FlorML Reference Manual

ver. 1.7

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Introduction

The document presented here is an extensive reference manual for FlorML. This document explains the use of each element and its attributes.

Although the FlorML XML schema is annotated with additional information on the use of each element, additional explanations are sometimes required. This reference manual aims at providing those. The manual more or less follows the hierarchy of the FlorML XML schema, starting with high-level elements and ending with low-level elements.

It is suggested that before users start using FlorML they at least inform themselves correctly on how XML works, including its terminology, as this will increase the success rate and quality of their work. This information can be found at the W3C website: http://www.w3.org/standards/xml/.

Update history:

- March 2016 – version 1.7: updated reference to current schema version (4.22), including some major changes.
- June 2015 – version 1.6: added various small things.
- November 2014 – version 1.5: added element subheading to vernacularNames, added element gatheringGroup, added attributes for additional contextualization of characters (elements char and subChar).
- March 2014 - version 1.4: updated contents to current schema status (FlorML v. 3.37)
- October 2013 - version 1.3: new elements defaultMeasurementUnit, value, unit,
- September 2013 - version 1.2: new attributes for <alternativeFieldNum>, added element toQuestion for key mark-up, translation for vernacular names mark-up
- August 2013 - version 1.1: colspan attribute added to <td> and <th>, new attributes for <collector>, <altitude>, <fieldNum>, <locality>, etc.
- May 2013 - version 1.0

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Information for non-IT users

Below is some additional information for non-IT users:

- An element encompasses both the opening tag and the closing tag
- Tags consist of an element name between < and > brackets
    - Closing tags all start with </
    - Most elements require an opening tag and a closing tag
    - Exception: the line break element, where the following is used:
- Elements can be divided into child and parent elements. Child elements are located within parent elements.
- Attributes are additional properties for elements that can be set
- There are several types of attributes. The following types are often used in FlorML:
    - Boolean: a property is true or false
    - string: a property is described by a text string, e.g. "leaves".
    - ID and IDREF: a property is an identifier
    - several date related ones (these are explained in more detail when used)
    - anyURI: for urls
- Both elements and attributes can be required or optional
- Depending on the type of contents, repetition of elements is sometimes allowed.
- Elements may have to be used in a fixed order in some cases.

The location and usage restrictions of the elements are defined in the FlorML XML schema.

For each element, information is given as follows:

A heading starting with "element" and followed by the element name.

Basic element and attribute information is given for each element using the following table:

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
element	optional	attribute1	optional	string
		attribute2	required	Boolean

More extensive information is given in the text below the table if required.

Element names, attribute names, and attribute values are given in this font. XML code samples are placed in text boxes in most cases.

Text not supported by FlorML

FlorML is meant to prepare printed legacy taxonomic works for online use. Unlike other solutions it does not aim at a perfect reproduction of the whole printed work. Pages are not represented by scans and only the text contents are converted into a format suitable for the web.

When a new printed document is generated from such information, indexes and tables of contents can be generated on the fly. This also takes care of the changing page numbers due to different fonts.

Therefore, the following contents are not really supported by FlorML:

- Tables of contents
- Indexes
- Lists of published volumes

These can be marked up with tables if you really want to mark them up.

The following is not supported at all:

- Fancy formatting

If you want to do that, use Cascading Style Sheets.

Whole publication level elements

Figure 1 shows the elements that are used to mark-up and subdivide a whole publication.

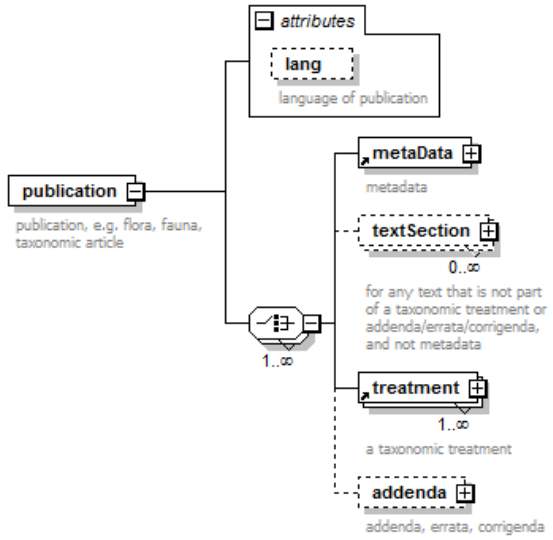


Figure 1: Whole document level elements.

element publication

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
publication	required	lang	optional	language

The opening <publication>-tag is the first tag in a document. It should look similar to this:

```
<publication xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="file://BGBM-PESIHPC/efloraSchema/FlorMLv4_latest.xsd"
xmlns:mods="http://www.loc.gov/mods/v3" lang="fr">
```

xsi:noNamespaceSchemaLocation is used because FlorML currently has no namespace. This should point to the location on your harddisk or a network drive where the schema is located. The version number of the schema will need to be changed accordingly any time a new version of the schema is created.

xmlns:mods="http://www.loc.gov/mods/v3" links to the MODS XML schema, which is used for most of the metadata (see here).

lang="fr" indicates that the document has French as its main language. The language code for English is "en" and that for Latin is "la". A list of language codes can be found here: http://www.w3schools.com/tags/ref_language_codes.asp.

The closing </publication>-tag is the last tag in a document.

The child elements of the publication element are explained below.

Document metadata

element metaData

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
metaData	required	-	-	-

Document metadata, such as ISBN, title, and other bibliographic information, is marked up using the metaData element, which has three child elements, shown in Figure 2, and described below.

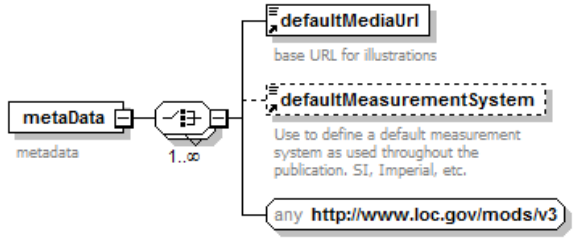


Figure 2: The metaData element and its child elements.

element defaultMediaUrl

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
defaultMediaUrl	required	-	-	-

The default media URL is the URL at which the media files linked from the taxonomic document are located, e.g. line art images. It is used as follows:

```
<defaultMediaUrl>http://media.e-taxonomy.eu/flora-gabon/</defaultMediaUrl>
```

element defaultMeasurementSystem

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
defaultMeasurementSystem	optional	-	-	-

The default measurement system defines which measurement system is used throughout a publication. For most publications this will be the SI system. It is used as follows:

```
<defaultMeasurementSystem>SI</defaultMeasurementSystem>
```

element mods

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
mods	required	-	-	-

The mods element is actually an element located in a separate XML schema, MODS, which is specifically meant for bibliographic information. Please see the documentation of that schema for its use: http://www.loc.gov/standards/mods/.

Title pages and bibliographic information can be marked up with the mods element.

An example of its use is shown below:

```
<mods:mods>
    <mods:titleInfo>
        <mods:title>FLORE DU GABON</mods:title>
        <mods:partNumber>30</mods:partNumber>
        <mods:partName>CAPPARIDACEAE,
BRASSICACEAE</mods:partName>
    </mods:titleInfo>
    <mods:name type="personal">
        <mods:namePart>L.E. KERS</mods:namePart>
        <mods:affiliation>MUSÉUM NATIONAL D'HISTOIRE NATURELLE
Laboratoire de Phanérogamic 16, rue Buffon, 75005 Paris</mods:affiliation>
    </mods:name>
    <mods:name type="personal">
        <mods:namePart>B. JONSELL</mods:namePart>
        <mods:affiliation>MUSÉUM NATIONAL D'HISTOIRE NATURELLE
Laboratoire de Phanérogamic 16, rue Buffon, 75005 Paris</mods:affiliation>
    </mods:name>
    <mods:originInfo>
        <mods:publisher>PUBLIÉE SOUS LA DIRECTION DE PH. MORAT
PROFESSEUR AU MUSÉUM OUVRAGE SUBVENTIONNÉ PAR LE C.N.R.S.</mods:publisher>
        <mods:dateIssued>1973</mods:dateIssued>
    </mods:originInfo>
    <mods:identifier>ISBN 2-85654-181-X</mods:identifier>
</mods:mods>
```

Every element has to be preceded by "mods:" to allow XMLSpy to understand it belongs to the MODS XML schema.

Non-taxonomic text sections

element textSection

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
textSection	optional	lang	optional	language
		type	optional	string

Non-taxonomic text sections (e.g. general introductions) are marked up with the textSection element. This element has two attributes.

- lang is used as explained earlier, but only if the non-taxonomic text is in a different language than the main publication language. A list of language codes can be found here: http://www.w3schools.com/tags/ref_language_codes.asp.

- type is used to indicate the type of text section and has several options. Although the attribute is optional it is strongly recommended that you use it. Every text section with a clearly specific subject should have its own type. Please avoid repetitions of the textSection type.

The child elements of the textSection element are explained later on, as they are shared with several other elements.

The box below shows two examples of the use of the textSection element, once for some acknowledgements and once for a list of abbreviations:

```
                <textSection type="acknowledgements">
                        <string>Illustrations de l'auteur</string>
                </textSection>
                <textSection type="abbreviations">
                        <string><heading>ABRÉVIATIONS</heading>(voir aussi volume no 2,
p. 2)<br />
<ul>
        <li>Cam.: Cameroun.</li>
        <li>C. ex br.: Cameroun ex-britannique.</li>
        <li>FHI: Forest Herbarium Ibadan (Nigéria).</li>
        <li>HBG: Herbier Hambourg.</li>
        <li>infl.: inflorescence.</li>
        <li>infr.: infrutescence.</li>
        <li>R.C.A.: République Centrafricaine.</li>
        <li>SRF. Cam.: Section de Recherches forestières du Cameroun.</li>
        <li>SF.: Service forestier du Gabon.</li>
        <li>YA: Herbier de Yaoundé (Cameroun).</li>
</ul></string>
                </textSection>
```

Taxonomic treatment sections

element treatment

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
treatment	required	nomCode	optional	string

All of the taxonomic contents of a taxonomic publication goes into the treatment element.

There can be multiple treatments with a taxonomic publication, each consisting of one or more taxons. For example, if a taxonomic publication contains treatments of several different families and their lower taxa, each family can be put into its own set of treatment tags. However, this is not required and is left to the person performing the mark-up.

The treatment element has an optional attribute nomCode that can be used to set the nomenclatural code used for a particular treatment. This allows FlorML to deal with publications that use multiple codes within the same volume.

The treatment element has two child elements: the taxon element and the addenda element.

element taxon

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
taxon	required	lang	optional	language
		class	optional	string
		uncertain	optional	Boolean
		id	optional	ID
		ref	optional	IDREFS
		inClassification	optional	Boolean
		inGeoScope	optional	Boolean

Each taxonomic treatment is divided into one or more taxa, each of which is surrounded by its own set of taxon tags, as shown in the text box below:

```
<treatment>
        <taxon>
                [Taxon information for 1st taxon goes here]
        </taxon>
        <taxon>
                [Taxon information for 2nd taxon goes here]
        </taxon>
        <taxon>
                [Taxon information for 3rd taxon goes here]
        </taxon>
</treatment>
```

The taxon element has seven optional attributes:

- lang is used as explained earlier, but only if the taxon is in a different language than the main publication language. A list of language codes can be found here: http://www.w3schools.com/tags/ref_language_codes.asp.
- class is used whenever a taxon has a specific status that is usually listed in a heading above it (or above a section of several taxa it belongs to), e.g. "cultivated", "introduced", etc.
- uncertain can be used for species of which the placement is uncertain while it is also known that they are, for example, cultivated.
- inClassification should be set to "false" if a taxon can not be classified in a taxonomic classification for some reason
- inGeoScope should be set to "false" if a (lower) taxon is not included in the target geographical area. This usually is apparent from the distribution information, e.g. when a species is listed to occur in countries surrounding the target country but not in the country itself.

The following two attributes are used to link taxa together in two specific cases

- id is used as an identifier for the behaviour described right below:
- ref should only be used to link a taxon in one of the following two cases:

    1. Linking a taxon mentioned in an addendum with the *same* taxon name in the *same* volume. Use the following format for these identifiers: "TA_xx" (without the quotation marks), where xx is a unique number.
    2. Linking an excluded taxon to its parent taxon if that parent taxon is unclear, e.g. an excluded family-level taxon at the end of a volume which should be linked to the family-level treatment earlier in the same

volume. Use the following format for these identifiers: "PID_xx" (without the quotation marks), where xx is a unique number.

The child elements of the taxon element are shown in Figure 3 (next page) and are discussed later on.

Notes on the use of the Taxon element:

Some notes on the use of the taxon element for a few specific cases:

1) If a taxon that is mentioned in a key lacks a treatment, you should add it:
    a. just below the treatment the key belongs to if it belongs to a genus that lacks its own treatment or if you cannot determine under which subfamily etc. it belongs.
    b. just below the last treatment of a species belonging to a particular genus if the genus is clear but not the position within the genus.
    c. just below the treatment of the species wherein the taxon is mentioned as directly or closely related in the taxonomy paragraph.
2) If a taxon that is mentioned in a key has a treatment, but that treatment is unnumbered, you should check whether the taxon name is spelled correctly in both key and taxon.
    a. If such a taxon does not occur in the target geographic area of the flora, use the inGeoScope attribute.
3) If a taxon is not mentioned in a key, but is mentioned as a separate species/variety/whatever near the end of another treatment, you should add it as a separate taxon.

(continued next page)

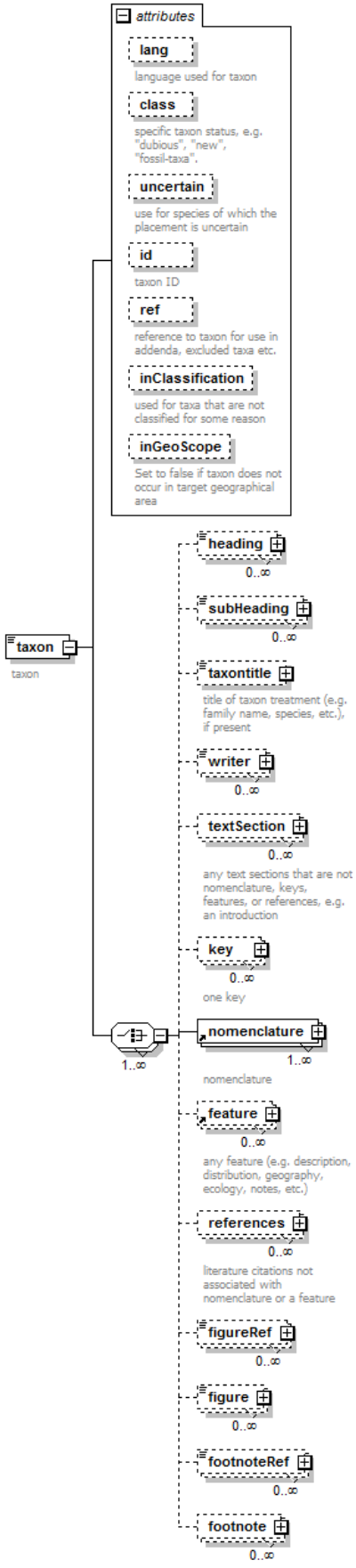


Figure 3: The taxon element and its child elements.

element addenda

See below. Only use in this location if, for example, a publication contains multiple family treatments and each family treatment includes its own set of addenda right after the last taxon of that particular treatment.

