MorphBank Biological Image Database

Darwin Core Standards: Where applicable, the MorphBank Biological Image Database will implement the Darwin Core Standard for database attribute names and characteristics.

Base Objects: Each MorphBank table will inherit a base object with identifies the authorized MorphBank user that created the table, the timestamp of the creation and the timestamp of the last time the record was modified. This will not be implemented as an inherited object because of the increased overhead in database join operations when performing queries. The additional code needed to perform the update operation on the items when adding or updating records is considered to be minimal.

MorphBank ID: Each MorphBank visible object will be identified using a MorphBank **id** number that is generated by a MorphBank applet. This is an 18 character field that is patterned after Life Science Identifiers (LSID). The Life Sciences Identifier is an I3C and OMG Life Sciences Research specification in progress. By using LSIDs for all unique primary key identifiers we are able to catalog each tuple as an entity in a central table and perform queries as well as link different objects together in our annotation applications. LSIDs, in accordance with the proposed standard, have five parts. They include the Network Identifier (NID); the root DNS name of the issuing authority; the namespace chosen by the issuing authority; the object id unique in that namespace; and finally an optional revision id for storing versioning information. Each part is separated by a colon to make LSIDs easy to parse. The modified version that will be used by MorphBank will only include the Namespace (morphbank) and a unique serial number generated by a MorphBank applet. Eventually when MorphBank full adopts the LSID standard, the database can be easily converted to include all five parts.

When a record of a table is added that uses the MorphBank id subset of the LSID, a new serial number is generated and after successful completion of the transaction there will be a new entry into a centralized table cataloging the id, the table in which the record resides, and appropriate time stamp information.

TSN: MorphBank will use the ITIS Database to catalog and identify specimens to a related taxon using the Taxonomic Serial Number. Initially, MorphBank will download the database into a local copy and access the information directly. The specimen's kingdom, phylum, class, order, family, genus, species, and other categories will be directly identified by the single **tsn**. Future implementations of the ITIS database will involve accessing the information directly instead maintaining a local copy.

Table Name: Specimen

      Definition: **Holds information and data indigenous to a particular**
                MorphBank specimen
      Primary Key: **ID**

<p align="center">ELEMENTS</p>

Name:	**id**
Element Type:	**Character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**No**
Values List:	**N/A**
Data Source:	**Obtained from Catalog, Primary Key**
Validation Rules:	**Value must not be duplicated in this table**
Description:	**Generated key value for the location table for MorphBank Entities. The id of each object in MorphBank shall carry the same characteristics based upon the Life Sciences Identifier. However, instead of 5 parts of the ID, MorpBank will only implement 2: the namespace and serial number. The length will be 18 characters long and the two parts divided by a colon. The serial number will be generated by a specific MorphBank applet and will also catalog the object so searches on MorphBank object ids will return the specific table location of each object.**

Name:	**sex**	
Element Type:	**Character**	
Element Size:	**2**	
Required:	**No**	
Foreign Key:	**No**	table: **N/A**
Values List:	**(M) Male**	
	(F) Female	
	(A) Agamic female	
	(H) Hermaphrodite	
	(I) Indeterminate (examined but could not be determined)	
	(U) Unknown (not examined)	
	(T) Transitional (between sexes; for sequential hermaphrodites)	
Data Source:	**User input**	
Validation Rules:	**Must be selected from the drop down box**	

Description:	**The sex of a specimen. The domain should be a controlled set of terms (codes) based on community consensus. See values list above for proposed values.**

Name:	**preparationType**
Element Type:	**Character**
Element Size:	**255**
Required:	**Yes**
Foreign Key:	**No** table: **N/A**
Values List:	**N/A**
Data Source:	**User input**
Validation Rules:	**Free text entry at this time**
Description:	**The type of preparation (skin. slide, etc). Probably best to add this as a record element rather than access point. Should be a list of preparations for a single collection record.**

Name:	**individualCount**
Element Type:	**Integer**
Element Size:	**32 bits**
Required:	**No**
Foreign Key:	**No** table: **N/A**
Values List:	**N/A**
Data Source:	**User input**
Validation Rules:	**Must be a positive integer input**
Description:	**The number of individuals present in the lot or container. Not an estimate of abundance or density at the collecting locality.**

Name:	**relationshipType**
Element Type:	**Character**
Element Size:	**128**
Required:	**No**
Foreign Key:	**No** table: **N/A**
Values List:	**N/A at this time**
Data Source:	**User Input**
Validation Rules:	**N/A**
Description:	**A named or coded valued that identifies the kind relationship between this Collection Item and the referenced Collection Item. Named values include: "parasite of", "epiphyte on", "progeny of", etc. In future versions of this schema this attribute should be set-valued.**

Name:	**developmentalStage**
Element Type:	**Character**
Element Size:	**128**

Required:	**No**	
Foreign Key:	**No**	table: **N/A**
Values List:	**N/A**	
Data Source:	**User input**	
Validation Rules:	**N/A**	
Description:	**The developmental stage of the specimen. For insects, relevant values might be "egg", "larva", "pupa" and "adult", or "egg", "first-instar larva", "second-instar larva", "prepupa" etc. For others expressions are used to denote the developmental stage of the specimen.**	

Name:	**typeStatus**	
Element Type:	**Integer**	
Element Size:	**32 bits**	
Required:	**No**	
Foreign Key:	**No**	table: **N/A**
Values List:	**N/A**	
Data Source:	**User input**	
Validation Rules:	**N/A**	
Description:	**The type status of the specimen. Should in the future be set-valued ("Holotype", "Paratype", "Syntype" are the primary values that will be entered for this field).**	

Name:	**typeofTaxon**	
Element Type:	**Integer**	
Element Size:	**32 bits**	
Required:	**No**	
Foreign Key:	**No**	table: **N/A**
Values List:	**N/A**	
Data Source:	**User input**	
Validation Rules:	**Must contain a valid species-level entry from the ITIS/TSN if the specimen has type status.**	
Description:	**The species-level name of which the specimen is a type.**	

Name:	**tsn**	
Element Type:	**Integer**	
Element Size:	**32 bits**	
Required:	**Yes**	
Foreign Key:	**Yes**	table: **Taxonomic_Units**
Values List:	**N/A**	
Data Source:	**ITIS Database, Taxonomic Serial Number**	
Validation Rules:	**Must exist in the ITIS Database**	
Description:	**Taxonomic Serial Number. The unique identifier of an occurrence of taxonomic units.**	

	Name: **basisOfRecord**	
Element Type:	**Character**	
Element Size:	**1**	
Required:	**No**	
Foreign Key:	**No**	table: **N/A**
Values List:	**(O) Observation**	
	(L) Living Organism	
	(S) Specimen	
	(G) Germplasm/seed, etc	
Data Source:	**Drop Down Selection**	
Validation Rules:	**Must be O, L,S, or G**	
Description:	**An abbreviation indicating whether the record represents an observation (O), living organism (L), specimen (S), germplasm/seed (G), etc.**	

Name:	**institutionCode**	
Element Type:	**Character**	
Element Size:	**128**	
Required:	**No**	
Foreign Key:	**No**	table: **N/A**
Values List:	**N/A**	
Data Source:	**User input**	
Validation Rules:		
Description:	**A "standard" code identifier that identifies the institution to which the collection belongs. No global registry exists for assigning institutional codes. Use the code that is "standard" in your discipline. (Check that no global registry exist yet)**	

Name:	**collectionCode**	
Element Type:	**Character**	
Element Size:	**128**	
Required:	**No**	
Foreign Key:	**No**	table: **N/A**
Values List:	**N/A**	
Data Source:	**User input**	
Validation Rules:	**A unique alphanumeric value which identifies the collection within the institution.**	
Description:		

Name:	**catalogNumber**	
Element Type:	**Character**	
Element Size:	**128**	
Required:	**No**	
Foreign Key:	**No**	table: **N/A**
Values List:	**N/A**	

