonym](#) | [tcs:vernacularName](#) | [tcs:taxonRank](#) | [tcs:parent](#) | [tcs:child](#) | [tcs:isCongruentWith](#) | [tcs:includes](#) | [tcs:isIncludedIn](#) | [tcs:partiallyOverlaps](#) | [tcs:isDisjointFrom](#) | [tcs:intersects](#) | [dwc:scientificName](#) | [dwc:vernacularName](#) | [dwc:verbatimTaxonRank](#) | [dcterms:title](#)

Taxon Concept Mapping

[tcs:TaxonConceptMapping](#) | [tcs:mappingAccordingTo](#) | [tcs:mappingRelation](#) | [tcs:subjectTaxonConcept](#) | [tcs:objectTaxonConcept](#) | [dcterms:creator](#) | [dcterms:created](#)

Taxon Name

[tcs:TaxonName](#) | [tcs:nameString](#) | [tcs:namePublishedIn](#) | [tcs:microreference](#) | [tcs:nomenclaturalCode](#) | [tcs:nomenclaturalStatus](#) | [tcs:typification](#) | [tcs:typificationLiteral](#) | [tcs:basionym](#) | [tcs:replacedName](#) | [tcs:basedOn](#) | [tcs:laterHomonymOf](#) | [tcs:conservedAgainst](#) | [tcs:combinationAuthor](#) | [tcs:combinationAuthorLiteral](#) | [tcs:basionymAuthor](#) | [tcs:basionymAuthorLiteral](#) | [tcs:combinationAscribedAuthor](#) | [tcs:combinationAscribedAuthorLiteral](#) | [tcs:basionymAscribedAuthor](#) | [tcs:basionymAscribedAuthorLiteral](#) | [dwc:scientificNameAuthorship](#) | [dwc:namePublishedIn](#) | [dwc:namePublishedInYear](#) | [dwc:genericName](#) | [dwc:infragenericEpithet](#) | [dwc:specificEpithet](#) | [dwc:infraspecificEpithet](#) | [dwc:cultivarEpithet](#)

Nomenclatural Type

[tcs:NomenclaturalType](#) | [tcs:typifiedName](#) | [tcs:typeOfType](#) | [tcs:typeName](#) | [tcs:typeSpecimen](#) | [tcs:typePublishedIn](#)

5. Vocabulary

Taxon Concept

tcs:TaxonConcept

Identifier	http://rs.tdwg.org/tcs/terms/TaxonConcept
Type	http://www.w3.org/2000/01/rdf-schema#Class
Label	Taxon Concept
Definition	An identifiable taxonomic position that can be aligned to other such positions through TCS concept mapping relations.
Usage	A TaxonConcept MUST have taxonName and accordingTo properties.
Comments	A taxonomic position is an opinion about the definition of a taxonomic group. A Taxon Concept is identifiable, because it combines a label – taxonName in TCS – with a source –

`accordingTo`. Both the `taxonName` and `accordingTo` properties are required on a `tcs:TaxonConcept`. When mentioning a taxon concept, the label and the source are combined, separated by 'sec.' (from, 'secundus', meaning 'according to') or 'sensu' (meaning the same). The term `dcterms:title` has been borrowed from Dublin Core to provide this taxon concept label. Because of the context provided by the source, taxon concepts are in principle also alignable to other Taxon Concepts using TCS concept mapping statements. The concept mapping properties in TCS are `isCongruentWith`, `includes`, `isIncludedIn`, `partiallyOverlaps`, `isDisjointFrom` and `intersects`. These properties can be used directly on a `TaxonConcept` object or as the value of the `tcs:mappingRelation` property in a `tcs:TaxonConceptMapping` object.

The TCS Taxon Concept is applied more broadly than the term is used in science (e.g. Franz & Peet 2009 [franz_perspectives_2009]). On the one hand, things that are not generally considered to be biological taxa, e.g. hybrids and cultivars, can be casted as TCS Taxon Concepts. Also Operational Taxonomic Units (OTUs) [sokal_principles_1963] can be exchanged as Taxon Concepts, if there is a reason to do so, e.g. if one wants to align them with other Taxon Concepts later. On the other hand, entries from treatments that are considered to cite concepts from other treatments can be formulated as Taxon Concepts. Every taxon concept from a treatment that is likely to be referenced as the source of taxonomic context, for example a field guide for a determination of a specimen or a national census for an ecological study, can – and it would be very nice if they would – be stated as a Taxon Concept, so they can be aligned with other Taxon Concepts that may provide more or different taxonomic context.

By contrast, entries in the nomenclature section of treatments ('TaxonomicNameUsage's sensu Senderov et al. 2018 [senderov_openbiodiv-o_2018]) and in lists of nomenclatural types are not Taxon Concepts.

Examples

```
[ ] a tcs:TaxonConcept ;
    dcterms:title "Dicranoloma blumei sec. Klazenga 1999" ;
    tcs:accordingTo <https://www.tropicos.org/reference/9020903>
    tcs:taxonName <https://www.tropicos.org/name/35121475> .

<https://www.tropicos.org/name/35121475> a tcs:TaxonName ;
    tcs:nameString "Dicranoloma blumei" ;
    dwc:scientificNameAuthorship "(Nees) Renauld" .

<https://www.tropicos.org/reference/9020903> a bibo:AcademicArticle ;
    dcterms:bibliographicCitation ""Klazenga, N. (1999). A revision of the
        Malesian species of Dicranoloma (Dicranaceae, Musci). Journal of the
        Hattori Botanical Laboratory 87: 1-130."" .
```

[\[TaxonConcept-example-1.ttl\]](#) [\[TaxonConcept-example-1.jsonld\]](#)

[\[TaxonConcept-example-2.ttl\]](#) [\[TaxonConcept-example-2.jsonld\]](#)

- [TaxonConcept-example-3.ttl] [TaxonConcept-example-3.jsonld]
- [TaxonConcept-example-4.ttl] [TaxonConcept-example-4.jsonld]
- [TaxonConcept-example-5.ttl] [TaxonConcept-example-5.jsonld]
- [TaxonConcept-example-6.ttl] [TaxonConcept-example-6.jsonld]
- [TaxonConcept-example-7.ttl] [TaxonConcept-example-7.jsonld]

GitHub issue <https://github.com/tdwg/tcs2/issues/213>

tcs:accordingTo

Identifier	http://rs.tdwg.org/tcs/terms/accordingTo
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	According To
Definition	Reference to the treatment or other source in which a Taxon Concept is established or used.
Usage	accordingTo is an IRI term and is required on a Taxon Concept. A Taxon Concept can have only one accordingTo .
required: Yes — repeatable: No	

Comments

Every Taxon Concept is in some sort of treatment and this treatment provides important context without which we do not know what a taxon name really means and therefore the **accordingTo** property is required for a TCS Taxon Concept. In TCS 2, **accordingTo** has to be a reference to some sort of resource rather than just a person's name. However, TCS is lenient about the nature of this resource and, apart from references to bibliographic resources, references to personal communications and determinations are also acceptable, if there is value in supplying taxon concepts from such communications as Taxon Concepts.

The value of **accordingTo** has to be an object or IRI. This object can contain as little as a bibliographic reference but it is much more useful to provide it in a format that can be understood by reference managers such as Zotero or Mendeley.

Examples

```
# Taxonomic article (object of property only)
<https://doi.org/10.1080/14772000.2013.806371> a bibo:AcademicArticle ;
  dcterms:creator <https://orcid.org/0000-0001-7089-7018>,
    <https://orcid.org/0000-0002-2469-8162> ;
  bibo:authorList ( <https://orcid.org/0000-0001-7089-7018>
    <https://orcid.org/0000-0002-2469-8162> ) ;
  dcterms:title ""Description of two new species and phylogenetic reassessment
```

```
of
    Perellesschus O'Brien & Wibmer, 1986 (Coleoptera: Curculionidae), with
    a complete taxonomic concept history of Perellesschus sec. Franz &
    Cardona-Duque, 2013""";
    bibo:shortTitle ""Description of two new species and phylogenetic
reassessment
    of Perellesschus O'Brien & Wibmer, 1986 (Coleoptera""";
    dcterms:isPartOf [ a bibo:Issue ;
        dcterms:date "June 1, 2013" ;
        dcterms:isPartOf [ a bibo:Journal ;
            dcterms:title "Systematics and Biodiversity" ;
            bibo:issn "1477-2000" ] ;
            dcterms:publisher [ a foaf:Organization ;
                foaf:name "Taylor & Francis" ] ;
            bibo:volume "11" ;
            bibo:issue "2" ] ;
        bibo:pages "209-236" ;
        bibo:doi "10.1080/14772000.2013.806371" ;
        bibo:uri "https://doi.org/10.1080/14772000.2013.806371" .

<https://orcid.org/0000-0001-7089-7018> a foaf:Person ;
    foaf:givenName "Nico M." ;
    foaf:surname "Franz" .

<https://orcid.org/0000-0002-2469-8162> a foaf:Person ;
    foaf:givenName "Juliana" ;
    foaf:surname "Cardona-Duque*" .
```

[\[TaxonConcept-accordingTo-example-1.ttl\]](#) [\[TaxonConcept-accordingTo-example-1.jsonld\]](#)

[\[TaxonConcept-accordingTo-example-2.ttl\]](#) [\[TaxonConcept-accordingTo-example-2.jsonld\]](#)

[\[TaxonConcept-accordingTo-example-3.ttl\]](#) [\[TaxonConcept-accordingTo-example-3.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/4>

tcs:taxonName

Identifier	http://rs.tdwg.org/tcs/terms/taxonName
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Taxon name
Definition	The accepted name for the taxonomic group.
Usage	taxonName is an IRI term and is required on a TCS Taxon Concept. A Taxon Concept can only have one taxonName .
required: Yes — repeatable: No	

