Standard fields and terms for Ecological and Geographic data on arthropods

Gerald R. Noonan

Margaret K. Thayer

This is a revised version of the standard ecological fields and terms proposed by Noonan in issue 4 of the *Insect Collection Newsletter*. The revision is based upon decisions made by participants in the Computerization workshop held under USDA auspices at the Smithsonian Institution October 29-3 1. The fields and terms were originally proposed by Gerald Noonan based on discussions with other entomologists, with Margaret Thayer and Al Newton taking time to provide especially detailed input. During the Computerization work shop Noonan and Thayer modified the fields and the way they are handled in data bases to meet data standards adopted by all the Work Shop participants.

Present draft of fields & terms for data bases about collecting & ecological data

Boldface type & double underlining denote fields. Uppercase letters denote the various terms & their modifiers for each field. The Workshop participants suggest that entomologists consider certain fields as **Essential** (data must be entered, if available, by all museums or workers who want to interchange data), other fields as **Recommended (**recommended for museums or workers wanting to share data), and **Optional** (might be used by museum or worker for internal or specialized purposes).

Sites (File SITEBASE)

This file contains all data that do not change either over time or space for a given site. If such data do change over time or distance, then the area should be divided into two or more sites.

SITENO — Essential Field that a worker uses to give a site a unique number. The field consists of a combination of letters and/or numbers that identify the site and provide pointers to other files as regards the geographical location of the site. ECN and ASC will provide suggestions as how to be sure that a unique number is used for each site, but each institution will be free to adopt a method that best meets its needs.

COUNTRY — Essential Field Unless we wish to spell out all countries, we need to adopt a set of abbreviations. ASC will probably suggest a set of terms for all natural history disciplines.

UNIT1 — First political subdivision within a country, such as state for the U.S.

UNIT2 — Subdivision within unit 1, such as county for the U.S.

UNIT3 — Subdivision within unit 2, such as National Forest.

UNIT4 — A subdivision smaller than any above, in the U.S. might be used for Range and Township.

UNIT5 — The smallest political subdivision.

REFPOINT — Essential Field that should be used whenever possible to provide a reference point for locating the site. Data for the field are the name of a town, village or other point found on readily available maps. For example, an entry might read Phoenix.

DISTANCE — Essential Field that should be used when entries are made in the above field. Data for the distance field consists of the distance(s) (in km) a locality site is from the reference point,

the direction(s) of such distance, and the name of roads along which distances may have been measured. (For example, an entry might read "12.3 km NW on rte 12 & 3.4 km W on rte 22. The distance data in combination with the data in the reference point field and one or more of the unit fields will provide a depiction of the location of the site).

LOCAL — Optional Field that may contain the name of a particular point located at the site but not found readily on most maps. For example, the local field might contain the name of a public campground.

LAT — Recommended Field. When available, latitude coordinates are entered. The prefix - denotes southern latitudes while the prefix + denotes those in the northern hemisphere.

LONGT — Recommended Field. When available, longitude coordinates are entered. The prefix - denotes western longitudes while + denotes eastern.

DECLAT — Recommended Field in which the data base calculates the decimal value of the latitude.

DECLONG — Recommended Field in which the data base calculates the decimal value of the longitude.

FAUNAL — Essential Field for faunal terms: AFROTROPICAL, AUSTRALIAN, NEARCTIC, NEOTROPICAL, OCEANIC, ORIENTAL, PALAEARCTIC

FAUNSD — Optional Field in which a user may place subdivisions of a faunal region.

FEET — This optional field is used when elevation information is available only in terms of feet. The data base converts the feet data into meters and stores the results in the essential field meters.

METERS — Essential Field in which elevation is entered in meters or in which the data base places meters calculated from data in the feet field.

SITENTS1 — Optional Field in which a user may place text notes about a site.

SITENTS2 — Optional Field in which a user may place a second set of text notes about a site.

REFNO — Optional Field that might be used to allow inclusion of numbers referring to literature records.