Note: The current approach is to merge addenda into their corresponding taxa prior to mark-up.

Addenda, corrigenda, and errata sections

element addenda

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
addenda	optional	-	-	-

The addenda element is used for any text that contains additional information, corrections, or error listings for previously published taxonomic treatments. These are usually located at the back of taxonomic works. Each taxonomic publication (as defined in the XML using the publication element) can contain one set of addenda tags, which in turn can contain one or more individual addendums.

Note: The current approach is to merge addenda into their corresponding taxa prior to mark-up.

The addenda element has several child elements, shown in Figure 4. The elements addendumPublication and addendum are explained below and textSection above, while the others are explained later on, as they are shared with other elements.

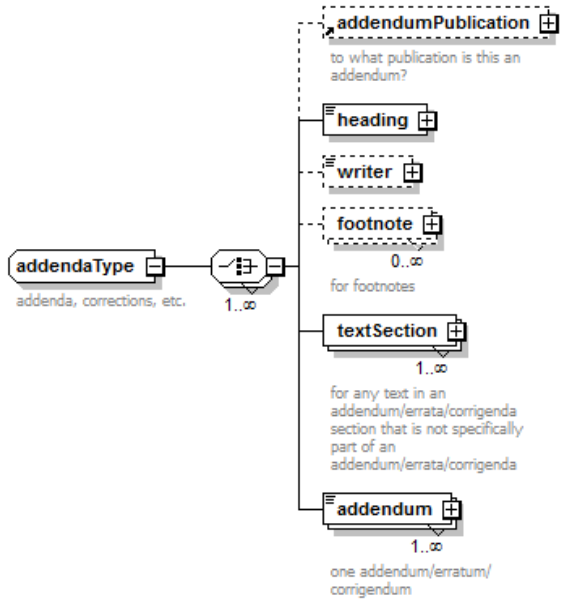


Figure 4: Addenda element child elements.

element addendumPublication

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
addendumPublication	optional	-	-	-

If **all** the addenda belong to a particular publication that is:

- ***not*** the one in which the addenda are printed (= not the current publication)

and

- a clear reference to that other publication is given

this element can be used to mark up that information.

It has one child element that can be used multiple times, the refPart element. This element is explained here.

element addendum

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
addendum	required	-	-	-

Each addendum, of which there can be multiples within an addenda section, is marked up with the addendum element. Figure 5 shows the child elements of the addendum element. The taxon element is explained here, textSection here, addendumPublication here, and the other two below.

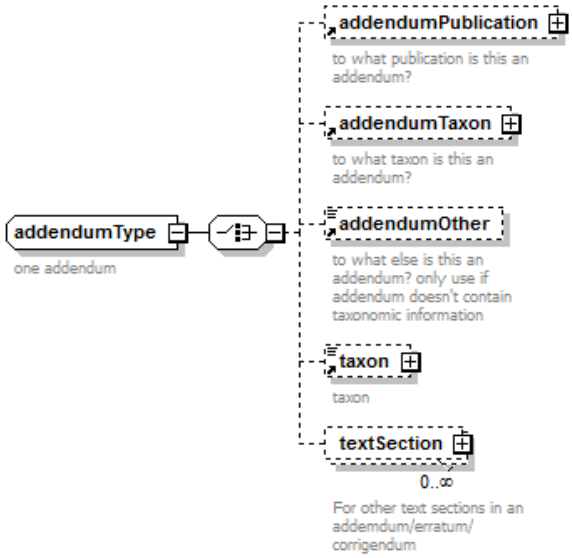


Figure 5: Addendum element with its child elements.

Although all child elements of the addendum element are optional, you should try to use as many of them as possible.

At this location only, addendumPublication should be used to mark up volume and page information if present. If the title of the publication is absent, it does not matter (at this particular location only).

element addendumTaxon

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
addendumTaxon	optional	-	-	-

This element is used to mark up the taxon information (if present) to which information in an addendum belongs. It has the name element as its single child element; see here for information on that element.

element addendumOther

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
addendumOther	optional	-	-	-

This element should be used only for addendums that contain no taxonomic information whatsoever.

Important note with regards to addenda

Deprecated: Some addendums might simply consist of instructions such as "add the following to [taxon]" or "remove the following from [page xxx].

Deprecated: In such cases, it is suggested that you make this change and remove the addendum in question. Only addendums that require the more or less explicit assistance of an experienced taxonomist should be left alone and marked up according to the mark-up provided for them.

Current practice: Try to merge all addenda into the text prior to mark up. Ask for assistance of taxonomists if required.

(Example of addendum has been removed in light of current practice.)

Keys

FlorML has support for polytomous keys and certain types of multi-access keys. Indented keys should be converted to polytomous keys as explained in **text preparation.doc**.

element key

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
key	optional	num	optional	string
		lang	optional	language
		id	optional	ID
		multiAccessKey	optional	Boolean
		onlyNumberedTaxaExist	optional	Boolean

Each key is placed between an opening <key>-tag and a closing</key>-tag, including any notes pertaining to the key. The key element has five optional attributes:

- num is for the number of the key, if it has one. Often these will be Roman numerals, which can simply be used.
- lang is used as explained earlier, but only if the key is in a different language than the main publication language. A list of language codes can be found here: http://www.w3schools.com/tags/ref_language_codes.asp.
- id is only used when there is a reference to a particular key elsewhere in the publication. See here for more information.
- multiAccessKey is used to indicate whether a key is a multi-access key. It can be left off if the key is not a multi-access key.
- onlyNumberedTaxaExist is used to indicate whether in a key with both numbered and unnumbered taxa only the numbered taxa have corresponding taxon descriptions. The attribute can be left off if this is not the case.
  Current practice: The current practice with regards to such keys is to add dummy taxa for any taxa mentioned that are in a key but absent as a separate treatment. A description based on the text given in the key is added, and if distribution data is provided in the key that too is added.

The key element has three child elements, all of which are described below.

element keyTitle

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
keyTitle	optional	-	-	-

The keyTitle element is used for the key title. It has three child elements, which are described later on.

element keynotes

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
keynotes	optional	-	-	-

The keynotes element is used for key-related notes (not footnotes, but including *references* to footnotes). Its child elements are discussed later on.

element couplet

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
couplet	required	num	required	string
		keyId	optional	ID

Each set of questions is called a couplet and should be surrounded with an opening <couplet>-tag and a closing </couplet>-tag. The couplet element has a required attribute for the question number, an optional attribute keyId, which can be used if another couplet in another links to this specific couplet, and two child elements: the question element and the keynotes element. Usually there are only two questions per couplet, but FlorML can theoretically support an unlimited number of questions per couplet. This is practical for multi-access “Spot Characters” keys.

element question

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
question	required	num	required	string

Each question lead should be surrounding by a set of an opening <question>-tag and a closing </question>-tag. The num attribute is required and can contain a number or a letter. The question element has seven child elements: text, couplet, toQuestion, toCouplet, toTaxon, toKey, and keynotes (Figure 6). Although it is possible to

have another couplet within a question, this only occurs very rarely and should be avoided as much as possible.

The keynotes element is described here, couplet above, the others below.

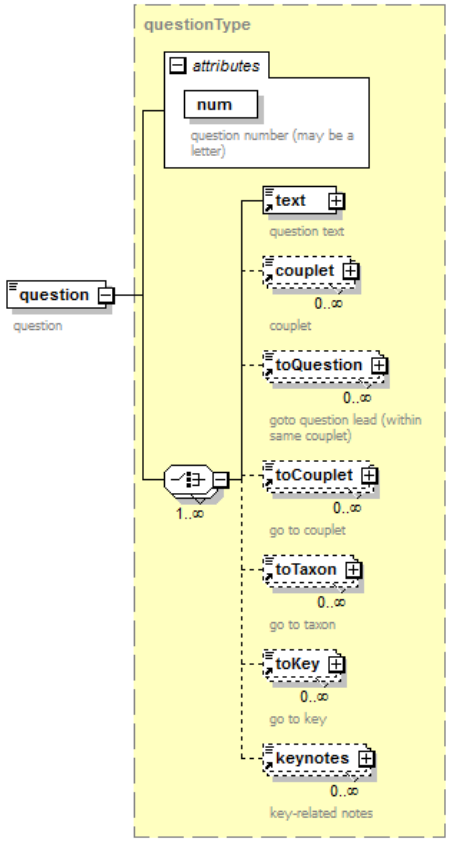


Figure 6: The question elements and its child elements.

element text

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
text	required	-	-	-

The text element is used for the text of a question, excluding any information required to go to another couplet, a taxon, or another key. The text element has seven child elements (Figure 7, next page). These are explained elsewhere.

Each question element is required to contain the text element. Although the toCouplet, toTaxon, and toKey elements are all optional, at least one of them should be used per question.

Keys that lack information that would normally go into the toCouplet, toTaxon, or toKey elements are best marked up as a table (see here).

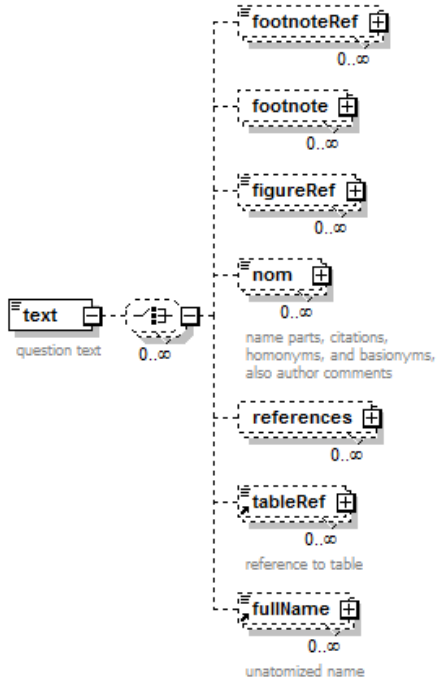


Figure 7: The text element and its child elements.

element toQuestion

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
toCouplet	optional	num	required	string

The toQuestion element is used for information at the end of a question that leads to another question within the same couplet.

element toCouplet

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
toCouplet	optional	num	required	string
		keyRef	optional	string

The toCouplet element is used for information at the end of a question that leads to another couplet. The couplet number should show both in the num attribute and be repeated between the opening and closing toCouplet tags, as seen in the example later on. The keyRef attribute is used to link to another couplet in another key, as explained here under id.

element toTaxon

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
toTaxon	optional	num	optional	string
		exists	optional	Boolean
		doubtful	optional	Boolean

The toTaxon element is used for taxonomic names at the end of a question. It has three optional attributes:

- num is used for the number that sometimes precedes the taxon name. If the number is followed by "bis" or "b" or similar, this should be included with the number.
- exists is used when the key contains both taxa that do not have a taxonomic descriptions and ones that have. Those taxa that have should have this attribute set to "true".
- doubtful is set to true whenever the taxonomic name that is linked to is uncertain.

The toTaxon element has three child elements, which are explained here and here (figureRef).

element toKey

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
toKey	optional	num	optional	string
		ref	required	IDREFS

The toKey element is only used to link to another key, preferably within the same volume. It has two attributes:

- num is used for the number preceding the title of the other key, if present.
- ref is used for the identifier used to link to another key. This identifier should use the format "K_xx", where xx is a number. Keep in mind to use different number when linking to different keys.

The toKey element has three child elements. Two of these have a specific meaning within the context of linking to another key. The toCouplet and toTaxon child elements

can be used to link to specific couplets within another key or specific taxa (the latter is to be avoided as much as possible). The keynotes element is explained here.

Key mark-up sample

Below is a key mark-up sample.

```
<key>
    <keyTitle>CLÉ DES ESPÈCES</keyTitle>
    <couplet num="1">
        <question num="a">
        <text>Feuilles caulinaires supérieures amplexicaules ou auriculées.</text>
            <toTaxon num="1">B. oleracea</toTaxon>
        </question>
        <question num="b">
            <text>Feuilles caulinaires supérieures ± pétiolées, ni amplexicaules ni auriculées.</text>
            <toCouplet num="2">2</toCouplet>
        </question>
    </couplet>
    <couplet num="2">
        <question num="a">
            <text>Feuilles caulinaires inférieures avec 0-1 segments latéraux; rostre le plus souvent inférieur à 6 mm</text>
            <toTaxon num="2">B. carinata</toTaxon>
        </question>
        <question num="b">
            <text>Feuilles caulinaires inférieures avec 1-3 paires de segments latéraux; rostre dépassant 6 mm.</text>
            <toTaxon num="3">B. juncea</toTaxon>
        </question>
    </couplet>
</key>
```

Nomenclature

The following mark-up is used for the nomenclatural sections of each taxon treatment.

element nomenclature

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
nomenclature	required	lang	optional	language

The nomenclature element is the element that surrounds the whole nomenclature section.

It has one optional attribute, lang, which is used if the nomenclature section is in a different language than the main publication language. A list of language codes can be found here: http://www.w3schools.com/tags/ref_language_codes.asp.

The nomenclature element has two child elements, the homotypes element and the nomenclaturalNotes element, both of which are explained below.

element nomenclaturalNotes

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
nomenclaturalNotes	optional	-	-	-

The nomenclaturalNotes element is optional and is used for notes about a taxon's nomenclature in general. It should not be used for names, homotypes, name citations, or notes pertaining to a single name.

The nomenclaturalNotes element has five child elements (Figure 8): heading (explained here), writer (explained here), string (explained here), and figureRef and figure (explained here).

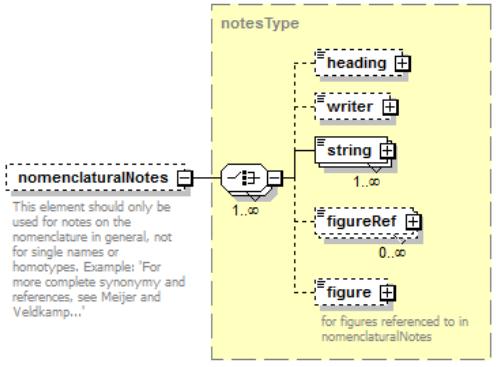


Figure 8: The nomenclaturalNotes element and its child elements.

element homotypes

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
homotypes	required	-	-	-

The homotypes element is used to group homotypic synonyms together. Different pairs of homotypes tags indicate heterotypic synonyms.