Data Source: **User input**
Validation Rules: **N/A**
Description: **A unique alphanumeric value which identifies an individual record within the collection. It is recommended that this value provides a key by which the actual specimen can be identified. If the specimen has several items such as various types of preparation, this value should identify the individual component of the specimen.**

Name: **relatedCatalogItem**
Element Type: **Character**
Element Size: **128**
Required: **No**
Foreign Key: **No**   table: **N/A**
Values List: **N/A**
Data Source: **User input**
Validation Rules: **Must exist as a catalog item in a recognized institute**
Description: **The fully qualified identifier of a related Catalogue Item (a reference to another specimen); Institution Code, Collection Code, and Catalogue Number of the related Catalogued Item, where a space separates the three sub-elements.**

Name: **previousCatalogNumber**
Element Type: **Character**
Element Size: **128**
Required: **No**
Foreign Key: **No**   table: **N/A**
Values List: **N/A**
Data Source: **User input**
Validation Rules: **Must exist as a catalog number at a recognized institute.**
Description: **The previous (fully qualified) catalogue number of the Catalogued Item if the item earlier identified by another Catalogue Number, either in the current catalogue or another Institution / catalogue. A fully qualified Catalogue Number is preceded by Institution Code and Collection Code, with a space separating each sub-element. Referencing a previous Catalogue Number does not imply that a record for the referenced item is or is not present in the corresponding catalogue, or even that the referenced catalogue still exists. This access point is intended to provide a way to retrieve this record by a previously used identifier, which may be used in the literature. In future versions of this schema this attribute should be set-valued.**

Name:	**collectionNumber**	
Element Type:	**Character**	
Element Size:	**128**	
Required:	**No**	
Foreign Key:	**No**	table: **N/A**
Values List:	**N/A**	
Data Source:	**User input**	
Validation Rules:	**None**	
Description:	**An identifying "number" (really a string) applied to specimens (in some disciplines) at the time of collection. Establishes a link between different parts/preparations of a single specimen and between field notes and the specimen.**	

Name:	**collectorName**	
Element Type:	**Character**	
Element Size:	**128**	
Required:	**No**	
Foreign Key:	**No**	table: **N/A**
Values List:	**N/A**	
Data Source:	**User input**	
Validation Rules:	**None**	
Description:	**Name of the person collecting the specimen**	

Name:	**dateCollected**	
Element Type:	**timestamp**	
Element Size:	14	
Required:	**No**	
Foreign Key:	**No**	table: **N/A**
Values List:	**N/A**	
Data Source:	**User input**	
Validation Rules:	**Must be a valid Gregorian date**	
Description:	**Date the specimen was collected**	

Name:	**locationId**	
Element Type:	**Character**	
Element Size:	**18**	
Required:	**Yes**	
Foreign Key:	**Yes**	table: **Location**
Values List:	**N/A**	
Data Source:	**System updated from referenced table**	
Validation Rules:	**Must exist in Location table**	
Description:	**The MorphBank Object ID of the related location.**	

Name:	**notes**	

Element Type:	**Character**
Element Size:	**255**
Required:	**No**
Foreign Key:	**No** table: **N/A**
Values List:	**N/A**
Data Source:	**User input**
Validation Rules:	**N/A**
Description:	**Free entry notes on the specimen.**

Name:	**publishDate**
Element Type:	**timestamp**
Element Size:	**14**
Required:	**Yes**
Foreign Key:	**No** table: **N/A**
Values List:	**N/A**
Data Source:	**User input**
Validation Rules:	**Must be a valid Gregorian date**
Description:	**The date in which the specimen was made public.**

Base Object: Each record of each table will have the following data items:

Name:	**userID**
Element Type:	**character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**Yes** Table: **user**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must exist in the user table.**
Description:	**Identification of the user who entered the record.**

Name:	**dateCreated**
Element Type:	**timestamp**
Element Size:	**14**
Required:	**Yes**
Foreign Key:	**No** Table: **N/A**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must be a valid date field.**
Description:	**Date in which the record was entered.**

Name:	**datelastModified**
Element Type:	**timestamp**
Element Size:	**14**
Required:	**Yes**

Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **System generated.**
Validation Rules: **Must be a valid date field.**
Description: **Date in which the record was last modified.**

Table Name: **Location**

Definition: **Table of Valid locations of MorphBank Specimens**
Primary Key: **ID**

ELEMENTS

Name:	**id**
Element Type:	**Character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**No**
Values List:	**N/A**
Data Source:	**Obtained from Catalog, Primary Key**
Validation Rules:	**Value must not be duplicated in this table**
Description:	**Generated key value for the location table for MorphBank Entities. The id of each object in MorphBank shall carry the same characteristics based upon the Life Sciences Identifier. However, instead of 5 parts of the ID, MorpBank will only implement 2: the namespace and serial number. The length will be 18 characters long and the two parts divided by a colon. The serial number will be generated by a specific MorphBank applet and will also catalog the object so searches on MorphBank object ids will return the specific table location of each object.**

Name:	**country**
Element Type:	**Character**
Element Size:	**2**
Required:	**No**
Foreign Key:	**No** Table: **N/A**
Values List:	**N/A**
Data Source:	**Selected from value list or table.**
Validation Rules:	**Value must be a valid country code**
Description:	**The country or major political unit from which the specimen was collected. ISO 3166-1 values should be used. Full country names are currently in use. A future recommendation is to use ISO3166-1 two letter codes or the full name when searching. MorphBank will adopt the two letter codes for this database.**

Name:	**continentocean**

Element Type: **Character**
Element Size: **56**
Required: **No**
Foreign Key: **No**   **Table: N/A**
Values List: **Selected from value list or table**
Data Source: **Selected from value list or table.**
Validation Rules: **Value must be a valid country code**
Description: **The continent or ocean from which a specimen was collected.**

Name: **locality**
Element Type: **Character**
Element Size: **56**
Required: **Optional**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **User Input.**
Validation Rules: **N/A**
Description: **The locality description (place name plus optionally a displacement from the place name) from which the specimen was collected. Where a displacement from a location is provided, it should be in un-projected units of measurement.**

Name: **latitude**
Element Type: **Real**
Element Size: **long**
Required: **No**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **User Input.**
Validation Rules: **Must be a valid latitude number**
Description: **The latitude of the location from which the specimen was collected. This value should be expressed in decimal degrees with a datum such as WGS-84**

Name: **longitude**
Element Type: **Real**
Element Size: **long**
Required: **No**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **User Input.**
Validation Rules: **Must be a valid longitude number**
Description: **The longitude of the location from which the specimen was collected. This value should be expressed in decimal degrees with a datum such as WGS-84**

Name:	**coordinatePrecision**
Element Type:	**Integer**
Element Size:	**short**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**User Input.**
Validation Rules:	**Must be a valid integer number**
Description:	**An estimate of how tightly the collecting locality was specified; expressed as a distance, in meters, that corresponds to a radius around the latitude-longitude coordinates. Use NULL where precision is unknown, cannot be estimated, or is not applicable**

Name:	**minimumElevation**
Element Type:	**Integer**
Element Size:	**short**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**User Input.**
Validation Rules:	**Must be a valid integer number**

Description: **The minimum distance in meters above (positive) or below sea level of the collecting locality**

Name:	**maximumElevation**
Element Type:	**Integer**
Element Size:	**short**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**User Input.**
Validation Rules:	**Must be a valid integer number**
Description:	**The maximum distance in meters above (positive) or below sea level of the collecting locality**

Name:	**minimumDept**
Element Type:	**Integer**
Element Size:	**short**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**User Input.**
Validation Rules:	**Must be a valid integer number**

Description: **The minimum distance in meters below the surface of the water at which the collection was made; all material collected was at least this deep. Positive below the surface, negative above (e.g. collecting above sea level in tidal areas).**

Name: **maximumDept**
Element Type: **Integer**
Element Size: **short**
Required: **No**
Foreign Key: **No**   Table: N/A
Values List: **N/A**
Data Source: **User Input.**
Validation Rules: **Must be a valid integer number**
Description: **The minimum distance in meters below the surface of the water at which the collection was made; all material collected was at least this deep. Positive below the surface, negative above (e.g. collecting above sea level in tidal areas).**