General Habitat Data Elements File HABGEN

This file is for all general habitat data that do not change either over time or space for a given habitat within a site. If such data do change over time or distance, then the site should be divided into two or general habitats.

SITENO — Essential Field defined and used as noted under file sitebase.

RABNO — Essential Field that provides a unique habitat number for each habitat, with such number serving a pointer to related files. The habitat number is a child of the site number.

BIOTYPE — Essential Field that describes the general habitat rather than the particular type of site in which an insect is found. For example, an insect found in a meadow in a region that was otherwise boreal forest would receive an entry of "BOREAL FOREST", with the term meadow being reserved for the site field described below. Terms for the biotype field are derived from a combination of biogeographical sources:

BOREAL FOREST Extends in broad band across northern North America, Europe & Asia in areas of subtemperate climate & also extends southward into the temperate latitudes at higher elevations. The canopy is often not dense, & there may be a well developed understory of shrubs, mosses & lichens in the

most moist sites. Vegetation is typically dominated by a few species of narrow, needle-leaved evergreen tree conifers such as listed below as additional terms.

DESERT Rainfall usually less than 25 cm per year. Plants typically widely spaced, with large bare areas in between. Plantsof3 forms: 1annuals that avoid drought by growing only when moisture present; 2 succulents, such as cacti, that store water; 3 desert shrubs with numerous branches ramifying from a short basal trunk bearing small, thick leaves that may be shed during prolonged drought.

GLACIAL For insects found on or in snow or ice in permanent glaciers or snowfields at high elevations or at polar regions.

PANTANAL Swamp or wet grasslands such as in the Everglades of Florida.

SCLEROPHYLLOUS WOODLAND Occur in mild temperate climates where they receive moderate winter precipitation but experience long, usually, dry summers. Dominant plants have sclerophyllous hard, tough, evergreen leaves. The woodlands may be tall communities that receive over 100 cm of annual rainfall, as in the eucalypt woodlands of southwestern Australia. Woodlands that receive less than 60cm/year of precipitation tend to be shrublands. The shrublands are characteristic of mediterranean-type climates & form dense almost impenetrable masses of vegetation only a few meters high.

SEMI-EVERGREEN This biotype is a form of subtropical evergreen forest in which temperate broad-leaved deciduous trees comprise half or more of a forest whose other trees are subtropicalevergreens. See description of subtropical evergreen forest.

SUBTROPICALEVERGREENFOREST Common in subtropical mountains at intermediate elevations & in extensive areas of China & Japan, the southeastern United States & disjunct areas in the Southern Hemisphere. Such forests may receive as much as 150 cm of rainfall/year, evenly distributed. Do not occur where mean annual temperature is much below 13 C. Most dominant species are dicotyledons with entire or with margined, sclerophyllous evergreen leaves such as laurels [Lauraceae], oaks & magnolias. Stratification is usually not present, & understory plants, especially mosses, can be common where fog occurs. Some temperate broad-leaved deciduous trees may occur in the subtropical evergreen forests, with such temperate trees progressively replacing the broad-leaved evergreen trees as climate becomes colder.

TEMPERATE DECIDUOUS FOREST Grow throughout temperate latitudes almost wherever there is enough moisture. Typically are dormant during cold winters.

TEMPERATE GRASSLAND Occurs in all areas with a moderately dry & cold continental climate. Vegetation is confined to a single stratum that varies in height & density depending largely on water availability. Perennial grasses usually predominate, but a large number of other herbaceous plants are sometimes also present. Fires play a major role in preventing the establishment of forests.

TEMPERATE RAIN FOREST Found in a few temperate regions where precipitation exceeds 100 cm/year & occurs during at least 10 months/year. The dominant trees are large evergreens. The epiphytes are mostly mosses, lichens, fungi & some ferns.

