

SIDbase

(Structured Inventories of Diversity database)

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Introduction

Database system (MS-Access database core) developed by Maurice Leponce, Conservation Biology Section, to manage biodiversity survey data. Many programs were written by Charles Vander Linden.

Despite the fact that other databases systems such as Biota, BioLink, ... already exist and allow to manage biodiversity information we found useful to develop a specialised database system to meet more closely our specific research needs that are :

- input of data from structured inventories: by contrast to traditional museum collections, in structured inventories the sampling effort is taken into account and allow reliable quantitative comparisons of species diversity among sites.
- emphasis on social insects specimens: a sample of a social insect colony, by contrast with many others animals, may contain individuals belonging to many different categories (called castes: queen and king, nymphs, workers, soldiers, ...).
- extensive use of images of specimens and of collection sites.
- easy changes in specimen identification: during the sorting and identification processes, temporary morphospecies are often used or misidentifications need to be corrected.

- easy changes in the database structure: new fields, peripheral tables, ... to follow the evolution of the research project.
- easy adaptations to specialised hardwares such as barcode scanners and thermal printers.
- easy addition of custom queries, macros and modules to retrieve the data

SIDbase main features are:

- Management of sample and specimen data through barcode printed labels (alcohol and ether proof, to speed up data entry and facilitate loan management).
- Quick storage and retrieval of numeric pictures on habitats and taxa.
- Tools for specimen identification (computer keys linked with an image bank) and data entry (world checklist of ant genera and South American habitats).
- Data analysis friendly (filters for sorting data with respect to taxon, site and sampling method; abundance matrices automatically exported to EstimateS format).
- Simultaneous data-entry by several users (front-end /back-end structure).
- The use of specific fields and tables to allow to organize data from structured inventories of social insects.

General structure of SIDbase application

SIDbase is an application consisting of several database files (Fig. 1). The "back-end" database files (SID_BE and SID_Refs) contain the data tables. The "front-end" database files contains all other database objects (queries, forms, reports, macros, and modules) and links to the tables in the back-end databases. The two back-end database are located on a network server, and copies of the front-end database are installed on individual users' computers.

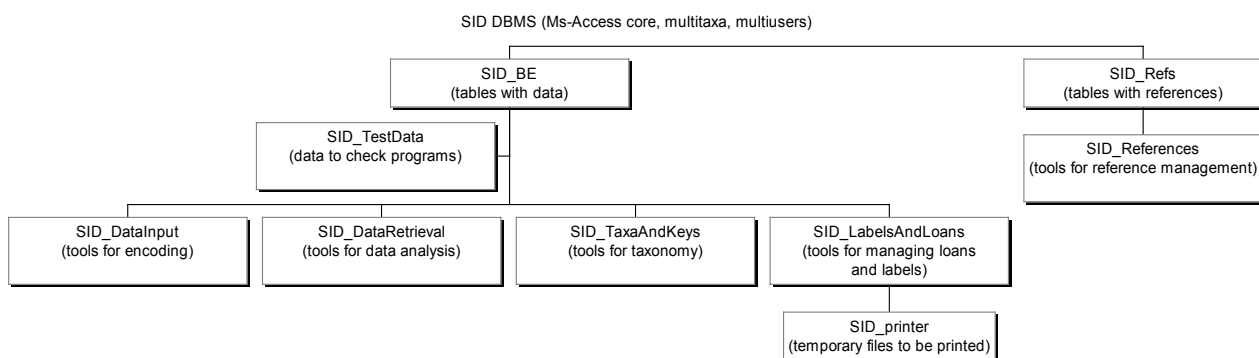


Figure 1: General structure of SIDbase application.

SIDbase back-end, core, tables: quick overview

SIDbase core tables, found in SID_BE.mdb (BE for back-end) (figure 1) are:

- 1) T_PROJECTS: which allows to group data by research project (examples of projects: assessment of invertebrate diversity in Brussels parks, study of ant species replacement in Gran Chaco,...).
- 2) T_LOCALITIES: which allows to group data by localities (eg Brussels parks, National parks in Argentina, ...). It includes general administrative and geographic data on localities.
- 3) T_COLLECTIONS: which allows to group data by samples. It includes data on the sampling scheme (transect, quadrat,...), sampling method (pitfall trap, winkler, fogging, ...) and sampling effort (dates when sampling started and ended, sample weight,...). Precise geographical and ecological information on the sample are included: latitude and longitude as measured with a GPS (Global Positioning System)(plus eventually x,y coordinates at finer geographical scale), precise altitude, habitat type (CORINE typology), rainfall and extreme temperatures during the sampling. Samples from a single transect or quadrat share a single number, the integer value of field "Site_No". Decimal value of field "Site_No" is used to code samples from a single transect or quadrat (eg Site_No=1.001 & Site_No=1.002 are two sampling points of transect 1). It happens that the same area is sampled several times, then the field Replicate_No is incremented by 1.
- 4) T_SERIES: Series allow to group all specimens from a single (nest,soil, wood, leaf, ...) sample and belonging to a single species. The main advantage is that the taxonomic information has only to be entered once for all the related specimens.
- 5) T_SPECIMENS: specimens inside a series are generally grouped by stage and/or sex. Each record, which may include several individuals (abundance is stored in field "SPM_abundance"), is given a unique identifier ("SPM_ID"). A specimen record can be moved to another series if grouped by mistake with specimens of another species or sample (field "Ser_No" or "COL_ID" is then changed for this record). Morphometric information, type status, loan status, storage conditions can be input for each record. The full identifier of a specimen include the "SPM_ID" plus a prefix for the research institute and the scientist (eg "RISNBML04560").
- 6) T_TAXA: contains all the taxonomic information from highest (phylum) to lowest (variety) taxonomic level. It is organized in a parent-child way. One field comprises the taxonomic level (e.g. species)
- 7) T_IMAGES Sites: allow to link image files (JPEG format) to any sample of T_COLLECTION.
- 8) T_IMAGES Taxa: allow to link image files (JPEG format) to any taxonomic level of T_TAXA.
- 9) T_PERSONNEL: contains information about all people involved in the project (taxonomists, collectors, encoders, etc.).
- 10) L_CODES: contains values found in combo boxes (see appendix 2).

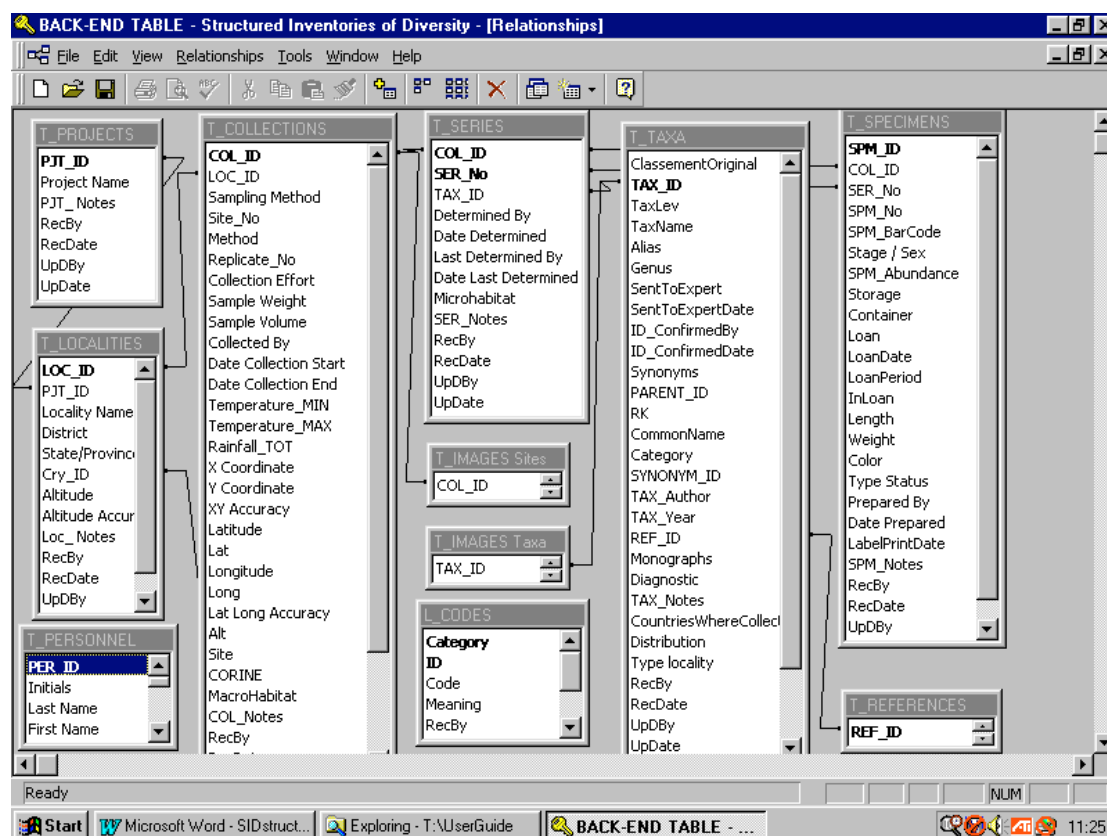


Figure 2: SIDbase core tables. Boldfaced field names are key fields and linking fields. Lines show main relations except, for reason of clarity, the numerous relations of combo fields with L_CODES and people name fields with T_PERSONNEL.