Base Object: Each record of each table will have the following data items:

Name: **userID**
Element Type: **character**
Element Size: **18**
Required: **Yes**
Foreign Key: **Yes**   Table: user
Values List: **N/A**
Data Source: **System generated.**
Validation Rules: **Must exist in the user table.**
Description: **Identification of the user who entered the record.**

Name: **dateCreated**
Element Type: **timestamp**
Element Size: **14**
Required: **Yes**
Foreign Key: **No**   Table: N/A
Values List: **N/A**
Data Source: **System generated.**
Validation Rules: **Must be a valid date field.**
Description: **Date in which the record was entered.**

Name: **datelastModified**
Element Type: **timestamp**
Element Size: **14**
Required: **Yes**

Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**System generated.**	
Validation Rules:	**Must be a valid date field.**	
Description:	**Date in which the record was last modified.**	

Table Name: **ImageAnnotation**

Definition: **Annotation location and description. The annotation can be a specific point, area in terms of a rectangle, area in terms of an oval, or area in terms of a circle.**
Primary Key: **ID**

ELEMENTS

Name:	**id**
Element Type:	**Character**
Element Size:	**18**
Required:	**Primary Key**
Foreign Key:	**No**
Values List:	**N/A**
Data Source:	**Obtained from Catalog, Primary Key**
Validation Rules:	**Value must not be duplicated in this table**
Description:	**Generated key value for the location table for MorphBank Entities. The ID of each object in MorphBank shall carry the same characteristics based upon the Life Sciences Identifier. However, instead of 5 parts of the ID, MorpBank will only implement 2: the namespace and serial number. The length will be 18 characters long and the two parts divided by a colon. The serial number will be generated by a specific MorphBank applet and will also catalog the object so searches on MorphBank object ids will return the specific table location of each object.**

Name:	**description**
Element Type:	**Character**
Element Size:	**256**
Required:	**No**
Foreign Key:	**No**
Values List:	**N/A**
Data Source:	**User input**
Validation Rules:	**None**
Description:	**A character description of the annotation.**

Name:	**imageID**
Element Type:	**Character**

Element Size:	**18**
Required:	**Yes**
Foreign Key:	**Yes** **Table: image**
Values List:	**N/A**
Data Source:	**System updated from referenced table**
Validation Rules:	**Must exist in image table.**
Description:	**The MorphBank Object ID of the related image.**

Name:	**phylogeneticChar**
Element Type:	**Character**
Element Size:	**1**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**User input**
Validation Rules:	**Must be a valid character state from a publication source.**
Description:	**The related character state of the specific annotation.**

Name:	**value**
Element Type:	**integer**
Element Size:	**short**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**User input**
Validation Rules:	**Must be a positive integer value.**
Description:	**The related measurement of the annotation.**

Name:	**areaX**
Element Type:	**integer**
Element Size:	**long**
Required:	**Required if a specific annotation is made**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**Captured by annotation software**
Validation Rules:	**Must be a percentage of the range of pixel values in the image.**
Description:	**The X-Location of the annotation or x-anchor of the rectangle, center point of the radius or oval.**

Name:	**areay**
Element Type:	**integer**
Element Size:	**long**
Required:	**Required if a specific annotation is made**

Foreign Key:	No	Table: N/A
Values List:	N/A	
Data Source:	Captured by annotation software	
Validation Rules:	Must be a percentage of the range of pixel values in the image.	
Description:	The Y-Location of the annotation or y-anchor of the rectangle, center point of the radius or oval.	

Name:	areaheight	
Element Type:	integer	
Element Size:	long	
Required:	Required if a rectangle or oval is specified.	
Foreign Key:	No	Table: N/A
Values List:	N/A	
Data Source:	Captured by annotation software	
Validation Rules:	Must be a percentage of the range of pixel values in the image.	
Description:	The height of the annotation if a rectangle was specified. If it is an oval then this represents the height of the y coordinate.	

Name:	areawidth	
Element Type:	integer	
Element Size:	long	
Required:	Required if a rectangle or oval is specified.	
Foreign Key:	No	Table: N/A
Values List:	N/A	
Data Source:	Captured by annotation software	
Validation Rules:	Must be a percentage of the range of pixel values in the image.	
Description:	The width of the annotation if a rectangle was specified. If it is an oval then this represents the width of the x coordinate.	

Name:	arearadius	
Element Type:	integer	
Element Size:	long	
Required:	Required if a circle is specified.	
Foreign Key:	No	Table: N/A
Values List:	N/A	
Data Source:	Captured by annotation software	
Validation Rules:	Must be a percentage of the range of pixel values in the image.	
Description:	The height of the annotation if a rectangle was specified.	

Name:	typeannotation	
Element Type:	character	
Element Size:	18	
Required:	Yes	

Foreign Key:	**No**	**Table: N/A**
Values List:	**point, circle, rectangle, oval, general**	
Data Source:	**Captured by annotation software**	
Validation Rules:	**Must be one of the specified values**	
Description:	**The type of area annotation.**	

Base Object: Each record of each table will have the following data items:

Name:	**userID**	
Element Type:	**character**	
Element Size:	**18**	
Required:	**Yes**	
Foreign Key:	**Yes**	**Table: user**
Values List:	**N/A**	
Data Source:	**System generated.**	
Validation Rules:	**Must exist in the user table.**	
Description:	**Identification of the user who entered the record.**	

Name:	**dateCreated**	
Element Type:	**timestamp**	
Element Size:	**14**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**System generated.**	
Validation Rules:	**Must be a valid date field.**	
Description:	**Date in which the record was entered.**	

Name:	**datelastModified**	
Element Type:	**timestamp**	
Element Size:	**14**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**System generated.**	
Validation Rules:	**Must be a valid date field.**	
Description:	**Date in which the record was last modified.**	

Table Name: **Image**

Definition: **Table of the image that is being annotated.**
Primary Key: **ID**

ELEMENTS

Name:	**id**
Element Type:	**Character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**No**
Values List:	**N/A**
Data Source:	**Obtained from Catalog, Primary Key**
Validation Rules:	**Value must not be duplicated in this table**
Description:	**Generated key value for the location table for MorphBank Entities. The ID of each object in MorphBank shall carry the same characteristics based upon the Life Sciences Identifier. However, instead of 5 parts of the ID, MorpBank will only implement 2: the namespace and serial number. The length will be 18 characters long and the two parts divided by a colon. The serial number will be generated by a specific MorphBank applet and will also catalog the object so searches on MorphBank object ids will return the specific table location of each object.**

Name:	**specimenID**	
Element Type:	**character**	
Element Size:	**18**	
Required:	**Yes**	
Foreign Key:	**yes**	**Table: specimen**
Values List:	**N/A**	
Data Source:	**Captured by annotation software**	
Validation Rules:	**Must exist in the specimen table.**	
Description:	**The id of the specimen being annotated.**	

Name:	**viewID**	
Element Type:	**character**	
Element Size:	**18**	
Required:	**Yes**	
Foreign Key:	**yes**	**Table: view**
Values List:	**N/A**	
Data Source:	**Captured by annotation software**	
Validation Rules:	**Must exist in the specimen table.**	

Description: **The view of the image being annotated.**

Name: **imageHeight**
Element Type: **integer**
Element Size: **long**
Required: **Yes**
Foreign Key: **no**   **Table: N/A**
Values List: **N/A**
Data Source: **Captured by annotation software**
Validation Rules: **Positive integer value**
Description: **The height in pixels of the image.**

Name: **imagewidth**
Element Type: **integer**
Element Size: **long**
Required: **Yes**
Foreign Key: **no**   **Table: N/A**
Values List: **N/A**
Data Source: **User input**
Validation Rules: **Positive integer value**
Description: **The width in pixels of the image.**

Name: **resolution**
Element Type: **integer**
Element Size: **long**
Required: **Yes**
Foreign Key: **no**   **Table: N/A**
Values List: **N/A**
Data Source: **User input**
Validation Rules: **Positive integer value**
Description: **The resolutions in pixels per inch of the image.**