THORN FOREST Low arborescent vegetation types that grow in hot, somewhat dry to semiarid lowlands. Dominant plants are small, spiny or thorny shrubs & trees, including many members of Acacia. Succulents, such as cacti or euphorbia are often abundant. Most plants lack leaves during the prolonged dry season, but the trees leaf out & a dense herbaceous understory develops during the wet season. Thorn forests are often found on drier sites adjacent to tropical deciduous forests. Usually at least 30 cm of rainfall/year are required to establish a thorn forest, & the region is mostly without rainfall for about 6 months.

TROPICAL DECIDUOUS FOREST Occurs chiefly in hot lowlands outside the equatorial zone, where rainfall is more seasonal than in tropical rain forest. canopies lower & more open than those of tropical rain forest, with more understory vegetation present because more light reaches ground. Many trees & understory plants leafless during the long dry season but may flower then.

TROPICAL RAIN FOREST Chiefly found at low elevations in tropical latitudes of Ca. 10 degrees N to 10 degrees S where rainfall is abundant & over 180

cm/year; uniform annual temperatures, without any freezing. Humidity high. Trees evergreen, often with buttressed bases & smooth, straight trunks. With many vines & epiphytes. No or only a few annual plants.

TROPICAL SAVANNA Tall grasslands with widely scattered trees or shrubs. Found mostly at low to intermediate elevations where seasonal drought & fire favor grasses & limit tree growth.

TUNDRA Low scrubland & mat-like vegetation found at high latitudes & above tree line at high elevations. Characterized by plants adapted to low temperatures & short growing seasons. Precipitation is scanty, & cold temperatures limit the water available for plant growth. Many tundra regions receive less precipitation than some deserts, but evaporation is usually so limited that soils become saturated with water. Subdivisions include:

ALPINE TUNDRA Found in mountains at high elevations. Vegetation usually low, only a few centimeters or decimeters high & dense & complex. The dominant plants are usually dwarf perennial shrubs, sedges, grasses, mosses & lichens.

ANTARCTIC TUNDRA Found at high latitudes in southern part of world. vegetation of same general appearance as in alpine tundra.

ARCTIC TUNDRA Found at high latitudes in northern part of world. Vegetation of same type as in alpine tundra.

TROPIC ALPINE SCRUBLAND TUNDRA Found on mountaintops in the equatorial zone mountains of the Andes [paramo], the upper slopes of the highest mountains in east Africa & mountaintops in New Guinea. Vegetation is taller than alpine tundra, with dominant plants being bizarre, erect rosette perennials with thick stems & tussock grasses. This biotype is found below the region of permanent snow & bare rock.

BIOMOD Recommended Field to hold any necessary modifiers of the previous biotype field.
Modifiers for BOREAL FOREST include the dominant trees: Douglas fir (*Pseudotsuga*); fir (*Abies*); pine (*Pinus*); spruce (*Picea*).

Regional terms or modifiers for SHRUBLANDS are: CHAPARRAL; FYNBOS; MACCHIA; MATFORAL; MAQUIS.

Modifiers for subtropical evergreen forest include: CLOUD FOREST; MONTANE FOREST; OAK; OAK-LAUREL FOREST.

Modifiers for TEMPERATE GRASSLAND are related to decreasing amounts of moisture & are: PRAIRIE (veldt of South Africa, puszta of Hungary, pampas of Argentina& Uruguay); SHORT GRASS PLAINS (steppe of Eurasia); DESERT GRASSLAND (adjacent to deserts)

REGION1 Optional Field for regional zones of interest to a given researcher. For example, some North American researchers use Life Zones as originally proposed by Merriam (1894) & modified by Marr (1967). Life Zones are based on isotherms that seem to coincide with concentrations of plant & animal species limits & that also form the boundaries of recognizable vegetation formations such as tundra, coniferous forest, etc. The Zones do not consider factors other than temperature, such as aridity & humidity The Zones are primarily of interest to some workers who collect in the southwestern United States since the zones are well correlated to the altitudinal belts of mountains there. However, the zones do not work in many other areas. Terms are: BOREALREGION: ARCTIC ZONE; HUDSONIAN ZONE; CANADIAN ZONE. AUSTRAL REGION: TRANSITION ZONE, UPPER AUSTRAL ZONE; LOWER AUSTRAL ZONE. TROPICAL REGION. It would be helpful if researchers could identify other regional zones of interest to them so that terminology can be standardized.