SIDbase: dictionaries and peripheral tables

- 1) L_Countries: contains a list of country codes (see appendix 3).
- 2) L_TaxAuthors: contains a list of authors who described species found in the database.
- 3) T_BulkSeries: this table allows to encode Series of taxa (eg spiders, mites, coleoptera) not sorted to species and that will be directed to a specialist of the group concerned (labels with all relevant collection information and a COL_ID can then be easily printed and dip into the sample vial).
- 4) T_CORINE: dictionary of CORINE typology of habitats.
- 5) T_BOXES: this table allows to specify where the specimens are stored (e.g. entomological box number)
- 6) sT_COL_BROM: example of a peripheral table that contains additional information, in relation with a particular research need, for some records.

SIDbase: references tables (bibliography).

SID_Refs is a back-end database which contains all references linked to some records in SID_BE tables plus others stored in relation with past and ongoing research projects.

SIDbase front-end databases

Data input module: SID_DataInput.mdb

This front-end database allows from a start menu (Fig. 3) to navigate between input forms to quickly encode the data for projects, localities, taxa, personnel, collections (Fig. 4), series of specimens etc (Fig. 5).

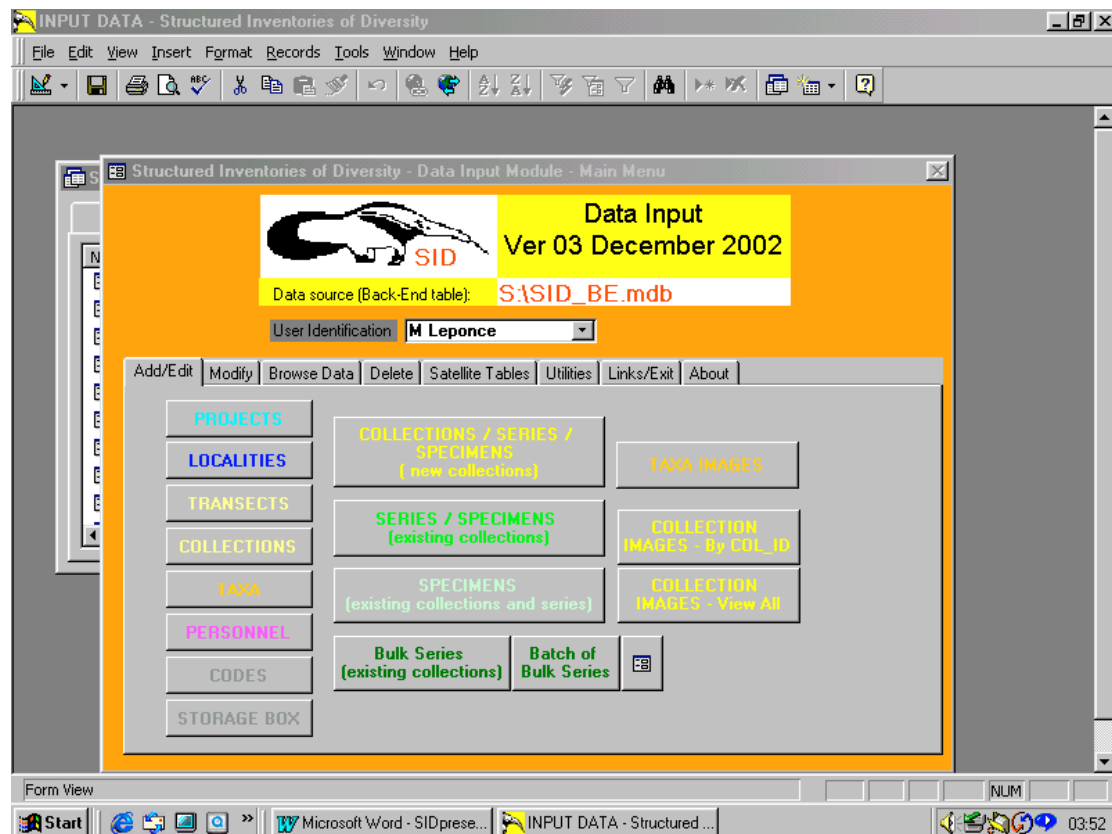


Figure 3: SID_DataInput main menu.

