

Proposed database model and file structures for arthropod collection management

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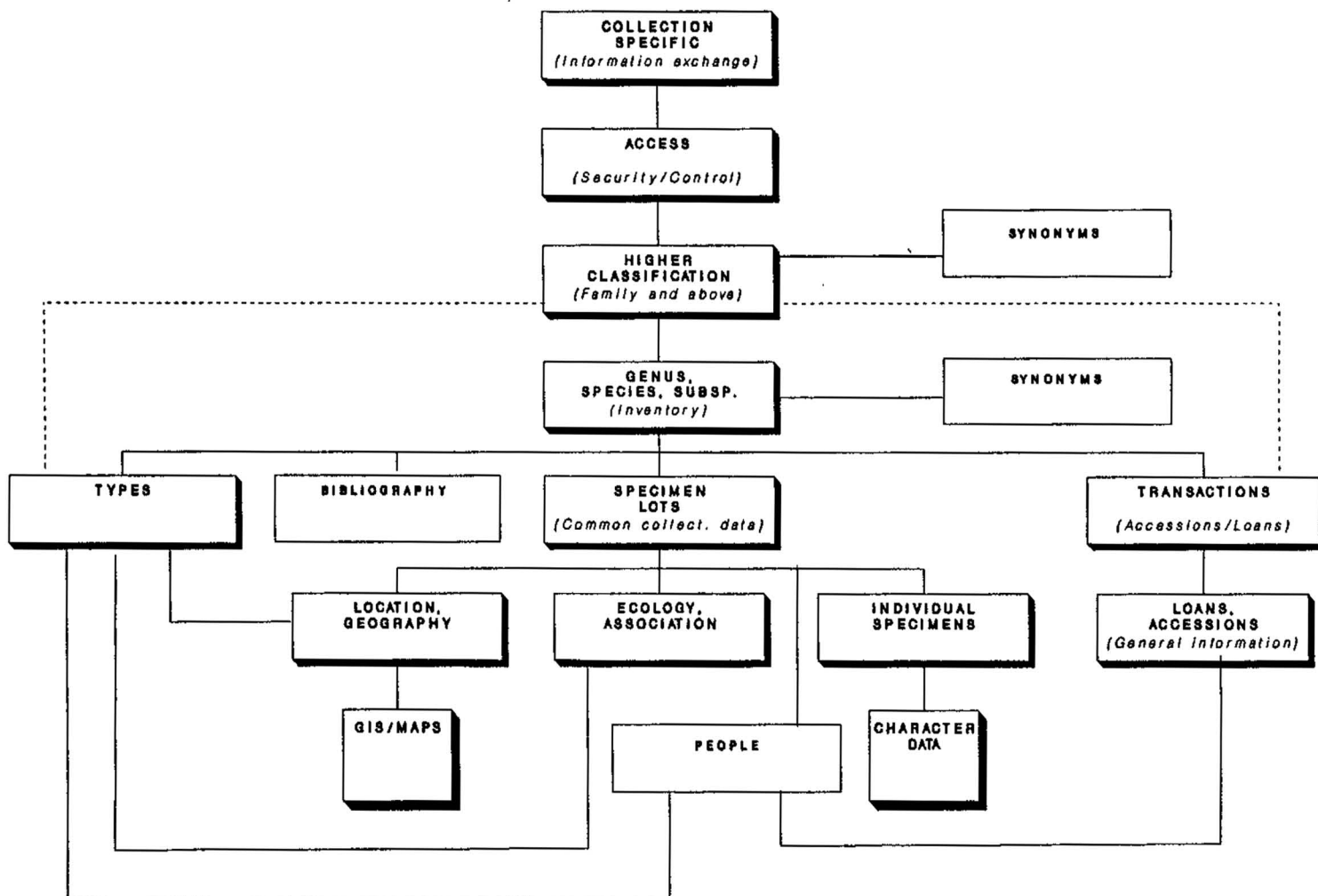
Because of the complexity and size of arthropod collections, it is important that standards for data storage and representation be considered with respect to an overall model. This model must take into account the vast differences in collection size, the tendency for individual collections to develop areas of concentration and specialization, and the diversity of uses of collection based information. These uses include administration, service and research. Administrative uses of computerized information include preparation of accession reports, labels for cabinets and unit trays, museum directories and lists of holdings, gift acknowledgement and loan correspondence, etc. Service functions may include maintenance of county record information, outbreak or endangered status for specific taxa, and associations between parasitic or pest arthropods and favored hosts. Research data may include character data for taxonomic analysis or behavioral, physiological, and ecological information.

