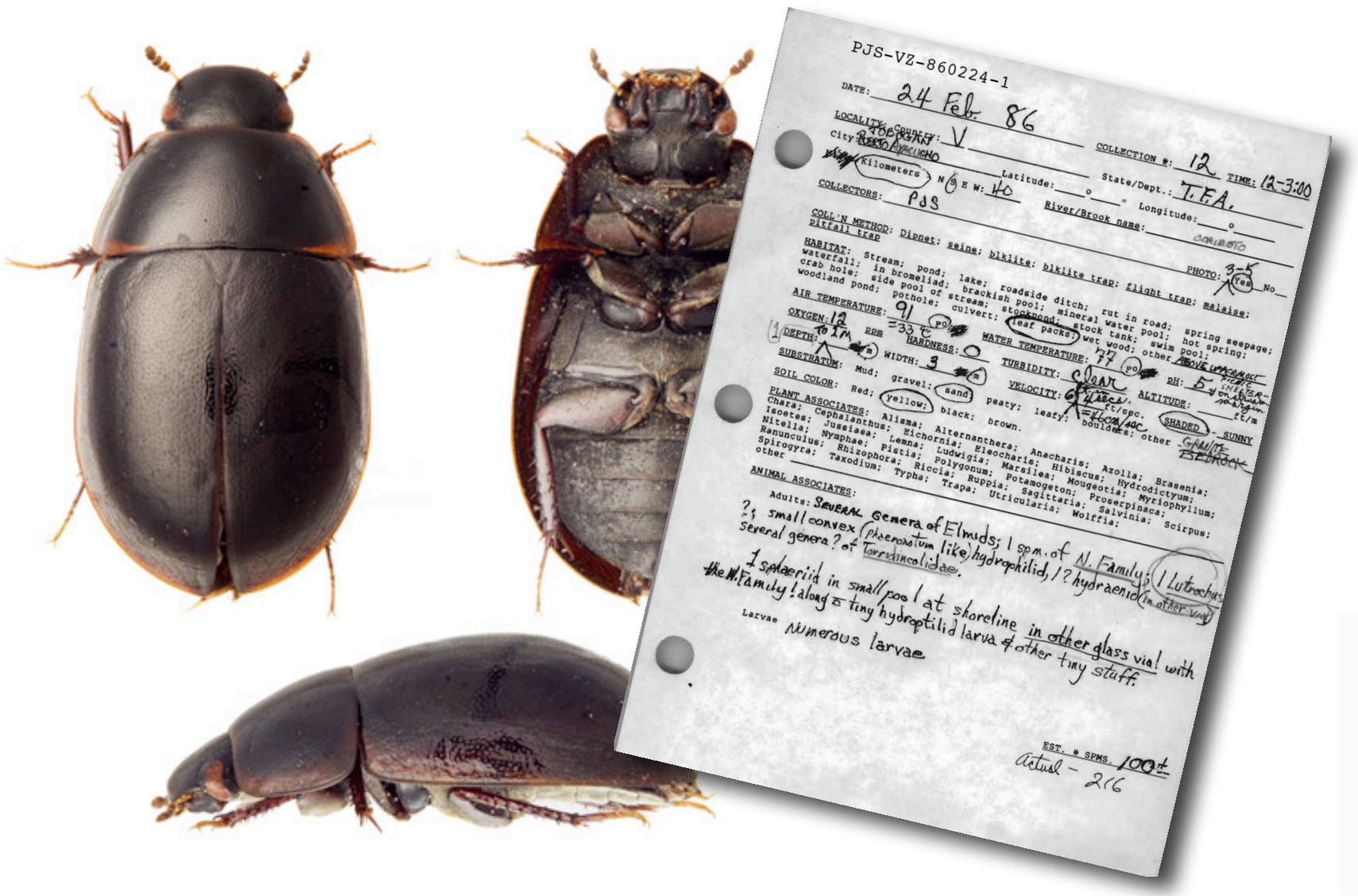
Viewing specimen data through the prism of collecting events

Benefits of "*Collecting Event Firs*t" Databasing Approaches



Andrew Short

KU BIODIVERSITY INSTITUTE
The University of Kansas

What is a Collecting Event?

A unique combination of collection data

Example: Locality+Date+Habitat+Method

What is a Collecting Event?