If the taxonomic work you are adding mark-up to does not make a difference between homotypic and heterotypic synonyms, you only use a single pair of tags.

Figure 9 shows the child elements of the homotypes element. The nom element is explained below, the nameType and specimenType elements are explained a little later, while the nomenclaturalNotes element here.

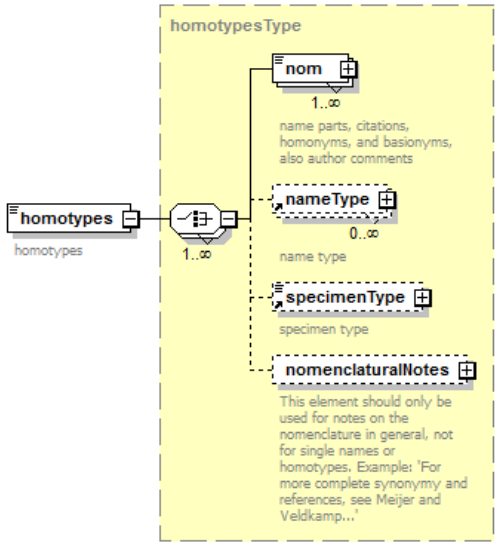


Figure 9: The homotypes element and its child elements.

element nom

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
nom	required	class	required	string
		fungiMorph	optional	Boolean
		doubtful	optional	Boolean
		misidentification	optional	Boolean

The nom element is used for any name-related information in the nomenclature, types, or any other place that may require taxonomic names to be atomized. Furthermore, each pair of nom tags is used to delimit a single synonym.

The nom element has four attributes:

- The attribute class has six options:
    - accepted, for accepted names. This is generally the first name mentioned in the nomenclature.
    - synonym, for any synonyms.
    - basionym, for basionyms.
    - homonym, for homonyms.
    - correct name, for the correct determination of excluded taxa.
    - nametype, only used for nametypes.
    - freetextName, only used for names outside nomenclature in various free text areas.

  Basionyms, synonyms, and correct names are sometimes also present in nametypes, in which case they should be marked up.
- The optional attribute fungiMorph is used for fungi only and should be set to true if required. In all other cases it can be left out.
- The optional attribute doubtful is used for names that may be considered doubtful or having some kind of problem.
- The optional attribute misidentification is used for misidentified names (see Article 52 of the Bratislava Code).

Figure 10 shows the child elements of the nom element. The fullName, num, name, and citation elements are explained below. The explanation for the literatureRef element can be found here, footnoteRef here, and for the nomenclaturalNotes element here.

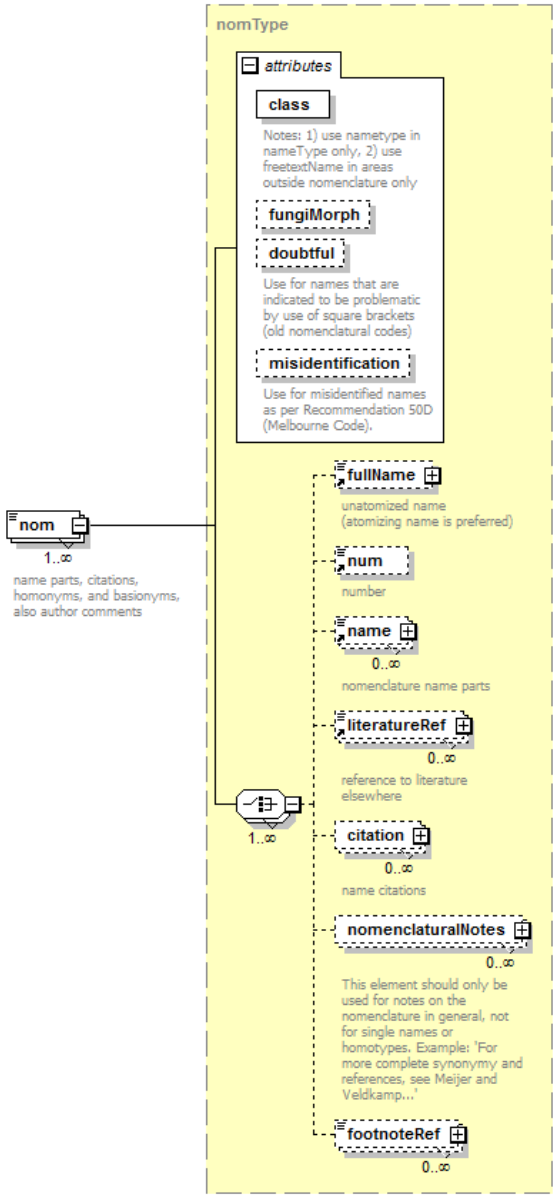


Figure 10: The nom element and its child elements.

element fullName

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
fullName	optional	rank	required	string
		hybridClass	optional	string
		descriptiveName	optional	Boolean
		doubtful	optional	Boolean
		freetextName	optional	Boolean

The fullName element is used for names that for some reason cannot be atomized into their component parts, such as names from before the binomial naming system. It has five attributes. The attribute rank should be used to indicate the name's taxonomic rank. The attribute hybridClass is used to indicate whether a taxon name is a hybrid or hybrid formula. The attribute descriptiveName should be set to true for any names that are not an actual name, but a short description intended as a placeholder until actual naming occurs. The attribute doubtful is to be used for names that are somehow doubtful or otherwise problematic. The attribute freetextName is only used for names outside nomenclature in various free text areas.

The fullName element can also be used to mark-up taxonomic names in text that is not immediately related to nomenclature.

element num

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
num	optional	-	-	-

The num element is used to mark up numbers, for example the number preceding a taxon's accepted name.

element name

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
name	optional	class	required	string
		cultivar	optional	Boolean
		doubtful	optional	Boolean

The name element is used for each of the component name parts in the atomization of taxonomic names. It has three attributes:

- The attribute class is used to indicate which name part is between the opening <name>-tag and the closing </name> tag. There are several options:
    - rank and infrank, used to indicate what kind of rank is explicitly given in the taxonomic treatment (e.g. "var." or "Section"). The following rules are generally followed: 1) Anything below species = infrank, 2) Highest rank mentioned = rank, all lower ranks = infrank, 3) Any rank starting with "sub" or "section" = infrank.
    - various taxonomic ranks, used to give the rank of a particular taxonomic name part

  - author, used to indicate the author for anything that is not explicitly referred to as an infrank.
  - paraut, used to indicate the author between parentheses for anything that is not explicitly referred to as an infrank.
  - infraut, used to indicate the author for anything that is explicitly referred to as an infrank.
  - infraparaut, used to indicate the author between parentheses for anything that is explicitly referred to as an infrank.
  - status, used only for nomenclatural statuses.
  - notes, used for additional notes on a particular name.
  - num, used for the number preceding a taxon. Deprecated, use the num element instead.
  - vernacular, used for vernacular names.
  - year, used for names with a year mentioned.

- The optional attribute cultivar can be used to indicate whether a taxon name is that of a cultivated variety.
- The optional attribute doubtful is to be used for name parts that are somehow doubtful or otherwise problematic.

Important notes:

- If you have a name where the author or author between parentheses starts with "Auct. non [author name]: [other author name]", put everything in the author (or infraut) or sometimes paraut (or infrparaut) class!
- If a status includes a citation, do not atomize that reference. However, if the citation indicates a homonym, refer to here and add the appropriate mark-up.

The name element has a single optional child element: footnoteRef (see here).

element citation

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
citation	optional	class	required	string
		id	optional	ID
		doubtful	optional	Boolean
		homonym	optional	Boolean
		excluded	optional	Boolean

The citation element is used for the literature citations that usually follow a taxonomic name. It is an optional element because some names lack citations. When it is used, it should encompass the entire block of citations for a single name. It has five attributes:

- The attribute class is used to indicate the type of citation and has three values:
    - publication, used for the first publication in which a particular name was cited
    - usage, used for publications following the first publication in which a particular name was cited
    - type, used for type citations only.
- The optional attribute id can be used to link a reference to a particular citation to that citation. See the literatureRef element for an explanation.
- The optional attribute doubtful is used to indicate whether a citation is considered doubtful or otherwise problematic.
- The optional attribute homonym is used for citations that obviously refer to a homonym. These general follow a status and are preceded by 'hom.' or 'non' ('non' without an author name following or with only a single author name following; if an author name follows with a colon and another author name following that is a misidentification!).
- The optional attribute excluded is used for citations that are explicitly indicated to be excluded.

The citation element has the refPart element as its only child element. See here for how to use it.

(deprecated elements homonym and basionym removed)

element nameType

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
nameType	optional	typeStatus	optional	string

The nameType element is used for nametypes (types that consist of a taxonomic name). If a type status is given, this can be indicated with the typeStatus attribute.

The nameType element has three child elements: citation (see here), nom (see here), and typeNotes, explained below.

When using the nom child element to atomize a nametype, be sure to set the nom element's class attribute to nametype.

(deprecated element acceptedName removed)

element typeNotes

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
typeNotes	optional	-	-	-

The typeNotes element is used exclusively for notes on the type or type status. It has five child elements: heading (explained here), writer (explained here), string (explained here), and figureRef and figure (explained here).

nameType mark-up sample

An example of some XML for a nametype that includes a basionym:

```
<nameType>
    <nom class="nametype">
        <name class="genus">Wildemaniodoxa</name>
        <name class="species">Laurentii</name>
        <name class="paraut">De Wild.</name>
        <name class="author">Aubr. et Pellegr.</name>
    </nom>
        <nom class="basionym">
            <name class="genus">Chrysophyllum</name>
            <name class="genus">Laurentii</name>
            <name class="author">De Wild.</name>
        </nom>
</nameType>
```

element specimenType

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
specimenType	optional	iconoType	optional	Boolean
		doubtful	optional	Boolean
		unknown	optional	Boolean
		notSeen	optional	Boolean
		notFound	optional	Boolean
		lost	optional	Boolean
		destroyed	optional	Boolean
		typeStatus	optional	string
		lang	optional	language

The specimenType element is used for specimen types. It has nine attributes, all optional. Most are used to precisely indicate both the physical and taxonomic type status. The lang attribute is used when the type information is in a different language than the main publication language. A list of language codes can be found here: http://www.w3schools.com/tags/ref_language_codes.asp.

The specimenType element's child elements are shown in Figure 11. The following child elements are explained below: fullType, originalDetermination, and collectionAndType. See here for the child element gathering, here for citation, here for typeNotes, here for br, and here for footnoteRef. Please avoid using the specimenType element within other specimenType elements.

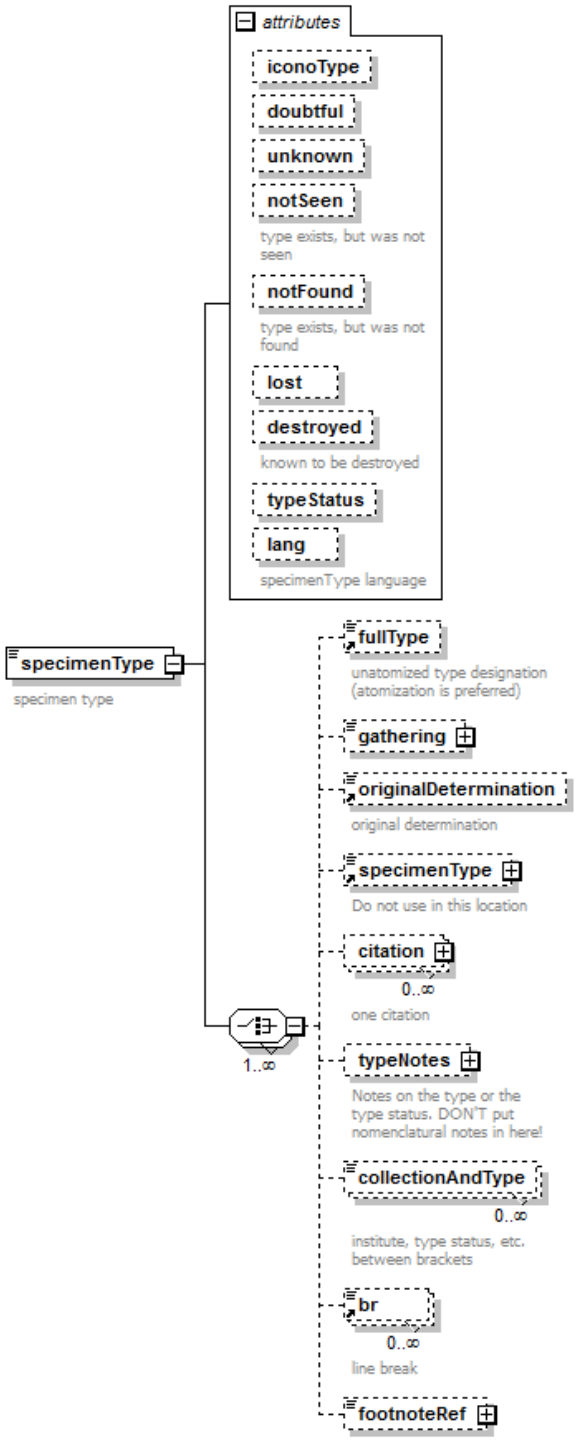


Figure 11: The specimenType element and its child elements.

element fullType

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
fullType	optional	-	-	-

The fullType element is used for the mark-up of specimen types that cannot be atomised for some reason.

(deprecated element typeStatus removed)

element originalDetermination

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
originalDetermination	optional	-	-	-

The originalDetermination is used when a type was originally determined as belonging to another taxon and this information is given.

element collectionAndType

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
collectionAndType	optional	-	-	-

The collectionAndType element is used for information on the location where a (type) specimen is housed, such as herbarium abbreviations, and the physical state of the (type) specimen. Often this information is placed between brackets.

See the explanation on the gathering element for an XML sample.

Nomenclature mark-up sample

Below is a sample showing some marked up nomenclature including a specimen type:

```
                    <nomenclature>
                        <homotypes>
                            <nom class="accepted">
                                <num>6 bis</num>
                                <name class="genus">Beilschmiedia</name>
                                <name class="species">Corbisieri</name>
                                <name class="infrank">var.</name>
                                <name class="variety">diversiflora</name>
                                <name class="infrparaut">Pierre</name>
                                <name class="infraut">R. Fouilloy</name>
                                <name class="status">comb. nov.</name>
                            </nom>
                            <nom class="synonym">
                                <name class="genus
abbreviation">B.</name>
                                <name class="species">diversiflora</name>
                                <name class="author">Pierre</name>
                                <name class="status"> nom. nud. in sched
Mus. Paris.</name>
                                <citation class="publication">
                                    <refPart class="author">Rob. et
Wilcz.</refPart>
                                    <refPart class="pubname">Bull. jard.
bot. Ét. Brux.</refPart>
                                    <refPart class="volume">20</refPart>
                                    <refPart class="pages">200</refPart>
                                    <refPart class="year">1950</refPart>
                                </citation>
                            </nom>

        <specimenType><gathering><collector>Klaine</collector><fieldNum>1850</fieldNum>
<locality
class="locality">Libreville.</locality><collectionAndType>(P)</collectionAndType></gathering>
</specimenType>
                        </homotypes>
                    </nomenclature>
```

In the sample above only a single citation is given for the synonym (the accepted name is a new combination). If more citations were present, these would be of class "usage".