The database model described below is intended to demonstrate how such disparate information can be associated and linked within the context of a single data management system. The value of this linkage is that it permits developers who are interested in a particular type of collection-based information to see how this fits within the broadest possible context. It is not meant to specify how collections should be computerized but, rather, to show how specific computerization projects can be related to each other.

The proposed database model is relational. This means that the database is composed of a group of database files or "tables" that are linked to each other by information contained in one or several common fields or "columns." Such linkage generally reflects a one to many relationship between database file structures. For example, many species in a collection may share common family and higher classification information. Each species may be represented by "lots" of specimens collected at the same place and time. Specimens that comprise individual lots share common ecological information, whereas those collected at the same site share common geographic information, etc. Likewise, a single loan or gift may contain many specimens representing a discrete number of lots but, initially, an undefined number of specific taxa.

In theory, it is possible to define a single database file structure with fields for all of these kinds of information. However, in practice such a database file would be too large and unwieldy to be practical. Repeating the class, order, suborder, etc., for each species in a collection wastes space and invites errors and inconsistencies in the data. Likewise, repeating latitude, longitude, elevation, soil type, collection method, etc., for each specimen in a series also is unnecessarily redundant and wasteful both in terms of data entry time and storage space. In some mainframe based database management systems, it is possible to define repeating subsets of information as part of a single database file structure. However, few personal computer-based systems have this capability. A repeating groups capability is not assumed in the database file structures that follow. However, this capability can simplify the model and should be used if available.

PROPOSED DATABASE MODEL FOR ARTHROPOD COLLECTION MANAGEMENT



Database File Descriptions

Database file descriptions include the following information:

- Field Name** A descriptive name for each data field up to 40 characters in length. Field names always are unique within a single database file.
- Mnemonic Tag** A short name for each data field of from 2 to 8 characters in length. Mnemonic Tags always are unique within a single database file. The naming convention used for Mnemonic Tags is designed to permit them to be used as field (or variable) names in database file structures, but this is not mandated by the proposed standard. For exchange of information between collections the Field Name may be used to establish an equivalence between disparate Mnemonic Tags.
- Status** The importance of the field with respect to the proposed database model and data exchange standards.
- E** Essential fields are required by the model to establish relationships between necessary database files or for interchange of the information between workers.
 - R** Recommended fields are those that are generally useful for information exchange but that are not required by the model or those that may be omitted in a partial implementation of the model.
 - O** Optional fields are those that are specific to a particular collection or worker but are not required components of the database model. They may be essential for a specific collection but have limited value for exchange between workers for institutions.
- Data Type** The representation of information in database files. Care has been taken to avoid data types that are highly specific to a single database management system. For example, no distinction has been made between integer, decimal, single and double precision floating point, etc., numeric data representation, although these are distinguished by some database management software. We also have been conservative on the use of the variable length text string field because support for this kind of information tends to be limited in microcomputer-based database management software. While date and logical data types are not universally supported, they are easily simulated by character and/or numeric data. However, character representation of dates must be alphanumerically sortable chronologically.
- C** Character - A field containing a fixed length string of from 1 to 255 alphanumeric characters. Character fields may contain numbers, but these are not used arithmetically (e.g., for numerical operations such as addition, subtraction, or statistics).
 - N** Numeric - A field containing numbers that are used arithmetically such as for counts. Internal representation of numeric data may be binary (integer or exponential), binary coded decimal (BCD), hexadecimal, etc. For exchange, however, numeric data must be converted to a fixed length format representation that includes only digits, and optionally a sign and decimal point.
 - D** Date - A field containing a date represented in a fashion that allows for chronological sorting. A typical representation is YYYYMMDD where each letter is replaced by the appropriate numerical equivalent.
 - L** Logical - A field containing true/false, yes/no, on/off, 0/1, or other boolean information. It usually is represented as a single character or binary value used as a switch.
 - T** Text - A field of variable length usually containing alphanumeric characters, but that, at least in theory, can contain any type of information including binary data or images. This type of field is not supported by all database management systems. Its use in proposed data structures is