REGION2 Second Optional Field for regional terms.

HOLDLAT Optional Field for Holdridge latitudinal zones. BOREAL; COOL TEMPERATE; LOW SUBTROPICAL; POLAR; SUBPOLAR; TROPICAL; & WARM TEMPERATE.

HOLDALT Optional Field for Holdridge altitudinal belts: ALPINE; NWAL; LOWER MONTANE; MONTANE; SUBALPINE; SUBTROPICAL.

HOLDZON Optional Field for Holdridge zones: DESERT; DESERT BUSH; DRY FOREST; DRY TUNDRA; MOIST FOREST; MOIST TUNDRA; PARAMO; PUNA; MOIST FOREST; RAIN FOREST; RAIN FOREST [RAIN PARAMO]; RAINTUNDRA; STEPPE; THORN WOODLAND; VERY DRY FOREST; WET FOREST; WET TUNDRA

COMMUN Optional Field used for community names that modify the biotype, regional or holdridge fields.

Habitat, Terrestrial File HABTERR

This file contains microhabitat data about terrestrial habitats. Terrestrial insects are defined as those found on land or alongside bodies of water in places where any film of water over the substrate is not deep enough for the insects to swim.

SITENO Essential Field defined and used as noted under file sitebase.

HABNO Essential Field that provides a unique habitat number for each habitat, with such number serving a pointer to related files.

MICRONO Essential Field assigns a microhabitat number, allowing for later retrieval of desired terrestrial microhabitat data.

SITE Essential Field that comprises a general description of the type of site in which an insect was found. For example, the site field might contain an entry such as "swamp"; while the biotype field would identify whether the swamp was found in a generally forested region, grassland, etc. Entries in the site field may be one or several words, such as "meadow with grass & other herbaceous plants & scattered shrubs". Terms include: BEACH (beach alongside saltwater; for fresh water use shore); BOG (has a floating mat of vegetation & is acidic, formed from shore going out, has a quaking mat before any open water, Ericaceae); BRACKISH MARSH (Needs a characterization); CAVE (Modifying terms are probably needed); CULTIVATED LAND (for areas with crops growing on them); DISTURBED AREA (modified by humans); FALLOW FIELD (crop growing area with crops not on it when insects collected); FELL (Rocky area with sparse or little vegetation); FOREST; GRASSLAND; MINE; PASTURE (Has grazing animals or evidence [cropped plants, droppings] of recent presence of such animals; forests if formerly present have been mostly cleared); SEDGE MEADOW (dominated by sedges that form hummocks); SEEP; SHORE (alongside a body of fresh or brackish water; if possible specify type of body of water by using a term from the wattype field of file habaqa [for example, "shore of lake"]); SHRUB CARR (wetland dominated by shrubs); and TUNDRA.

TOPOTYPE Optional Field for descriptions of the type of topography of the general site, with terms such as: FLAT with angle of approximately 10 degrees or less; MODSLOPE moderately sloped, with angle of approximately 11 to 30 degrees; STEEPSLOPE steeply sloped with angle of approximately 30 degrees or greater; FLOOD PLAIN; RAVINE modifiers include: BOTTOM for insects found in bottom HEADSECTION for head section of ravine; MIDSECTION for mid section of ravine; MOUTHSECTION for mouth section of ravine; SIDES for insects found on sides; ROLLING topography changes notably within site, with mixed flat to steep areas.

TOPODIRCT Optional Field for the direction of slope: EAST-FACING; NORTH-FACING; NORTHEAST-FACING; NORTHWEST-FACING; SOUTH-FACING; SOUTHEAST-FACING; SOUTHWEST-FACING; WESTFACING

HERBCOVER Recommended Field for percent estimated in most instances by simple inspection cover of ground by herbaceous plants with terms being: COMPLETE 90 to 100% covered; DENSE 50% to 90% covered; MODERATE approximately 25-50% covered; SPARSE under 25 %

LITCOV Recommended Field for places where cover from leaf litter should be described; terms, modifiers & definitions need to be written.