Features

element feature

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
feature	optional	isFreetext	optional	Boolean
		lang	optional	language
		class	required	string

The feature element is used for so-called taxonomic features: One or more paragraphs that contain the taxon description, distribution, ecological information, taxonomy, etc.

It has three attributes:

- The isFreetext attribute is used for certain features that normally contain only structured data. If this is not the case, the isFreetext attribute should be added and set to "true".
- The lang attribute is used when the feature text is in a different language than the main publication language, e.g. for Latin descriptions. A list of language codes can be found here: http://www.w3schools.com/tags/ref_language_codes.asp.
- The class attribute is required and should be set to whichever option best describes the contents of the feature.
    - In some rare cases, a description of a taxon can have a complementary description based on a single specimen. In such cases, mark up the base description with class="description" and the complementary description with class="complementary description".

The child elements of the feature element are shown in Figure 12. These elements are all described later on in this manual, except for the num element and the key element, which can be found here and here, respectively. Some notes on child element use:

- The child element char should only be used in description features, unless you want to atomize other features into their component characters too.
- The child element habitatList should only be used in habitat or habitatecology features.

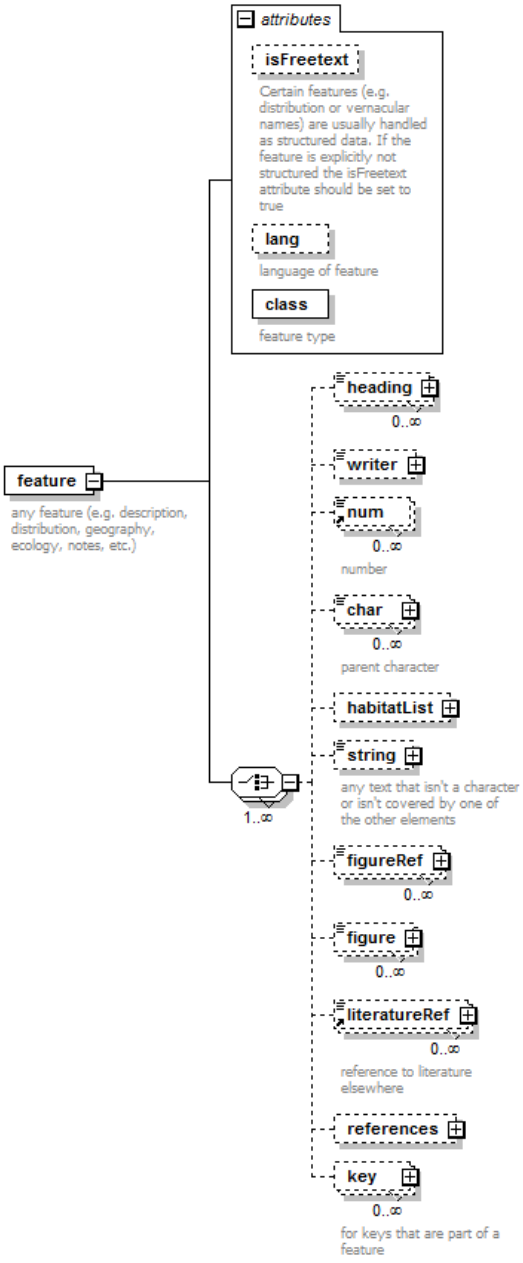


Figure 12: The feature element and its child elements.

Feature mark-up samples

Below are several samples of feature mark-up:

1) Description feature with characters and subcharacters marked up:

```
<feature class="description">
<char class="habit">Dioecious.</char>
<char class="tendrils">Tendrils distally 2-branched, spiralling below point of branching.</char>
<char class="male flowers">Male flowers in panicles or racemes.</char>
<char class="stamens">Stamens 5, inserted on narrow, flat receptacle, free or united, disc not obvious, anthers small, 1-thecous (except Alsomitra and Bayabusua: stamens 3).</char>
<char class="pollen">Pollen small, usually striate, prolate.</char>
<char class="style">Styles (2 or) 3 (or 5), free.</char>
<char class="ovary">Ovary truncate at apex, not narrowed;
<subChar class="ovules">ovules pendent.</subChar>
</char>
<char class="fruits">Fruits dehiscing, capsular, apically opening with 3 incurving valves releasing (mostly) winged seeds (except Gynostemma, p.p. indehiscent).</char>
</feature>
```

2) Distribution feature with distribution localities marked up:

```
<feature class="distribution">
<string>Ce genre comprenant environ 80 espèces, est répandu dans le <distributionLocality class="world">monde entier sauf dans les régions arctiques</distributionLocality>; 12 espèces ont été reconnues en <distributionLocality class="continental region">Afrique tropicale</distributionLocality> (incl. <distributionLocality class="country">Madagascar</distributionLocality>) dont 1 au <distributionLocality class="country">Gabon</distributionLocality>.</string>
</feature>
```

3) Habitat feature with habitat information marked up:

```
<feature class="habitatecology">
<string><subHeading>Habitat &amp;amp; Ecology</subHeading><habitat>Grasslands with short forest, heath forest; soil sandy, generally iron rich ultrabasic/serpentine. Altitude: <altitude>300-1700 m.</altitude></habitat>.</string>
</feature>
```

4) Vernacular names feature with vernacular name and local language marked up:

```
<feature class="vernacular">
<string><subHeading>NOM VERNACULAIRE:</subHeading><vernacularNames>
<vernacularName><name class="vernacular">radis</name>
(<localLanguage>Français</localLanguage>)</vernacularName>
</vernacularNames>.</string>
</feature>
```

Vernacular name that exists in multiple languages:

```
<feature class="vernacular">
        <string><subHeading>NOM VERNACULAIRE:</subHeading><vernacularNames>
                <vernacularName><name class="vernacular">difubu</name>
(<localLanguage>éshira</localLanguage>, <localLanguage>bavarama</localLanguage>,
<localLanguage>bavungu</localLanguage>, <localLanguage>bapunu</localLanguage>,
<localLanguage>balumbu</localLanguage>, <localLanguage>masangu</localLanguage>,
<localLanguage>ngowé</localLanguage>)</vernacularName>
        </vernacularNames>.</string>
</feature>
```

5) Specimens feature with specimen information marked up:

```
                        <feature class="specimens">
                                <string><subHeading>MATÉRIEL GABONAIS
ÉTUDIÉ:</subHeading><br />
<gathering><collector>Hallé &amp;amp; Cours</collector><fieldNum>5870</fieldNum><locality
class="locality">district de Mimongo, route de Lébamba à Etéké, entre 250 et 800 m
d'altitude</locality></gathering>; <gathering>bord de rivière<locality
class="locality"></locality><collectionAndType>P</collectionAndType></gathering>.<br />
<gathering><collector>Louis, Breteler &amp;amp; De
Bruijn</collector><fieldNum>1021</fieldNum><locality class="locality">Massif du Chaillu, Nord de
Lébamba, lisière le long de la rivière Ogouo près de Guévédé, alt. ca 300
m</locality><collectionAndType>, WAG</collectionAndType></gathering>.<br />
Spécimens atypiques (nervures peu nombreuses, petites fleurs) rattachés à cette espèce avec
doute:<br />
<gathering><collector>Dybowsky</collector><fieldNum>130</fieldNum><locality
class="locality">Fernan Vaz, dans un
village</locality><collectionAndType>P</collectionAndType></gathering>.<br />
<gathering><collector>Descoings</collector><fieldNum>6260</fieldNum><locality
class="locality">vallée de la Ngounié, route de Dolisie, à 19 km au Sud de N'Dende, sur le bord de la
mare</locality><collectionAndType>P</collectionAndType></gathering>.</string>
                        </feature>
```

6) Notes feature with two separate notes marked up, one of which contains a reference:

```
                        <feature class="notes">
                                <string><subHeading>Notes</subHeading><num>1</num> Telford
(1982) remarks that plants from eastern Malesia, the Pacific and Australia, with larger ellipsoid fruits
(Bryonia affinis) may be subspecifically distinct.</string>
<string><num>2</num> Cooked shoots are eaten in Papua New Guinea and cooked young fruits in
Sulawesi (<references><reference>
                                <refPart class="pubname">PROSEA</refPart>
                                <refPart class="volume">8</refPart>
                                <refPart class="year">1994</refPart>
                                <refPart class="details">290</refPart>
</reference></references>).</string>
                        </feature>
```

7) Taxonomy feature:

```
<feature class="taxonomy">
<string>De Wilde &amp;amp; Duyfjes (Reinwardtia, 2008) distinguished in T. pilosa two varieties, var. roseipulpa W.J.de Wilde &amp;amp; Duyfjes (Thailand) and var. pilosa; only var. pilosa occurs in Malesia.</string>
</feature>
```

This last XML sample for a feature can serve as an example for about all other feature options. Of course, if certain types of contents (e.g. references) are present in the text of those other features they still need to be marked up.

Text

String

element string

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
string	required/optional depending on location in schema	class	optional	string
		lang	optional	language

The string element is used for most text, in many different contexts. A notable exception is the text of description features, which is atomized using the char and subChar elements (see there).

It has two optional attributes:

- The class attribute is there for legacy reasons (backwards compatibility) and should not be used (use the textSection element or the feature element instead).
- The lang attribute is used when the text string is in a different language than the main publication language. A list of language codes can be found here: http://www.w3schools.com/tags/ref_language_codes.asp.

Figure 13 shows the child elements of the string element. The num child element is explained here, the fullName child element here, and the toKey child element here, while the other child elements are explained from here on.

Several examples of the use of the string element can be seen in various examples elsewhere in this manual.

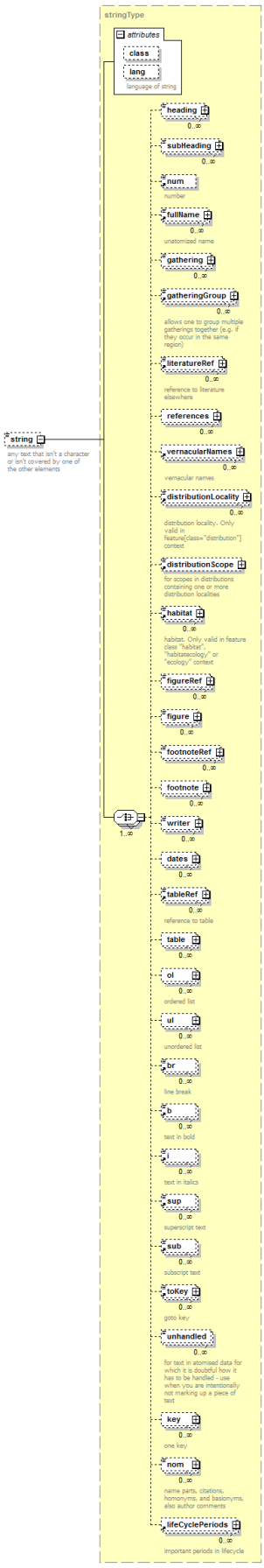


Figure 13: The string element and its child elements.

Other contents

(deprecated element annotation removed)

Headings and subheadings

element heading

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
heading	optional	-	-	-

element subHeading

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
subHeading	optional	-	-	-

The heading and subHeading elements are used for heading and subheadings, respectively.

Here it is mostly important to understand what are considering headings and what are considered subheadings. Headings are any short piece of text, usually bolded and often ALL-CAPS, above a paragraph. Subheadings are often on the same line as the rest of the paragraph and separated from the latter by a colon, dot, or dash (or a combination of those).

The heading element has a single child element, footnoteRef, explained here, while the subHeading element also has figureRef as a child element (see here).

Taxon titles

element taxontitle (deprecated)

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
taxontitle	optional	rank	optional	string
		num	optional	string

In some taxon treatments, the nomenclature is preceded by a heading that repeats the accepted name and the taxon number. The taxontitle element can be used for these. It has two attributes:

- rank is used to indicate the taxonomic rank of the taxon name.

- num is used for the taxon number preceding the taxon name.

The taxontitle element has a single child element, footnoteRef, explained here.

Note: Please avoid using this element, as it complicates linking keys to taxon treatments. Use the regular nomenclature mark-up with the num element instead.

Writer

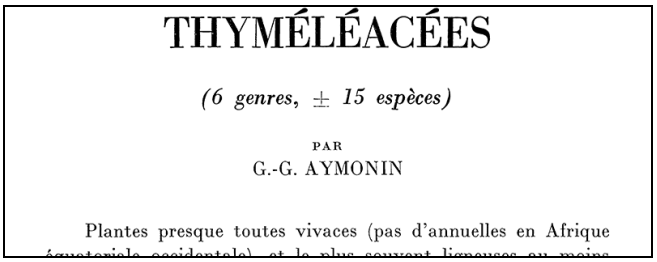
element writer

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
writer	optional	-	-	-

The writer element is used to mark up the name of the writer for specific taxa, features, or other text. An example of its use is shown below:

```
<nomenclature>
        <homotypes>
                <nom class="accepted">
                        <name class="family">THYMÉLÉACÉES</name>
                </nom>
        </homotypes>
</nomenclature>
<feature class="taxonomy">
        <string>(6 genres, ±15 espèces)</string>
</feature>
<writer>G.-G. AYMONIN</writer>
<feature class="description">
```

For reference, an image of the original can be found in Figure 14.



THYMÉLÉACÉES

(6 genres, ± 15 espèces)

PAR
G.-G. AYMONIN

Plantes presque toutes vivaces (pas d'annuelles en Afrique

Figure 14: Writer information example original.

The writer element has a single child element, footnoteRef, explained here.

Figures

element figureRef

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
figureRef	optional	ref	required	IDREFS

The figureRef element is used to mark up references to figures in text. It has a required attribute ref that should contain the identifier for the figure. This identifier takes the following format "ID_xx", where xx is a number. This identifier should match the identifier assigned to the figure in question, as shown in the image administration (see **image processing.doc** for details).

The figureRef element has two child elements, num and figurePart. The num element is used to mark up the figure number in the text; for information on using it see here. The figurePart element is explained below.

element figurePart

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
figurePart	optional	-	-	-

The figurePart element is used to mark up the parts of a figure referenced by a figure reference. See the XML sample below.

figureRef mark-up sample

```
<figureRef ref="ID_324">Pl. <num>6</num>, <figurePart>1-9</figurePart>, p. 25.</figureRef>
```

element figure

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
figure	optional	id	required	ID
		url	optional (required)	anyURI
		type	optional (required)	string
		lang	optional	language

The figure element is used to mark up figure captions, which are used as placeholders for the images they are associated with.

It has four attributes.