A unique combination of collection data

Example: Locality+Date+Habitat+Method

What is a Collecting Event?

A unique combination of collection data

Example: Locality+Date+Habitat+Method

COSTA RICA: Cartago Prov. Tapanti National Park, Rio Orosi, kicknetting, leg. A. Short [Some GPS, etc.], 12.v.2009
CR09-0512-03A

Approaches

Specimen Based: Data attached to Specimens

vs.

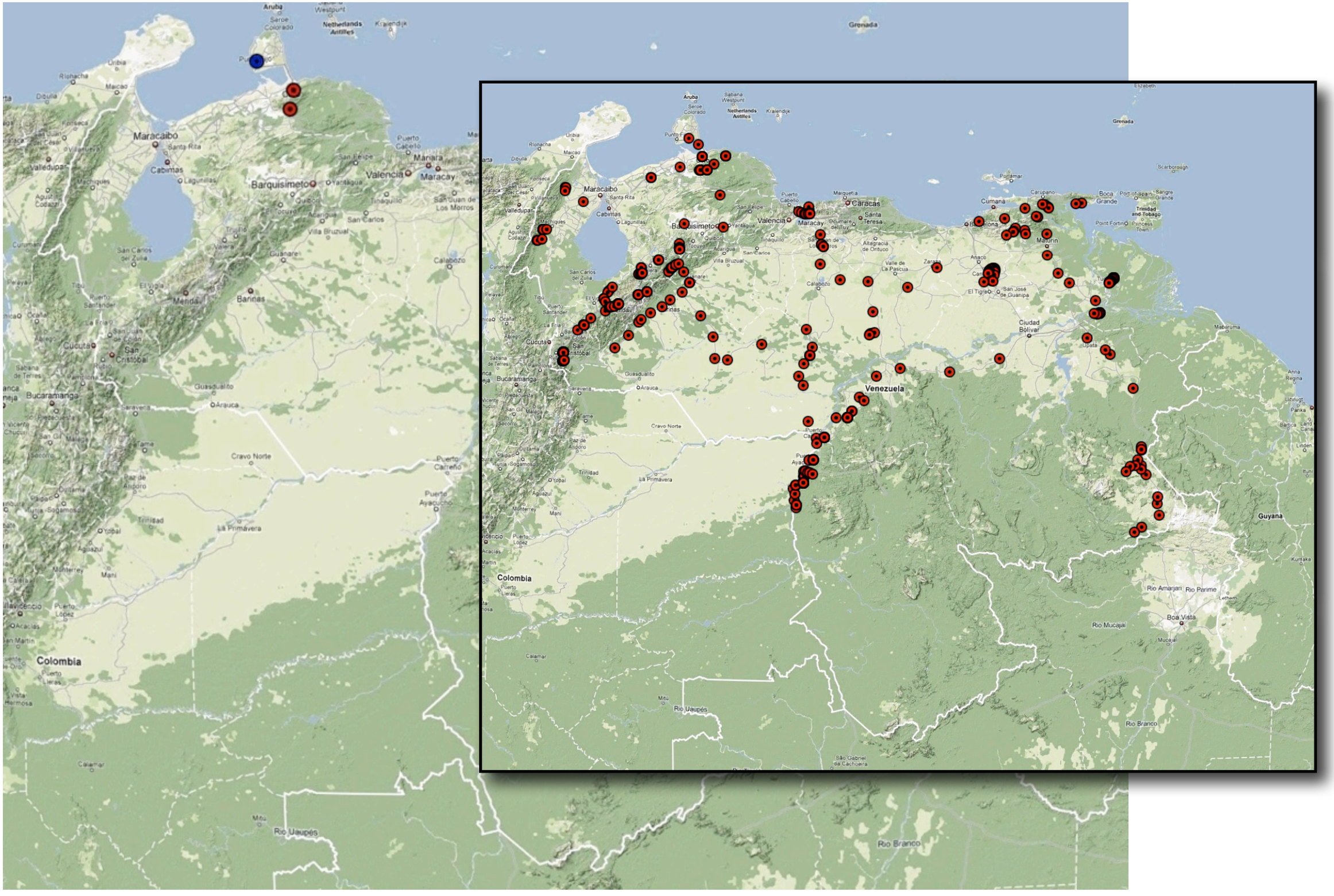
Event Based: Specimens attached to Data

Specimens vs Events

Specimen-based approach: This event **never happened!**

Tropisternus lateralis

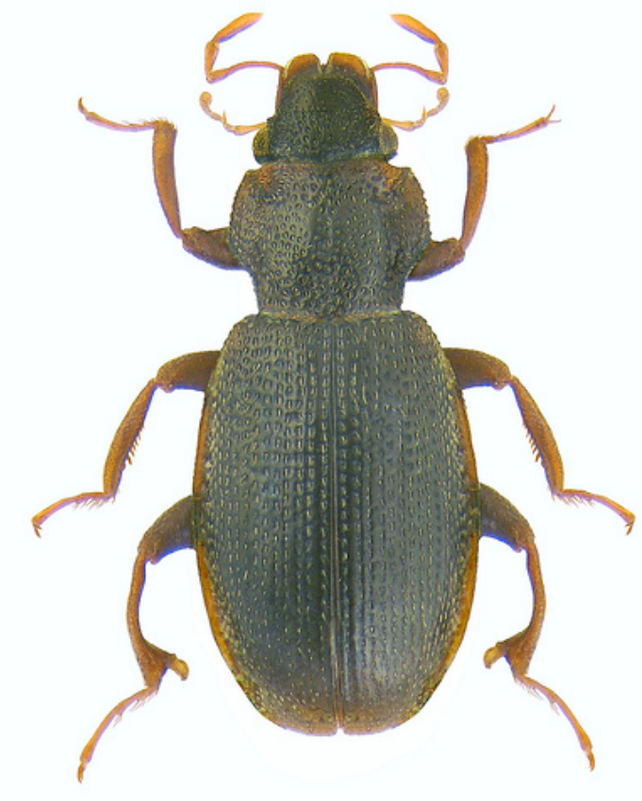
Tropisternus lateralis



Example:

Smithsonian Aquatic Beetle Collection

c. 1.5 million specimens



Starting Point: Specimen Based Approach

Starting Point: Event Based Approach

Field notes for ca. 40 expeditions [1952-1995]

Step 1: Scan Notes

PJS-VZ-860224-1

DATE: 24 Feb. 86 COLLECTION #: 12 TIME: 12-3:00