DISTURB Recommended Field for use in describing conditions in disturbed areas. Terms include: BURNT burned in past by fires set by humans or caused by nature; may refer to areas that are regularly burnt or those that have been burned only once in recent years; CLEARED normal vegetation removed by humans; CIJLFIELD cultivated field; DITCH drainage areas dug for keeping fields, roads, or other human modified areas dry; these ditches are usually maintained periodically to ensure proper water drainage; FLATROADSIDE portion of road or parking bed that has been graded flat & left to pioneer plants; FLOOD; LANDSLIDE; LEAF-PACKS; LOGGED; MOUNDROADSIDE soil pushed up by graders & left along road or parking lot as mound that is soon covered by pioneer vegetation; PASTURE made by humans as opposed to a naturally occurring meadow with grazing animals; PLANTS PIONEER grasses & annual herbaceous plants & perhaps small shrubs & seedlings; most plants are of species typically found in disturbed areas]; SECOND GROWTH small trees & shrubs & usually grasses & perennial herbaceous plants; CLIMAX refers to maturing stands of plants in areas that were disturbed long ago & are nearly back to having normal cover of climax plants; TREEFALL This term describes the creation of a clearing in a forest due to one or more trees falling. The falling trees may or may not drag down surrounding trees, & the sizes of the clearings may thus vary considerably.

SUBSTRATE Recommended Field for insects found on ground. For the terms listed the following modifiers may be used: ALONGSIDE; AMONG; IN; ON; UNDER. Note that terms & modifiers for insects found alongside free water are the same as those for aquatic insects with the addition of the term ALONGSIDE. [For example, an entry might read "on ground alongside rapid stream."]

BOULDER large rock, possibly requiring implement such as a crowbar to overturn; CLAY firm, fine-grained earth; COBBLE fist-sized, mostly rounded stones that can be easily overturned with one hand; GRAVEL loose mixture of pebbles & rock fragments, coarser than sand, often mixed with clay, etc.; HUMUS brown or black product from partial decay of leaves & other plant matter; LATERITE red, porous deposit with large amounts of aluminum & ferric hydroxides, formed by decomposition of certain rocks; LEAF MOLD rich soil consisting largely of decayed leaves; LEAF LITTER surface layer in which leaves are partially decomposed; LOAM rich soil composed of clay, sand & some organic mater; PEAT spongy like material composed of partially decomposed swamp plants; SAND loose, small, gritty particles of worn or disintegrated rock or coral; SILT earthy material composed of very fine particles, as soil or sand suspended in or deposited by water; STONE rock of relatively small size requiring two hands for overturning; WOOD LOG [tree trunk that has fallen to ground]; FUNGUSY [covered with fungus]; ON; IN; IN HEARTWOOD; IN SAPWOOD; PIECE [fragment of wood lying on ground]; UNDER

MOISTURE Recommended Field for insects found on ground, with terms including: DAMP soil feels wet when touched but is not saturated with water; DRY soil is thy to the touch; IMPERFECTLY DRAINED water from precipitation or from melting snow tends to pool in microhabitat, which might be a depressed area, microhabitat presently lacks free water; INTERMITTENT WATERWAY presently dry intermittent waterway; MOIST intermediate between thy & damp, soil has some moisture; SPLASH ZONE kept moist by spray but without water flowing over it; SATURATED soil saturated with water, but without free water on it; WELL-DRAINED water from precipitation or melting snow does not tend to pool; WATER [ALONGSIDE; NEAR; term water used for terrestrial insects near free water but not living in such water]

STRATA Optional Field to describe the vertical sequence of layers in which the insect was taken, with terms of: CANOPY associated with a tree crown in a forest; EPIGEAN found on surface of ground; may or may not be beneath objects such as rocks; ENDOGEAN within the ground, found in the soil; HYPOGEAN underground; SUPRA-EPIGEAN on grass, shrubs, logs & other objects.