subject to the following limitations: 1) no more than 1 text field is defined per database file; 2) text fields are not used for linkage between database files; 3) text fields are not used for fields that are likely to be used as the basis of keys or indices, and 4) text fields always have an Optional Status. The text field as defined here is conceptually equivalent to the "Memo" field of database management software that support the dBASE III data representation.

DATABASE FILE: COLLECTION SPECIFIC INFORMATION

This file facilitates transfer of data between collections and permits museum data management programs to be developed that are collection-independent but that can be locally customized. Provides file name components that permit information for more than one collection to coexist on the same storage area (folder, disk or directory).

IMPORTANCE: OPTIONAL (ESSENTIAL IF RECORDS ARE MAINTAINED FOR MORE THAN ONE COLLECTION)

<u>TAG</u>	<u>DESCRIPTIVE FIELD NAME</u>	<u>TYPE</u>	<u>STATUS</u>	<u>LINKED FILE(S)</u>
MPREF	Prefix for Museum Files	C	E	
MCODE	Museum Identifier Code	C	R	
	[We recommend use of the 4-character codes of Arnett & Samuelson, 1986 ¹]			
INSTIT	Institution Name	C	R	
MUSEUM	Collection Name	C	R	
NDIR	Director Name	C	E	PEOPLE,
DLNAME	Director Last Name	C	E	ACCESS
DFNAME	Director First Name	C	E	
DMNAME	Director Middle Name (or Initial)	C	R	

NOTES: Additional fields may be added to define collection-specific features (e.g., whether county records, ecological, geographic, species and/or type data are maintained, etc.). For general compatibility on a variety of different kinds of computer hardware, the file prefix should not exceed 2 characters. This code may be used as a prefix for all database files and/or specimen lot identifiers for a single collection.

DATABASE FILE: ACCESS

Contains a list of user names, collection responsibilities, passwords, and access rights for collection information. On networked systems or those with general access terminals, provides control over type of access (e.g., distinguishes between users who can retrieve data, add entries and/or modify database files).

IMPORTANCE: RECOMMENDED

<u>TAG</u>	<u>DESCRIPTIVE FIELD NAME</u>	<u>TYPE</u>	<u>STATUS</u>	<u>LINKED FILE(S)</u>
UNAME	User Name	C	E	PEOPLE
ULNAME	User Last Name	C	E	

¹Arnett, R. H., Jr. and G. A. Samuelson. 1986. The Insect and Spider Collections of the World. E.J. Brill/Flora & Fauna Publications. Gainesville, FL. 220p.

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UFNAME	User First Name	C	E	
UMNAME	User Middle Name (or Initial)	C	R	
USERID	Identifier [Unique for each user]	C	E	LOANS/ACCESSIONS, TRANSACTIONS
RESPON	Responsibility	C	R	
ACCODE	Password	C	R	
RIGHTS	Rights	C	R	

NOTES: File should be encrypted to prevent unauthorized access or modification. The unique Identifier associated with each authorized user can be used with Loan/Accession and Transaction database files to identify the individual responsible for each entry.