LOCALITY: Country: V State/Dept.: T.F.A.

City: TOBOGAN PUERTO AYACUCHO Latitude: ____° ____" Longitude: ____° ____

(Kilometers) N (S) E W: 40 River/Brook name: CORIMOTO

COLLECTORS: PJS PHOTO: 3-5 (Yes) No

COLL'N METHOD: Dipnet; seine; blklite; blklite trap; flight trap; malaise; pitfall trap

HABITAT: Stream; pond; lake; roadside ditch; rut in road; spring seepage; waterfall; in bromeliad; brackish pool; mineral water pool; hot spring; crab hole; side pool of stream; stockpond; stock tank; swim pool; woodland pond; pothole; culvert; (leaf packs;) wet wood; other ABOVE UPPERMOST PICNIC SHELTER- on stream margin

AIR TEMPERATURE: 91 (F°) =33 C WATER TEMPERATURE: 77 (F°) pH: 5

OXYGEN: 12 ppm HARDNESS: 0 TURBIDITY: clear ALTITUDE: ____ft/m

(1) DEPTH: to 1m m WIDTH: 3 m VELOCITY: 6 4secs. ft/sec. =46cm/sec (SHADED) - SUNNY

SUBSTRATUM: Mud; gravel; (sand;) peaty; leafy; boulders; other - GRANITE BEDROCK

SOIL COLOR: Red; (yellow;) black; brown.