- The id attribute is required and should contain the identifier for the figure. This identifier should match the identifier assigned to the figure in question, as shown in the image administration (see **image processing.doc** for details). See also the figureRef element.
- The url attribute is optional, but you are strongly recommended to use it. It should contain the file name for the figure.
- The type attribute is optional for legacy reasons, but you should use it. It has four possible values:
    - photo, for figures that are photographs.
    - line art, for figures that are line art drawings or maps.
    - signature, for signatures.
    - other, for anything that does not fit the above options.
- The lang attribute is used when the figure information is in a different language than the main publication language. A list of language codes can be found here: http://www.w3schools.com/tags/ref_language_codes.asp.

The figure element has two child elements. The num element is explained here, the other one below.

(deprecated elements figureTitle and url removed)

element figureLegend

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
figureLegend	optional	-	-	-

The figureLegend element is used for the caption (= legend) of the figure proper. See the XML sample below for its use.

It has various child elements, as shown in Figure 15, which are explained elsewhere in this document.

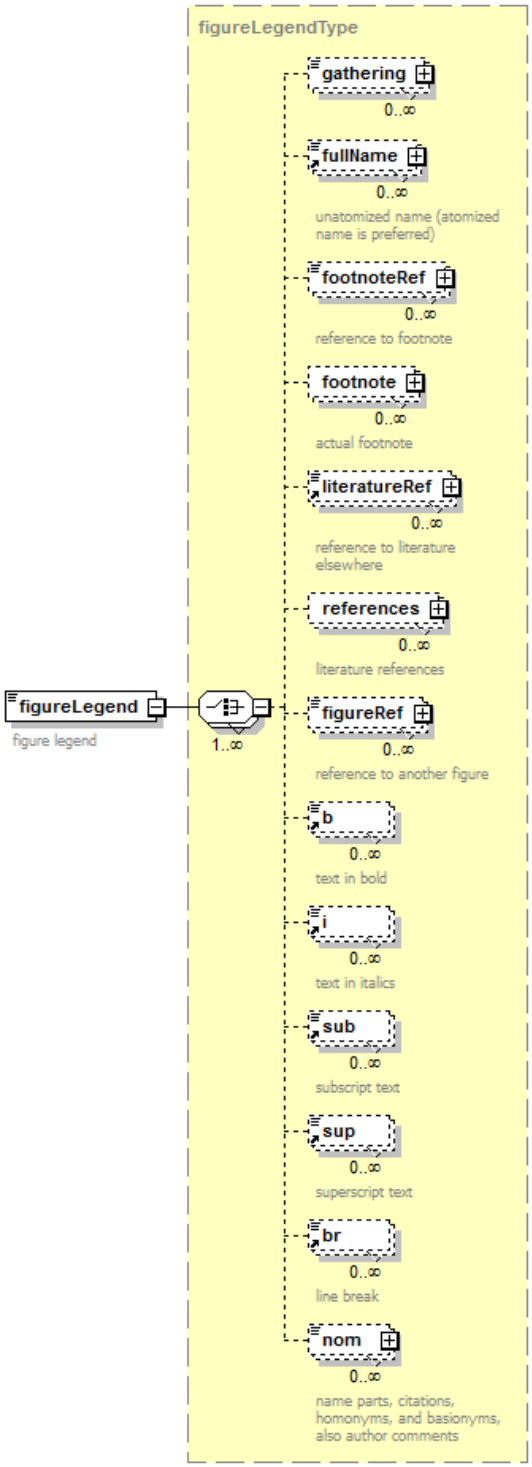


Figure 15: The figureLegend element and its child elements.

figure mark-up sample

The XML sample below showcases the mark-up of a figure caption. Note that the specimen information in the figure caption is also marked up (more information on that here).

```
<figure id="ID_324" type="lineart" url="fdg-22-324.gif">Pl. <num>6</num>. —
<figureLegend>Microdesmis puberula Hook. f. ex Planch: 1, feuilles et infl. x 2/3; 2, détail de la nervation; 3, pétale face int. x 10; 4, pistillode x 10; 5, pistil x 20; 6, drupe x 2; 7, 8, endocarpe x 3; 9, graine x 6. — Microdesmis haumaniana J. Léonard: 10, étamine x 20; 11, pistillode x 18; 12, pistil x 24; 13, drupe x 3; 14, 15, endocarpe x 3,5 (1-2, <gathering><collector>Hallé N.</collector><fieldNum>1312</fieldNum></gathering>; 3-4,
<gathering><collector>Klaine</collector><fieldNum>50</fieldNum></gathering>; 5-9,
<gathering><collector>Annet</collector><fieldNum>310</fieldNum></gathering>; 10-11,
<gathering><collector>Jacques-Félix</collector><fieldNum>2276</fieldNum></gathering>; 12-15,
<gathering><collector>Chevalier</collector><fieldNum>26124</fieldNum></gathering>).</figure Legend></figure>
```

Footnotes

element footnoteRef

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
footnoteRef	optional	ref	required	IDREFS

The footnoteRef element is used to mark up references to footnotes in text. It has a required attribute ref that should contain the identifier for the footnote. This identifier takes the following format "FN_xx", where xx is a number. Please ensure that different footnotes are linked to using different identifiers!!!

The footnoteRef element has one child element, the num element, which is used to mark up the footnote number in the text. For information on using it see here.

footnoteRef mark-up sample

```
<footnoteRef ref="FN_2"><num>1</num></footnoteRef>
```

element footnote

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
footnote	optional	lang	optional	language
		id	optional	ID

The footnote element is used to mark up footnotes. It has two attributes:

- lang is used when the footnote is in a different language than the main publication language. A list of language codes can be found here: http://www.w3schools.com/tags/ref_language_codes.asp.

- id is used to link a reference to a footnote to the footnote. See the footnoteRef element for more information.

The footnote element has a single child element called footnoteString, explained below.

element footnoteString

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
footnoteString	optional	-	-	-

The footnoteString element is used to mark up the text of a footnote, as shown in the sample below.

footnote mark-up sample

```
<footnote id="FN_2"><footnoteString>(1). nom. cons.</footnoteString></footnote>
```

References

element references

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
references	optional	lang	optional	language
		bibliography	optional	Boolean
		serialsAbbreviations	optional	Boolean

The references element is used to mark up a block of literature references, e.g. literature mentioned at the end of a treatment. It has three attributes:

- lang is used when the literature references are in a different language than the main publication language. A list of language codes can be found here: http://www.w3schools.com/tags/ref_language_codes.asp.

- bibliography should be set to true if the references form a separate section in the taxonomic work that is not associated with a particular feature or even taxon.

- serialsAbbreviations should be set to true if the references are in the form of a list of abbreviations followed by the full name of the reference.

- Note: These can also be marked up as a regular list if you are sure they all occur elsewhere in the treatment.

The child elements of the references element can be seen in Figure 16. The refNum, literatureRef, and reference elements are explained below; the others elsewhere in this document.

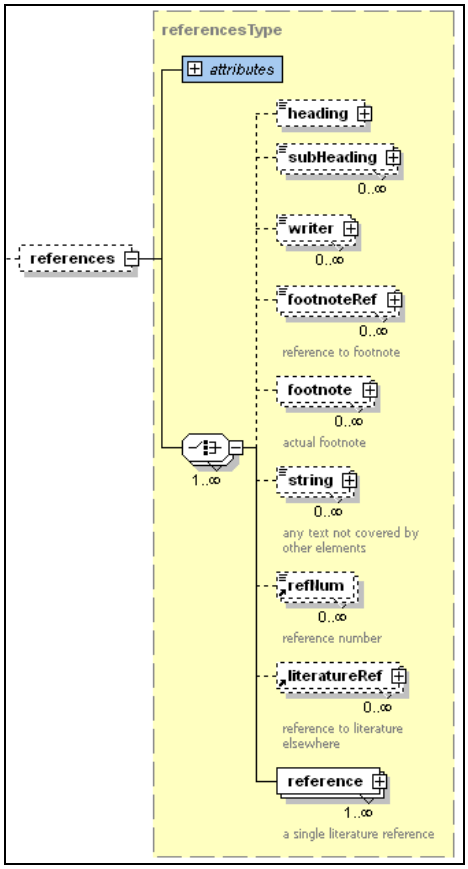


Figure 16: The references element and its child elements.

element refNum

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
refNum	optional	-	-	-

The element refNum is used to mark up the number when individual references in a list of references are preceded by a number.

element literatureRef

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
literatureRef	optional	ref	required	IDREFS

The literatureRef element is used to mark up references to literature references elsewhere in the text. It has a required attribute ref that should contain the identifier for the literature reference. This identifier takes the following format "B_xx", where xx is a number. Please ensure that different literature references are linked to using different identifiers!!!

The literatureRef element has one child element, the refPart element, explained here.

element reference

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
reference	required	id	optional	ID

Each block of references consists of one or more individual references. The reference element serves to mark up every separate reference.

It has an optional attribute id that can be used whenever you want to link a reference to a particular piece of literature to that piece of literature.

The reference element has a single child element, the refPart element. This is explained below.

element refPart

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
refPart	required	class	required	string
		doubtful	optional	Boolean

The refPart element is used for the atomization of literature references. It has two attributes class and doubtful, explained below:

- the required attribute class, which has the following possible values:
    - author, the author of the publication.
    - co-author, for separately mentioned co-authors.

- paraut, for an author mentioned between parentheses.
- pubtitle, the title of the chapter, journal article, etc.
- alternatepubtitle, if an alternate title is given next to the regular title, you can use this.
- pubname, the name of the publication.
- alternatepubname, if an alternate publication name is given next to the publication name, you can use this.
- pubfullname, used if next to the abbreviated name the full name of the publication is given.
- pubtype, if a specific type description of the publication is given, e.g. “book”.
- publocation, if the location where a publication was published is given.
- publisher, the publishing house + location.
- series, volume, section, issue, part, chapter, appendix
- treatmentNumber, used if a taxon treatment number is mentioned in the reference.
- edition
- editors
- translator
- revisers
- pages, the pages mentioned.
- details, plates, tables, maps, etc.
- year, year or year range
- fullDate, a complete date
- namestatus, taxonomic name statuses appended to cited literature.
- notes, notes on cited literature or literature references.
- status, status pertaining to the reference itself.
- url, if a web address is given, for example when a website is cited.
- doi, digital object identifier, for modern online literature.

- the optional attribute doubtful, to indicate whether a certain part of the publication information has a problem.

The refPart element has six child elements: b, I, sub and sup (explained here), and footnoteRef and footnote (explained here).

References mark-up samples

Below are a few examples of references mark-up:

1) A reference in a footnote:

```
<footnote id="FN_3"><footnoteString>(1) HUTCHINSON (<references><reference>
                                    <refPart class="pubname">The families of the Flowering
Plants</refPart>
                                    <refPart class="edition"> ed. 2</refPart>
                                    <refPart class="volume">vol. 1</refPart>
                                    <refPart class="year">1959</refPart>
                                    <refPart class="pages">p. 438</refPart>
                                </reference></references>) a placé ce genre dans la famille des
Petiveriacées.</footnoteString></footnote>
```

2) A single reference in some distribution information:

```
<feature class="distribution">
        <string>Lemée (<references><reference>
                                    <refPart class="pubname">Dictionnaire</refPart>
                                    <refPart class="volume">4</refPart>
                                    <refPart class="year">1932</refPart>
                                    <refPart class="pages">798</refPart>
                                </reference></references>) estime le nombre des espèces à 280, réparties dans les
<distributionLocality class="world">régions tropicales du monde entier</distributionLocality>. Pour
l'<distributionLocality class="continent">Afrique</distributionLocality>, Kostermans décrit quatre espèces en
1938 et Robyns en dénombre sept en 1960 dont cinq dans les régions intertropicales (les deux autres
croissant l'une aux <distributionLocality class="region">Canaries</distributionLocality>, l'autre en
<distributionLocality class="continental region">Afrique du sud-est</distributionLocality>). Voici la clé des
Ocotea d'<distributionLocality class="continental region">Afrique intertropicale</distributionLocality> (d'après
Robyns, avec compléments).</string>
</feature>
```

3) Two subsequent references within a character in a description:

```
<char class="male flowers"><b>Fleurs mâles</b> formées d'étamines libres (Freycinetia, certaines
espèces de Pandanus extra-africaines) ou associées de diverses manières en colonnes staminifères qui
sont autant de fleurs mâles (<references><reference>
                    <refPart class="author">HUYNH</refPart>
                    <refPart class="pubname">Beitr. Biol. Pflanzen</refPart>
                    <refPart class="volume">57</refPart>
                    <refPart class="year">1982</refPart>
                    <refPart class="pages">50</refPart>
                </reference><reference>
                    <refPart class="pubname">Bot. J. Linn. Soc. </refPart>
                    <refPart class="volume">87</refPart>
                    <refPart class="year">1983</refPart>
                    <refPart class="pages">181 &amp;amp; 189</refPart>
                </reference></references>). </char>
```

Characters

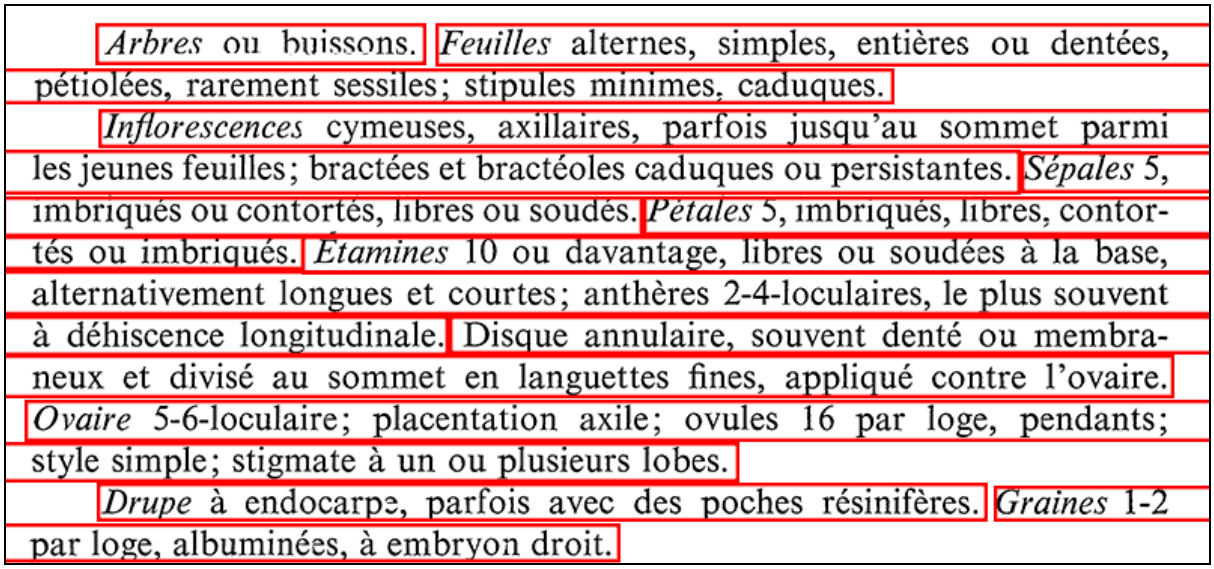
Features are atomized into separate characters using specific elements, instead of being marked up with the string element like the other features. The elements involved are explained below.