DATABASE FILE: HIGHER CLASSIFICATION INVENTORY

Contains family and higher level taxonomic information for material contained in collection, references genus-species-subspecies database files, if any, indicates location of specimens in collection, provides management level status information and, optionally, family-level inventory data as specimen or storage container (e.g., drawer, vial or vial rack, slide or slide box) counts.

IMPORTANCE: ESSENTIAL

<u>TAG</u>	<u>DESCRIPTIVE FIELD NAME</u>	<u>TYPE</u>	<u>STATUS</u>	<u>LINKED FILE(S)</u>
SPDBFILE	File Name ² [Root name for related database files, if any]	C	R	GENUS-SPECIES-SUBSP, TYPES, LOTS
CLASS	Class	C	O	
ORDER	Order	C	E	
SUBORD	Suborder	C	O	
SUPFAM	Superfamily	C	O	
FAMILY	Family	C	E	
FAMCODE	Family Code [A unique 4-5 character code for each family in collection]	C	R	GENUS-SPECIES-SUBSP, FAMILY SYNONYMS, TRANSACTIONS

²If separate Genus-Species-Subspecies or Type database files are maintained for orders and/or families, the File Name field can supply the associated database file names. For example, a Genus-Species-Subspecies database file for a collection could be represented by PREFIX+"S"+FILE NAME, where PREFIX is specific to the collection (See Museum Specific Information database file). In DOS and some mainframe computer environments, file names cannot exceed 8 characters and may not include symbols and/or may not begin with numbers. File names composed of a 2-character collection prefix, a single letter to distinguish between types, lots, species, and other database files, and up to a 5-character family or order abbreviation are compatible with most computer operating systems. Particular file name extensions may be required by database management systems to distinguish between database, index, program and other types of files, and should not be used to distinguish among taxonomic groups or database file structures.

PHYSEQN	Phylogenetic Sequence Number	N	O
LOCATION	Location in Collection	C	O
LOCPIN	Location of Pinned Specimens	C	O
LOCSLIDE	Location of Slide Mount Specimens	C	O
LOCVIAL	Location of Vial Stored Specimens	C	O
	Counts of Specimens or Storage Units	N	O
PINDETSP	Pinned Determined Specimens	N	O
PINUNDET	Pinned Undetermined Specimens	N	O
PINPRTYP	Pinned Primary Types	N	O
PINSETYP	Pinned Secondary Types	N	O
ALCDETSP	Vial Stored Determined Specimens	N	O
ALCUNDET	Vial Stored Undetermined Specimens	N	O
ALCPRTYP	Vial Stored Primary Types	N	O
ALCSETYP	Vial Stored Secondary Types	N	O
SLIDETSP	Slide Mount Determined Specimens	N	O
SLIUNDET	Slide Mount Undetermined Specimens	N	O
SLIPRTYP	Slide Mount Primary Types	N	O
SLISETYP	Slide Mounted Secondary Types	N	O
NSPECIES	Species Count	N	R
	[Species counts should be independent of storage method]		
MGMTFAM	Management Level Information ³	N	R
LOANSOUT	Outstanding Loans Exist	L	O
SPECFILE	Species Database File Exists	L	O
LOTSFILE	Lots Database File Exists	L	O
TYPEFILE	Types Database File Exists	L	O
SYNENTRY	Synonymy Database File Entry	L	O
MULTFAM	Multiple Families in Database Files	L	O
	[For Genus-Species-Subspecies, Types, etc.]		

NOTES: For collections that maintain full inventory information in Genus-Species-Subspecies and/or Types database files, count fields for determined specimens, species, and/or types may be redundant and unnecessary.

DATABASE FILE: GENUS-SPECIES-SUBSPECIES INVENTORY

Contains genus, species, and subspecies names and associated collection inventory information for one or more families.