Name: **magnification**
Element Type: **integer**
Element Size: **long**
Required: **Yes**
Foreign Key: **no**   **Table: N/A**
Values List: **N/A**
Data Source: **User input**
Validation Rules: **Positive integer value**
Description: **The magnification of the image.**

Name: **originalFileName**
Element Type: **character**

Element Size:	**128**	
Required:	**Yes**	
Foreign Key:	**no**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**System update. Image must be selected**	
Validation Rules:	**Image must exist and be able to be accessed by the system.**	
Description:	**File name or URL reference of the image.**	

Name:	**originalFileName**	
Element Type:	**character**	
Element Size:	**128**	
Required:	**Yes**	
Foreign Key:	**no**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**System update. Image must be selected**	
Validation Rules:	**Image must exist and be able to be accessed by the system.**	
Description:	**File name or URL reference of the image.**	

Name:	**imageType**	
Element Type:	**character**	
Element Size:	**8**	
Required:	**Yes**	
Foreign Key:	**no**	**Table: N/A**
Values List:	**jpeg, tif, BMP, etc.**	
Data Source:	**User input**	
Validation Rules:	**Must be one of the values listed.**	
Description:	**File type of the image.**	

Name:	**publicationID**	
Element Type:	**character**	
Element Size:	18	
Required:	**No**	
Foreign Key:	**Yes**	**Table: publication**
Values List:	**N/A.**	
Data Source:	**User selected from publication list**	
Validation Rules:	**Must exist in the publication table.**	
Description:	**The publication related to the image.**	

Base Object: Each record of each table will have the following data items:

Name:	**userID**	
Element Type:	**character**	
Element Size:	**18**	
Required:	**Yes**	
Foreign Key:	**Yes**	**Table: user**

Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must exist in the user table.**
Description:	**Identification of the user who entered the record.**

Name:	**dateCreated**
Element Type:	**timestamp**
Element Size:	**14**
Required:	**Yes**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must be a valid date field.**
Description:	**Date in which the record was entered.**

Name:	**datelastModified**
Element Type:	**timestamp**
Element Size:	**14**
Required:	**Yes**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must be a valid date field.**
Description:	**Date in which the record was last modified.**

Table Name: **View**

Definition: **Table of the image that is being annotated.**
Primary Key: **ID**

ELEMENTS

Name:	**id**
Element Type:	**Character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**No**
Values List:	**N/A**
Data Source:	**Obtained from Catalog, Primary Key**
Validation Rules:	**Value must not be duplicated in this table**
Description:	**Generated key value for the location table for MorphBank Entities. The ID of each object in MorphBank shall carry the same characteristics based upon the Life Sciences Identifier. However, instead of 5 parts of the ID, MorpBank will only implement 2: the namespace and serial number. The length will be 18 characters long and the two parts divided by a colon. The serial number will be generated by a specific MorphBank applet and will also catalog the object so searches on MorphBank object ids will return the specific table location of each object.**

Name:	**viewName**	
Element Type:	**character**	
Element Size:	**64**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**User input.**	
Validation Rules:	**Must not be blank.**	
Description:	**The name of the view.**	

Name:	**imagingTechnique**	
Element Type:	**character**	
Element Size:	**128**	
Required:	**No**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**User input.**	

Validation Rules: **None.**
Description: **A description of the imaging technique used for this specific**
view.

Name: **imagingPreparationTechnique**
Element Type: **character**
Element Size: **128**
Required: **No**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **User input.**
Validation Rules: **None.**
Description: **A description of the preparation techniques used for this**
                     specific view.

Name: **specimenPart**
Element Type: **character**
Element Size: **128**
Required: **No**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **User input.**
Validation Rules: **None.**
Description: **A description of the specimen part for this particular view.**

Name: **viewangle**
Element Type: **character**
Element Size: **128**
Required: **No**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **User input.**
Validation Rules: **None.**
Description: **A description of the angle of the image in comparison to the**
                     relationship to the specimen.

Name: **viewDevelopmentStage**
Element Type: **character**
Element Size: **128**
Required: **No**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **User input.**
Validation Rules: **None.**

Description: **A description of the development stage of the related taxon.**

Name: **viewSex**
Element Type: **character**
Element Size: **8**
Required: **No**
Foreign Key: **No**   Table: N/A
Values List: **M = Male**
                 F = Female
                 I = Indeterminate (examined but could not be determined)
                 U = Unknown (not examined)
                 T = Transitional (between
Data Source: **User input.**
Validation Rules: **None.**
Description: **The sex of the specimen referenced by this view. Optional if the**
                 view is applicable to all sexes of this taxon. The domain should
                 be a controlled set of terms (codes) based on community
                 consensus. Proposed values: M=Male; F=Female;
                 H=Hermaphrodite; I=Indeterminate (examined but could not
                 be determined; U=Unknown (not examined); T=Transitional
                 (between sexes; useful for sequential hermaphrodites)

Name: **viewTSN**
Element Type: **integer**
Element Size: **long**
Required: **Yes**
Foreign Key: **Yes**   Table: Taxonomic_Unit

Values List: **N/A**
Data Source: **Selected from list of Taxonomic_Unit table.**
Validation Rules: **Must exist in the Taxonomic_Unit Table.**
Description: **The foreign key into the Taxonomic_unit table that applies to**
                 this specific view.

Base Object: Each record of each table will have the following data items:

Name: **userID**
Element Type: **character**
Element Size: **18**
Required: **Yes**
Foreign Key: **Yes**   Table: user
Values List: **N/A**

Data Source:	**System generated.**
Validation Rules:	**Must exist in the user table.**
Description:	**Identification of the user who entered the record.**

Name:	**dateCreated**	
Element Type:	**timestamp**	
Element Size:	**14**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**System generated.**	
Validation Rules:	**Must be a valid date field.**	
Description:	**Date in which the record was entered.**	

Name:	**datelastModified**	
Element Type:	**timestamp**	
Element Size:	**14**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**System generated.**	
Validation Rules:	**Must be a valid date field.**	
Description:	**Date in which the record was last modified.**	

Table Name: **PhylogeneticState**

Definition: **Table of the different allowed phylogenetic states referenced by the MorphBank object annotation.**

Primary Key: **ID**

ELEMENTS

Name:	**id**
Element Type:	**Character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**No**
Values List:	**N/A**
Data Source:	**Obtained from Catalog, Primary Key**
Validation Rules:	**Value must not be duplicated in this table**
Description:	**Generated key value for the location table for MorphBank Entities. The ID of each object in MorphBank shall carry the same characteristics based upon the Life Sciences Identifier. However, instead of 5 parts of the ID, MorpBank will only implement 2: the namespace and serial number. The length will be 18 characters long and the two parts divided by a colon. The serial number will be generated by a specific MorphBank applet and will also catalog the object so searches on MorphBank object ids will return the specific table location of each object.**

Name:	**phylogeneticChar**	
Element Type:	**character**	
Element Size:	**1**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**User input.**	
Validation Rules:	**ASCII Character**	
Description:	**The specific state used to identify a part on a biological unit.**	

Name:	**description**	
Element Type:	**character**	
Element Size:	**128**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**User input.**	

| Validation Rules: | **ASCII Character** | |
| Description: | **A description of the state referenced by the character.** | |

Name:	**definingImageAnnotationID**	
Element Type:	**character**	
Element Size:	**18**	
Required:	**No**	
Foreign Key:	**Yes**	**Table: ImageAnnotation**

Values List:	**N/A**	
Data Source:	**Selected from a list of values presented from that annotation table.**	
Validation Rules:	**Must exist in the ImageAnnotation table**	
Description:	**The defining image and annotation for this particular state.**	

Name:	**Exteme1ImageAnnotationID**	
Element Type:	**character**	
Element Size:	**18**	
Required:	**No**	
Foreign Key:	**Yes**	**Table: ImageAnnotation**