It should be noted that it is also possible to atomize other features using the same elements, if you wish to do so.

element char

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
char	optional	class	optional	string
		doubtful	optional	Boolean
		baseClass	optional	string
		absolutePosition	optional	string
		relativePosition	optional	string
		genderRelation	optional	string
		sizeRelation	optional	string

The char element is used to mark up separate characters that each form a single sentence (Figure 17).


Arbres ou buissons. *Feuilles* alternes, simples, entières ou dentées, pétiolées, rarement sessiles; stipules minimes, caduques.

Inflorescences cymeuses, axillaires, parfois jusqu'au sommet parmi les jeunes feuilles; bractées et bractéoles caduques ou persistantes. *Sépales* 5, imbriqués ou contortés, libres ou soudés. *Pétales* 5, imbriqués, libres, contortés ou imbriqués. *Étamines* 10 ou davantage, libres ou soudées à la base, alternativement longues et courtes; anthères 2-4-loculaires, le plus souvent à déhiscence longitudinale. Disque annulaire, souvent denté ou membraneux et divisé au sommet en languettes fines, appliqué contre l'ovaire. *Ovaire* 5-6-loculaire; placentation axile; ovules 16 par loge, pendants; style simple; stigmate à un ou plusieurs lobes.

Drupe à endocarpe, parfois avec des poches résinifères. *Graines* 1-2 par loge, albuminées, à embryon droit.

Figure 17: A description with separate characters (single sentences) surrounded by red rectangles.

It has seven attributes. The first two are explained below:

- class, which should always be used and which should be set to the proper corresponding character. If that character is not in the list in the FlorML XML schema, you should add it to the list (see **XML proofreading.doc** for details). Please try to ensure that the character list for both the char and the subChar elements is the same.

- doubtful, which should be set to "true" only if a character is explicitly mentioned to be entirely doubtful.

The other five can be used to add additional contextual information to characters:

- baseClass, which can be used to indicate to which base character class a character belongs, e.g. “basal leaves” => “leaves”.

- absolutePosition, which can be used to include a modifier related to absolute positioning.

- relativePosition, which can be used to include a modifier related to relative positioning.

- genderRelation, which can be used to indicate whether a character only occurs in one gender, both, or undecided.

- sizeRelation, which can be used to include a modifier related to size.

These five attributes are currently experimental.

Figure 18 shows the child elements of the char element. Most of these child elements are explained elsewhere in this reference manual, but the subChar, childChar and charClass elements are explained below.

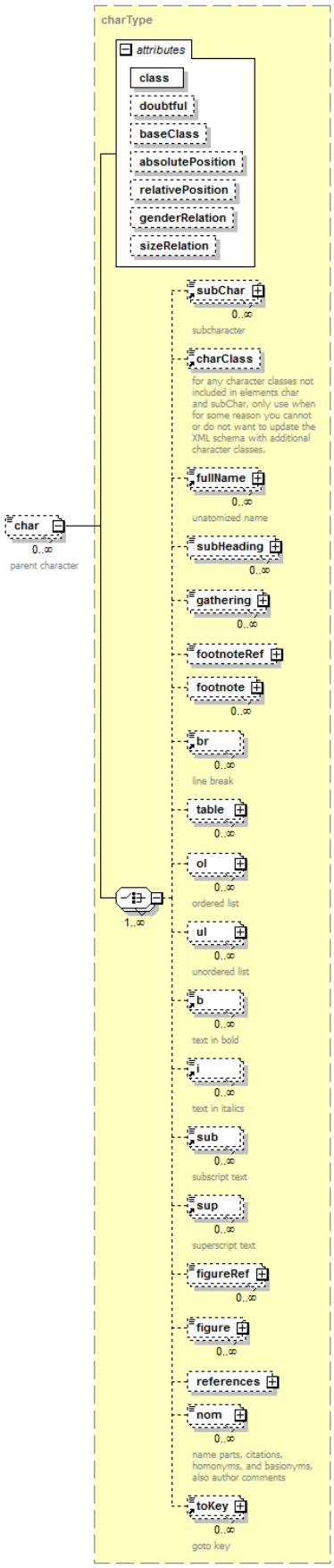


Figure 18: The char element and its child elements.

element subChar

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
subChar	optional	class	optional	string
		doubtful	optional	Boolean
		baseClass	optional	string
		absolutePosition	optional	string
		relativePosition	optional	string
		genderRelation	optional	string
		sizeRelation	optional	string

The subChar element is used to mark up subcharacters, characters that are part of another character (Figure 19).

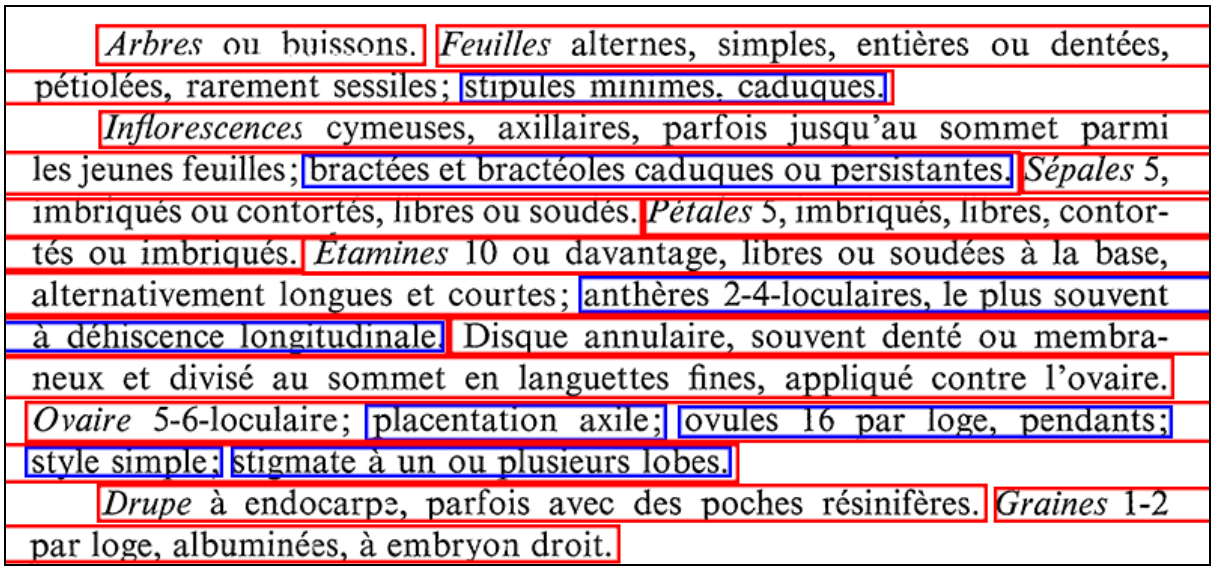


Figure 19: A description with both separate characters (red rectangles) and subcharacters (blue rectangles) indicated.

In the figure above there is only a single level of subcharacters, but technically the number of levels can be more.

It has seven attributes, the first two of which are explained below:

- class, which should always be used and which should be set to the proper corresponding character. If that character is not in the list in the FlorML XML schema, you should add it to the list (see **XML proofreading.doc** for details).

Please try to ensure that the character list for both the char and the subChar elements is the same.

- doubtful, which should be set to "true" only if a character is explicitly mentioned to be entirely doubtful.

The other five can be used to add additional contextual information to characters:

- baseClass, which can be used to indicate to which base character class a character belongs, e.g. “basal leaves” => “leaves”.
- absolutePosition, which can be used to include a modifier related to absolute positioning.
- relativePosition, which can be used to include a modifier related to relative positioning.
- genderRelation, which can be used to indicate whether a character only occurs in one gender, both, or undecided.
- sizeRelation, which can be used to include a modifier related to size.

These five attributes are currently experimental.

The subChar element mostly has the same child elements as the char element.

(deprecated and never used elements childChar and charPart removed)

element charClass

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
charClass	optional	-	-	-

The charClass element can be used only if you wish to use the FlorML XML schema without ever adding characters to the character lists of the char and subChar elements. If you use so, do not use the class attribute for the char and subChar elements.

Distribution data

element distributionLocality

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
distributionLocality	optional	class	required	string
		status	optional	string
		frequency	optional	string
		doubtful	optional	Boolean
		extra	optional	Boolean

The distributionLocality element is used for distribution data. One distribution locality should be marked up with one set of tags.

The distributionLocality element has five attributes:

- class: this attribute is required and defines the type of distribution locality, which often corresponds with a measure for a taxon's dispersal. Some notes:
    - TDWG regions are supported.
    - Use "world" for any distribution locality that mentions hemispheres or (e.g.) temperate regions.
    - Use "continent" for whole continents only (note: the North Pole is not a continent). Otherwise, use "continental region".
    - Use "oceanic region" for any distribution locality where only the name of a sea is given.
    - Use "locality" for any small location that is not clearly defined.
    - "kingdom" was added to deal with some historic locations that could not be defined otherwise.
    - If you are uncertain what this is supposed to be, google the name of the locality to find out.
- status: use if status information (e.g. "cultivated", "native", etc.) is given for a distribution locality.
- frequency: use if information on the frequency of occurrence is explicitly given for a distribution locality.

- doubtful: add this attribute and set it to true if a distribution locality is doubtful.
- extra: for distribution data that has been added to a distribution feature manually and is not present in the original printed work. You can do this when, for example, the text of the distribution feature says that the distribution if the same as some other taxon.

The distributionLocality element has one child element coordinates (explained below).

element coordinates

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
coordinates	optional	-	-	-

The coordinates element is used for geographical coordinates. It has two optional child elements, latitude and longitude. These are optional because sometimes the latitude or longitude is missing.

element latitude

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
latitude	optional	estimate	optional	Boolean

The latitude element is used for the latitude, no matter which coordinates system is used.

It has an attribute estimate that can be added and set to "true" if it is explicitly mentioned that the latitude is an estimate.

element longitude

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
longitude	optional	estimate	optional	Boolean

The longitude element is used for the longitude, no matter which coordinates system is used.

It has an attribute estimate that can be added and set to "true" if it is explicitly mentioned that the longitude is an estimate.

coordinates XML sample

```
<coordinates><latitude>0°50'N</latitude><longitude>11°10'E</longitude></coordinates>
```

element distributionScope

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
distributionScope	optional	class	required	string
		doubtful	optional	Boolean

The distributionScope element is used for distributional scopes containing one of more distribution localities (see here). Its two attributes work the same way as the two corresponding attributes of distributionLocality.

Habitats

Individual habitats can be marked up in a feature with class habitat or ecology or habitatecology (this is because the headings “Habitat”, “Ecology”, and “Habitat & Ecology” are used interchangeably by most authors). The mark-up used is explained below.

element habitat

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
habitat	optional	extra	optional	Boolean

The habitat element can be used to mark up a habitat in a text string. It has an optional attribute extra that should be used if the habitat added was not originally part of the text.

The habitat element has various child elements. Most are explained elsewhere, but the elements altitude, lifeCyclePeriods, and gathering are explained below.

element altitude

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
altitude	optional	estimate	optional	Boolean
		range (deprecated)	optional	Boolean

The altitude element is used to mark up the altitude at which a taxon occurs. Preferably this value is in meters.

It has two attributes:

estimate, which is set to true if the altitude is explicitly indicated to be an estimate.

range, which is set to true if an altitude range is given.

element lifeCyclePeriods

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
lifeCyclePeriods	optional	class	required	string

The lifeCyclePeriods element is used to mark up life cycle information if provided. Its attribute class has various values, for different types of lifecycle-related processes (do not use the value “both”). It has the dates element as its only child element (see here).

element habitatList

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
habitatList	optional	-	-	-

The habitatList element can be used to add a list of habitats to a habitat or habitatecology feature, instead of marking up the habitats inline with the feature's text.

(continued next page)

Gatherings

element gathering

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
gathering	optional	iconoType	optional	Boolean
		typeStatus	optional	string
		notSeen	optional	Boolean
		unknown	optional	Boolean
		destroyed	optional	Boolean
		lost	optional	Boolean
		notFound	optional	Boolean
		doubtful	optional	Boolean

The gathering element is used to mark up specimen information. Currently this is done in types, specimen lists, and figure captions.

The gathering element has eight attributes. Most are used in types to precisely indicate both the physical and taxonomic type status.

The child elements of the gathering element are shown in Figure 20. The fullName element is explained here, the dates element here, the string element here, the typeNotes element here, and the collectionAndType element here, while the other elements are explained below.

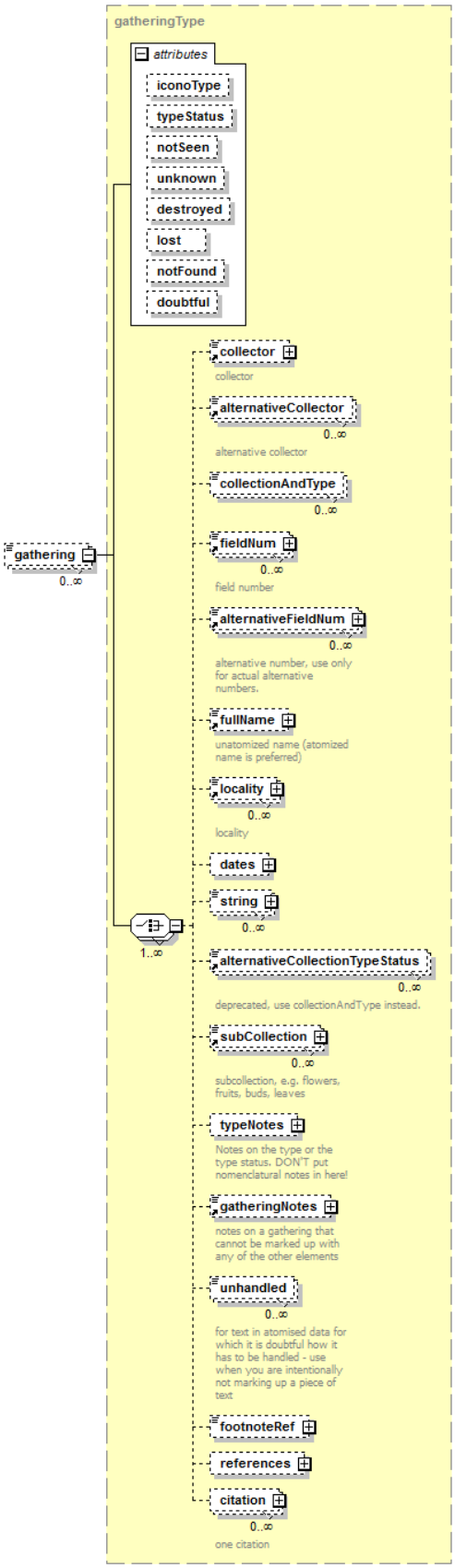


Figure 20: The gathering element and its child elements.

element collector

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
collector	optional	doubtful	optional	Boolean

The collector element is used for the collector's name. One collector can consist of one or more people, or the name of an expedition. It has the optional attribute doubtful, which can be set to true if the collector name is doubtful.

element alternativeCollector

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
alternativeCollector	optional	-	-	-

The alternativeCollector element is used when an alternative name for the collector is given. There can be multiple alternative collectors.

element fieldNum

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
fieldNum	optional	doubtful	optional	Boolean

The fieldNum element is used for the specimen number. It has one optional attribute doubtful that is set to true if a specimen number is doubtful.