Perhaps the next 4 fields should be combined as a single microhabitat field.

DROPPING Optional Field for certain insects, with terms such as: DUNG (BALL; BUFFALO; BURIED; CATTLE; DEER; DOG; DRY; FRESH [still moist, & not notably decomposed]; GUANO (BATS; BIRDS); HUMAN; IN; ON; ON GROUND; UNDER; as needed names of other animals may be listed).

CARRION Optional Field If possible give name of animal. Other terms & modifiers include: IN; ON; UNDER.

NEST Optional Field ANT; BEE; BIRD; MAMMAL; TERMITE; WASP; other animals as needed; (when possible, give species, genus, family & order of animal).

OTHER1 Recommended Field for miscellaneous terms not placed in other terrestrial fields. ALGAE FILAMENTOUS; FLOCCULENT; ANT CARRIED BY; COLUMN; ESCAPING FROM; FLYING ABOVE; RIDING ANTS; WALKING]; FUNGUS GARDEN; LEAP-CUT]ING; NEST;; BARK ALIVE; ON; LOG; SHRUB; SNAG standing dead tree; TREE; UNDER; HUMAN DEBRIS For human-produced trash such as pieces of plastic, mattresses, cans, etc.; NATURAL DEBRIS WOOD, DRIFTWOOD, BARK. etc. TERMITE take modifiers from ant term as needed; SPIDER WEB. Modifiers that may apply to all terms include: AMONG; IN; UNDER.

INSOLAT Optional Field for describing insolation of microhabitat, with terms such as: CLOSED (microhabitat is situated in an area that does not receive sunlight, such as in a dense forest); OPEN (microhabitat receives sun during all of day, lacks shade); PARTIALLY OPEN (microhabitat receives shade during part of day; for example from scattered trees).

NESTLOC Location of nest, number of cells or chambers, etc.

TRAP (Perhaps trap should be part of the method field).

Optional Field for the type of trap used. Terms & modifiers include: BAIT (CARRION; FERMENTING; FUNNEL; MALT; MEAT; MOLASSES; PHEROMONE; SUGAR); BLACKLIGHT; BLACKLIGHT & WHITE LIGHT; MALAISE; PAN; GROUND (any type of pit fall trap put into hole in ground or rested on top of ground with a ramp leading up to it); HEIGHT (followed by height above ground, expressed as a decimal & in meters, e.g. 1.2 m); INTERCEPT; MERCURY VAPOR; STICKY; SUCTION; WHITELIGHT (general term, more inclusive than mercury vapor & may include light such as that from lanterns); WINDOW; YELLOW PAN

METHOD Optional Field for the method (other than trap, which has its own field) used to collect the insect. ASPIRATED; BEATING; DVAC; FOGGING; FUNNEL (modifiers include: BERLESE; other words to be furnished by entomologists); HAND (picking up insect with hand); BLACKLIGHT; BLACKLIGHT & WHITE; MERCURY VAPOR; TOWN [Insects found at town or city lights that may be of various types as regards wavelengths]; WHITE [broad modifier that includes lights such as mercury vapor & lantern]; NET AERIAL; SWEEPING; RAKING; SIFTING; SOIL WASHING; SPLASHING; TREADING.

NOTES1 Optional Field for notes

NOTES2 Second Optional Field for notes.

NOTES3 Third Optional Field for notes.

Habitat, Aquatic File HABAQA

This file contains data about aquatic microhabitats.

SITENO Essential Field defined and used as noted under file sitebase.