IMPORTANCE: RECOMMENDED (ESSENTIAL IF ECOLOGY/ASSOCIATION DATABASE FILES ARE MAINTAINED)

<u>TAG</u>	<u>DESCRIPTIVE FIELD NAME</u>	<u>TYPE</u>	<u>STATUS</u>	<u>LINKED FILE(S)</u>
FAMILY	Family or Family Code	C	E	HIGHER CLASSIFICATION
SUBFAM	Subfamily	C	O	
TRIBE	Tribe	C	O	
SUBTRIB	Subtribe	C	O	

³Representation of management level information for families is discussed by McGinley (Insect Collection News. 2(2):19-26). Small collections (median number of drawers per family 2 or fewer) may use logical (true/false) entries rather than drawer counts for Management Level Information.

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SUBGEN	Subgenus	C	O	
GSSNAME	Genus-Species-Subspecies	C	R	GENUS-SPECIES-SUBSP,
GENUS	Genus	C	E	LOTS, TYPES
SPECIES	Species	C	E	
SUBSPEC	Subspecies	C	O	
CITATION	Citation	C	R	BIBLIOGRAPHY
AUTHOR	Author	C	E	
PUBYEAR	Year of Publication	C	E	
PUBPAGE	Page of Description	C	O	
ORGENUS	Original Genus if New Combination	C	R	
PHYSEQN	Phylogenetic Sequence Number [or Catalog Number]	N	O	
LOCATION	Location in Collection	C	O	
LOCPIN	Location of Pinned Specimens	C	O	
LOCVIAL	Location of Vial Stored Specimens	C	O	
LOCSLIDE	Location of Slide Mounted Specimens	C	O	
	Counts of Specimens by Storage Method	N	O	
	[For vial stored and slide mounted specimens counts may be of number of vials or slides]			
PINDETSP	Pinned Specimens	N	O	
PINPRTYP	Pinned Primary Types	N	O	
PINSETYP	Pinned Secondary Types	N	O	
ALCDETSP	Vial Stored Specimens	N	O	
ALCPRTYP	Vial Stored Primary Types	N	O	
ALCSETYP	Vial Stored Secondary Types	N	O	
SLIDETSP	Slide Mount Specimens	N	O	
SLIPRTYP	Slide Mount Primary Types	N	O	
SLISETYP	Slide Mount Secondary Types	N	O	
LIFSTAGE	Life Stages	C	R	
ASSOCMAT	Associated Case or Host	L	R	
ASSOCSTG	Associated Life Stages	L	R	
SEXES	Sexes	C	R	
GENDIST	General Distribution	C	O	
GEOGREG	Geographic Regions [State, country, biogeographic realm, etc.]	C	O	
COUNTIES	County Records	C	O	
VERIFIED	Record Verified	L	O	

NOTES: For collections that maintain counts in the Higher Classification and/or Types database files, count fields may be unnecessary. Separate database files may be maintained by family, family group or order.

DATABASE FILE: TYPES INVENTORY

Contains type inventory information by genus, species and subspecies for one or more families. Separate database files may be maintained by family or order.

IMPORTANCE: RECOMMENDED

<u>TAG</u>	<u>DESCRIPTIVE FIELD NAME</u>	<u>TYPE</u>	<u>STATUS</u>	<u>LINKED FILE(S)</u>
FAMILY	Family (or Family Code)	C	R	HIGHER CLASSIFICATION
	Genus-species-subspecies	C	E	GENUS-SPECIES-SUBSP,
GENUS	Genus	C	E	SYNONYMS
SPECIES	Species	C	E	