The fieldNum element has two optional child elements: the typeNotes element (see here) and the footnoteRef element (see here).

element alternativeFieldNum

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
alternativeFieldNum	optional	doubtful	optional	Boolean

The alternativeFieldNum element is used for alternative specimen numbers that belong to the same gathering. These are usually preceded by a "=" sign. There can be multiple alternative numbers per gathering. It has one optional attribute doubtful that is set to true if an alternative specimen number is doubtful.

The alternativeFieldNum element has the typeNotes element (see here) as its optional child element.

element locality

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
locality	optional	doubtful	optional	Boolean
		class	optional	string
		isPreviousLocality	optional	Boolean

The locality element is used for locality information given with specimens. Each locality should be marked up with one set of tags.

The locality element has three attributes:

- doubtful, which is set to true if a locality is explicitly mentioned to be doubtful.
- class, which is required and defines the type of locality. Some notes:
    - TDWG regions are supported.
    - Use "world" for any locality that mentions hemispheres or (e.g.) temperate regions.
    - Use "continent" for whole continents only (note: the North Pole is not a continent). Otherwise, use "continental region".
    - Use "oceanic region" for any locality where only the name of a sea is given.
    - Use "locality" for any small location that is not clearly defined.
    - If you are uncertain what this is supposed to be, google the name of the locality to find out.
- isPreviousLocality is to be set to "true" when no locality is given but instead "eod. loc." is written there.

The locality element has three child elements: altitude (explained here), coordinates (explained here), and footnoteRef (see here).

element subCollection

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
subCollection	optional	-	-	-

The subCollection element is used to mark up information about subcollections, such as flowers, fruits, leaves, buds, etc. Often these are followed by information about when they were collected.

(deprecated elements collection, collectionStatus, collectionTypeStatus, alternativeCollectionStatus, subGathering removed)

element gatheringGroup

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
gatheringGroup	optional	geoscope	optional	string
		doubtful	optional	Boolean

The gatheringGroup element can be used to mark up groups of specimens when they are grouped by country or other large region.
The gatheringGroup element has two attributes: geoscope, used to explicitly indicate the grouping category, and doubtful.

There is one child element, gathering, explained above.

Vernacular names

element vernacularNames

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
vernacularNames	optional	-	-	-

The vernacularNames element is used for paragraphs that contain a listing of one or more vernacular names together with the languages the vernacular names come from. It is used in the vernacular names feature.

Note: Vernacular names without a language that are given in nomenclature sections go right into <name class="vernacular"> and do not use the vernacularNames and vernacularName elements.

The vernacularNames element has the subheading and vernacularName elements as its child elements. The latter is explained below.

element vernacularName

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
vernacularName	required	-	-	-

The vernacularName element is used for the text block in which a single vernacular name and its synonyms, as well as the language(s) in which it can occur, are given.

The child elements of the vernacularName element are shown in Figure 21.

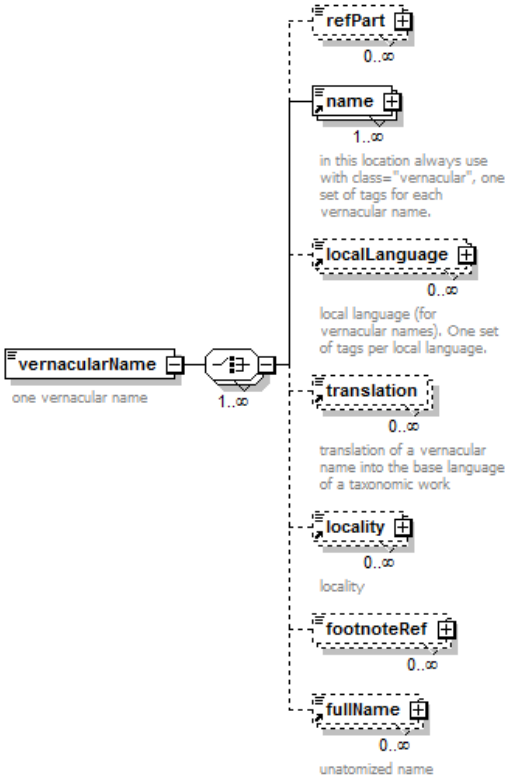


Figure 21: The vernacularName element and its child elements.

The refPart element is explained here, the name and fullName elements here, the locality element here, and footnoteRef here.

There are code samples later on (Figure 22 and Figure 23).

The other elements are explained below.

element localLanguage

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
localLanguage	optional	doubtful	optional	Boolean

		unknown	optional	Boolean

The localLanguage element is used to mark up a single language for a vernacular name. See also the examples below.

If it is explicitly indicated that the information given for the language is doubtful, add the doubtful attribute and set it to "true". If it is explicitly indicated that the local language is unknown, set the unknown attribute to "true".

element translation

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
localLanguage	optional			

The translation element is used to mark up a single translation of a vernacular name.

vernacularNames XML samples

Figure 22 and Figure 23 show two examples of vernacular name mark-up.

```
<feature class="vernacular">
  <string><subHeading>Noms vernaculaires (d'après Walker):</subHeading><vernacularNames>
    <vernacularName><name class="vernacular">Ebobogo</name> (<localLanguage>Mpongwé</localLanguage>)</vernacularName>
    <vernacularName><name class="vernacular">Mbogo-wogo</name> (<localLanguage>Nkomi</localLanguage>, <localLanguage>Orungu</localLanguage>)</vernacularName>
    <vernacularName><name class="vernacular">Ayong-nsac</name> (<localLanguage>Fang</localLanguage>)</vernacularName>
    <vernacularName><name class="vernacular">Ngandélyé</name> (<localLanguage>Bakélé</localLanguage>)</vernacularName>
    <vernacularName><name class="vernacular">Lindalindyé</name> (<localLanguage>Béséki</localLanguage>)</vernacularName>
  </vernacularNames>.</string>
</feature>
```

Figure 22: Vernacular names example 1.

```
<feature class="vernacular">
  <string><subHeading>Noms vernaculaires (d'après Walker et Sillans):</subHeading><vernacularNames>
    <vernacularName><name class="vernacular">Dibugila</name> (<localLanguage>Eshira</localLanguage>, <localLanguage>Bavarama</localLanguage>, <localLanguage>Bavungu</localLanguage>)</
vernacularName>
    <vernacularName><name class="vernacular">Dibugila</name>, <name class="vernacular">Duvinda</name> (<localLanguage>Bapunu</localLanguage>)</vernacularName>
  </vernacularNames>.</string>
</feature>
```

Figure 23: Vernacular names example 2.

Dates

element dates

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
dates	optional	-	-	-

The dates element is used for dates. It has four child elements, all of which are explained below.

element fullDate

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
fullDate	optional	doubtful	optional	Boolean

The fullDate element is used for any date with non-numerical information (e.g. Monday) or that does not follow a normal data format (e.g. a range of years). The day, month, and year elements require that information is provided as a number and do not support more complex dates. The fullDate element has one attribute, doubtful, used when a date is questionable.

element day

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
day	optional	-	-	-

The day element is used for the day part of a date.

day XML sample

```
<dates><day>---10</day></dates>
```

The numerical value should be preceded by three dashes.

element month

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
month	optional	-	-	-

The month element is used for the month part of a date.

month XML sample

```
<dates><month>--11</month></dates>
```

The numerical value should be preceded by two dashes.

element year

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
year	optional	-	-	-

The year element is used for the year part of a date.

year XML sample

```
<dates><year>2013</year></dates>
```

Text formatting elements

The following elements are used to mark-up specific types of textual contents to reproduce formats used in a printed taxonomic work.

Lists

element ol

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
ol	optional	-	-	-

The ol element is used for ordered (numbered) lists. It has the li, ol and ul elements as its child elements. The latter two are used for nested lists, although their use at this location is deprecated.

element ul

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
ul	optional	-	-	-

The ul element is used for unordered (bulleted) lists. It has the li, ol and ul elements as its child elements. The latter two are used for nested lists, although their use at this location is deprecated.

The li element is explained below.

element li

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
li	required	type	optional	string
		value	optional	Boolean

The li element is used for individual list items in both ordered and unordered lists.

It has two optional attributes:

- type can be used to indicate what kind of information is placed on a list item line.
- value can be used to indicate the presence of a numerical value on a list item line.

The li element has many different child elements that are all discussed elsewhere in this document.

For nested lists, put the ol or ul element within a list item as shown on this webpage: http://www.w3schools.com/html/tryit.asp?filename=tryhtml_nestedlists2

list mark-up sample

A mark-up sample for a list is shown in the example located here.

Tables

element table

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
table	optional	id	optional	ID

The table element is used for tables. It has an optional attribute id that is used to link references to a particular table to that table. See the tableRef element for more information.

The table element has two child elements: the tableTitle element and the tr element, both explained below.

element tableTitle

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
tableTitle	optional	-	-	-

The tableTitle element is used for an eventually present table title.

element tr

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
tr	required	-	-	-

The tr element is used to define a single table row.

It has two possible child elements: the th element and the td element. See below.

element th

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
th	optional	type	optional	string
		colspan	optional	integer

The th element is used to define a single table header cell. It has two optional attributes:

type can be used to indicate what kind of contents the table header cell contains.

colspan is used when a cell spans two are more columns. Its value is the number of columns it spans.

Its child elements are shown in Figure 24 and explained elsewhere in this reference manual.

element td

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
td	optional	type	optional	string
		colspan	optional	integer

The td element is used to define a single table cell. It has two optional attributes

type can be used to indicate what kind of contents the table cell contains.

colspan is used when a cell spans two are more columns. Its value is the number of columns it spans.

Its child elements are the same as for the th element and explained elsewhere in this reference manual.

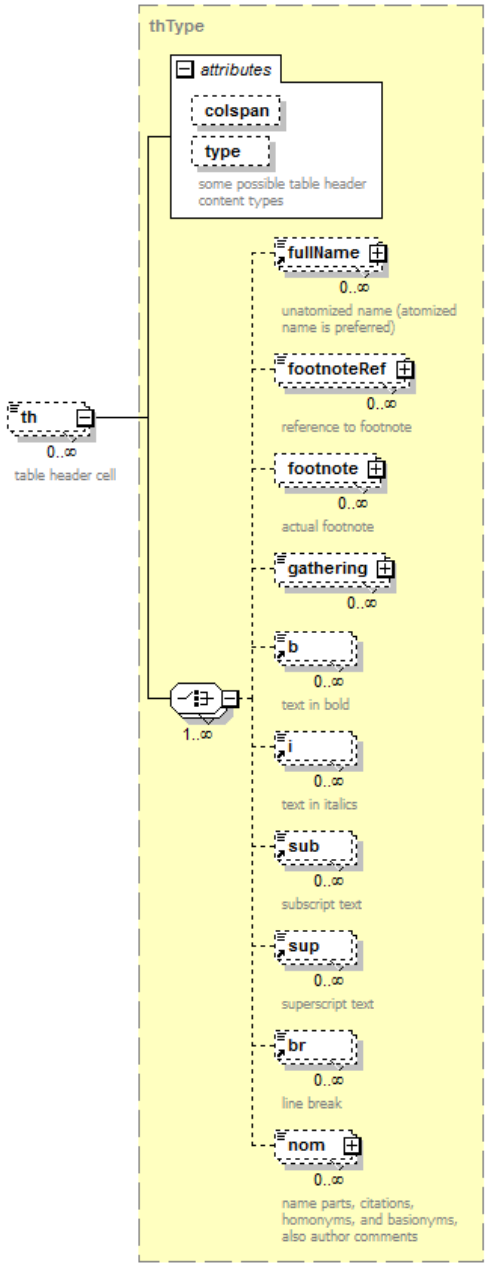


Figure 24: The th element and its child elements. The td element has the same child elements.

element tableRef

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
tableRef	optional	ref	required	IDREFS

The tableRef element is used to link from text to a table elsewhere in a document. It has a required attribute ref for the identifier, which uses the following format: "TA_xx", where xx is a number. Be sure to use different numbers to link to different tables!!!

table mark-up sample

The text box below shows an example for table mark-up:

```
<feature class="notes">
        <string><subHeading>Remarque:</subHeading> Les différences entre B. Corbisieri et B.
megaphylla seraient les suivantes selon les auteurs:<br />
<table>
        <tr>
                <td></td>
                <td>B. Corbisieri</td>
                <td>B. megaphylla</td>
        </tr>
        <tr>
                <td>Pédicelles</td>
                <td>2,5 à 5 mm</td>
                <td>2,5 mm</td>
        </tr>
        <tr>
                <td>Extérieur des tépales</td>
                <td>pubérulent</td>
                <td>tomenteux</td>
        </tr>
        <tr>
                <td>Ovaire</td>
                <td>pubérulent (gris)</td>
                <td>tomentelleux (fauve)</td>
        </tr>
        <tr>
                <td>Stigmate</td>
                <td>globuleux</td>
                <td>filiforme</td>
        </tr>
</table>
Elles ne nous ont pas paru suffisantes pour justifier le maintien de deux espèces.</string>
</feature>
```

The original table as it appears in the printed volume is shown in Figure 25. The empty table cell in the first row is also present in the marked up version.

	B. Corbisieri	*B. megaphylla*
Pédicelles.....	2,5 à 5 mm	2,5 mm
Extérieur des tépales.....	pubérulent	tomenteux
Ovaire	pubérulent (gris)	tomentelleux (fauve)
Stigmate	globuleux	filiforme

Elles ne nous ont pas paru suffisantes pour justifier le maintien de deux espèces.

Figure 25: Table sample original version.

Line breaks

element br

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
br	optional	-	-	-

For line breaks between paragraphs belonging to the same text section or feature the br element is used.