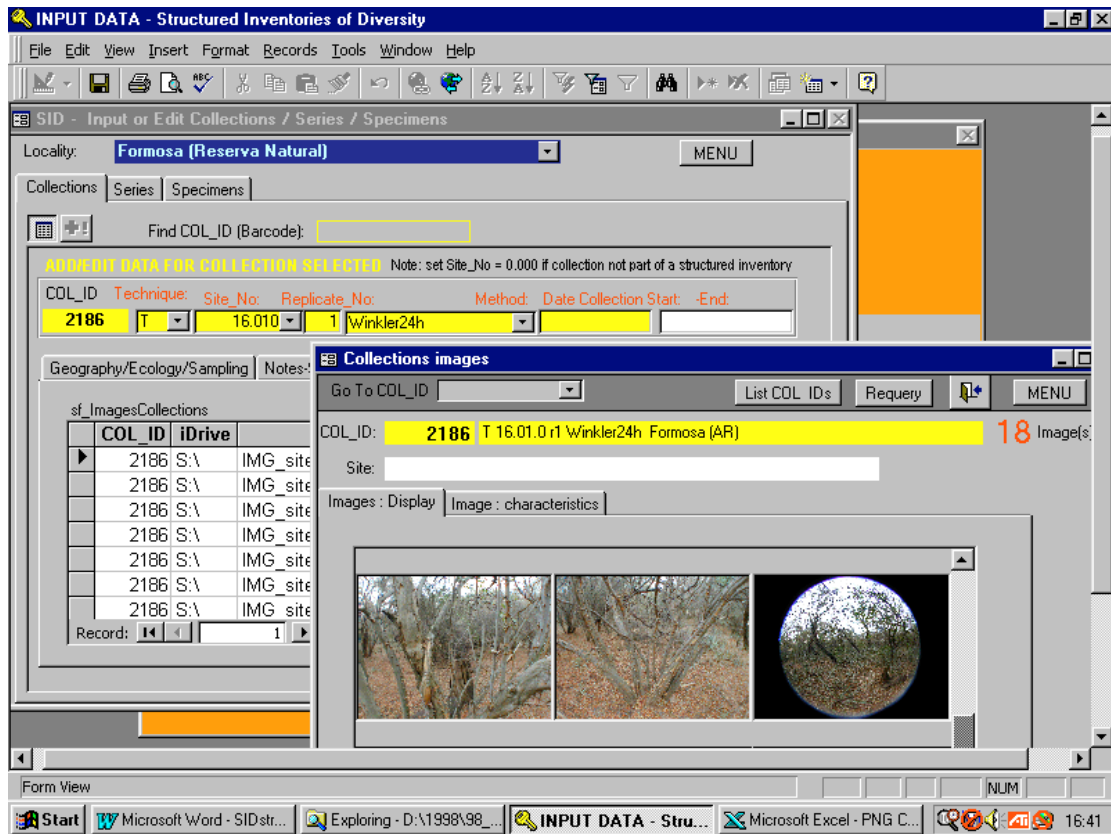


Figure 4: SID_DataInput: example of cascading input forms for collections.