HABNO	Essential Field that provides a unique habitat number for each habitat, with such number serving a pointer to related files.
MICRONO	Essential Field assigns a microhabitat number. The file **habaqa** is a child of the file **habgen** and will probably be related to it by the **habno** field, with the **microno** field providing a unique microhabitat number for later retrieval of the record.
WATTYPE	Essential Field to describe type of body of water in which insect found, with terms including: LAKE (A large body of water whose shores generally have relatively few plants due to the action of waves); FRESH WATER MARSH (characterized mainly by cattails & possibly sedges & other herbaceous plants); POND (A small & relatively quiet body of water with shores usually having a moderate to dense cover of plants & not being washed by waves). Modifiers include: TEMPORARY; & VERNAL.; POOL(A temporary body of water, smaller than a pond & having only those aquatic animals & plants that can complete their life cycles quickly or can disperse readily to other bodies of water); RIPARIAN (in or alongside stream, creek or other body of running water); RIFFLE; RIVER; SPRING; STREAM (The modifier of INTERMITENT may be used as needed); SWAMP (has trees in the wet areas); and WETLAND (General term for use when not certain if body of water is bog, marsh, etc).
WATMOD	Essential Field with modifiers for body of water, including: HYPORHEIC; LITTORAL; PROFUNDAL; NONVEGETATED; VEGETATED
WATPLANT	Essential Field for vegetation type: ALGAE; DECAYING; EMERGENT; FLOATING; MOSSES; SUBMERGED; ROOTS; WOOD
FLOW	Recommended Field for describing flow, with terms such as: CASCADING (steep gradient, water flow extremely rapid, all "white water", does not lose contact with substrate); RAPID (moderately steep, water moves swiftly, mix of "white water" & smooth surface); RIFFLE; RUN; SLOW (low gradient, slow movement, no "white water"); STANDING (no gradient, water not moving, typical of ponds & swamps, flooded meadows); WATERFALL (steep gradient with water losing contact with substrate)
WAVES	Optional Field used mostly for large bodies of water, such as lakes or oceans, where there is movement of water from action of the wind or tide, as contrasted to the current of a stream. We need additional modifying terms to describe speed & height of waves; possible terms & modifiers are LIGHT SURF; MODERATE SURF; HEAVY SURF (Definitions for these terms & modifiers are needed).
PH	Optional Field for Ph of water.
02	Optional Field for dissolved oxygen. Someone please tell me the best way of expressing this.
C02	Optional Field for dissolved carbon dioxide. Same request as for oxygen.
HARI	Optional Field for hardness expressed as parts per million.
WATAPP	Essential Field for appearance of water. Terms include: CLEAR & COLORLESS; CLEAR & COLORED; CLOUDY; MUDDY; POLLUTED
WATEMP1	Optional Field for temperature of water in C.
TEMPDEEP1	Optional Field for depth at which temperature ofWATEMP1 field measured mm or cm.
WATEMP2 WATEMP3 TEMPDEEP2 TEMPDEEP3	Additional optional fields for temperatures at various depths.

BOTTOM	Essential Field with terms such as: BEDROCK; BOULDERS; STONES; GRAVEL; PEBBLES; SAND; MUD; CLAY; DETRITUS
INSOLAT	Optional Field for describing insolation of microhabitat, with terms such as: CLOSED (microhabitat is situated in an area that does not receive sunlight, such as in a dense forest); OPEN (microhabitat receives sun during all of day, lacks shade); PARTIALLY OPEN (microhabitat receives shade during part of day; for example from scattered trees).
TRAP	We need feedback on what types of aquatic traps to include and on whether trap should be part of the method field. Traps outside of water for example, blacklights are handled under the terrestrial microhabitat since the insects, whether aquatic or terrestrial, are taken in terrestrial habitats.
METHOD	Optional Field for the method other than trap, (which has its own field) used to collect the insect. HAND (picking up insect with hand); KICK-NETTING; NET; SURBER SAMPLING.
NOTES1	Optional Field for notes
NOTES2	Second Optional Field for notes.
NOTES3	Third Optional Field for notes.