Comments	<p>The taxonName can be anything from a well-formed scientific name to an informal name, vernacular name, indigenous knowledge label, or even a label containing numbers and/or special symbols, such as are often used for OTUs.</p> <p>The object of taxonName is an object or IRI, so that it can be reused in other Taxon Concepts. TCS has got the Taxon Name class, which can be used for any type of name, but people are free to use alternatives, e.g. skosxl:Label, if they want to restrict the use of the Taxon Name class to scientific (or scientific-y) names only.</p>
GitHub issue	https://github.com/tdwg/tcs2/issues/2
tcs:synonym	
Identifier	http://rs.tdwg.org/tcs/terms/synonym
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Synonym
Definition	Name considered to apply to the same taxon as the accepted name.
Usage	synonym is a Taxon Name; a Taxon Concept can have multiple synonyms.
required: No — repeatable: Yes	
Comments	<p>A synonym is an alternative label for a taxon, so synonym, like taxonName, is a relation between a TaxonConcept and a TaxonName, not a relationship between different taxonomic entities.</p> <p>The terms 'heterotypic synonym' and 'homotypic synonym' from the nomenclatural codes ('subjective synonym' and 'objective synonym', respectively, in the Zoological Code) are, in the context of Taxon Concepts and Taxon Names, best understood as synonyms (relations between Taxon Concepts and Taxon Names) and combinations (relations between Taxon Names), respectively. In TCS, combinations are dealt with using properties of the TaxonName class, e.g. basionym and replacedName (note that 'combination' is used here in a broader sense than what the term actually means). This has the advantage that people do not need to separate heterotypic and homotypic synonyms, or generally deal with nomenclature, which adds a degree of complexity that not all systems need or want. Avoiding terms that are too strictly defined in the nomenclatural codes also has the advantage that the term can, in principle, be applied to things that cannot be heterotypic or homotypic synonyms, e.g., to names that are not validly published under the relevant code, or names at different taxonomic ranks than the accepted name, and avoids inappropriate use of the terms defined in the nomenclatural codes.</p>
Examples	


```

[] a tcs:TaxonConcept ;
  dcterms:title "Dicranoloma blumei sec. Klazenga 1999" ;
  tcs:accordingTo <https://www.tropicos.org/reference/9020903> ;
  tcs:taxonName <https://www.tropicos.org/name/35121475> ;
  tcs:synonym <https://www.tropicos.org/name/35121973> ,
    <https://www.tropicos.org/name/35121477> ,
    <https://www.tropicos.org/name/35121484> ,
    <https://www.tropicos.org/name/35188177> .

<https://www.tropicos.org/name/35121475> a tcs:TaxonName ;
  tcs:nameString "Dicranoloma blumei" ;
  dwc:scientificNameAuthorship "(Nees) Renauld" ;
  dwc:namePublishedIn "Rev. Bryol. 28(4): 69 (1901)" ;
  tcs:basionym <https://www.tropicos.org/name/35121972> .

<https://www.tropicos.org/name/35121972> a tcs:TaxonName ;
  tcs:nameString "Dicranum blumei" ;
  dwc:scientificNameAuthorship "Nees" ;
  dwc:namePublishedIn ""Nova Acta Phys.-Med. Acad. Caes. Leop.-Carol. Nat.
    Cur. 11(1): 131 (1823)"" .

<https://www.tropicos.org/name/35154856> a tcs:TaxonName ;
  tcs:nameString "Leucoloma blumei" ;
  dwc:scientificNameAuthorship "(Nees) Broth." ;
  dwc:namePublishedIn "Nat. Pflanzenfam. I(3): 322 (1901)" ;
  tcs:basionym <https://www.tropicos.org/name/35121972> .

<https://www.tropicos.org/name/35121973> a tcs:TaxonName ;
  tcs:nameString "Dicranum blumei var. laxifolium" ;
  dwc:scientificNameAuthorship "Broth. & Geh." ;
  dwc:namePublishedIn "Biblioth. Bot. 44: 4 (1898)" .

<https://www.tropicos.org/name/35121477> a tcs:TaxonName ;
  tcs:nameString "Dicranoloma blumei var. papillisetum" ;
  dwc:scientificNameAuthorship "M. Fleisch." ;
  dwc:namePublishedIn "Nova Guinea 12(2): 112 (1914)" .

<https://www.tropicos.org/name/35188177> a tcs:TaxonName ;
  tcs:nameString "Dicranoloma blumei f. subintegrum" ;
  dwc:scientificNameAuthorship "Dixon" ;
  dwc:namePublishedIn "J. Bot. 80: 4 (1942)" .

<https://www.tropicos.org/name/35121484> a tcs:TaxonName ;
  tcs:nameString "Dicranoloma braunfelsioides" ;
  dwc:scientificNameAuthorship "Herzog" ;
  dwc:namePublishedIn "Hedwigia 61: 288 (1919)" .

<https://www.tropicos.org/reference/9020903> a bibo:AcademicArticle ;
  dcterms:bibliographicCitation ""Klazenga, N. (1999). A revision of the
    Malesian species of Dicranoloma (Dicranaceae, Musci). Journal of the
    Hattori Botanical Laboratory 87: 1-130."" .

```

```
# Example shows both homotypic and heterotypic synonyms:
#
# Dicranoloma blumei, Dicranum blumei and Leucoloma blumei are homotypic
# synonyms and are linked through the basionym (Dicranum blumei is the basionym
# of Dicranoloma blumei and Leucoloma blumei).
#
# Dicranum blumei var. laxifolium, Dicranoloma blumei var. papillisetum,
# Dicranoloma braunfelsioides and Dicranoloma blumei f. subintegrum are
# heterotypic synonyms of Dicranoloma blumei (according to this publication) and
# are provided using the `synonym` property.
```

[\[TaxonConcept-synonym-example-1.ttl\]](#) [\[TaxonConcept-synonym-example-1.jsonld\]](#)

[\[TaxonConcept-synonym-example-2.ttl\]](#) [\[TaxonConcept-synonym-example-2.jsonld\]](#)

[\[TaxonConcept-synonym-example-3.ttl\]](#) [\[TaxonConcept-synonym-example-3.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/65>

tcs:vernacularName

Identifier	http://rs.tdwg.org/tcs/terms/vernacularName
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Vernacular Name
Definition	Name for a taxon in a language used for general purposes.
Usage	vernacularName is an IRI term; a Taxon Concept can have more than one vernacularName .
required: No — repeatable: Yes	

The **vernacularName** property can be used when a vernacular name is used alongside a scientific name, which is the **taxonName**. If a vernacular name is the only name, the **taxonName** property SHOULD be used. The object of the **vernacularName** property can be a Taxon Name, but another label object, such as the GBIF [Vernacular Name](#), might be preferable, especially if there can be multiple vernacular names for a concept.

Examples

```
[ ] a tcs:TaxonConcept ;
    dct:terms:title "Graphium macleayanum sec. Orr & Kitching 2010" ;
    tcs:accordingTo <urn:isbn:978-1-74175-108-6> ;
    tcs:taxonName [ a tcs:TaxonName ;
        tcs:nameString "Graphium macleayanum" ] ;
    tcs:vernacularName [ a gbif:VernacularName ;
        dwc:vernacularName "Macleay's Swallowtail" ;
```

```
    dcterms:language: "en" ] .

    <urn:isbn:978-1-74175-108-6> a bibo:Book ;
      dcterms:bibliographicCitation ""Orr, A. & Kitching, R. (2010). The
        butterflies of Australia. Jacana Books, Crows Nest, Australia."" .
```

[\[TaxonConcept-vernacularName-example-1.ttl\]](#) [\[TaxonConcept-vernacularName-example-1.jsonld\]](#)

[\[TaxonConcept-vernacularName-example-2.ttl\]](#) [\[TaxonConcept-vernacularName-example-2.jsonld\]](#)

[\[TaxonConcept-vernacularName-example-3.ttl\]](#) [\[TaxonConcept-vernacularName-example-3.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/10>

tcs:taxonRank

Identifier	http://rs.tdwg.org/tcs/terms/taxonRank
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Taxonomic Rank
Definition	The rank at which a taxon is classified.
Usage	taxonRank is an IRI property; a Taxon Concept or Taxon Name can have only one taxonRank .
required: No — repeatable: No	
Comments	<p>This property takes an object or IRI and it is RECOMMENDED to use a value from an existing controlled vocabulary. While there is no TDWG vocabulary yet, the GBIF Taxonomic Rank Vocabulary (https://rs.gbif.org/vocabulary/gbif/rank.xml) is RECOMMENDED.</p> <p>A TaxonName takes its taxonRank from the taxonConcept it is applied to, so this property can also be used on a (stand-alone) TaxonName object.</p>
GitHub issue	https://github.com/tdwg/tcs2/issues/32

tcs:parent

Identifier	http://rs.tdwg.org/tcs/terms/parent
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Parent
Definition	The direct parent in a classification.

Usage	parent is another Taxon Concept; a Taxon Concept can have only one parent .
required: No — repeatable: No	
Comments	The parent is another Taxon Concept. This is the parent as indicated in the accordingTo reference, rather than a third-party classification. The accordingTo of the parent will generally, but not necessarily, be the same as that of the child.
Examples	
<pre><https://www.catalogueoflife.org/data/taxon/6DBT> a tcs:TaxonConcept ; dcterms:title "Panthera sec. Catalogue of Life 2024-01-24" ; tcs:accordingTo <https://doi.org/10.48580/dfrdl> ; tcs:taxonName: [a tcs:TaxonName ; tcs:nameString: "Panthera" ; dwc:scientificNameAuthorship: "Oken, 1816"] . <https://www.catalogueoflife.org/data/taxon/4CGXP> a tcs:TaxonConcept ; dcterms:title "Panthera leo sec. Catalogue of Life 2024-01-24" ; tcs:accordingTo <https://doi.org/10.48580/dfrdl> ; tcs:taxonName: [a tcs:TaxonName ; tcs:nameString: "Panthera leo" ; dwc:scientificNameAuthorship: "(Linnaeus, 1758)"] ; tcs:parent <https://www.catalogueoflife.org/data/taxon/6DBT> . <https://www.catalogueoflife.org/data/taxon/4CGXQ> a tcs:TaxonConcept ; dcterms:title "Panthera onca sec. Catalogue of Life 2024-01-24" ; tcs:accordingTo <https://doi.org/10.48580/dfrdl> ; tcs:taxonName: [a tcs:TaxonName ; tcs:nameString: "Panthera onca" ; dwc:scientificNameAuthorship: "(Linnaeus, 1758)"] ; tcs:parent <https://www.catalogueoflife.org/data/taxon/6DBT> . <https://www.catalogueoflife.org/data/taxon/4CGXR> a tcs:TaxonConcept ; dcterms:title "Panthera pardus sec. Catalogue of Life 2024-01-24" ; tcs:accordingTo <https://doi.org/10.48580/dfrdl> ; tcs:taxonName: [a tcs:TaxonName ; tcs:nameString: "Panthera pardus" ; dwc:scientificNameAuthorship: "(Linnaeus, 1758)"] ; tcs:parent <https://www.catalogueoflife.org/data/taxon/6DBT> . <https://www.catalogueoflife.org/data/taxon/4CGXS> a tcs:TaxonConcept ; dcterms:title "Panthera tigris sec. Catalogue of Life 2024-01-24" ; tcs:accordingTo <https://doi.org/10.48580/dfrdl> ; tcs:taxonName: [a tcs:TaxonName ; tcs:nameString: "Panthera tigris" ; dwc:scientificNameAuthorship: "(Linnaeus, 1758)"] ; tcs:parent <https://www.catalogueoflife.org/data/taxon/6DBT> .</pre>	

[TaxonConcept-parent-example-1.ttl] [TaxonConcept-parent-example-1.jsonld]