Values List:	**N/A**	
Data Source:	**Selected from a list of values presented from that annotation table.**	
Validation Rules:	**Must exist in the ImageAnnotation table**	
Description:	**The extreme example image and annotation for this particular state.**	

Name:	**Extreme1description**	
Element Type:	**character**	
Element Size:	**128**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**User input.**	
Validation Rules:	**ASCII Character**	
Description:	**The description of the first extreme example annotation.**	

Name:	**Exteme2ImageAnnotationID**	
Element Type:	**character**	
Element Size:	**18**	
Required:	**No**	
Foreign Key:	**Yes**	**Table: ImageAnnotation**

| Values List: | **N/A** | |

Data Source:	**Selected from a list of values presented from that annotation table.**
Validation Rules:	**Must exist in the ImageAnnotation table**
Description:	**The second extreme example image and annotation for this particular character.**

Name:	**Extreme2description**	
Element Type:	**character**	
Element Size:	**128**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**User input.**	
Validation Rules:	**ASCII Character**	
Description:	**The description of the second extreme example annotation.**	

Name:	**publicationID**	
Element Type:	**character**	
Element Size:	**18**	
Required:	**No**	
Foreign Key:	**Yes**	**Table: publication**
Values List:	**N/A**	
Data Source:	**User selected from the publication table.**	
Validation Rules:	**Must exist in the publication table**	
Description:	**The publication that supports this state and where they are derived.**	

Base Object: Each record of each table will have the following data items:

Name:	**userID**	
Element Type:	**character**	
Element Size:	**18**	
Required:	**Yes**	
Foreign Key:	**Yes**	**Table: user**
Values List:	**N/A**	
Data Source:	**System generated.**	
Validation Rules:	**Must exist in the user table.**	
Description:	**Identification of the user who entered the record.**	

Name:	**dateCreated**	
Element Type:	**timestamp**	
Element Size:	**14**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**System generated.**	

Validation Rules: **Must be a valid date field.**
Description: **Date in which the record was entered.**

Name: **datelastModified**
Element Type: **timestamp**
Element Size: **14**
Required: **Yes**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **System generated.**
Validation Rules: **Must be a valid date field.**
Description: **Date in which the record was last modified.**

Table Name: **PhylogeneticCharacter**

Definition: **Table of the different allowed phylogenetic characters referenced by the MorphBank object annotation.**

Primary Key: **ID**

ELEMENTS

Name:	**id**
Element Type:	**Character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**No**
Values List:	**N/A**
Data Source:	**Obtained from Catalog, Primary Key**
Validation Rules:	**Value must not be duplicated in this table**
Description:	**Generated key value for the location table for MorphBank Entities. The ID of each object in MorphBank shall carry the same characteristics based upon the Life Sciences Identifier. However, instead of 5 parts of the ID, MorpBank will only implement 2: the namespace and serial number. The length will be 18 characters long and the two parts divided by a colon. The serial number will be generated by a specific MorphBank applet and will also catalog the object so searches on MorphBank object ids will return the specific table location of each object.**

Name:	**characterDescription**	
Element Type:	**character**	
Element Size:	**128**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**User input**	
Validation Rules:	**ASCII Characters**	
Description:	**A description of the character.**	

Name:	**characterNumber**	
Element Type:	**integer**	
Element Size:	**short**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	

Data Source: **User input**
Validation Rules: **positive integer value. Must be referenced in a publication**
Description: **The sequential number of the particular character.**

Name: **publicationID**
Element Type: **character**
Element Size: **18**
Required: **Yes**
Foreign Key: **Yes**   **Table: publication**
Values List: **N/A**
Data Source: **User selected from a list obtained from the publication table.**
Validation Rules: **Must exist in the publication table**
Description: **References a publication to which the phylogentic character codes are defived.**

Name: **characterTSN**
Element Type: **integer**
Element Size: **long**
Required: **No**
Foreign Key: **Yes**   **Table: Taxonomic_Unit**

Values List: **N/A**
Data Source: **Selected from the Taxonomic_Unit table**
Validation Rules: **Must exist in the Taxonomic_unit table**
Description: **The specific taxon referenced by this particular phylogenetic character.**

Name: **phylogeneticCharacterSex**
Element Type: **character**
Element Size: **8**
Required: **No**
Foreign Key: **No**   **Table: N/A**
Values List: **M = Male**
                      F = Female
                      I = Indeterminate (examined but could not be determined)
                      U = Unknown (not examined)
                      T = Transitional (between
Data Source: **User input.**
Validation Rules: **None.**
Description: **The sex of the specimen referenced by this character. Optional if the character is applicable to all sexes of this taxon. The domain should be a controlled set of terms (codes) based on community consensus. Proposed values: M=Male; F=Female; H=Hermaphrodite; I=Indeterminate (examined but could not**

be determined; U=Unknown (not examined); T=Transitional (between sexes; useful for sequential hermaphrodites)

Name:	**similarities**
Element Type:	**character**
Element Size:	**128**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**User input**
Validation Rules:	**ASCII Characters**
Description:	**Describes other characteristics that might be similar.**

Name:	**relatedCharacterID**
Element Type:	**character**
Element Size:	**18**
Required:	**No**
Foreign Key:	**Yes** **Table: PhylogeneticCharacter**
Values List:	**N/A**
Data Source:	**User selected from a list of records from this table.**
Validation Rules:	**Must exist in the PhylogeneticCharacter**
Description:	**Points to other characteristics that might be similar.**

Base Object: Each record of each table will have the following data items:

Name:	**userID**
Element Type:	**character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**Yes** **Table: user**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must exist in the user table.**
Description:	**Identification of the user who entered the record.**

Name:	**dateCreated**
Element Type:	**timestamp**
Element Size:	**14**
Required:	**Yes**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**System generated.**

Validation Rules: **Must be a valid date field.**
Description: **Date in which the record was entered.**

Name: **datelastModified**
Element Type: **timestamp**
Element Size: **14**
Required: **Yes**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **System generated.**
Validation Rules: **Must be a valid date field.**
Description: **Date in which the record was last modified.**

Table Name: **Publication**

Definition: **Table of the defining publication that authorizes entries into the MorphBank Database. Conforms to the Latex bibliography entries. Taken from "Latex, A document Preparation System, Users Guide & Reference Manual" by Leslie Lamport, Addison-Wesley Publishing Company, ISBN 0-201-15790-X, 1986.**

Primary Key: **ID**

ELEMENTS

Name:	**id**
Element Type:	**Character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**No**
Values List:	**N/A**
Data Source:	**Obtained from Catalog, Primary Key**
Validation Rules:	**Value must not be duplicated in this table**
Description:	**Generated key value for the location table for MorphBank Entities. The ID of each object in MorphBank shall carry the same characteristics based upon the Life Sciences Identifier. However, instead of 5 parts of the ID, MorpBank will only implement 2: the namespace and serial number. The length will be 18 characters long and the two parts divided by a colon. The serial number will be generated by a specific MorphBank applet and will also catalog the object so searches on MorphBank object ids will return the specific table location of each object.**

Name:	**publicationType**
Element Type:	**character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**No** Table: N/A
Values List:	**article, book, booklet, conference, inbook, incollection, inproceedings, manual, mastersthesis, misc, phdthesis, proceedings, techreport, unpublished**
Data Source:	**User selected.**
Validation Rules:	**Must be selected in the values list.**
Description:	**Identifies the type of publication.**

Name:	**address**
Element Type:	**character**

Element Size:	**64**	
Required:	**No**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**None**	
Data Source:	**user input.**	
Validation Rules:	**ASCII Values.**	
Description:	**Publisher's address**	

Name:	**annote**	
Element Type:	**character**	
Element Size:	**256**	
Required:	**No**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**None**	
Data Source:	**user input.**	
Validation Rules:	**ASCII Values.**	
Description:	**Used for annotated bibliographies.**	

Name:	**author**	
Element Type:	**character**	
Element Size:	**128**	
Required:	**Yes for type publications: article, gook, inbook, incollection, inproceedings, mastersthesis, misc, phdthesis, unpublished**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**None**	
Data Source:	**user input.**	
Validation Rules:	**ASCII Values.**	
Description:	**Author or Authors of the publication**	