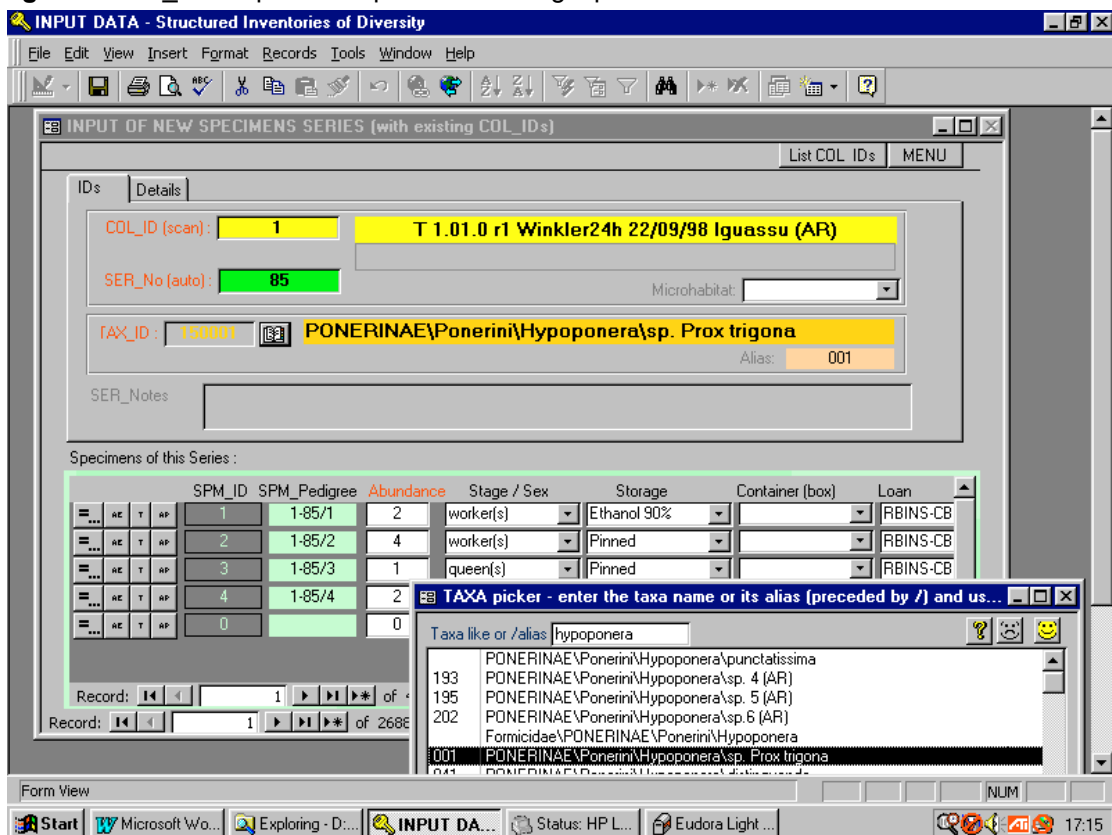


Figure 5: SID_DataInput: cascading input forms for specimens.

Data retrieval module: SID_DataRetrieval.mdb

This front-end database allows from a main menu (Fig. 6):

- 1) to export filtered data and matrices to statistical packages.
- 2) to check for errors (anomalies, duplicates, missing data etc.) during data encoding.
- 3) to perform basic descriptive statistics (eg abundances and occurrences of species in samples).
- 4) to compare faunal similarity between samples.
- 5) to print reports.

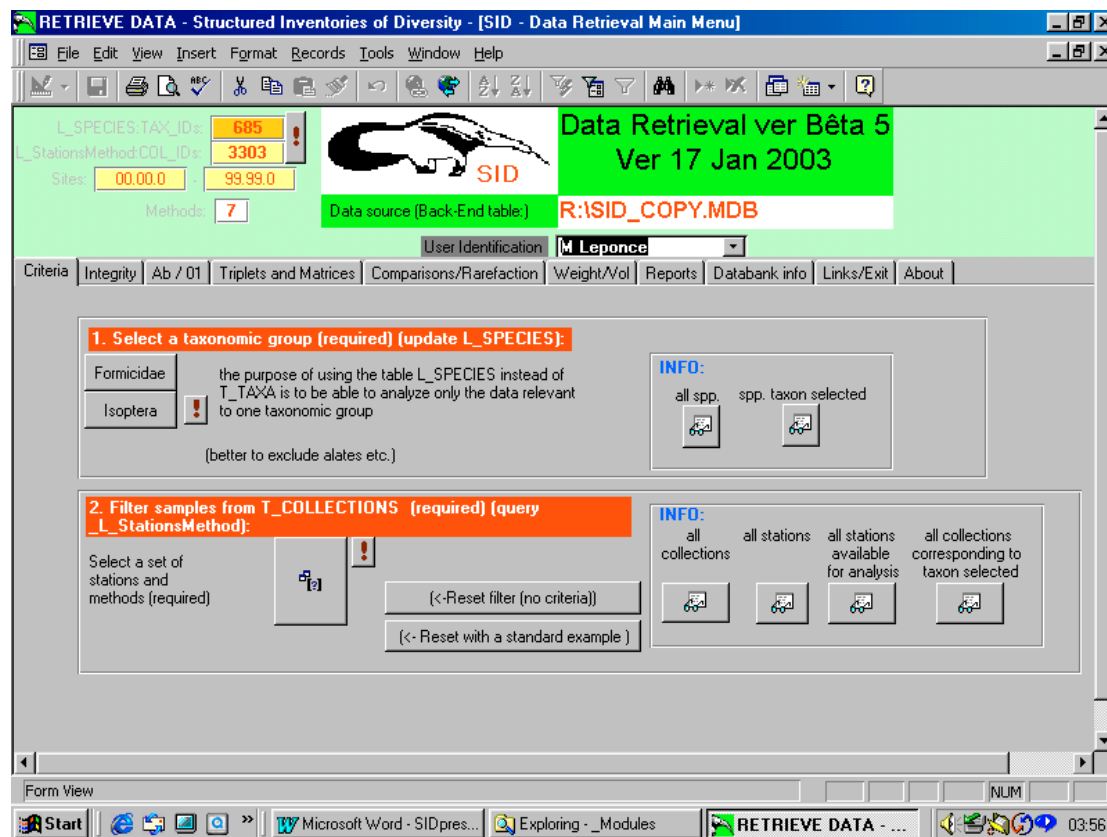


Figure 6: SID_DataRetrieval main menu.

Taxonomic module: SID_TaxaAndKeys.mdb

SID_TaxaAndKeys is a front-end database which principally allows:

- 1) To add/move/delete/rename taxa arranged in a hierarchical structure (taxonomic tree) (Fig. 7).
- 2) To deal with problems of synonymy.
- 3) To list series of specimens collected for each species (Fig.7).
- 4) To view an image of the taxa (Fig.7).
- 5) To identify specimens with digital taxonomic keys (Fig.8).