GitHub issue <https://github.com/tdwg/tcs2/issues/9>

tcs:child

Identifier	http://rs.tdwg.org/tcs/terms/child
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Child
Definition	A direct subordinate in a classification.
Usage	child is another Taxon Concept; a Taxon Concept can have more than one child.
required: No — repeatable: Yes	

Examples

```
<https://www.catalogueoflife.org/data/taxon/6DBT> a tcs:TaxonConcept ;
  dcterms:title "Panthera sec. Catalogue of Life 2024-01-24" ;
  tcs:accordingTo <https://doi.org/10.48580/dfrdl> ;
  tcs:taxonName: [ a tcs:TaxonName ;
    tcs:nameString: "Panthera" ;
    dwc:scientificNameAuthorship: "Oken, 1816" ] ;
  tcs:child <https://www.catalogueoflife.org/data/taxon/4CGXP> ,
    <https://www.catalogueoflife.org/data/taxon/4CGXQ> ,
    <https://www.catalogueoflife.org/data/taxon/4CGXR> ,
    <https://www.catalogueoflife.org/data/taxon/4CGXS> .

<https://www.catalogueoflife.org/data/taxon/4CGXP> a tcs:TaxonConcept ;
  dcterms:title "Panthera leo sec. Catalogue of Life 2024-01-24" ;
  tcs:accordingTo <https://doi.org/10.48580/dfrdl> ;
  tcs:taxonName: [ a tcs:TaxonName ;
    tcs:nameString: "Panthera leo" ;
    dwc:scientificNameAuthorship: "(Linnaeus, 1758)" ] .

<https://www.catalogueoflife.org/data/taxon/4CGXQ> a tcs:TaxonConcept ;
  dcterms:title "Panthera onca sec. Catalogue of Life 2024-01-24" ;
  tcs:accordingTo <https://doi.org/10.48580/dfrdl> ;
  tcs:taxonName: [ a tcs:TaxonName ;
    tcs:nameString: "Panthera onca" ;
    dwc:scientificNameAuthorship: "(Linnaeus, 1758)" ] .

<https://www.catalogueoflife.org/data/taxon/4CGXR> a tcs:TaxonConcept ;
  dcterms:title "Panthera pardus sec. Catalogue of Life 2024-01-24" ;
  tcs:accordingTo <https://doi.org/10.48580/dfrdl> ;
  tcs:taxonName: [ a tcs:TaxonName ;
    tcs:nameString: "Panthera pardus" ;
```

```
    dwc:scientificNameAuthorship: "(Linnaeus, 1758)" ] .

<https://www.catalogueoflife.org/data/taxon/4CGXS> a tcs:TaxonConcept ;
    dct:terms:title "Panthera tigris sec. Catalogue of Life 2024-01-24" ;
    tcs:accordingTo <https://doi.org/10.48580/dfddl> ;
    tcs:taxonName: [ a tcs:TaxonName ;
        tcs:nameString: "Panthera tigris" ;
        dwc:scientificNameAuthorship: "(Linnaeus, 1758)" ] .
```

[\[TaxonConcept-child-example-1.ttl\]](#) [\[TaxonConcept-child-example-1.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/232>

tcs:isCongruentWith

Identifier	http://rs.tdwg.org/tcs/terms/isCongruentWith
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Is Congruent With
Definition	The subject and object taxon concepts have a congruent taxonomic meaning, i.e. there is no conflict between the concepts
Usage	isCongruentWith can be used as a property on a Taxon Concept object, or as the value of the mappingRelation property on a Taxon Concept Mapping object. In both cases both the subject and object are Taxon Concepts.
required: No — repeatable: Yes	

The **isCongruentWith** relation is symmetrical, so if A **isCongruentWith** B then B **isCongruentWith** A, as well as transitive, so if A **isCongruentWith** B and B **isCongruentWith** C it follows that A **isCongruentWith** C.



Comments

This relation can also be written as the formula **A ≅ B** or **A == B**.

Examples

```
[ ] a tcs:TaxonConcept ;
  dcterms:title "Aspleniaceae sec. Rothfels & al. 2012" ;
  tcs:accordingTo <https://doi.org/10.1002/tax.613003> ;
  tcs:taxonName <https://ipni.org/n/30001382-2> ;
  tcs:isCongruentWith [ a tcs:TaxonConcept ;
    dcterms:title "Aspleniaceae sec. Christenhusz & al. 2011" ;
    tcs:accordingTo <https://doi.org/10.11646/phytotaxa.19.1.2> ;
    tcs:taxonName <https://ipni.org/n/30001382-2> ] ,
  [ a tcs:TaxonConcept ;
    dcterms:title "Aspleniaceae sec. Smith & al. 2006" ;
    tcs:accordingTo <https://doi.org/10.2307/25065646> ;
    tcs:acceptedName <https://ipni.org/n/30001382-2> ] ,
  [ a tcs:TaxonConcept ;
    dcterms:title "Aspleniaceae sec. Pichi Sermolli 1977" ;
    tcs:accordingTo <https://doi.org/10.1080/00837792.1977.10670077> ;
    tcs:taxonName <https://ipni.org/n/30001382-2> ] ,
  [ a tcs:TaxonConcept ;
    dcterms:title "Aspleniaceae sec. Nayar 1970" ;
    tcs:accordingTo <https://doi.org/10.2307/1217958> ;
    tcs:taxonName <https://ipni.org/n/30001382-2> ] .
```

[\[TaxonConcept-isCongruentWith-example-1.ttl\]](#) [\[TaxonConcept-isCongruentWith-example-1.jsonld\]](#)

[\[TaxonConceptMapping-isCongruentWith-example-2.ttl\]](#) [\[TaxonConceptMapping-isCongruentWith-example-2.jsonld\]](#)

[\[TaxonConcept-isCongruentWith-example-3.ttl\]](#) [\[TaxonConcept-isCongruentWith-example-3.jsonld\]](#)

[\[TaxonConceptMapping-isCongruentWith-example-1.ttl\]](#) [\[TaxonConceptMapping-isCongruentWith-example-1.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/52>

tcs:includes

Identifier	http://rs.tdwg.org/tcs/terms/includes
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Includes
Definition	The subject taxon concept has a more inclusive taxonomic meaning than the object taxon concept
Usage	includes can be used as a property on a Taxon Concept object, or as the value of the mappingRelation property on a Taxon Concept Mapping object. In both cases both the subject and object are Taxon Concepts.
required: No — repeatable: Yes	

Comments The **includes** relation is not symmetric, its inverse relation being **isIncludedIn**, so if A **includes** B then B **isIncludedIn** A. The **includes** relation is transitive, so if A **includes** B and B **includes** C it follows that A **includes** C.



This relation can also be written as the formula **A > B**.

Examples

```
[ ] a tcs:TaxonConcept ;
    dcterms:title "Diplaziopsidaceae sec. Rothfels & al. 2012" ;
    tcs:accordingTo <https://doi.org/10.1002/tax.613003> ;
    tcs:taxonName <https://ipni.org/n/77110538-1> ;
    tcs:includes [ a tcs:TaxonConcept ;
        dcterms:title "Diplaziopsidaceae sec. Christenhusz & al. 2011" ;
        tcs:accordingTo <https://doi.org/10.11646/phytotaxa.19.1.2> ;
        tcs:taxonName <https://ipni.org/n/77110538-1> ] .
```

[\[TaxonConcept-includes-example-1.ttl\]](#) [\[TaxonConcept-includes-example-1.jsonld\]](#)

[\[TaxonConceptMapping-includes-example-2.ttl\]](#) [\[TaxonConceptMapping-includes-example-2.jsonld\]](#)

[\[TaxonConceptMapping-includes-example-1.ttl\]](#) [\[TaxonConceptMapping-includes-example-1.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/53>

tcs:isIncludedIn

Identifier	http://rs.tdwg.org/tcs/terms/isIncludedIn
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	is included in
Definition	The subject taxon concept has a less inclusive taxonomic meaning than the object taxon concept
Usage	isIncludedIn can be used as a property on a Taxon Concept object, or as the value of the mappingRelation property on a Taxon Concept Mapping object. In both cases both the subject and object are Taxon Concepts.

required: No — **repeatable:** Yes

The **isIncludedIn** relation is not symmetric, its inverse relation being **includes**, so if A **isIncludedIn** B then B **includes** A. The **isIncludedIn** relation is transitive, so if A **isIncludedIn** B and B **isIncludedIn** C it follows that A **isIncludedIn** C.

Comments



This relation can also be written as the formula **A < B**.

Examples

```
[ ] a tcs:TaxonConcept ;
  dcterms:title "Athyriaceae sec. Rothfels & al. 2012" ;
  tcs:accordingTo <https://doi.org/10.1002/tax.613003> ;
  tcs:taxonName <https://ipni.org/n/30000361-2> ;
  tcs:isIncludedIn [ a tcs:TaxonConcept ;
    dcterms:title "Athyriaceae sec. Christenhusz & al. 2011" ;
    tcs:accordingTo <https://doi.org/10.11646/phytotaxa.19.1.2> ;
    tcs:taxonName <https://ipni.org/n/30000361-2> ] ,
  [ a tcs:TaxonConcept ;
    dcterms:title "Woodsiaceae sec. Smith & al. 2006" ;
    tcs:accordingTo <https://doi.org/10.2307/25065646> ;
    tcs:taxonName <https://ipni.org/n/30000455-2> ] ,
  [ a tcs:TaxonConcept ;
    dcterms:title "Dryopteridaceae sec. Nayar 1970" ;
    tcs:accordingTo <https://doi.org/10.2307/1217958> ;
    tcs:taxonName <https://ipni.org/n/30014148-2> ] ,
  [ a tcs:TaxonConcept ;
    dcterms:title "Dennstaedtiaceae sec. Holttum 1947" ;
    tcs:accordingTo [ a dcterms:BibliographicResource ;
      dcterms:bibliographicCitation ""Holttum, R.E. (1947). A
        revised classification of leptosporangiate ferns.
        Journal of the Linnean Society. Botany 53: 123-155.""
    ] ;
    tcs:taxonName <https://ipni.org/n/17434830-1> ] .
```

[\[TaxonConcept-isIncludedIn-example-1.ttl\]](#) [\[TaxonConcept-isIncludedIn-example-1.jsonld\]](#)

[\[TaxonConceptMapping-isIncludedIn-example-2.ttl\]](#) [\[TaxonConceptMapping-isIncludedIn-example-2.jsonld\]](#)

[\[TaxonConceptMapping-isIncludedIn-example-1.ttl\]](#) [\[TaxonConceptMapping-isIncludedIn-example-1.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/54>

tcs:partiallyOverlaps

Identifier	http://rs.tdwg.org/tcs/terms/partiallyOverlaps
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	partially overlaps
Definition	The subject and object taxon concepts have partially overlapping taxonomic meanings, <i>i.e.</i> they have some members in common, but each concept in addition has members that are not included in the other concept
Usage	partiallyOverlaps can be used as a property on a Taxon Concept object, or as the value of the mappingRelation property on a Taxon Concept Mapping object. In both cases both the subject and object are Taxon Concepts.
required: No — repeatable: Yes	

The **partiallyOverlaps** relation is symmetrical, so if A **partiallyOverlaps** B then B **partiallyOverlaps** A, but not transitive, so, if A **partiallyOverlaps** B and B **partiallyOverlaps** C, it does not follow that A **partiallyOverlaps** C.