Name:	**booktitle**	
Element Type:	**character**	
Element Size:	**128**	
Required:	**Required for type publication books.**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**None**	
Data Source:	**user input.**	
Validation Rules:	**ASCII Values.**	
Description:	**The title of the book.**	

Name:	**chapter**	
Element Type:	**integer**	
Element Size:	**short**	
Required:	**Required for type publications: inbook,**	
Foreign Key:	**No**	**Table: N/A**

Values List:	**None**
Data Source:	**user input.**
Validation Rules:	**ASCII Values.**
Description:	**A chapter number.**

Name:	**edition**
Element Type:	**character**
Element Size:	**64**
Required:	**No**
Foreign Key:	**No**	**Table: N/A**
Values List:	**None**
Data Source:	**user input.**
Validation Rules:	**ASCII Values.**
Description:	**The edition usually stated in words such as "second".**

Name:	**editor**
Element Type:	**character**
Element Size:	**128**
Required:	**Required for type publication: books.**
Foreign Key:	**No**	**Table: N/A**
Values List:	**None**
Data Source:	**user input.**
Validation Rules:	**ASCII Values.**
Description:	**The editor or editors of the publication.**

Name:	**howpublished**
Element Type:	**character**
Element Size:	**128**
Required:	**No**
Foreign Key:	**No**	**Table: N/A**
Values List:	**None**
Data Source:	**user input.**
Validation Rules:	**ASCII Values.**
Description:	**How something strange has been published.**

Name:	**institution**
Element Type:	**character**
Element Size:	**128**
Required:	**No**
Foreign Key:	**No**	**Table: N/A**
Values List:	**None**
Data Source:	**user input.**
Validation Rules:	**ASCII Values.**
Description:	**The institution that published the work**

Name:	**journal**
Element Type:	**character**
Element Size:	**128**
Required:	**Required for type publication journal.**
Foreign Key:	**No** **Table: N/A**
Values List:	**None**
Data Source:	**user input.**
Validation Rules:	**ASCII Values.**
Description:	**The journal name**

Name:	**key**
Element Type:	**character**
Element Size:	**64**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**None**
Data Source:	**user input.**
Validation Rules:	**ASCII Values.**
Description:	**Used for alphabetizing and creating a label when the author and editor fields are missing.**

Name:	**Month**
Element Type:	**character**
Element Size:	**3**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec**
Data Source:	**user selected**
Validation Rules:	**Must be input from the above list. .**
Description:	**Month of publication**

Name:	**note**
Element Type:	**character**
Element Size:	**128**
Required:	**Required for type publication books.**
Foreign Key:	**No** **Table: N/A**
Values List:	**None**
Data Source:	**user input.**
Validation Rules:	**ASCII Values.**
Description:	**Any additional information that can help the reader.**

Name:	**number**
Element Type:	**integer**

Element Size:	**short**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**None**
Data Source:	**user input.**
Validation Rules:	**integer value.**
Description:	**The number of a journal, magazine, or technical report.**

Name:	**Organization**
Element Type:	**character**
Element Size:	**128**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**None**
Data Source:	**user input.**
Validation Rules:	**ASCII Values.**
Description:	**The organization sponsoring the conference.**

Name:	**pages**
Element Type:	**character**
Element Size:	**64**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**None**
Data Source:	**user input.**
Validation Rules:	**ASCII Values.**
Description:	**One or more page numbers or ranges such as 100 – 201 or 4, 6, 7-- 89.**

Name:	**publisher**
Element Type:	**character**
Element Size:	**128**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**None**
Data Source:	**user input.**
Validation Rules:	**ASCII Values.**
Description:	**Publisher's name.**

Name:	**school**
Element Type:	**character**
Element Size:	**128**
Required:	**No**
Foreign Key:	**No** **Table: N/A**

Values List:	None
Data Source:	user input.
Validation Rules:	ASCII Values.
Description:	The name of the school where the thesis or dissertation was written.

Name:	series
Element Type:	character
Element Size:	128
Required:	No
Foreign Key:	No	Table: N/A
Values List:	None
Data Source:	user input.
Validation Rules:	ASCII Values.
Description:	The name of the series of the set up books.

Name:	title
Element Type:	character
Element Size:	128
Required:	Yes
Foreign Key:	No	Table: N/A
Values List:	None
Data Source:	user input.
Validation Rules:	ASCII Values.
Description:	The title of the publication.

Name:	volume
Element Type:	integer
Element Size:	short
Required:	No
Foreign Key:	No	Table: N/A
Values List:	None
Data Source:	user input.
Validation Rules:	ASCII Values.
Description:	The volume of a journal or multivolume book.

Name:	year
Element Type:	charater
Element Size:	4
Required:	No
Foreign Key:	No	Table: N/A
Values List:	None

Data Source: **user input.**
Validation Rules: **ASCII Values.**
Description: **The four digit year of the work.**

Base Object: Each record of each table will have the following data items:

Name: **userID**
Element Type: **character**
Element Size: **18**
Required: **Yes**
Foreign Key: **Yes   Table: user**
Values List: **N/A**
Data Source: **System generated.**
Validation Rules: **Must exist in the user table.**
Description: **Identification of the user who entered the record.**

Name: **dateCreated**
Element Type: **timestamp**
Element Size: **14**
Required: **Yes**
Foreign Key: **No   Table: N/A**
Values List: **N/A**
Data Source: **System generated.**
Validation Rules: **Must be a valid date field.**
Description: **Date in which the record was entered.**

Name: **datelastModified**
Element Type: **timestamp**
Element Size: **14**
Required: **Yes**
Foreign Key: **No   Table: N/A**
Values List: **N/A**
Data Source: **System generated.**
Validation Rules: **Must be a valid date field.**
Description: **Date in which the record was last modified.**

Table Name: **ImagePublication**

Definition: **Table of many to many relationshipd to the image an publication documents..**

Primary Key: **Imageid and publicationid**

Name:	**imageid**
Element Type:	**character**
Element Size:	**18**
Required:	**Primary Key**
Foreign Key:	**Yes** **Table: Image**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**System**
Description:	**Foreign Key into the image table.**

Name:	**publicationId**
Element Type:	**character**
Element Size:	**18**
Required:	**Primary Key**
Foreign Key:	**Yes** **Table: Publication**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**System**
Description:	**Foreign key into the publication table.**

Base Object: Each record of each table will have the following data items:

Name:	**userID**
Element Type:	**character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**Yes** **Table: user**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must exist in the user table.**
Description:	**Identification of the user who entered the record.**

Name:	**dateCreated**
Element Type:	**timestamp**
Element Size:	**14**
Required:	**Yes**
Foreign Key:	**No** **Table: N/A**

Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must be a valid date field.**
Description:	**Date in which the record was entered.**

Name:	**datelastModified**	
Element Type:	**timestamp**	
Element Size:	**14**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**System generated.**	
Validation Rules:	**Must be a valid date field.**	
Description:	**Date in which the record was last modified.**	

Table Name: **Identity**

Definition: **Table of many to many relationships between the specimen and suggested taxon descriptions.**

Primary Key: **specimenID and tsnID**

Name:	**specimenId**
Element Type:	**character**
Element Size:	**18**
Required:	**Required**
Foreign Key:	**yes** **Table: specimen**
Values List:	**N/A**
Data Source:	**Automatic.**
Validation Rules:	**Must exist in the specimen table.**
Description:	**The id of the specimen being referred to in the relationship.**

Name:	**tsnId**
Element Type:	**character**
Element Size:	**18**
Required:	**Required**
Foreign Key:	**yes** **Table: TSN**
Values List:	**N/A**
Data Source:	**Automatically inputted.**
Validation Rules:	**TSN table/TSN database.**
Description:	**The TSN id.**

Name:	**comment**
Element Type:	**Text**
Element Size:	**N/A (32 Bit)**
Required:	**No**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**User Input**
Validation Rules:	**N/A**
Description:	**Entered text relating to the relationship specified by the entry.**

Base Object: Each record of each table will have the following data items:

Name:	**userID**
Element Type:	**character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**Yes** **Table: user**

Values List:	N/A
Data Source:	System generated.
Validation Rules:	Must exist in the user table.
Description:	Identification of the user who entered the record.