PLANT ASSOCIATES: Alisma; Alternanthera; Anacharis; Azolla; Brasenia; Chara; Cephalanthus; Eichornia; Eleocharis; Hibiscus; Hydrodictyum; Isoetes; Jussiaea; Lemna; Ludwigia; Marsilea; Mougeotia; Myriophyllum; Nitella; Nymphae; Pistia; Polygonum; Potamogeton; Proserpinaca; Ranunculus; Rhizophora; Riccia; Ruppia; Sagittaria; Salvinia; Scirpus; Spirogyra; Taxodium; Typha; Trapa; Utricularia; Wolffia;
other ____

ANIMAL ASSOCIATES:

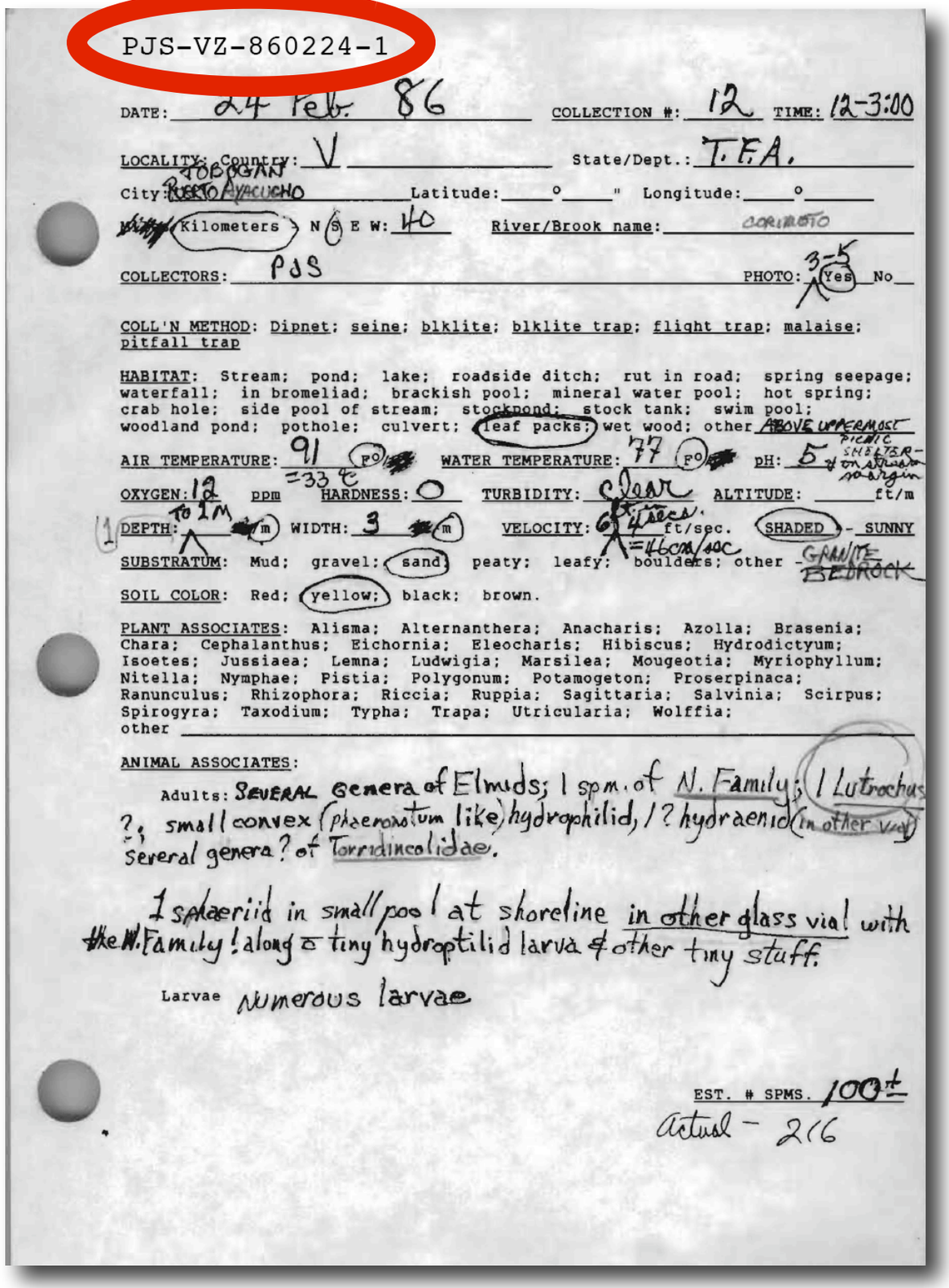
Adults: SEVERAL Genera of Elmids; 1 spm. of N. Family; 1 Lutrochus ?; small convex (phaenonotum like) hydrophilid, 1? hydraenid (in other vial) several genera? of Torridincolidae.