Comments



This relation can also be written as the formula **A >< B**.

Examples

```
[ ] a tcs:TaxonConcept ;
    dcterms:title "Diplaziopsidaceae sec. Rothfels & al. 2012" ;
    tcs:accordingTo <https://doi.org/10.1002/tax.613003> ;
    tcs:taxonName <https://ipni.org/n/77110538-1> ;
    tcs:partiallyOverlaps [ a tcs:TaxonConcept ;
        dcterms:title "Athyriaceae sec. Christenhusz & al. 2011" ;
        tcs:accordingTo <https://doi.org/10.11646/phytotaxa.19.1.2> ;
        tcs:taxonName <https://ipni.org/n/30000361-2> ] .
```

[\[TaxonConcept-partiallyOverlaps-example-1.ttl\]](#) [\[TaxonConcept-partiallyOverlaps-example-1.jsonld\]](#)

[TaxonConceptMapping-partiallyOverlaps-example-2.ttl] [TaxonConceptMapping-partiallyOverlaps-example-2.jsonld]

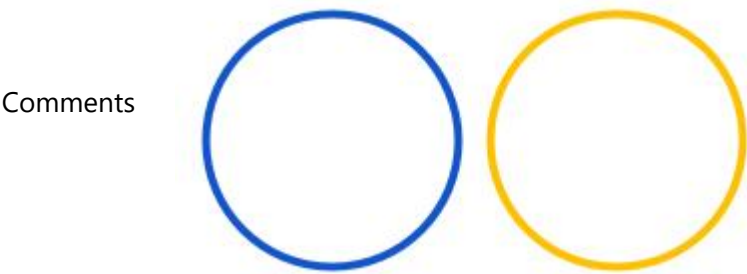
[TaxonConceptMapping-partiallyOverlaps-example-1.ttl] [TaxonConceptMapping-partiallyOverlaps-example-1.jsonld]

GitHub issue <https://github.com/tdwg/tcs2/issues/55>

tcs:isDisjointFrom

Identifier	http://rs.tdwg.org/tcs/terms/isDisjointFrom
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	is disjoint from
Definition	The subject and object taxon concepts have non-overlapping taxonomic meanings, <i>i.e.</i> they do not have any members in common
Usage	<code>isDisjointFrom</code> can be used as a property on a Taxon Concept object, or as the value of the <code>mappingRelation</code> property on a Taxon Concept Mapping object. In both cases both the subject and object are Taxon Concepts.
required: No — repeatable: Yes	

The `isDisjointFrom` relation is symmetrical, so if A `isDisjointFrom` B then B `isDisjointFrom` A, but not transitive, so, if A `isDisjointFrom` B and B `isDisjointFrom` C, it does not follow that A `isDisjointFrom` C.



This relation can also be written as the formula **A | B**.

Examples

```
[ ] a tcs:TaxonConcept
  dcterms:title "Campylopus introflexus sec. Koperski & al. 2000" ;
  tcs:accordingTo <https://www.tropicos.org/reference/9022656> ;
  tcs:taxonName <https://www.tropicos.org/name/35156181> ;
  tcs:isDisjointFrom [ rdf:value [ a tcs:TaxonConcept ;
                                dcterms:title "Campylopus introflexus sec. Mönkemeyer 1927" ;
```

```

tcs:accordingTo <https://www.tropicos.org/publication/700> ;
tcs:taxonName <https://www.tropicos.org/name/35156181> ] ;
rdfs:comment ""Mit dem Taxon in Mönkemeyer ist der Beschreibung
nach eindeutig *C. pilifer Brid. (C. polytrichoides De
Not.), eine ozeanisch-submediterrane Art, gemeint. In
älteren Floren wird C. introflexus, bevor diese Art von
Störmer (1958) für Europa nachgewiesen wurde, regelmäßig als
Synonym von C. polytrichoides aufgeführt oder in diesem
Sinne verwendet (vgl. u. a. Demaret & Castagne 1961:
203)"" ] .

# Because of the comment it is better to use a Taxon Concept Mapping object
# here.
```

[\[TaxonConcept-isDisjointFrom-example-1.ttl\]](#) [\[TaxonConcept-isDisjointFrom-example-1.jsonld\]](#)

[\[TaxonConceptMapping-isDisjointFrom-example-2.ttl\]](#) [\[TaxonConceptMapping-isDisjointFrom-example-2.jsonld\]](#)

[\[TaxonConceptMapping-isDisjointFrom-example-1.ttl\]](#) [\[TaxonConceptMapping-isDisjointFrom-example-1.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/56>

tcs:intersects

Identifier	http://rs.tdwg.org/tcs/terms/intersects
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Intersects
Definition	The taxonomic meanings of the subject and object taxon concepts intersect, <i>i.e.</i> they have at least one member in common.
Usage	intersects can be used as a property on a Taxon Concept object, or as the value of the mappingRelation property on a Taxon Concept Mapping object. In both cases both the subject and object are Taxon Concepts.
required: No — repeatable: Yes	

Comments

intersects is the opposite of **isDisjointFrom** and the union of **isCongruentWith**, **includes**, **isIncludedIn** and **partiallyOverlaps**, meaning it can be any of these relations. This relation can be used when the more precise nature of the relationship is not known.

Quasi-nomenclatural statements like 'pro parte synonym', 'partial synonym' and 'misapplication', are Taxon Concept Mappings, no matter how imperfect, and, in TCS, are best dealt with using the **intersects** relation. In fact, all 'traditional synonymy'

relationships, cf. Berendsohn & al. (2000 [[berendsohn_berlin_2003](#)]), can be accommodated using **intersects**. Also, citations of references in treatments are, in the context of TCS, best accommodated using the **intersects** relation.

Examples

```
[ ] a tcs:TaxonConcept ;
    dcterms:title "Begonia salaziensis sec. Klazenga & al. 1994" ;
    tcs:accordingTo <https://doi.org/10.2307/3668252> ;
    tcs:taxonName <https://ipni.org/n/105644-1> ;
    tcs:intersects [ a tcs:TaxonConcept ;
        dcterms:title "Begonia salaziensis sec. Warburg 1894" ;
        tcs:accordingTo [ a bibo:Chapter ;
            dcterms:bibliographicCitation ""Warburg, O. (1894).
Begoniaceae,
                                in Engler, A. & K. Prantl, Nat. Pflanzenfam. 3(6a):
                                121-150."" ] ;
        tcs:taxonName <https://ipni.org/n/105644-1> ] ,
    [ a tcs:TaxonConcept ;
        dcterms:title "Begonia salaziensis sec. Irmscher 1925" ;
        tcs:accordingTo [ a bibo:Chapter ;
            dcterms:bibliographicCitation ""Irmscher, E. (1925).
Begoniaceae,
                                in Engler, A. & K. Prantl, Nat. Pflanzenfam. ed. 2,
21:
                                548-588."" ] ;
        tcs:taxonName <https://ipni.org/n/105644-1> ] .

[ ] a tcs:TaxonConcept ;
    dcterms:title "Begonia seychellensis sec. Klazenga & al. 1994" ;
    tcs:accordingTo <https://doi.org/10.2307/3668252> ;
    tcs:taxonName <https://ipni.org/n/105731-1> ;
    tcs:intersects [ a tcs:TaxonConcept ;
        dcterms:title "Begonia comorensis sec. Keraudren-Aymonin 1983" ;
        tcs:accordingTo [ a bibo:Book ;
            dcterms:bibliographicCitation ""Keraudren-Aymonin, M. (1983).
Flore
                                de Madagascar et des Comores. Famille 144 - Begoniacées:
7-108"" ] ;
        tcs:taxonName <https://ipni.org/n/104440-1> ;
        tcs:synonym <https://ipni.org/n/105731-1> ] .
```

[\[TaxonConcept-intersects-example-1.ttl\]](#) [\[TaxonConcept-intersects-example-1.jsonld\]](#)

[\[TaxonConcept-intersects-example-2.ttl\]](#) [\[TaxonConcept-intersects-example-2.jsonld\]](#)

[\[TaxonConceptMapping-intersects-example-1.ttl\]](#) [\[TaxonConceptMapping-intersects-example-1.jsonld\]](#)

[\[TaxonConcept-intersects-example-3.ttl\]](#) [\[TaxonConcept-intersects-example-3.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/57>

dwc:scientificName

Identifier	http://rs.tdwg.org/dwc/terms/scientificName
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Scientific Name
Definition	The full scientific name, with authorship and date information if known. When forming part of an Identification, this should be the name in lowest level taxonomic rank that can be determined. This term should not contain identification qualifications, which should instead be supplied in the IdentificationQualifier term.
Usage	scientificName can be used in addition to the taxonName property on a Taxon Concept or the nameString property on a Taxon Name.
required: No — repeatable: No	
GitHub issue	https://github.com/tdwg/tcs2/issues/17

dwc:vernacularName

Identifier	http://rs.tdwg.org/dwc/terms/vernacularName
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Vernacular Name
Definition	A common or vernacular name.
required: No — repeatable: No	
GitHub issue	https://github.com/tdwg/tcs2/issues/235

dwc:verbatimTaxonRank

Identifier	http://rs.tdwg.org/dwc/terms/verbatimTaxonRank
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Verbatim taxon rank
Definition	The taxonomic rank of the most specific name in the dwc:scientificName as it appears in the original record.
required: No — repeatable: No	
Comments	

This term can be used for taxonomic rank designations that are not in the controlled vocabulary that is used. Implementations can decide for themselves if it makes more sense to use this term on a Taxon Concept object or a Taxon Name object, or both.

GitHub
issue <https://github.com/tdwg/tcs2/issues/6>

dcterms:title

Identifier <http://purl.org/dc/terms/title>

Type <http://www.w3.org/1999/02/22-rdf-syntax-ns#Property>

Label Taxon concept label

Definition A name given to the resource.

required: No — **repeatable:** No

Comments In TCS **dcterms:title** is used for the taxonomic concept label [[senderov_openbiodiv-o_2018](#)], which consists of the Taxon Name and a reference to the publication where the concept is circumscribed, separated by 'sec.', which stands for 'secundus' ('according to'). It is used to indicate one specific meaning of a name – a Taxon Concept – rather than the cumulative nomenclatural and taxonomic legacy associated with the name.