SUBSPEC	Subspecies	C	O	
CITATION	Citation	C	R	BIBLIOGRAPHY
AUTHOR	Author	C	E	
PUBYEAR	Year of Publication	C	E	
PUBPAGE	Page of Description	C	O	
ORGENUS	Original Genus if New Combination	C	R	
NEWNAME	Current Species if Junior Synonym	C	R	
LOCATION	Location in Collection	C	O	
NUMPTYP	Primary Type Specimens Count	N	O	
NUMSTYP	Secondary Type Specimens Count	N	O	
TYPEDES	Type Designation	C	O	
STORAGE	Storage Methods	C	O	
ASSOCLS	Associated Life Stages	L	O	
SEXES	Sexes	C	O	
ACCNUM	Accession Number	C	O	
LABDATA	Full Label Data	T	O	
CTRLACC	Control Access (to Material)	C	O	
SITENO	Locality Code	C	O	LOCATION/GEOGRAPHY
LOTNO	Lot Identifier	C	O	LOTS

NOTES: Separate database files may be maintained by family or order. The Control Access field can be used to indicate special conditions or restrictions on the distribution or use of the specimens.

DATABASE FILE: LOTS

Contains common information on specimens of a single taxon collected together at the same site (or on a single host).

IMPORTANCE: OPTIONAL (ESSENTIAL IF ECOLOGY/ASSOCIATION DATABASE FILES ARE MAINTAINED)

<u>TAG</u>	<u>DESCRIPTIVE FIELD NAME</u>	<u>TYPE</u>	<u>STATUS</u>	<u>LINKED FILE(S)</u>
FAMILY	Family (or Family Code)	C	R	HIGHER CLASSIFICATION
	Genus-Species-Subspecies	C	E	GENUS-SPECIES-SUBSP
GENUS	Genus	C	E	
SPECIES	Species	C	E	
SUBSPEC	Subspecies	C	R	
	Specimen Counts	N	R	
NDET	Determined Specimens	N	R	
NUND	Undetermined Specimens	N	R	
	[Not identified to species]			
STRMTH	Storage Method(s)	C	R	
LOTNO	Lot Identifier	C	R	TYPES
SITENO	Location Code	C	R	LOCATION/GEOGRAPHY
LFTGS	Life Stages	C	R	
ASSCHS	Associated Case or Host	L	O	
ASSLFS	Associated Life Stages	L	O	
SEXES	Sexes	C	O	
CNTLACC	Control Access (to Material)	C	O	
	[Indicates special conditions or restrictions on material, such as those requiring the return of specimens if they are designated types, etc.]			
HSTNAME	Host Name	C	O	

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HSTFAM	Host Family	C	R
HSTGEN	Host Genus	C	R
HSTSPE	Host Species	C	R
HSTSSP	Host Subspecies	C	O
HSTCOM	Host Common Name	C	O

NOTES: Lot Identifier and Locality Code values should be taxon independent. For data exchange, Lot Identifiers may be made museum specific by adding the museum Prefix (See Collection Specific Information database file).

DATABASE FILE: PEOPLE

Maintains name and, if available, address, phone, fax and bitnet address information for borrowers, collectors, donors, etc.

IMPORTANCE: OPTIONAL (ESSENTIAL IF LOANS/ACCESSIONS DATABASE FILES ARE MAINTAINED)

<u>TAG</u>	<u>DESCRIPTIVE FIELD NAME</u>	<u>TYPE</u>	<u>STATUS</u>	<u>LINKED FILE(S)</u>
NAME	Person Name	C	E	LOANS/ACCESSIONS,
LNAME	Last Name	C	E	MUSEUM SPECIFIC,
FNAME	First Name	C	E	ACCESS
MNAME	Middle Name (or Initial)	C	R	
TITLE	Title	C	R	
ADDRESS	Address	C	R	
ADLIN1	Address Line 1	C	E	
ADLIN2	Address Line 2	C	E	
ADLIN3	Address Line 3	C	O	
STCNTRY	State / Country	C	E	
PCODE	Postal Code	C	E	
PPCOD	Postal Code Position	C	O	
TPHONE	Telephone Number	C	R	
TFAX	Fax Number	C	O	
BITNET	Bitnet Address	C	O	
HASLOAN	Loans Outstanding	L	R	
COLLECT	Collector	L	O	
DONOR	Donor	L	O	
CONTRACT	Contracts	C	O	
	[Indicates special arrangements for remote curatorial responsibility]			
SPECIALY	Interest/Specialty	C	O	

NOTES: Full address records need only be maintained for borrowers, although it also may be useful for collectors if they are living and their whereabouts are known.