Name:	dateCreated
Element Type:	timestamp
Element Size:	14
Required:	Yes
Foreign Key:	No Table: N/A
Values List:	N/A
Data Source:	System generated.
Validation Rules:	Must be a valid date field.
Description:	Date in which the record was entered.

Name:	datelastModified
Element Type:	timestamp
Element Size:	14
Required:	Yes
Foreign Key:	No Table: N/A
Values List:	N/A
Data Source:	System generated.
Validation Rules:	Must be a valid date field.
Description:	Date in which the record was last modified.

Table Name: **News**

Definition: **Standard Database news table**

Primary Key: **id**

Name:	**id**
Element Type:	**character**
Element Size:	**18**
Required:	**Primary key**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**System generated**
Validation Rules:	**Must be unique in the news table.**
Description:	**Unique ID for every item of news in the database.**

Name:	**title**
Element Type:	**character**
Element Size:	**32**
Required:	**Yes**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**User Input**
Validation Rules:	**N/A**
Description:	**Short title for the item of news.**

Name:	**body**
Element Type:	**text**
Element Size:	**N/A**
Required:	**Yes**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**User Input**
Validation Rules:	**N/A**
Description:	**Main body of the item of news.**

Base Object: Each record of each table will have the following data items:

Name:	**userID**
Element Type:	**character**
Element Size:	**18**

Required:	**Yes**	
Foreign Key:	**Yes**	**Table: user**
Values List:	**N/A**	
Data Source:	**System generated.**	
Validation Rules:	**Must exist in the user table.**	
Description:	**Identification of the user who entered the record.**	

Name:	**dateCreated**	
Element Type:	**timestamp**	
Element Size:	**14**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**System generated.**	
Validation Rules:	**Must be a valid date field.**	
Description:	**Date in which the record was entered.**	

Name:	**datelastModified**	
Element Type:	**timestamp**	
Element Size:	**14**	
Required:	**Yes**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**System generated.**	
Validation Rules:	**Must be a valid date field.**	
Description:	**Date in which the record was last modified.**	

Table Name: **Use**

Definition: **Table of the authorized users of the system.**

Primary Key: **id**

Name:	**id**
Element Type:	**character**
Element Size:	**18**
Required:	**Primary Key**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must be unique in the user table.**
Description:	**Identification of the user who entered the record.**

Name:	**tsn**
Element Type:	**Integer**
Element Size:	**32**
Required:	**Yes**
Foreign Key:	**Yes** **Table: TSN**
Values List:	**N/A**
Data Source:	**ITIS database, or merger of ITIS database and local database.**
Validation Rules:	**Must exist in the ITIS database.**
Description:	**Taxonomic serial number of the highest taxon for which the user as the right to enter annotations or submit images to the database.**

Name:	**uin**
Element Type:	**Integer**
Element Size:	**8 bit**
Required:	**Yes**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**User input**
Validation Rules:	**Must not be duplicated in the user table.**
Description:	**The user id entered by the user for identification.**

Name:	**pin**
Element Type:	**Password**
Element Size:	**N/A**
Required:	**Yes**
Foreign Key:	**No** **Table: N/A**

Values List: **N/A**
Data Source: **User input/Generated**
Validation Rules: **N/A**
Description: **Password for the user to gain access to the database/website.**

Name: **name**
Element Type: **Text**
Element Size: **128 bit**
Required: **Yes**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **User input**
Validation Rules: **N/A**
Description: **The name of the user.**

Name: **email**
Element Type: **text**
Element Size: **128 bit**
Required: **Yes**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **User input**
Validation Rules: **Must be a valid W3C email address.**
Description: **Email of the user.**

Name: **affiliation**
Element Type: **Text**
Element Size: **12bit**
Required: **No**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **User input**
Validation Rules: **N/A**
Description: **The institute/organisation user if affiliated with.**

Name: **address**
Element Type: **Integer**
Element Size: **12bit**
Required: **No**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **User input**
Validation Rules: **N/A**
Description:

Base Object: Each record of each table will have the following data items:

Name:	**userID**
Element Type:	**character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**Yes** **Table: user**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must exist in the user table.**
Description:	**Identification of the user who entered the record.**

Name:	**dateCreated**
Element Type:	**timestamp**
Element Size:	**14**
Required:	**Yes**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must be a valid date field.**
Description:	**Date in which the record was entered.**

Name:	**datelastModified**
Element Type:	**timestamp**
Element Size:	**14**
Required:	**Yes**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must be a valid date field.**
Description:	**Date in which the record was last modified.**

Table Name: **Group**

Definition: Table of the defining groups of users. Users may belong to many groups and all users belong to a single group of authorized MorphBank users.

Primary Key: **groupID**

Name:	**groupId**	
Element Type:	**character**	
Element Size:	**18**	
Required:	**Primary Key**	
Foreign Key:	**No**	**Table: N/A**
Values List:	**N/A**	
Data Source:	**System generated.**	
Validation Rules:	**Value must not be duplicated within this table**	
Description:	**Generated key value of the group table for Morphbank entities.**	

Name:	**groupName**	
Element Type:	**Text**	
Element Size:	**128**	
Required:	**Yes**	
Foreign Key:	**No**	**Table:**
Values List:	**N/A**	
Data Source:	**User input.**	
Validation Rules:	**Must be unique in group table.**	
Description:	**Formal name for the group.**	

Name:	**tsn**	
Element Type:	**Integer**	
Element Size:	**32**	
Required:	**Yes**	
Foreign Key:	**Yes**	**Table: TSN/ITIS**
Values List:	**N/A**	
Data Source:	**ITIS database, or table copy within Morphbank.**	
Validation Rules:	**Must exist in the ITIS database.**	
Description:	**Taxonomic serial number of the highest taxon for which the group has the right to enter annotations or submit images to the database.**	

Base Object: Each record of each table will have the following data items:

Name:	**userID**

Element Type:	**character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**Yes** **Table: user**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must exist in the user table.**
Description:	**Identification of the user who entered the record.**

Name:	**dateCreated**
Element Type:	**timestamp**
Element Size:	**14**
Required:	**Yes**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must be a valid date field.**
Description:	**Date in which the record was entered.**

Name:	**datelastModified**
Element Type:	**timestamp**
Element Size:	**14**
Required:	**Yes**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must be a valid date field.**
Description:	**Date in which the record was last modified.**

Table Name: **Usergroup**

Definition: **Table of the many to many relationships of the User and UserGroup tables.**

Primary Key: **userID and groupID**

Name:	**userId**
Element Type:	**character**
Element Size:	**18**
Required:	**Primary Key**
Foreign Key:	**No** **Table: N/A**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must be present within the user table.**
Description:	

Name:	**groupId**
Element Type:	**character**
Element Size:	**18**
Required:	**Primary Key**
Foreign Key:	**Yes** **Table: Group**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must be present within the group table.**
Description:	

Base Object: Each record of each table will have the following data items:

Name:	**userID**
Element Type:	**character**
Element Size:	**18**
Required:	**Yes**
Foreign Key:	**Yes** **Table: user**
Values List:	**N/A**
Data Source:	**System generated.**
Validation Rules:	**Must exist in the user table.**
Description:	**Identification of the user who entered the record.**

Name:	**dateCreated**
Element Type:	**timestamp**
Element Size:	**14**

Required: **Yes**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **System generated.**
Validation Rules: **Must be a valid date field.**
Description: **Date in which the record was entered.**

Name: **datelastModified**
Element Type: **timestamp**
Element Size: **14**
Required: **Yes**
Foreign Key: **No**   **Table: N/A**
Values List: **N/A**
Data Source: **System generated.**
Validation Rules: **Must be a valid date field.**
Description: **Date in which the record was last modified.**

Appendix A
Elements

This document is an up-to-date specification of all elements and terms used by the MorphBank Database Management system. Some of the terms are Darwin core elements and can be found at http://gbif.nbii.gov/standards/standards.html web site.