Examples

- *Dicranoloma assimile* sec. Klazenga 1999
- *Euphrasia gibbsiae* sec. Barker 1982
- *Megalorhipida leucodactylus* sec. Gielis & Hobern 2020-07-16
- *Circus cyaneus* sec. Clements 2021
- *Circus cyaneus* sec. Howard & Moore 2013
- *Circus [cyaneus or hudsonius]* sec. AviBase #82745BAA

GitHub
issue <https://github.com/tdwg/tcs2/issues/222>

Taxon Concept Mapping

tcs:TaxonConceptMapping

Identifier <http://rs.tdwg.org/tcs/terms/TaxonConceptMapping>

Type <http://www.w3.org/2000/01/rdf-schema#Class>

Label Taxon concept mapping

Definition Alignment or mapping of two Taxon Concepts in different taxonomies or different versions of a taxonomy

Usage	When using this class all properties are required
-------	---

Comments	The Taxon Concept Mapping class allows for adding extra data to a taxon concept mapping statement. As it allows for adding an 'according to' to a concept mapping it can be used for third-party mappings. While structurally very similar to the Darwin Core Resource Relationship class, it is different in that instances of the Taxon Concept Mapping class are meaningful as standalone objects.
----------	---

Examples

```
# Andropogon capillipes sec. BONAP 2014 is congruent with Andropogon capillipes
sec. Weakley 2006
[ ] a tcs:TaxonConceptMapping ;
    tcs:mappingAccordingTo <https://doi.org/10.3233/SW-160220> ;
    tcs:mappingRelation tcs:isCongruentWith ;
    tcs:subjectTaxonConcept [ a tcs:TaxonConcept ;
        dcterms:title "Andropogon capillipes sec. BONAP 2014" ;
        tcs:taxonName <https://ipni.org/n/12781-2> ;
        tcs:accordingTo <http://bonap.net/napa#2014> ] ;
    tcs:objectTaxonConcept [ a tcs:TaxonConcept ;
        dcterms:title "Andropogon capillipes sec. Weakley 2006" ;
        tcs:taxonName <https://ipni.org/n/12781-2> ;
        tcs:accordingTo
        <http://www.herbarium.unc.edu/FloraArchives/WeakleyFlora_2006-Jan.pdf> ] .
```

[\[TaxonConceptMapping-isCongruentWith-example-1.ttl\]](#) [\[TaxonConceptMapping-isCongruentWith-example-1.jsonld\]](#)

[\[TaxonConceptMapping-isCongruentWith-example-2.ttl\]](#) [\[TaxonConceptMapping-isCongruentWith-example-2.jsonld\]](#)

[\[TaxonConceptMapping-includes-example-1.ttl\]](#) [\[TaxonConceptMapping-includes-example-1.jsonld\]](#)

[\[TaxonConceptMapping-includes-example-2.ttl\]](#) [\[TaxonConceptMapping-includes-example-2.jsonld\]](#)

[\[TaxonConceptMapping-isIncludedIn-example-1.ttl\]](#) [\[TaxonConceptMapping-isIncludedIn-example-1.jsonld\]](#)

[\[TaxonConceptMapping-isIncludedIn-example-2.ttl\]](#) [\[TaxonConceptMapping-isIncludedIn-example-2.jsonld\]](#)

[\[TaxonConceptMapping-partiallyOverlaps-example-1.ttl\]](#) [\[TaxonConceptMapping-partiallyOverlaps-example-1.jsonld\]](#)

[\[TaxonConceptMapping-partiallyOverlaps-example-2.ttl\]](#) [\[TaxonConceptMapping-partiallyOverlaps-example-2.jsonld\]](#)

[\[TaxonConceptMapping-isDisjointFrom-example-1.ttl\]](#) [\[TaxonConceptMapping-isDisjointFrom-example-1.jsonld\]](#)

[TaxonConceptMapping-isDisjointFrom-example-2.ttl] [TaxonConceptMapping-isDisjointFrom-example-2.jsonld]

[TaxonConceptMapping-intersects-example-1.ttl] [TaxonConceptMapping-intersects-example-1.jsonld]

[TaxonConceptMapping-intersects-example-2.ttl] [TaxonConceptMapping-intersects-example-2.jsonld]

GitHub issue <https://github.com/tdwg/tcs2/issues/43>

tcs:mappingAccordingTo

Identifier	http://rs.tdwg.org/tcs/terms/mappingAccordingTo
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Mapping according to
Definition	Reference to the source of the taxon concept mapping.
Usage	mappingAccordingTo is an IRI term and is required; a Taxon Concept Mapping can have only one mappingAccordingTo .
required: No — repeatable: No	
GitHub issue	https://github.com/tdwg/tcs2/issues/47

tcs:mappingRelation

Identifier	http://rs.tdwg.org/tcs/terms/mappingRelation
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Mapping relation
Definition	The kind of mapping relation between the two concepts
Usage	This property is required; one MUST use one of the mapping properties isCongruentWith , includes , isIncludedIn , partiallyOverlaps , isDisjointFrom or intersects .
required: Yes — repeatable: No	
GitHub issue	https://github.com/tdwg/tcs2/issues/44

tcs:subjectTaxonConcept

Identifier	http://rs.tdwg.org/tcs/terms/subjectTaxonConcept
------------	---

Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Subject Taxon Concept
Definition	Taxon Concept that is the subject in the mapping statement.
Usage	subjectTaxonConcept is a TCS Taxon Concept; a Taxon Concept Mapping statement can have only one subjectTaxonConcept .
required: Yes — repeatable: No	
Comments	This is the Taxon Concept at the left-hand side of the statement.
GitHub issue	https://github.com/tdwg/tcs2/issues/45

tcs:objectTaxonConcept

Identifier	http://rs.tdwg.org/tcs/terms/objectTaxonConcept
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Object Taxon Concept
Definition	Taxon Concept that is the object in the mapping statement.
Usage	objectTaxonConcept is a TCS Taxon Concept; a Taxon Concept Mapping statement can have only one objectTaxonConcept .
required: Yes — repeatable: No	
Comments	This is the Taxon Concept at the right-hand side of the statement.
GitHub issue	https://github.com/tdwg/tcs2/issues/46

dcterms:creator

Identifier	http://purl.org/dc/terms/creator
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Creator
Definition	An entity primarily responsible for making the resource.

required: No — **repeatable:** Yes

Comments `dcterms:creator` can be used in combination with `dcterms:created` as an alternative to `mappingAccordingTo`.

GitHub issue <https://github.com/tdwg/tcs2/issues/47>

dcterms:created

Identifier <http://purl.org/dc/terms/created>

Type <http://www.w3.org/1999/02/22-rdf-syntax-ns#Property>

Label Created

Definition Date of creation of the resource.

required: No — **repeatable:** No

Comments `dcterms:created` can be used in combination with `dcterms:creator` as an alternative to `mappingAccordingTo`.

GitHub issue <https://github.com/tdwg/tcs2/issues/47>

Taxon Name

tcs:TaxonName

Identifier <http://rs.tdwg.org/tcs/terms/TaxonName>

Type <http://www.w3.org/2000/01/rdf-schema#Class>

Label Taxon Name

Definition A name or label applied to a taxon or taxonomic group.

Usage A TCS Taxon Name requires either a `nameString` or `dwc:scientificName`.

Comments The word 'name' here is taken in its dictionary meaning and not in the sense of a particular nomenclatural code. This means that the Taxon Name class can, in principle, be used for any type of name, not just names that are validly published under the relevant nomenclatural code.

Examples

```
<urn:lsid:zoobank.org:act:355AAA50-D89F-466E-A216-96B7A17D5AD4> a tcs:TaxonName ;
    tcs:nameString "Carabus nitens" ;
    dwc:scientificNameAuthorship "Linnaeus, 1758" .
```

[\[TaxonName-example-1.ttl\]](#) [\[TaxonName-example-1.jsonld\]](#)

[\[TaxonName-example-2.ttl\]](#) [\[TaxonName-example-2.jsonld\]](#)

[\[TaxonName-example-3.ttl\]](#) [\[TaxonName-example-3.jsonld\]](#)

[\[TaxonName-example-4.ttl\]](#) [\[TaxonName-example-4.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/15>

tcs:nameString

Identifier	http://rs.tdwg.org/tcs/terms/nameString
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Taxon Name String
Definition	The complete name string without any authority or year components.
Usage	<code>nameString</code> is a literal. Either <code>taxonomicNameString</code> or <code>dwc:scientificName</code> is required on a TCS Taxon Name and a Taxon Name can have only one of either.
required: No — repeatable: No	
Comments	The <code>nameString</code> property differs from the <code>scientificName</code> property in Darwin Core in that all kinds of names are allowed. Also, in the case of scientific names, contrary to the <code>dwc:scientificName</code> , <code>nameString</code> does not include the authorship. In botanical names, it does include the rank prefixes for infrageneric and infraspecific epithets as they are considered part of the name.
GitHub issue	https://github.com/tdwg/tcs2/issues/16

tcs:namePublishedIn

Identifier	http://rs.tdwg.org/tcs/terms/namePublishedIn
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Name Published In
Definition	

Reference to the publication in which the name was first published.

required: No — **repeatable:** No

Comments In botany, this would be the protologue. This is the IRI counterpart of the Darwin Core `namePublishedIn`, which TCS borrows.

GitHub issue <https://github.com/tdwg/tcs2/issues/29>

tcs:microreference

Identifier <http://rs.tdwg.org/tcs/terms/microreference>

Type <http://www.w3.org/1999/02/22-rdf-syntax-ns#Property>

Label Microreference

Definition Specifies any minor reference parts, e.g. page number.

Usage `microreference` is a string literal; a Taxon Name can have only one `microreference` and only when `namePublishedIn` is used as well.

required: No — **repeatable:** No

Comments In taxonomic works it is convention to cite the exact location in a work where a new name is published. The `microreference` property lets one do that on the Taxon Name object, so that the `namePublishedIn` reference can be reused.

GitHub issue <https://github.com/tdwg/tcs2/issues/30>

tcs:nomenclaturalCode

Identifier <http://rs.tdwg.org/tcs/terms/nomenclaturalCode>

Type <http://www.w3.org/1999/02/22-rdf-syntax-ns#Property>

Label Nomenclatural Code

Definition Nomenclatural code that applies to the group of organisms the taxonomic name is for.