Sample (File SAMPLE)

SAMPLENO	This field will probably be formed by having the data base program combine elements from the Site Number field siteno, Habitat Number field habno, and Microhabitat Number field microno to generate a Sample Number for use in various file association schemes.
SITENO	Essential Field defined and used as noted under file sitebase.
HABNO	Essential Field that contains a unique habitat number that serves as a pointer to aquatic and/or terrestrial general habitat files so that desired records from these and the present file can be associated.
MICRONO	Essential Field contains a microhabitat number used in a microhabitat file for either aquatic or terrestrial habitats.The microhabitat number serves as a pointer to these files.
DATE1	Essential Field with date of visit to a site or beginning date of a trapping period.
DATE2	Date of trap pickup.
START	Optional Field for time at which collecting in site or in a particular habitat or microhabitat begins. Record, in military format, time when collecting on a given day starts, for example 0900 for 9 AM & 1300 for 1 PM.
STOP	Optional Field for time at which collecting stops.
ELAPSED	Optional Field for time spent collecting; data base can calculate.
DIEL	Optional Field for the diel period. DAWN; DAY; DUSK; NIGHT
SKY	Optional Field for appearance of sky, with terms and modifiers of: SKY CLEAR; FOG/HAZE; CLOUD COVER {give %}; SUN [BRIGHT; HAZY]
PRECIPTY	Optional Field for type of precipitation: NONE precipitation absent; RAIN; SLEET; SNOW.
PRECSTRE	Optional Field for modifiers of precipitation: LIGHT; MODERATE; HEAVY.
WINDDIR	Optional Field for direction from which wind is blowing: EASTERLY; NORTHERLY; SOUTHERLY; WESTERLY

WFORCE Optional Field for force of wind: NIL; LIGHT; MODERATE; STRONG; VIOLENT

ASSOCNO Optional Field for association number, to permit associating insects such as parasite and host, provides pointers to associations file.

COLLRS Essential Field giving names of collectors, in format of first and second initial and last name. Example G. R. Noonan; T. A. Smith. Use of semicolon to separate collector names permits data base to parse out individual collectors if desired.

Activity (File ACTIVITY)

This file contains records describing what insects were doing before their capture. It might be merged with the associations file.

SITENO Essential Field defined and used as noted under file sitebase.

SAMPLENO This field provides pointers back to the sample file to allow searches of other files. See explanation of field under file sample.

ACTNO Essential Field that contains an activity number that is placed on specimen labels to identify the insect or insects in question. One or more fields to describe what an insect or group of insects were doing before capture. Possible terms are numerous & include: COPULATING; CORPSE dead when collected; COURTING; EATING list food if known; EXCAVATING; HUNTING; FLYING; NESTING; PROVISIONING; RESTING; RUNNING moving relatively fast; SITTING; SUNNING; SWARMING; WALKING.

Lots (File LOT)

Information in this file connects names with ecological and geographical data and with tapes or photos of insects.

SITENO Essential Field defined and used as noted under file sitebase.

SAMPLENO Essential Field with a sample number in it.

For the taxonomic fields below put data into the lowest taxonomic rank possible and note that species have data in both species and genus fields. The nomenclature table will allow users to access other associated categories, such as the families or kingdoms of genera.

FAMILY
TRIBE (specify family when not giving information below tribal level)
GENUS
SUBGENUS
SPECIES

CASTE (We need more input about this field and about whether it should include morphological classes of non-social insects, such as "major male" or "minor male").

Optional Field. Terms are: ADULTOID REPRODUCTIVE; DICHTHADIIFORM ERGATOGYNE; DRONE; ERGATOID REPRODUCTIVE; ERGATOMORPHIC MALE; ERGATOGYNE; LARVA, MALE; NYMPH NYMPHOID REPRODUCTWE; PRIMARY REPRODUCTIVE; QUEEN; PSEUDERGATE; REPLACEMENT REPRODUCTIVE; SUPPLEMENTARY REPRODUCTIVE; SOLDIER; WORKER

TAPE Optional Field for entry identifying the tape number on which data or recordings of vocalizations are recorded.

PHOTO Optional Field for entry identifying the photos taken of specimens or of a habitat or microhabitat.

NOTES1 Optional Field for notes

NOTES2 Second Optional Field for notes.

NOTES3 Third Optional Field for notes.

Associations (File for Associations)

A file will contain information on associations, including insect-plant, and is described elsewhere in this document.