DATABASE FILE: LOANS/ACCESSIONS

Contains all information on loans/accessions except for specimen transaction records.

IMPORTANCE: OPTIONAL (ESSENTIAL IF LOAN/ACCESSION TRANSACTIONS ARE MAINTAINED)

<u>TAG</u>	<u>DESCRIPTIVE FIELD NAME</u>	<u>TYPE</u>	<u>STATUS</u>	<u>LINKED FILE(S)</u>
LOANID	Loan/Accession Code	C	E	TRANSACTIONS
LONDATE	Date	D	R	
TRNCLAS	Transaction Class [Loan, Gift, Trade, etc.]	C	R	
BNAME	Transactor Name	C	E	PEOPLE
BLNAME	Transactor Last Name	C	E	
BFNAME	Transactor First Name	C	E	
BMNAME	Transactor Middle Name (or Initial)	C	R	
ONAME	Other Person Responsible	C	O	PEOPLE
OLNAME	Other Last Name	C	E	
OFNAME	Other First Name	C	E	
OMNAME	Other Middle Name (or Initial)	C	R	
ANAME	Addressee Name	C	O	PEOPLE
ALNAME	Addressee Last Name	C	E	
AFNAME	Addressee First Name	C	E	
AMNAME	Addressee Middle Name (or Initial)	C	R	
INSTIT	Borrowing Institution	C	R	
LTERMS	Loan Terms	C	R	
LONCOND	Condition of Material Shipped	C	O	
PRMDATE	Date of Promised Return	D	O	
RTNDATE	Date of Last Return	D	O	
RTNCOND	Condition Material Returned/Received	C	O	
LONSTAT	Loan Status	C	O	
LTRCODE	Code For Last Letter Sent	C	O	
LTRDATE	Date Last Letter Sent	D	O	
RSPDATE	Date of Response to Last Letter	D	O	
LTRSTAT	Letter Status	C	O	
ANRDATE	Anticipated Shipping Date	D	O	
COMMENT	Comment (About Borrower/Donor)	C	O	
MATLIST	Material List [Loaned/Donated/Exchanged, etc.]	T	O	
USERID	Identifier	C	O	ACCESS

NOTES: Museum policies vary with respect to loans to students. Some only issue loans to faculty members. In this case the student becomes the Other Person responsible for the loan. Where loans are issued to a student, the faculty advisor becomes the Other Person responsible. In the case where the borrower and/or student leaves the borrowing institution, correspondence may be directed to a curator or department chairman, etc. Thus, as many as three names may be associated with each loan. Several fields included in this structure may be used in conjunction with an automatic letter generation system. This requires one additional database file that contains the texts of standard form letters used by the collection. Each text is associated with a unique identifier code that may be recorded in the Loans/Accessions database file. The Material List field may be a variable length text field (e.g., dBASE Memo field or equivalent) that provides specific information about the specimens loaned, donated, or exchanged. Because the identification of loaned specimens may change, tracking borrowed material by taxonomic name may be difficult. Some collections may prefer to maintain loan transaction records at the genus or family level. This greatly reduces the number of entries required in the Transaction database file. In this case notations about species included in donations, exchanges, partial returns, etc., may be added to the Material List field.

DATABASE FILE: TRANSACTION RECORDS

Contains taxon-based transaction records for loans and accessions contained in the loan/accessions database file. A separate record is maintained by date and loan identifier for each taxon, storage method, and transaction type combination.