Usage `nomenclaturalCode` takes an IRI or object; a Taxon Name can have only one `nomenclaturalCode`.

required: No — **repeatable:** No

Comments	This is the IRI equivalent of the Darwin Core nomenclaturalCode . In the absence of a TDWG vocabulary, it is RECOMMENDED to use a value from the GBIF Nomenclatural Codes Vocabulary (https://rs.gbif.org/vocabulary/gbif/nomenclatural_code.xml).
----------	--

GitHub issue	https://github.com/tdwg/tcs2/issues/33
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tcs:nomenclaturalStatus

Identifier	http://rs.tdwg.org/tcs/terms/nomenclaturalStatus
------------	---

Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
------	---

Label	Nomenclatural Status
-------	----------------------

Definition	Status related to the original publication of the name and its conformance to the relevant rules of nomenclature.
------------	---

Usage	nomenclaturalStatus takes an IRI or object; a Taxon Name can have only one nomenclaturalStatus .
-------	--

required: No — **repeatable:** No

Comments	This is the IRI equivalent of the Darwin Core nomenclaturalStatus . In the absence of a TDWG vocabulary, it is RECOMMENDED to use a value from the GBIF Nomenclatural Status Vocabulary (https://rs.gbif.org/vocabulary/gbif/nomenclatural_status.xml).
----------	---

GitHub issue	https://github.com/tdwg/tcs2/issues/35
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tcs:typification

Identifier	http://rs.tdwg.org/tcs/terms/typification
------------	---

Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
------	---

Label	Typification
-------	--------------

Definition	Designation of a nomenclatural type for a name
------------	--

Usage	The typification property takes a tcs:NomenclaturalType or array of tcs:NomenclaturalTypes .
-------	---

required: No — **repeatable:** Yes

Comments `tcs:typification` is the inverse of `tcs:typifiedName`.

Examples

```
<https://ipni.org/n/105731-1> a tcs:TaxonName ;
    tcs:nameString "Begonia seychellensis" ;
    dwc:scientificNameAuthorship "Hemsl." ;
    dwc:namePublishedIn "J. Bot. 54(Suppl. 2): 15 (1916)" ;
    tcs:typification [ a tcs:NomenclaturalType ;
        tcs:typifiedName <https://ipni.org/n/105731-1> ;
        tcs:typeSpecimen [ a dwc:MaterialCitation ;
            dwc:country "Seychelles" ;
            dwc:island "Mahé" ;
            dwc:recordedBy "Horne" ;
            dwc:recordNumber "s.n." ;
            dwc:institutionCode "G" ] ;
        tcs:typeOfType
<http://rs.gbif.org/vocabulary/gbif/type_status/isolectotype> ] ,
    [ a tcs:NomenclaturalType ;
        tcs:typifiedName <https://ipni.org/n/105731-1> ;
        tcs:typeSpecimen [ a dwc:MaterialCitation ;
            dwc:country "Seychelles" ;
            dwc:island "Mahé" ;
            dwc:recordedBy "Horne" ;
            dwc:recordNumber "245" ;
            dwc:institutionCode "K" ] ;
        tcs:typeOfType
<http://rs.gbif.org/vocabulary/gbif/type_status/lectotype> ] ,
    [ a tcs:NomenclaturalType ;
        tcs:typifiedName <https://ipni.org/n/105731-1> ;
        tcs:typeSpecimen [ a dwc:MaterialCitation ;
            dwc:country "Seychelles" ;
            dwc:island "Mahé" ;
            dwc:recordedBy "Gardiner" ;
            dwc:recordNumber "s.n." ;
            dwc:institutionCode "K" ] ;
        tcs:typeOfType
<http://rs.gbif.org/vocabulary/gbif/type_status/syntype> ] ,
    [ a tcs:NomenclaturalType ;
        tcs:typifiedName <https://ipni.org/n/105731-1> ;
        tcs:typeSpecimen [ a dwc:MaterialCitation ;
            dwc:country "Seychelles" ;
            dwc:island "Silhouette" ;
            dwc:recordedBy "Gardiner" ;
            dwc:recordNumber "111" ;
            dwc:institutionCode "K" ] ;
        tcs:typeOfType
<http://rs.gbif.org/vocabulary/gbif/type_status/syntype> ] ,
    [ a tcs:NomenclaturalType ;
```

```

tcs:typifiedName <https://ipni.org/n/105731-1> ;
tcs:typeSpecimen [ a dwc:MaterialCitation ;
    dwc:country "Seychelles" ;
    dwc:island "Mahé and Silhouette" ;
    dwc:recordedBy "Neville" ;
    dwc:recordNumber "s.n." ;
    dwc:institutionCode "K" ] ;
tcs:typeOfType
<http://rs.gbif.org/vocabulary/gbif/type_status/syntype> ] .

```

[\[TaxonName-typification-example-1.ttl\]](#) [\[TaxonName-typification-example-1.jsonld\]](#)

[\[TaxonName-typification-example-2.ttl\]](#) [\[TaxonName-typification-example-2.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/238>

tcs:typificationLiteral

Identifier	http://rs.tdwg.org/tcs/terms/typificationLiteral
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Typification
Definition	Designation of a nomenclatural type for a name
Usage	The typificationLiteral property takes a literal value.
required: No — repeatable: No	
Comments	The typificationLiteral property can be used for citation of a type (or types) as written in the publication in which the typified name was published.
GitHub issue	https://github.com/tdwg/tcs2/issues/223

tcs:basionym

Identifier	http://rs.tdwg.org/tcs/terms/basionym
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Basionym
Definition	Epithet- or name-bringing synonym.
Usage	A basionym is another Taxon Name; a Taxon Name can have only one basionym .

required: No — repeatable: No	
Comments	<p>The term basionym is in the draft BioCode ([greuter_draft_2011]), so can be used for all organisms. The basionym property is only used for new combinations ('comb. nov.'). If the new name is a replacement name ('nom. nov.') the replacedName property SHOULD be used instead. It SHOULD be noted that a basionym is always a different name or combination: a name cannot be its own basionym.</p>
Examples	
<pre><https://id.biodiversity.org.au/name/apni/166271> a tcs:TaxonName ; rdf:seeAlso <https://ipni.org/n/17571690-1> ; tcs:nameString "Doodia australis" ; dwc:scientificNameAuthorship "(Parris) Parris" ; dwc:namePublishedIn "Fl. Australia 48: 710 (1998)" ; tcs:basionym <https://id.biodiversity.org.au/name/apni/117170> . <https://id.biodiversity.org.au/name/apni/117170> a tcs:TaxonName ; rdf:seeAlso <https://ipni.org/n/17567870-1> ; tcs:nameString "Doodia media subsp. australis" ; dwc:scientificNameAuthorship "Parris" ; dwc:namePublishedIn "New Zealand J. Bot. 10(4): 593 (1972)" .</pre>	
[TaxonName-basionym-example-1.ttl] [TaxonName-basionym-example-1.jsonld]	
[TaxonName-basionym-example-2.ttl] [TaxonName-basionym-example-2.jsonld]	
GitHub issue https://github.com/tdwg/tcs2/issues/36	
tcs:replacedName	
Identifier	http://rs.tdwg.org/tcs/terms/replacedName
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Replaced name
Definition	The legitimate or illegitimate, previously published name on which a replacement name (nomen novum) is based.
Usage	replacedName is another Taxon Name; a Taxon Name can have only one replacedName .
required: No — repeatable: No	
Comments	<p>'replaced name' is used in the draft BioCode ([greuter_draft_2011]). In the Botanical Code the term 'replaced synonym' is used for the same thing. A 'replacement name' is a name that is</p>

published as a substitute for an earlier published name that is either illegitimate or for which a new combination cannot be created in the place a taxon is transferred to because of an older blocking name.

Examples

```
<https://www.tropicos.org/name/35183593> a tcs:TaxonName ;
    tcs:nameString "Dicranum bartramianum" ;
    dwc:scientificNameAuthorship "B.H.Allen" ;
    dwc:namePublishedIn "Cryptog. Bryol. Lichénol. 8: 323" ;
    dwc:namePublishedInYear "1987" ;
    tcs:replacedName <https://www.tropicos.org/name/35120798> .

<https://www.tropicos.org/name/35120798> a tcs:TaxonName ;
    tcs:nameString "Dicnemon robustum" ;
    dwc:scientificNameAuthorship "E.B.Bartram" ;
    dwc:namePublishedIn "Bryologist 48: 112" ;
    dwc:namePublishedInYear "1945" .

# blocking name
<https://www.tropicos.org/name/35124067> a tcs:TaxonName ;
    tcs:nameString "Dicranum robustum" ;
    dwc:scientificNameAuthorship "Hook.f. & Wilson" ;
    dwc:namePublishedIn "London J. Bot. 3: 542" ;
    dwc:namePublishedInYear "1844" .

# combination of Dicnemon robustum
<https://www.tropicos.org/name/35162373> a tcs:TaxonName ;
    tcs:nameString "Eucamptodon robustum" ;
    dwc:scientificNameAuthorship "(E.B.Bartram) E.B.Bartram" ;
    dwc:namePublishedIn "Brittonia 11: 88" ;
    dwc:namePublishedInYear "1959" ;
    tcs:basionym <https://www.tropicos.org/name/35120798> .

# combination of Dicranum bartramianum
<https://www.tropicos.org/name/35204723> a tcs:TaxonName ;
    tcs:nameString "Dicranoloma bartramianum" ;
    dwc:scientificNameAuthorship "(B.H.Allen) Klazenga" ;
    dwc:namePublishedIn "J. Hattory Bot. Lab. 87: 57" ;
    dwc:namePublishedInYear "1999" ;
    tcs:basionym <https://www.tropicos.org/name/35183593> .
```

[\[TaxonName-replacedName-example-1.ttl\]](#) [\[TaxonName-replacedName-example-1.jsonld\]](#)

[\[TaxonName-replacedName-example-2.ttl\]](#) [\[TaxonName-replacedName-example-2.jsonld\]](#)

[\[TaxonName-replacedName-example-3.ttl\]](#) [\[TaxonName-replacedName-example-3.jsonld\]](#)

[\[TaxonName-replacedName-example-4.ttl\]](#) [\[TaxonName-replacedName-example-4.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/37>

tcs:basedOn

Identifier	http://rs.tdwg.org/tcs/terms/basedOn
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Based on
Definition	Earlier name on which this name is based
Usage	basedOn is another Taxon Name; a Taxon Name can have only one basedOn . The term SHOULD only be used in situations where the semantically more meaningful basionym and replacedName cannot be used.
required: No — repeatable: No	
Comments	The basedOn property can be used to associate a name to a homotypic group of names in situations where the basionym and replacedName properties cannot be used. Therefore the property can be useful for (1) linking an autonym to a species name, (2) linking a valid name to an earlier invalid name and (3) linking an invalid name to a later valid name.
GitHub issue	https://github.com/tdwg/tcs2/issues/38

tcs:laterHomonymOf

Identifier	http://rs.tdwg.org/tcs/terms/laterHomonymOf
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Later homonym of
Definition	An older legitimate name with the same spelling but a different nomenclatural type
Usage	laterHomonymOf is another Taxon Name object
required: No — repeatable: No	
Comments	If there are more than two homonyms, the oldest name SHOULD be given here. In zoology, this is the <i>senior homonym</i> .
GitHub issue	https://github.com/tdwg/tcs2/issues/229

tcs:conservedAgainst

Identifier	http://rs.tdwg.org/tcs/terms/conservedAgainst
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Conserved Against
Definition	Name(s) against which this name is conserved.
Usage	The conservedAgainst property takes another Taxon Name; a Taxon Name can be conserved against more than one other Taxon Names.
required: No — repeatable: Yes	
Comments	A scientific name below the rank of family is not conserved against all other names, but only against one or more names that in turn are rejected against the conserved name. A name can be conserved against more than one other name, so this property is repeatable.