1. **ID: An 18 character field generated by the MorphBank system for each object entered into the database. Partially compliant with the proposed LSID standard, the ID is comprised of a namespace (morphbank) and an unique 8 digit serial number generated by the MorphBank system and cataloged with the database for object searches.**

2. **DateLastModified: ISO 8601 compliant stamp indicating the date and time in UTC(GMT) when the record was last modified. Example: the instant "November 5, 1994, 8:15:30 am, US Eastern Standard Time" would be represented as "1994-11-05T13:15:30Z"**

3. **InstitutionCode: A "standard" code identifier that identifies the institution to which the collection belongs. No global registry exists for assigning institutional codes. Use the code that is "standard" in your discipline.**

4. **CollectionCode: A unique alphanumeric value which identifies the collection within the institution.**

5. **CatalogNumber: A unique alphanumeric value which identifies an individual record within the collection. It is recommended that this value provides a key by which the actual specimen can be identified. If the specimen has several items such as various types of preparation, this value should identify the individual component of the specimen.**

6. **ScientificName: The full name of lowest level taxon the Catalogued Item can be identified as a member of; includes genus name, specific epithet, and subspecific epithet (zool.) or infraspecific rank abbreviation, and infraspecific epithet (bot.) Use name of suprageneric taxon (e.g., family name) if Catalogued Item cannot be identified to genus, species, or infraspecific taxon.**

7. **BasisOfRecord: An abbreviation indicating whether the record represents an observation (O), living organism (L), specimen (S), germplasm/seed (G), etc.**

8. **Kingdom: The kingdom to which the organism belongs**

9. **Phylum: The phylum (or division) to which the organism belongs**

10. **Class: The class name of the organism**

11. **Order: The order name of the organism**

12. **Family: The family name of the organism**

13. <u>Genus</u>: The genus name of the organism
14. <u>Species</u>: The specific epithet of the organism
15. <u>Subspecies</u>: The sub-specific epithet of the organism
16. <u>ScientificNameAuthor</u>: The author of a scientific name. Author string as applied to the accepted name. Can be more than one author (concatenated string). Should be formatted according to the conventions of the applicable taxonomic discipline.
17. <u>IdentifiedBy</u>: The name(s) of the person(s) who applied the currently accepted Scientific Name to the Catalogued Item.
18. <u>YearIdentified</u>: The year portion of the date when the Collection Item was identified; as four digits [-9999..9999], e.g., 1906, 2002.
19. <u>MonthIdentified</u>: The month portion of the date when the Collection Item was identified; as two digits [01..12].
20. <u>DayIdentified</u>: The day portion of the date when the Collection Item was identified; as two digits [01..31].
21. <u>TypeStatus</u>: Indicates the kind of nomenclatural type that a specimen represents. In particular, the type status may not apply to the name listed in the scientific name, i.e. current identification. In rare cases, a single specimen may be the type of more than one name.
22. <u>CollectorNumber</u>: An identifying "number" (really a string) applied to specimens (in some disciplines) at the time of collection. Establishes a links different parts/preparations of a single specimen and between field notes and the specimen.
23. <u>FieldNumber</u>: A "number" (really a string) created at collection time to identify all material that resulted from a collecting event.
24. <u>Collector</u>: The name(s) of the collector(s) responsible for collection the specimen or taking the observation
25. <u>YearCollected</u>: The year (expressed as an integer) in which the specimen was collected. The full year should be expressed (e.g. 1972 must be expressed as "1972" not "72").
26. <u>MonthCollected</u>: The month of year the specimen was collected from the field. Possible values range from 01...12 inclusive
27. <u>DayCollected</u>: The day of the month the specimen was collected from the field. Possible value ranges from 01..31 inclusive
28. <u>JulianDay</u>: The ordinal day of the year; i.e., the number of days since January 1 of the same year. (January 1 is Julian Day 1.)
29. <u>TimeOfDay</u>: The time of day a specimen was collected expressed as decimal hours from midnight local time (e.g. 12.0 = mid day, 13.5 = 1:30pm
30. <u>ContinentOcean</u>: The continent or ocean from which a specimen was collected.
31. <u>Country</u>: The country or major political unit from which the specimen was collected. ISO 3166-1 values should be used. Full country names are currently in use. A future recommendation is to use ISO3166-1 two letter codes or the full name when searching

32. **StateProvince: The state, province or region (i.e. next political region smaller than Country) from which the specimen was collected.**
33. **County: The county (or shire, or next political region smaller than State/Province) from which the specimen was collected**
34. **Locality: The locality description (place name plus optionally a displacement from the place name) from which the specimen was collected. Where a displacement from a location is provided, it should be in un-projected units of measurement**
35. **Longitude: The longitude of the location from which the specimen was collected. This value should be expressed in decimal degrees with a datum such as WGS-84**
36. **Latitude: The latitude of the location from which the specimen was collected. This value should be expressed in decimal degrees with a datum such as WGS-84**
37. **CoordinatePrecision: An estimate of how tightly the collecting locality was specified; expressed as a distance, in meters, that corresponds to a radius around the latitude-longitude coordinates. Use NULL where precision is unknown, cannot be estimated, or is not applicable.**
38. **BoundingBox: This access point provides a mechanism for performing searches using a bounding box. A Bounding Box element is not typically present in the database, but rather is derived from the Latitude and Longitude columns by the data provider**
39. **MinimumElevation: The minimum distance in meters above (positive) or below sea level of the collecting locality.**
40. **MaximumElevation: The maximum distance in meters above (positive) or below sea level of the collecting locality.**
41. **MinimumDepth: The minimum distance in meters below the surface of the water at which the collection was made; all material collected was at least this deep. Positive below the surface, negative above (e.g. collecting above sea level in tidal areas).**
42. **MaximumDepth: The maximum distance in meters below the surface of the water at which the collection was made; all material collected was at most this deep. Positive below the surface, negative above (e.g. collecting above sea level in tidal areas).**
43. **Sex: The sex of a specimen. The domain should be a controlled set of terms (codes) based on community consensus. Proposed values: M=Male; F=Female; H=Hermaphrodite; I=Indeterminate (examined but could not be determined; U=Unknown (not examined); T=Transitional (between sexes; useful for sequential hermaphrodites)**
44. **PreparationType: The type of preparation (skin. slide, etc). Probably best to add this as a record element rather than access point. Should be a list of preparations for a single collection record.**
45. **IndividualCount: The number of individuals present in the lot or container. Not an estimate of abundance or density at the collecting locality.**

46. **PreviousCatalogNumber: The previous (fully qualified) catalogue number of the Catalogued Item if the item earlier identified by another Catalogue Number, either in the current catalogue or another Institution / catalogue. A fully qualified Catalogue Number is preceded by Institution Code and Collection Code, with a space separating the each subelement. Referencing a previous Catalogue Number does not imply that a record for the referenced item is or is not present in the corresponding catalogue, or even that the referenced catalogue still exists. This access point is intended to provide a way to retrieve this record by previously used identifier, which may used in the literature. In future versions of this schema this attribute should be set-valued.**

47. **RelationshipType: A named or coded valued that identifies the kind relationship between this Collection Item and the referenced Collection Item. Named values include: "parasite of", "epiphyte on", "progeny of", etc. In future versions of this schema this attribute should be set-valued.**

48. **RelatedCatalogItem: The fully qualified identifier of a related Catalogue Item (a reference to another specimen); Institution Code, Collection Code, and Catalogue Number of the related Catalogued Item, where a space separates the three subelements.**

49. **Notes: Free text notes attached to the specimen record.**

Additional Resources:

- http://digir.net/schema/conceptual/darwin/2003/1.0/darwin2.xsd
- http://tsadev.speciesanalyst.net/documentation/ow.asp?DarwinCoreV2