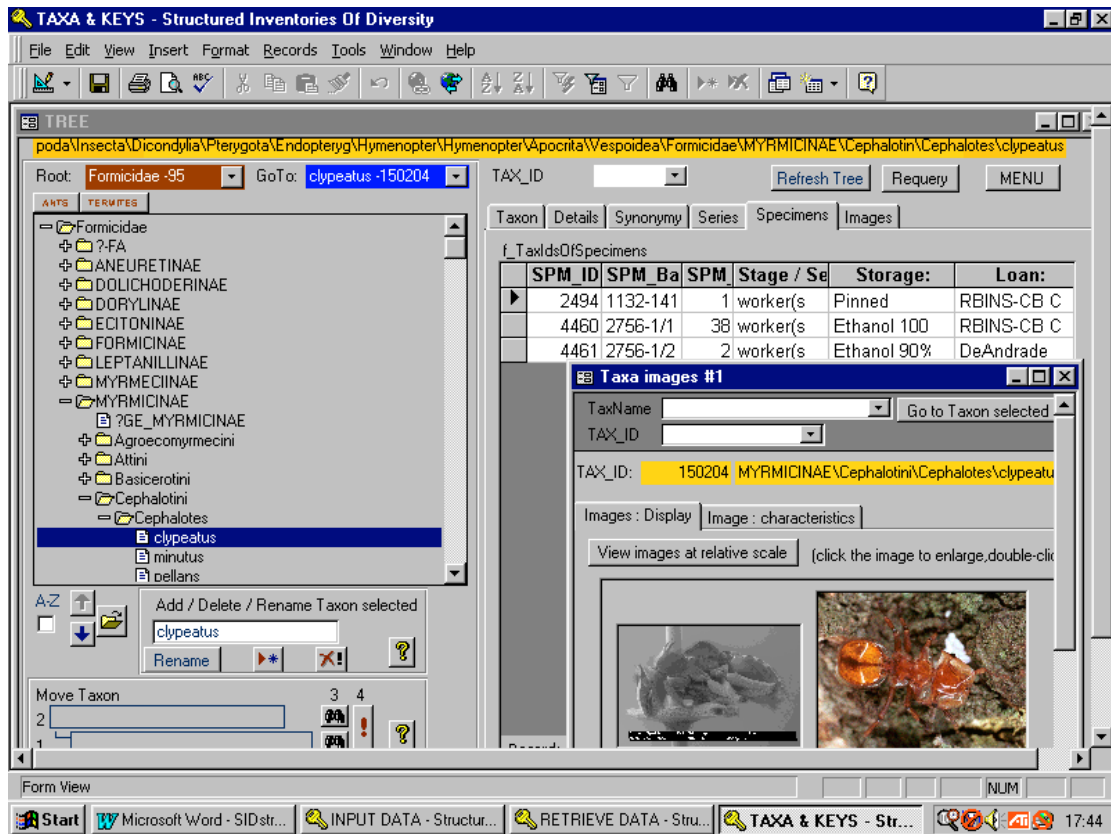


Figure 7: SID_TaxaAndKeys: input form for taxa.