Examples

```
<https://www.tropicos.org/name/35000378> a tcs:TaxonName ;
  tcs:nameString "Dicranoloma" ;
  dwc:scientificNameAuthorship "(Renauld) Renauld" ;
  tcs:namePublishedInYear "1909" ;
  tcs:conservedAgainst <https://www.tropicos.org/name/35000771> ,
    <https://www.tropicos.org/name/35000146> .

<https://www.tropicos.org/name/35000771> a tcs:TaxonName ;
  tcs:nameString "Megalostylium" ;
  dwc:scientificNameAuthorship "Dozy & Molk." ;
  dwc:namePublishedInYear "1848" .

<https://www.tropicos.org/name/35000146> a tcs:TaxonName ;
  tcs:nameString "Braunfelsia" ;
  dwc:scientificNameAuthorship "Paris" ;
  dwc:namePublishedInYear "1894" .
```

[\[TaxonName-conservedAgainst-example-1.ttl\]](#) [\[TaxonName-conservedAgainst-example-1.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/39>

tcs:combinationAuthor

Identifier	http://rs.tdwg.org/tcs/terms/combinationAuthor
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Combination author

Definition	Author of the combination
Usage	<code>combinationAuthor</code> is an IRI property. It can be a person or a list of persons.
required: No — repeatable: Yes	
Comments	'combination' is taken here to be a different name with the same nomenclatural type.
Examples	

```
<https://ipni.org/n/316069-1> a tcs:TaxonName ;
    tcs:nameString "Rafflesia arnoldi" ;
    dwc:scientificNameAuthorship "R.Br." ;
    tcs:combinationAuthor <https://ipni.org/a/1192-1> ;
    tcs:combinationAuthorLiteral "R.Br." .

<https://ipni.org/a/1192-1> a foaf:Person ;
    foaf:givenName "Robert" ;
    foaf:surname "Brown" .
```

[\[TaxonName-combinationAuthor-example-1.ttl\]](#) [\[TaxonName-combinationAuthor-example-1.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/239>

tcs:combinationAuthorLiteral

Identifier	http://rs.tdwg.org/tcs/terms/combinationAuthorLiteral
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Combination author literal
Definition	Author of the combination
Usage	<code>combinationAuthorLiteral</code> is a Literal property.
required: No — repeatable: No	
Comments	'combination' is taken here to be a different name with the same nomenclatural type.
GitHub issue	https://github.com/tdwg/tcs2/issues/239

tcs:basionymAuthor

Identifier	http://rs.tdwg.org/tcs/terms/basionymAuthor
------------	---

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Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Basionym author
Definition	Author of the basionym of the name
Usage	basionymAuthor is an IRI property. It can be a person or a list of persons.
required: No — repeatable: Yes	
Comments	basionymAuthor (or its literal counterpart) is the bit in parentheses in the dwc:scientificNameAuthorship .

Examples

```
<https://tropicos.org/name/35121611> a tcs:taxonName ;
  tcs:nameString "Dicranoloma robustum" ;
  dwc:scientificNameAuthorship "(Hook.f. & Wilson) Paris" ;
  tcs:combinationAuthor <https://tropicos.org/person/2011> ;
  tcs:combinationAuthorLiteral "Paris"
  tcs:basionymAuthor _:b1 ;
  tcs:basionymAuthorLiteral "Hook.f. & Wilson" ;
  tcs:basionym <https://tropicos.org/name/35124067> .

<https://tropicos.org/name/35124067> a tcs:TaxonName ;
  tcs:nameString "Dicranum robustum" ;
  dwc:scientificNameAuthorship ;
  tcs:combinationAuthor _:b1 ;
  tcs:combinationAuthorLiteral "Hook.f. & Wilson" .

<https://tropicos.org/person/2011> a foaf:Person ;
  foaf:givenName "Jean Édouard Gabriel Narcisse" ;
  foaf:surname "Paris" .

_:b1 a rdf:Seq ;
  rdf:_1 <https://tropicos.org/person/3> ;
  rdf:_2 <https://tropicos.org/person/10481> .

<https://tropicos.org/person/3> a foaf:Person ;
  foaf:givenName "Joseph Dalton" ;
  foaf:surname "Hooker" .

<https://tropicos.org/person/10481> a foaf:Person ;
  foaf:givenName "William" ;
  foaf:surname "Wilson" .
```

GitHub issue <https://github.com/tdwg/tcs2/issues/239>

tcs:basionymAuthorLiteral

Identifier	http://rs.tdwg.org/tcs/terms/basionymAuthorLiteral
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Basionym author literal
Definition	Author of the basionym of the name
Usage	basionymAuthorLiteral is a Literal property.
required: No — repeatable: No	
Comments	basionymAuthorLiteral is the bit in parentheses in the dwc:scientificNameAuthorship .
GitHub issue	https://github.com/tdwg/tcs2/issues/239

tcs:combinationAscribedAuthor

Identifier	http://rs.tdwg.org/tcs/terms/combinationAscribedAuthor
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Combination ascribed author
Definition	Ascribed author of the present name
Usage	combinationAscribedAuthor is an IRI property. It can be a person or a list of persons.
required: No — repeatable: Yes	
Comments	'Ascribed author' is a person (or group of people) who a name is ascribed to in a publication, but who is not the author of the name according to the rules of the nomenclatural codes, because they did not contribute to the validating description of the name. In the dwc:scientificNameAuthorship these authors are indicated with 'ex', the ascribed author coming before the 'ex' and the author the name is attributed to after. Note that the 'ex' construction that is sometimes used with zoological names has got nothing to do with attribution or ascription, but is used to indicate a concept, much like we do here with 'sec.' or 'sensu' in taxon concept labels.
Examples	

```
<https://tropicos.org/name/35153928> a tcs:TaxonName ;
  tcs:nameString "Calymperes serratum" ;
  dwc:scientificNameAuthorship "A.Braun ex Müll.Hal." ;
  tcs:combinationAuthor <https://tropicos.org/person/2> ;
  tcs:combinationAuthorLiteral "Müll.Hal." ;
  tcs:combinationAscribedAuthor <https://tropicos.org/person/973> ;
  tcs:combinationAscribedAuthorLiteral "A.Braun" .

<https://tropicos.org/person/2> a foaf:Person ;
  foaf:givenName "Johann Karl (Carl) August (Friedrich Wilhelm)" ;
  foaf:surname "Müller" .

<https://tropicos.org/person/973> a foaf:Person ;
  foaf:givenName "Alexander Karl (Carl) Heinrich" ;
  foaf:surname "Braun" .
```

[\[TaxonName-combinationAscribedAuthor-example-1.ttl\]](#) [\[TaxonName-combinationAscribedAuthor-example-1.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/239>

tcs:combinationAscribedAuthorLiteral

Identifier	http://rs.tdwg.org/tcs/terms/combinationAscribedAuthorLiteral
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Combination ascribed author literal
Definition	Ascribed author of the present name
Usage	<code>combinationAscribedAuthorLiteral</code> is a Literal property.
required: No — repeatable: No	
Comments	'Ascribed author' is a person (or group of people) who a name is ascribed to in a publication, but who is not the author of the name according to the rules of the nomenclatural codes, because they did not contribute to the validating description of the name. In the <code>dwc:scientificNameAuthorship</code> these authors are indicated with 'ex', the ascribed author coming before the 'ex' and the author the name is attributed to after. Note that the 'ex' construction that is sometimes used with zoological names has got nothing to do with attribution or ascription, but is used to indicate a concept, much like we do here with 'sec.' or 'sensu' in taxon concept labels.
GitHub issue	https://github.com/tdwg/tcs2/issues/239

tcs:basionymAscribedAuthor

Identifier	http://rs.tdwg.org/tcs/terms/basionymAscribedAuthor
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Basionym author
Definition	Ascribed author of the basionym of the name
Usage	basionymAscribedAuthor is an IRI property. It can be a person or a list of persons.
required: No — repeatable: Yes	

Comments 'Ascribed author' is a person (or group of people) who a name is ascribed to in a publication, but who is not the author of the name according to the rules of the nomenclatural codes, because they did not contribute to the validating description of the name. In the **dwc:scientificNameAuthorship** these authors are indicated with 'ex', the ascribed author coming before the 'ex' and the author the name is attributed to after. Note that the 'ex' construction that is sometimes used with zoological names has got nothing to do with attribution or ascription, but is used to indicate a concept, much like we do here with 'sec.' or 'sensu' in taxon concept labels.

Examples

```
<https://ipni.org/n/3007069-1> a tcs:TaxonName ;
  tcs:nameString "Senna artemisioides" ;
  dwc:scientificNameAuthorship "(Gaudich. ex DC.) Isely)" ;
  tcs:combinationAuthor <https://ipni.org/a/4317-1> ;
  tcs:combinationAuthorLiteral "Isely" ;
  tcs:basionymAuthor <https://ipni.org/a/16855-1> ;
  tcs:basionymAuthorLiteral "DC." ;
  tcs:basionymAscribedAuthor <https://ipni.org/a/3050-1> ;
  tcs:basionymAscribedAuthorLiteral "Gaudich." ;
  tcs:basionym <https://ipni.org/n/484142-1> .

<https://ipni.org/n/484142-1> a tcs:TaxonName ;
  tcs:nameString "Cassia artemisioides" ;
  dwc:scientificNameAuthorship "Gaudich. ex DC." ;
  tcs:combinationAuthor <https://ipni.org/a/16855-1> ;
  tcs:combinationAuthorLiteral "DC." ;
  tcs:combinationAscribedAuthor <https://ipni.org/a/3050-1> ;
  tcs:combinationAscribedAuthorLiteral "Gaudich." .

<https://ipni.org/a/4317-1> a foaf:Person ;
  foaf:givenName "Duane" ;
  foaf:surname "Isely" .
```

```
<https://ipni.org/a/16855-1> a foaf:Person ;
    foaf:givenName "Augustin Pyramus" ;
    foaf:surname "De Candolle" .

<https://ipni.org/a/3050-1> a foaf:Person ;
    foaf:givenName "Charles" ;
    foaf:surname "Gaudichaud-Beaupré" .
```

[\[TaxonName-basionymAscribedAuthor-example-1.ttl\]](#) [\[TaxonName-basionymAscribedAuthor-example-1.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/239>

tcs:basionymAscribedAuthorLiteral

Identifier	http://rs.tdwg.org/tcs/terms/basionymAscribedAuthorLiteral
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Basionym author literal
Definition	Ascribed author of the basionym of the name
Usage	basionymAscribedAuthorLiteral is a Literal property.
required: No — repeatable: No	

Comments 'Ascribed author' is a person (or group of people) who a name is ascribed to in a publication, but who is not the author of the name according to the rules of the nomenclatural codes, because they did not contribute to the validating description of the name. In the **dwc:scientificNameAuthorship** these authors are indicated with 'ex', the ascribed author coming before the 'ex' and the author the name is attributed to after. Note that the 'ex' construction that is sometimes used with zoological names has got nothing to do with attribution or ascription, but is used to indicate a concept, much like we do here with 'sec.' or 'sensu' in taxon concept labels.