This is the only element of FlorML that does not require a separate opening and closing tag. Instead, it can be written
. An example of its use is shown below:

```
<feature class="introducedspecies">
        <string><heading>APPENDICE</heading><br /><subHeading>Notes sur les espèces cultivées d'Amaryllidaceœ.</subHeading><br />Des représentants de 3 genres sud-africains: Amaryllis L., Clivia Lindl. et Nerine Herb. et de 4 genres américains tropicaux: Hippeastrum Herbert, Hymenocallis Salisb., Sprekelia Heister et Zephyranthes Korovin sont souvent cultivés en Afrique tropicale, y compris au Gabon.<br />
Amaryllis et Nerine sont proches de Crinum, avec lequel ils partagent les caractères suivants: hampe florale pleine, 2 bractées involucrales libres, et une capsule avec des graines globuleuses à irrégulières, verdâtres. Ces deux genres se distinguent facilement de Crinum par un tube périanthaire très court, presque absent. Amaryllis a peu de fleurs, rosâtres, grandes, d'environ 10 cm de longueur, infundibuliformes; segments périanthaires largement lancéolés et peu réfléchis. Le genre est monospécifique: A. belladonna L. poussant naturellement seulement au Cap.<br />
Nerine a des fleurs roses plus petites et plus ouvertes, nombreuses (5-15) disposées en ombelle. Les segments du périanthe sont Presque linéaires, atteignant 3-4 cm de longueur, réfléchis et souvent ondulés, crispés. N. flexuosa (Jacq.) Herb. et N. undulata (L.) Herb. sont souvent cultivés, le premier avec moins de fleurs et des fleurs plus grandes que le second. De plus on a plusieurs hybrides.<br />
Clivia avec un rhizome, 4-6 bractées involucrales et des baies rouges est probablement plus proche de Scadoxus (ou plutôt Haemanthus). Les feuilles sont épaisses rubanées et distiques. Les fleurs, en ombelles riches, sont rouges à orange et grandes (jusqu'à 8 cm). C. miniata Reg., avec des fleurs infundibuliformes et C. nobilis Lindl., avec des fleurs plus en cloche, sont souvent cultivées. Il y a aussi d'innombrables hybrides horticulturaux.<br />
Hippeastrum, un genre du nouveau monde de 50 à 60 espèces, ressemble superficiellement à Amaryllis avec de grandes fleurs rouges infundibuliformes encadrées de 2 bractées libres. Le fruit, cependant, est différent puisqu'il consiste en une capsule loculicide avec de nombreuses graines noires, comprimées.<br />
Hippeastrum a aussi une hampe florale creuse et de petites écailles entre les filaments staminaux à la gorge des fleurs. Très souvent cultivé et naturalisé au Gabon, H. puniceum (Lam.) Kuntze, a des inflorescences à 2-4 fleurs et des fleurs rouges à orange, souv [etc.]
```

Bold and italics

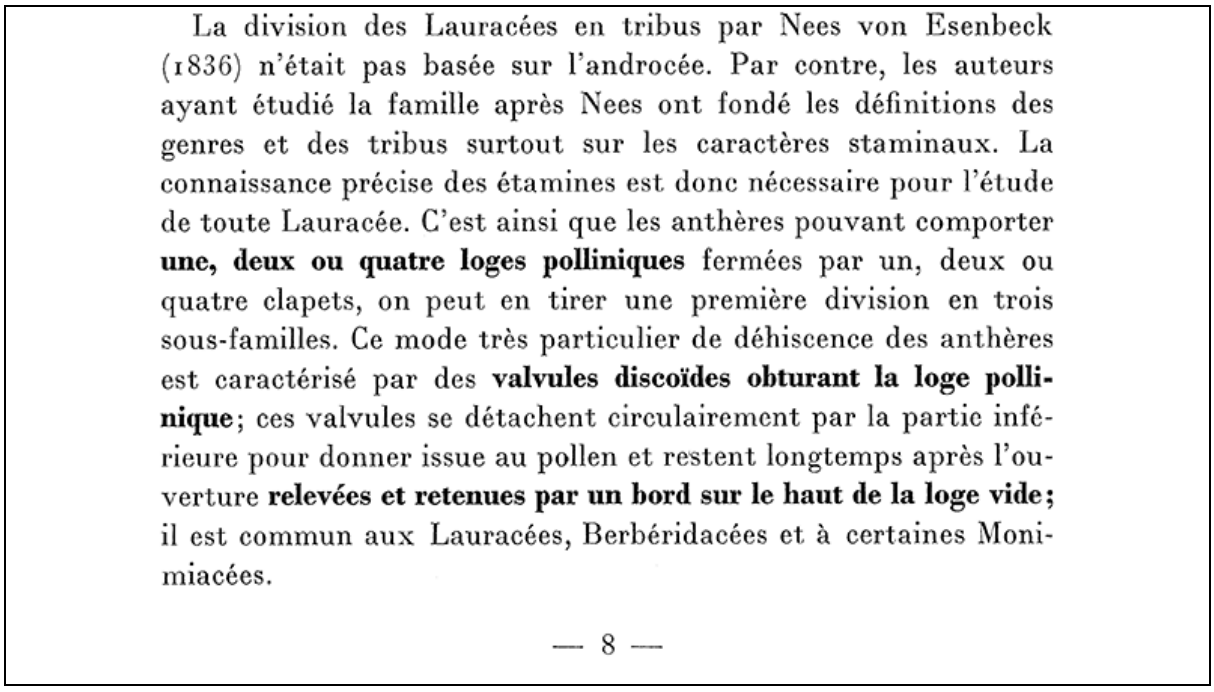
element b

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
b	optional	-	-	-

element i

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
i	optional	-	-	-

The b and i elements are used for bold and italic text, respectively. Bold and italics should only be used when the original text explicitly requires it.



La division des Lauracées en tribus par Nees von Esenbeck (1836) n'était pas basée sur l'androcée. Par contre, les auteurs ayant étudié la famille après Nees ont fondé les définitions des genres et des tribus surtout sur les caractères staminaux. La connaissance précise des étamines est donc nécessaire pour l'étude de toute Lauracée. C'est ainsi que les anthères pouvant comporter **une, deux ou quatre loges polliniques** fermées par un, deux ou quatre clapets, on peut en tirer une première division en trois sous-familles. Ce mode très particulier de déhiscence des anthères est caractérisé par des **valvules discoïdes obturant la loge pollinique**; ces valvules se détachent circulairement par la partie inférieure pour donner issue au pollen et restent longtemps après l'ouverture **relevées et retenues par un bord sur le haut de la loge vide;** il est commun aux Lauracées, Berbéridacées et à certaines Monimiacées.

— 8 —

Figure 26: Bolded text to indicate important characters.

An example of this is shown in Figure 26, where diagnostic characters have been printed in bold. Unless bold tags are added to the corresponding text, as shown on the next page, this information will be lost:

```
<char class="stamens">La division des Lauracées en tribus par Nées von Esenbeck 1836) n'était pas basée sur l'androcée. Par contre, les auteurs ayant étudié la famille après Nees ont fondé les définitions des genres et des tribus surtout sur les caractères staminaux. La connaissance précise des étamines est donc nécessaire pour l'étude de toute Lauracée. C'est ainsi que les anthères pouvant comporter <b>une, deux ou quatre loges polliniques</b> fermées par un, deux ou quatre clapets, on peut en tirer une première division en trois sous-familles. Ce mode très particulier de déhiscence des anthères est caractérisé par des <b>valvules discoïdes obturant la loge pollinique</b>; ces valvules se détachent circulairement par la partie inférieure pour donner issue au pollen et restent longtemps après l'ouverture <b>relevées et retenues par un bord sur le haut de la loge vide</b>; il est commun aux Lauracées, Berbéridacées et à certaines Monimiacées.<br /></char>
```

Sub- and superscript

element sub

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
sub	optional	-	-	-

element sup

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
sup	optional	-	-	-

The sub and sup elements are used for subscript and superscript text, respectively. However, this excludes superscript text as used for references to footnotes (see here). Most sub- and superscript text that should be marked up with these elements can be found in chemical formulas.

An example of superscript and subscript mark-up is shown in the text box below, with the original text shown in Figure 27.

```
<subHeading>Lignans and neolignans — </subHeading>These plant constituents are dimers of phenylpropanoids (C<sub>1</sub> ... C<sub>9</sub> + C<sub>1’</sub> ... C<sub>9’</sub>). According to Gottlieb and Yoshida (1989) lignans and neolignans should be defined biogenetically not purely on chemical arguments. They consider lignans as C<sub>8</sub>-C<sub>8’</sub>-linked dimers of phenolic derivatives of cinnamyl alcohol (C<sub>6</sub>H<sub>5</sub>-<sup>7</sup>CH = <sup>8</sup>CH<sup>9</sup>CH<sub>2</sub>OH) or phenolic derivatives of cinnamic acid (C<sub>6</sub>H<sub>5</sub>-<sup>7</sup>CH = <sup>8</sup>CH-<sup>9</sup>COOH). On the other hand neolignans are dimeric derivatives of allylbenzenes (C<sub>6</sub>H<sub>5</sub>-<sup>7</sup>CH<sub>2</sub>-<sup>8</sup>CH = <sup>9</sup>CH<sub>2</sub>; e.g. eugenol) or propenylbenzenes (C<sub>6</sub>H<sub>5</sub>-<sup>7</sup>CH = <sup>8</sup>CH-<sup>9</sup>CH<sub>3</sub>;e.g. isoeugenol), [etc.]
```

Lignans and neolignans — These plant constituents are dimers of phenylpropanoids (C_1 … C_9 + $C_{1'}$ … $C_{9'}$). According to Gottlieb and Yoshida (1989) lignans and neolignans should be defined biogenetically not purely on chemical arguments. They consider lignans as C_8–$C_{8'}$-linked dimers of phenolic derivatives of cinnamyl alcohol (C_6H_5-^{7}CH = ^{8}CH-$^9CH_2OH$) or phenolic derivatives of cinnamic acid (C_6H_5-^{7}CH = ^{8}CH-^{9}COOH). On the other hand neolignans are dimeric derivatives of allylbenzenes (C_6H_5-$^7CH_2$-^{8}CH = $^9CH_2$; e.g. eugenol) or propenylbenzenes (C_6H_5-^{7}CH = ^{8}CH-$^9CH_3$; e.g. isoeugenol), and different types of linkage between the two monomers occur, e.g.

Figure 27: Text with super script and subscript, original in printed volume.

Unclear text

element unhandled

Element name	Required or Optional	Attributes	Required or Optional	Attribute type
unhandled	optional	-	-	-

The unhandled element is used when a text string in otherwise atomised data contains data that of which the purpose is unclear - ONLY USE if you have doubts about the data and intentionally do not assign it to another element

Appendix: More technical information

More (literally) technical information on the FlorML XML schema can be obtained by:

1) Opening the schema in XML Spy, going to the "Schema design"-menu and selecting "Generate documentation…" (**Figure 28**).

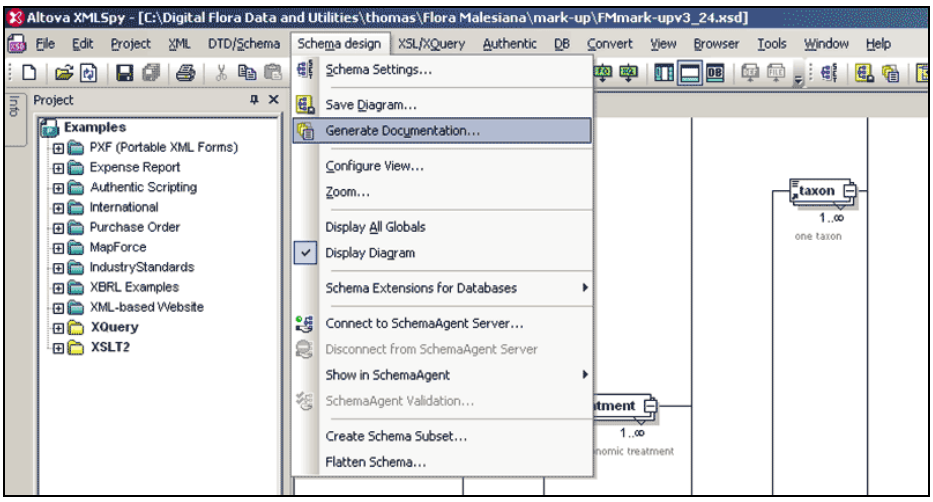


Figure 28: Generating documentation for an XML schema.

2) In the window that opens, check whether everything is as shown in Figure 29. HTML documentation includes hyperlinked elements for easy navigation.

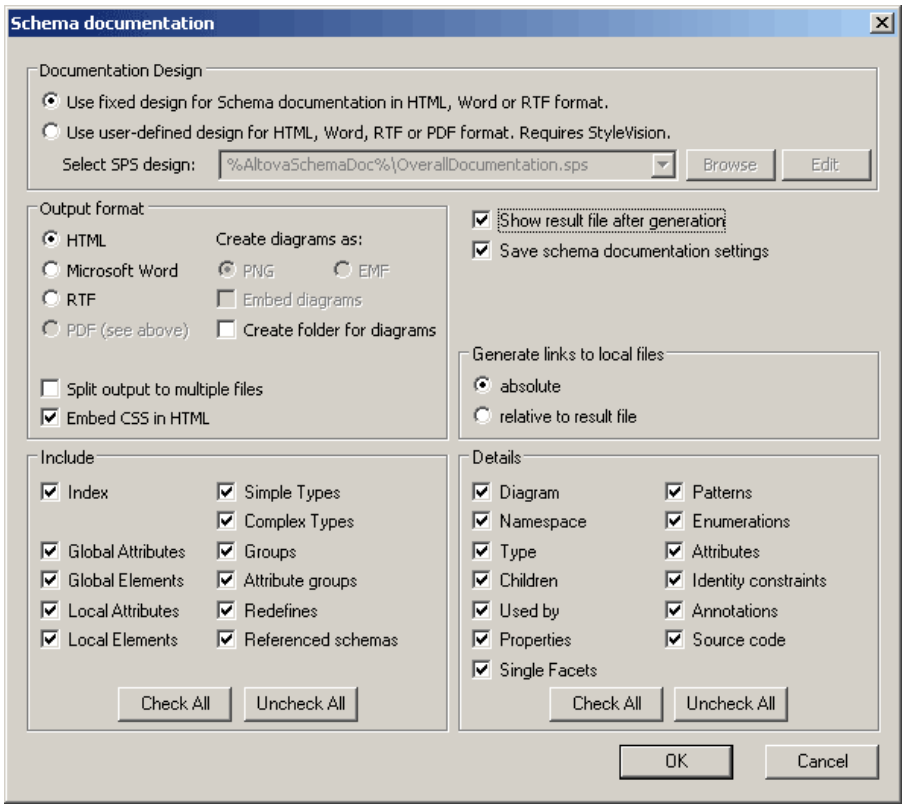


Figure 29: Schema documentation generation window.

3) Click "OK".
4) Then enter a file name for the documentation, choose a location to save it, and click "OK" again to save it.
5) Once the documentation has been generated, it will open in XML Spy and you can view it. You can also open the documentation in a web browser.