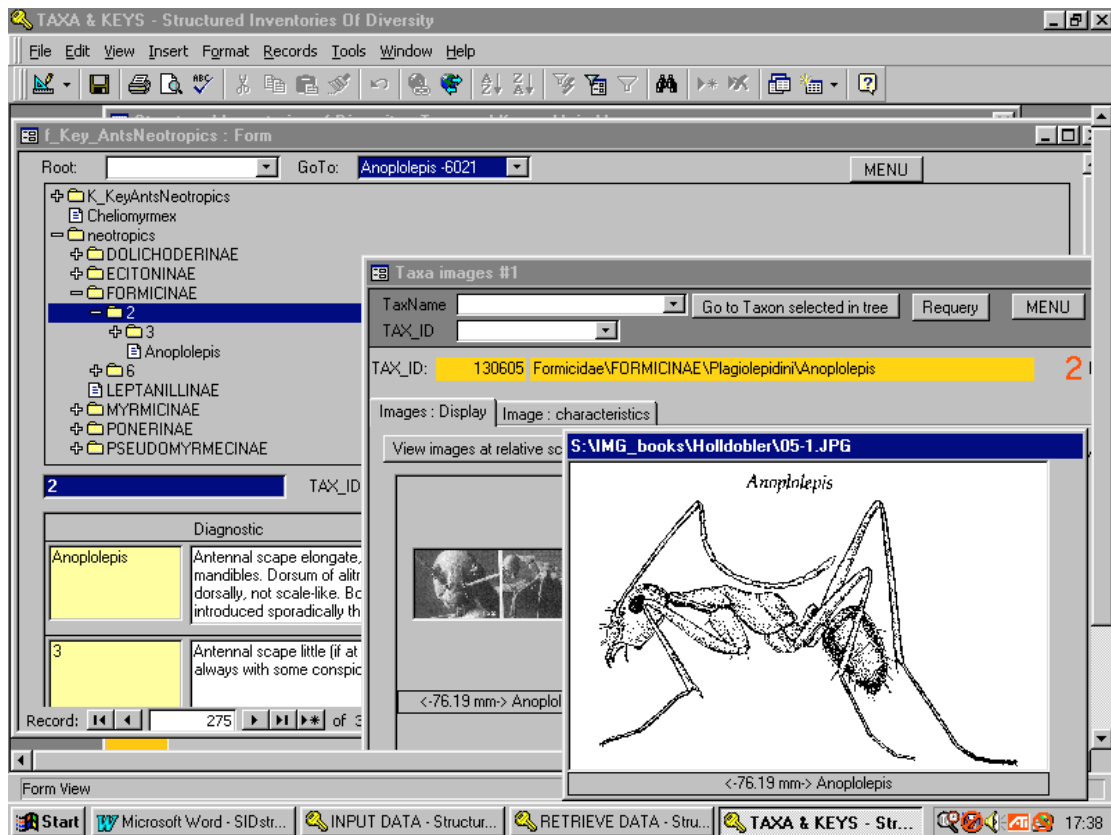


Figure 8: SID_TaxaAndKeys digital taxonomic key.

Labels and loans module: SID_LabelAndLoans.mdb

This front-end database contains various forms and allows from a main menu (Fig.9):

- 1) to create long-term labels for dry specimens (Fig.10), specimens vials and sampling bags (Fig. 11)
- 2) to manage loans of specimens.

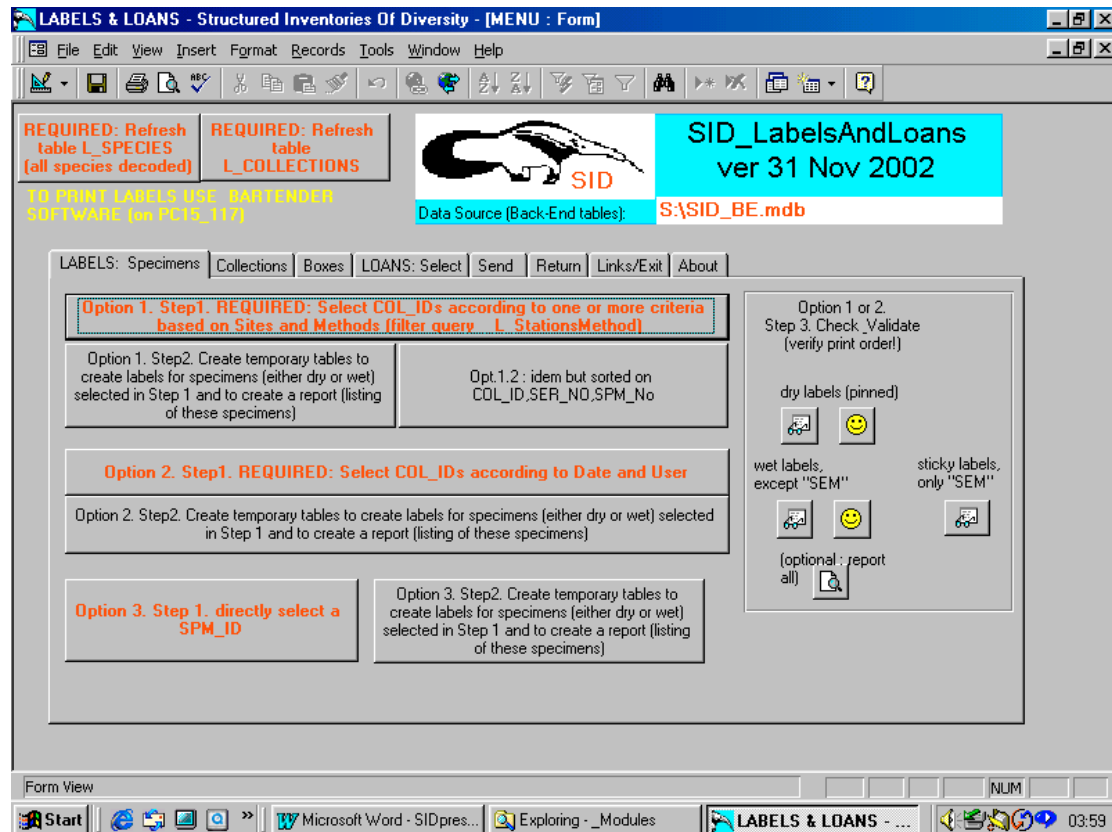


Figure 9: SID_LabelsAndLoans: main menu.