GitHub issue <https://github.com/tdwg/tcs2/issues/239>

dwc:scientificNameAuthorship

Identifier	http://rs.tdwg.org/dwc/terms/scientificNameAuthorship
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Scientific Name Authorship
Definition	

The authorship information for the `scientificName` formatted according to the conventions of the applicable `nomenclaturalCode`.

Usage `scientificNameAuthorship` can be used if the `nameString` is a scientific name.

required: No — **repeatable:** No

GitHub
issue <https://github.com/tdwg/tcs2/issues/24>

dwc:namePublishedIn

Identifier <http://rs.tdwg.org/dwc/terms/namePublishedIn>

Type <http://www.w3.org/1999/02/22-rdf-syntax-ns#Property>

Label Name Published In

Definition A reference for the publication in which the `dwc:scientificName` was originally established under the rules of the associated `dwc:nomenclaturalCode`.

required: No — **repeatable:** No

Comments This is the string equivalent of the TCS `namePublishedIn`. It can be used if one wants to give the protologue as a string, as in many botanical publications.

GitHub
issue <https://github.com/tdwg/tcs2/issues/237>

dwc:namePublishedInYear

Identifier <http://rs.tdwg.org/dwc/terms/namePublishedInYear>

Type <http://www.w3.org/1999/02/22-rdf-syntax-ns#Property>

Label Name Published In Year

Definition The four-digit year in which the `scientificName` was published.

Usage This is the publication year for the present name combination, not the basionym SHOULD this be a new combination.

required: No — **repeatable:** No

GitHub
issue <https://github.com/tdwg/tcs2/issues/31>

dwc:genericName

Identifier	http://rs.tdwg.org/dwc/terms/genericName
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Generic Name
Definition	The genus part of the scientificName without authorship.
Usage	This property SHOULD only be used for names below the rank of genus.
required: No — repeatable: No	
GitHub issue	https://github.com/tdwg/tcs2/issues/19

dwc:infragenericEpithet

Identifier	http://rs.tdwg.org/dwc/terms/infragenericEpithet
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Infrageneric Epithet
Definition	The infrageneric part of combinations at ranks above species but below genus.
Usage	Names at ranks between species and genus, e.g. subgenera and sections, are composed of two parts; the genus and the infrageneric epithet. This property SHOULD therefore always be accompanied by the genericName property. If the infragenericEpithet property is present, the specificEpithet and infraspecificEpithet properties SHOULD not be present.
required: No — repeatable: No	
GitHub issue	https://github.com/tdwg/tcs2/issues/20

dwc:specificEpithet

Identifier	http://rs.tdwg.org/dwc/terms/specificEpithet
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Specific Epithet
Definition	The name of the first or species epithet of the scientificName .
Usage	

Names at ranks of species and below are composed of two or three words; the genus name, the specific epithet and possibly an infraspecific epithet. This property SHOULD therefore always be accompanied by the `genus` property. If the `specificEpithet` property is present the `infragenericEpithet` property SHOULD not be present.

required: No — repeatable: No	
GitHub issue	https://github.com/tdwg/tcs2/issues/21
dwc:infraspecificEpithet	
Identifier	http://rs.tdwg.org/dwc/terms/infraspecificEpithet
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Infraspecific Epithet
Definition	The name of the lowest or terminal infraspecific epithet of the <code>scientificName</code> , excluding any rank designation.
Usage	Names at ranks below species are composed of three words; the genus name, the specific epithet and an infraspecific epithet. This property SHOULD therefore always be accompanied by the <code>genus</code> and <code>specificEpithet</code> properties. If the <code>infraspecificEpithet</code> property is present the <code>infragenericEpithet</code> property SHOULD not be present.
required: No — repeatable: No	
GitHub issue	https://github.com/tdwg/tcs2/issues/22
dwc:cultivarEpithet	
Identifier	http://rs.tdwg.org/dwc/terms/cultivarEpithet
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Cultivar Epithet
Definition	Part of the name of a cultivar, cultivar group or grex that follows the scientific name.
Usage	The cultivar epithet follows a well-formed botanical name. Only include the string of the epithet. i.e. omit the single quotes around cultivar names, the word 'Group' that denotes cultivar group, the + sign used in chimeras and the 'gx' suffix in grexes.
required: No — repeatable: No	

GitHub

https://github.com/tdwg/tcs2/issues/23

issue

Nomenclatural Type

tcs:NomenclaturalType

Identifier	http://rs.tdwg.org/tcs/terms/NomenclaturalType
Type	http://www.w3.org/2000/01/rdf-schema#Class
Label	Nomenclatural Type
Definition	Element to which a scientific name is permanently attached.
Usage	A Nomenclatural Type requires a typifiedName , typeOfType and either a typeName or typeSpecimen .
Comments	A nomenclatural type fixes the usage of a name to the taxonomic group that contains the type. One or more Nomenclatural Types make up the typification of a Taxon Name. In Darwin Core, NomenclaturalType can be used as object with dwciri:typeStatus .

Examples

```
# Examples from TCS 1
[] a tcs:NomenclaturalType ;
  tcs:typifiedName <https://ipni.org/n/50985479-1> ;
  tcs:typeOfType <http://rs.gbif.org/vocabulary/gbif/type_status/lectotype> ;
  tcs:typeName <https://ipni.org/n/333193-1> ;
  tcs:typePublishedIn [ a bibo:Article ;
    dcterms:bibliographicCitation ""Copeland, H.F. (1943). A study,
anatomical and
    taxonomic, of the genera of Rhododendroideae. Am. Midl. Nat. 30:
533-625"" ] .

[] a tcs:NomenclaturalType ;
  tcs:typifiedName <https://ipni.org/n/333193-1> ;
  tcs:typeOfType <http://rs.gbif.org/vocabulary/gbif/type_status/lectotype> ;
  tcs:typeSpecimen [ a dwc:MaterialCitation ;
    dwc:verbatimLocality "Japan, Honshu, Nikko" ;
    dwc:recordedBy "Bisset" ;
    dwc:recordNumber "233" ;
    dwc:eventDate "1876-05-23" ;
    dwc:institutionCode "E" ] ;
  tcs:typePublishedIn [ a bibo:Article ;
    dcterms:bibliographicCitation ""Judd, W.S.; Kron, K.A. (1995). A revision
of Rhododendron
    VI. Subgenus Pentanthera (sections Sciadorhodon, Rhodora and
```

```
Viscidula). Edinburgh
    Journal of Botany 52: 1-54. "" ] .

# name used in TaxonName examples; more data there
<https://ipni.org/n/50985479-1> a tcs:TaxonName ;
    tcs:nameString "Rhododendron sect. Sciadorhodion" ;
    dwc:scientificNameAuthorship "Rehder & Wilson" .

<https://ipni.org/n/333193-1> a tcs:TaxonName ;
    tcs:nameString "Rhododendron quinquefolium" ;
    dwc:scientificNameAuthorship "Bisset & S.Moore" .
```

[\[NomenclaturalType-example-1.ttl\]](#) [\[NomenclaturalType-example-1.jsonld\]](#)

GitHub issue <https://github.com/tdwg/tcs2/issues/58>

tcs:typifiedName

Identifier	http://rs.tdwg.org/tcs/terms/typifiedName
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Typified Name
Definition	The scientific name for which the specimen or other name is the type.
Usage	typifiedName is a Taxon Name and is required; a Nomenclatural Type can typify only one Taxon Name.
required: Yes — repeatable: No	
Comments	The typifiedName property links the Nomenclatural Type back to the Taxon Name. Also, when coming from the Preserved Specimen, the typified name is the most important piece of information, because there is no point in knowing what kind of type a specimen is without knowing for what name it is the type. Therefore, typifiedName is a required property.
GitHub issue	https://github.com/tdwg/tcs2/issues/59

tcs:typeOfType

Identifier	http://rs.tdwg.org/tcs/terms/typeOfType
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Type of Type
Definition	The kind of type this specimen is, e.g. holotype, isotype etc.

Usage	<code>typeOfType</code> is an IRI term and SHOULD take its value from a controlled vocabulary. A Nomenclatural Type can have only one <code>typeOfType</code>
required: Yes — repeatable: No	
Comments	This is an IRI property. In the absence of a TDWG controlled vocabulary, it is RECOMMENDED to use a value from the GBIF Nomenclatural Type Status Vocabulary (https://rs.gbif.org/vocabulary/gbif/type_status.xml).
GitHub issue	https://github.com/tdwg/tcs2/issues/60
tcs:typeName	
Identifier	http://rs.tdwg.org/tcs/terms/typeName
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Type Name
Definition	The name that is the type.
Usage	<code>typeName</code> is a Taxon Name. A nomenclatural type can have only one <code>typeName</code> .
required: No — repeatable: No	
Comments	Taxon names at ranks above species level can be typified by the name of a lower taxon. Ultimately, by following the chain of type names, all names resolve to a type species and thus a type specimen.
GitHub issue	https://github.com/tdwg/tcs2/issues/61
tcs:typeSpecimen	
Identifier	http://rs.tdwg.org/tcs/terms/typeSpecimen
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Type Specimen
Definition	The specimen that is the type.
Usage	<code>typeSpecimen</code> takes an IRI – or object – that refers to a specimen. A Nomenclatural Type

can only have one `typeSpecimen`.

required: No — repeatable: No	
Comments	Names at ranks of species and below are typified by a specimen. This property is mutually exclusive with <code>typeName</code> . This is an IRI property. One could use the Darwin Core Preserved Specimen or Material Citation. While a Taxon Name can have more than one type specimens, each of these type specimens requires its own Nomenclatural Type record, so a Nomenclatural Type can have only one <code>typeSpecimen</code> .
GitHub issue	https://github.com/tdwg/tcs2/issues/62
tcs:typePublishedIn	
Identifier	http://rs.tdwg.org/tcs/terms/typePublishedIn
Type	http://www.w3.org/1999/02/22-rdf-syntax-ns#Property
Label	Type Published In
Definition	Publication where the type was nominated
Usage	<code>typePublishedIn</code> is an IRI term. A Nomenclatural Type can have at most one <code>typePublishedIn</code> .
required: No — repeatable: No	
Comments	<code>typePublishedIn</code> is relevant for lectotypes, neotypes, epitypes and conserved types. For other kinds of type the publication where the type is designated is the publication the name was published in.
GitHub issue	https://github.com/tdwg/tcs2/issues/63