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IMPORTANCE: OPTIONAL (ESSENTIAL IF LOAN/TRANSACTION DATABASE FILES ARE MAINTAINED)

<u>TAG</u>	<u>DESCRIPTIVE FIELD NAME</u>	<u>TYPE</u>	<u>STATUS</u>	<u>LINKED FILE(S)</u>
FAMILY	Family (or Family Code)	C	R	HIGHER CLASSIFICATION
	Genus-species-subspecies	C	O	GENUS-SPECIES-SUBSP
GENUS	Genus	C	O	
SPECIES	Species	C	R	
SUBSPEC	Subspecies	C	R	
STORAGE	Storage Method	C	O	
	[Pinned, Slides, Vials, Unknown, etc.]			
	Specimens/Species in Transaction	N	O	
NDET	Determined Specimens	N	O	
NUND	Undetermined Specimens	N	O	
NPRMTYP	Primary Types	N	O	
NSECTYP	Secondary Types	N	O	
NSPEC	Species	N	O	
LOANID	Loan/Accession Identifier	C	E	LOANS/ACCESSIONS
TRNTYP	Transaction Type	C	E	
	[Loan, Return, Kept, Trade, Gift, etc.]			
TRNDAT	Transaction Date	D	R	
LONACT	Loan Open	L	O	
COMMENT	Comment	C	O	
USERID	Identifier	C	E	ACCESS

NOTES: If transactions are maintained by family, the Genus, Species, and Subspecies fields may be omitted. See notes for Loans/Accessions database file.

DATABASE FILE: FAMILY SYNONYMS

Provides equivalence between family names used in collection with modern equivalents and/or those used by other museums. When a family cannot be found in the Higher Classification database file, this database file can be searched to establish the appropriate name for a collection.

IMPORTANCE: OPTIONAL

<u>TAG</u>	<u>DESCRIPTIVE FIELD NAME</u>	<u>TYPE</u>	<u>STATUS</u>	<u>LINKED FILE(S)</u>
FAMILY	Family	C	E	HIGHER CLASSIFICATION
FAMCODE	Family Code	C	E	HIGHER CLASSIFICATION
COMMENT	Comment	C	O	

NOTES: The Family and Family Code fields can be used to indicate a fully synonymous family name. For example, the obsolete Diptera family name Corethridae could be entered with the code for the currently accepted name Chaoboridae. By using this database file, searches for the family Corethridae could reference material entered as Chaoboridae. The comment field can be accessed to provide additional information about a family. For example, if the family Omophronidae is maintained in a collection (distinct from family Carabidae), the Family name Carabidae could be included in this database file with the Comment, "Also see Omophronidae." In this case, the field Entry in Family Synonymy Database file would be set to True and searches for the family Carabidae also could retrieve the associated comment.

DATABASE FILE: BIBLIOGRAPHY

Contains bibliographic citations for the authors of species/types contained in collection. Also may contain references to catalogs and sources of phylogenetic organization for groups, taxonomic keys, publications citing collection, etc.

IMPORTANCE: OPTIONAL

<u>TAG</u>	<u>DESCRIPTIVE FIELD NAME</u>	<u>TYPE</u>	<u>STATUS</u>	<u>LINKED FILE(S)</u>
CITATION	Citation	C	E	GENUS-SPECIES-SUBSSP, TYPES
AUTHOR	Author List	C	E	
DATE	Year (of publication)	C	E	
TITLE	Title	C	R	
SOURCE	Source	C	R	
KEYWDS	Key Words	C	O	
LANG	Language	C	O	
CALLNO	Location (of reprint)	C	O	

NOTES: The Citation field must match the contents of the combined Author+ Year of Publication fields in nomenclature database files. Entry of names in the Author field should be consistent for multiple authored publications. For example, avoid varying the relative position of author initials between the first and subsequent authors of a publication. An example of a format that is both easy to decode and search and sorts alphabetically is:

Last_Name, 1st_initial 2nd_initial; Last_name, 1st_initial 2nd initial; Last_Name, 1st_initial 2nd initial; etc.