Figure 10: barcoded labels for dry entomological specimens.



Figure 11: Barcoded labels (uni- or bidimensional) for entomological specimens preserved in ethanol.

References module: SID_References.mdb

This module is a reference manager for both data contained in SID_BE and papers referred to elsewhere. A main menu (Fig.12) leads to various forms such as the data entry form (Fig. 13).

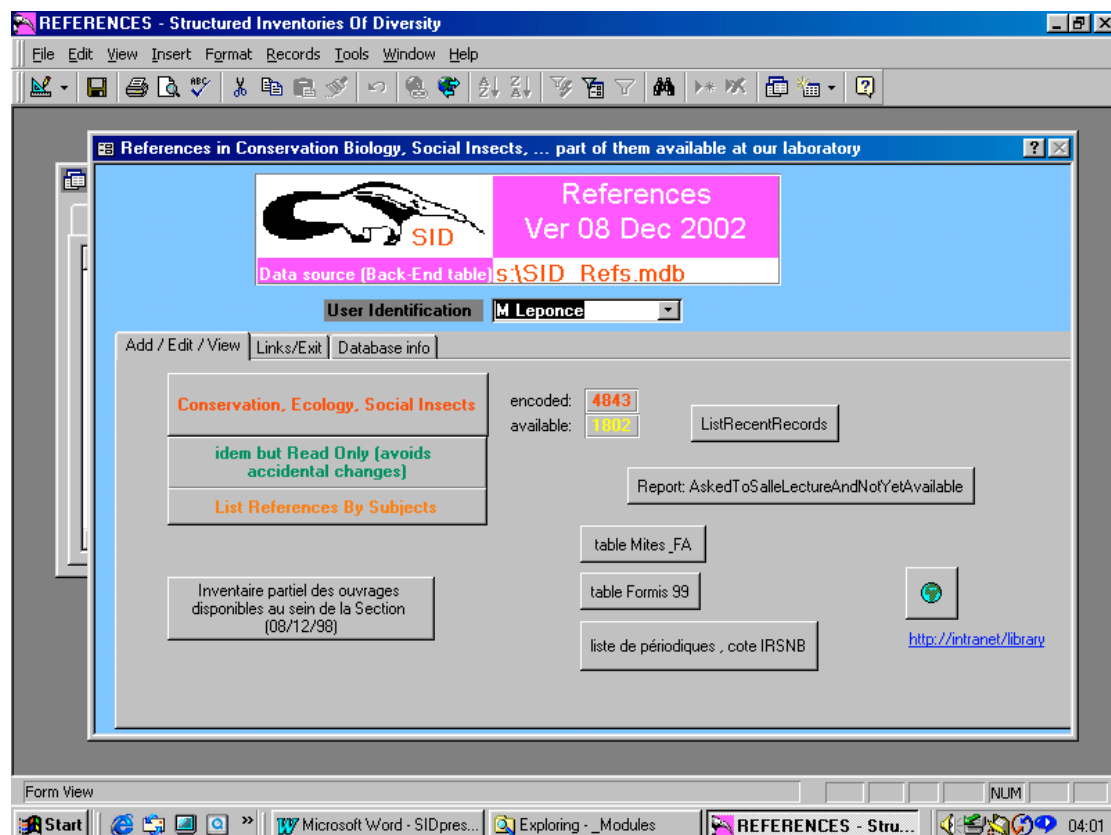


Figure12:Main menu of SID reference manager.

REFERENCES - Structured Inventories Of Diversity

f_Conservation&Social Insects : Form

Abat(T)1992a Conservation

REF_ID: (si recouplements : choisir le sujet le plus proche et ajouter les autres dans le champ "KEYWORDS")

format d'encodage des champs AUTHOR et EDITOR (respecter la ponctuation): Wilson, E.O.; Holldobler, B.

AUTHOR: Abate, T.

YEAR: 1992 a

TITLE: Environmental rapid-assessment programs have appeals and critics.

BOOKTITLE: BioScience P2614

VOLUME: 42 ISSUE: PAGES: 486-489 REF: Journal Article

EDITOR:

PUBLISHERS:

KEYWORDS:

SOURCE: Oliv(i)1993a labels (BarTender): PrintMeNow

ABSTRACT:

Record: 1 of 4631

Form View

Start Microsoft Word - SIDstruct... SID_Refs (Back-end) REFERENCES - Stru... 16:03

Figure 13: data entry form for references.