1 scirtid in small pool at shoreline in other glass vial with the N. Family along = tiny hydroptilid larva & other tiny stuff.

Larvae numerous larvae

EST. # SPMS. 100+
Actual - 216

Step 2: Assign & Stamp Coll Event #s



PJS-VZ-860224-1

DATE: 24 Feb. 86 COLLECTION #: 12 TIME: 12-3:00

LOCALITY: Country: V State/Dept.: T.F.A.

City: TOBOGAN PUERTO AYACUCHO Latitude: ° " Longitude: °

Kilometers N S E W: 40 River/Brook name: CORIMOTO

COLLECTORS: PJS PHOTO: 3-5 Yes No

COLL'N METHOD: Dipnet; seine; blklite; blklite trap; flight trap; malaise; pitfall trap

HABITAT: Stream; pond; lake; roadside ditch; rut in road; spring seepage; waterfall; in bromeliad; brackish pool; mineral water pool; hot spring; crab hole; side pool of stream; stockpond; stock tank; swim pool; woodland pond; pothole; culvert; leaf packs; wet wood; other ABOVE UPPERMOST PICNIC SHELTER-on stream margin

AIR TEMPERATURE: 91 F° =33 C WATER TEMPERATURE: 77 F° pH: 5

OXYGEN: 12 ppm HARDNESS: 0 TURBIDITY: clear ALTITUDE: ft/m

1 DEPTH: to 1m m WIDTH: 3 m VELOCITY: 6 4secs. ft/sec. =46cm/sec SHADED - SUNNY

SUBSTRATUM: Mud; gravel; sand; peaty; leafy; boulders; other - GRANITE BEDROCK

SOIL COLOR: Red; yellow; black; brown.

PLANT ASSOCIATES: Alisma; Alternanthera; Anacharis; Azolla; Brasenia; Chara; Cephalanthus; Eichornia; Eleocharis; Hibiscus; Hydrodictyum; Isoetes; Jussiaea; Lemna; Ludwigia; Marsilea; Mougeotia; Myriophyllum; Nitella; Nymphae; Pistia; Polygonum; Potamogeton; Proserpinaca; Ranunculus; Rhizophora; Riccia; Ruppia; Sagittaria; Salvinia; Scirpus; Spirogyra; Taxodium; Typha; Trapa; Utricularia; Wolffia;
other

ANIMAL ASSOCIATES:

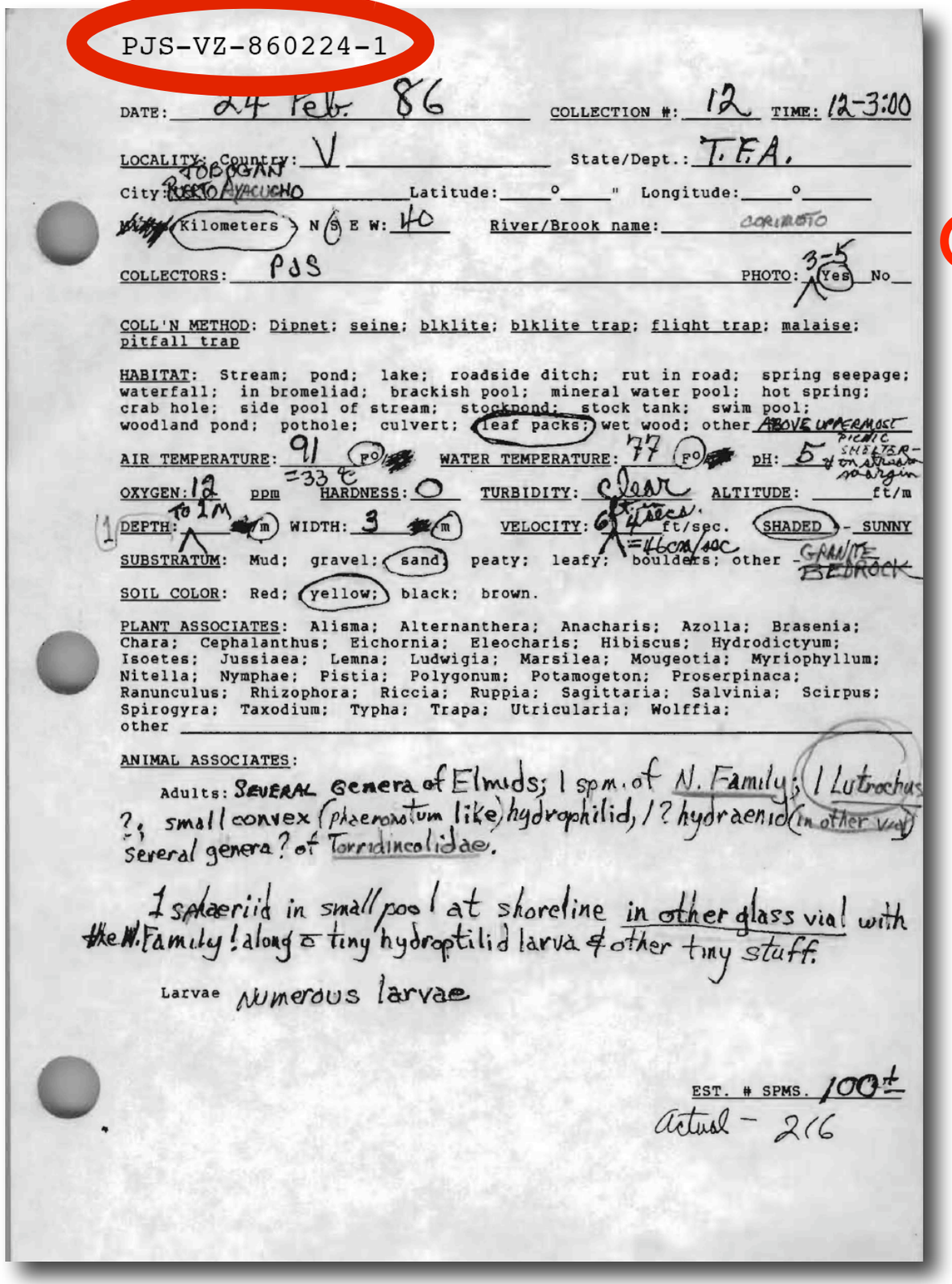
Adults: SEVERAL Genera of Elmids; 1 spm. of N. Family; 1 Lutrochus ?; small convex (phaenonotum like) hydrophilid, 1? hydraenid (in other vial) several genera? of Torridincolidae.

1 scirtid in small pool at shoreline in other glass vial with the N. Family along = tiny hydroptilid larva & other tiny stuff.

Larvae numerous larvae

EST. # SPMS. 100+
Actual - 216

Step 2: Assign & Stamp Coll Event #s



PJS-VZ-860224-1

DATE: 24 Feb. 86 COLLECTION #: 12 TIME: 12-3:00

LOCALITY: Country: V State/Dept.: T.F.A.

City: TOBOGAN PUERTO AYACUCHO Latitude: ° " Longitude: °

Kilometers N S E W: 40 River/Brook name: CORIMOTO

COLLECTORS: PJS PHOTO: 3-5 Yes No

COLL'N METHOD: Dipnet; seine; blklite; blklite trap; flight trap; malaise; pitfall trap

HABITAT: Stream; pond; lake; roadside ditch; rut in road; spring seepage; waterfall; in bromeliad; brackish pool; mineral water pool; hot spring; crab hole; side pool of stream; stockpond; stock tank; swim pool; woodland pond; pothole; culvert; leaf packs; wet wood; other ABOVE UPPERMOST PICNIC SHELTER-on stream margin

AIR TEMPERATURE: 91 F° =33 C WATER TEMPERATURE: 77 F° pH: 5

OXYGEN: 12 ppm HARDNESS: 0 TURBIDITY: clear ALTITUDE: ft/m

1 DEPTH: to 1m m WIDTH: 3 m VELOCITY: 6 secs. ft/sec. =46cm/10c SHADED - SUNNY

SUBSTRATUM: Mud; gravel; sand; peaty; leafy; boulders; other - GRANITE BEDROCK

SOIL COLOR: Red; yellow; black; brown.

PLANT ASSOCIATES: Alisma; Alternanthera; Anacharis; Azolla; Brasenia; Chara; Cephalanthus; Eichornia; Eleocharis; Hibiscus; Hydrodictyum; Isoetes; Jussiaea; Lemna; Ludwigia; Marsilea; Mougeotia; Myriophyllum; Nitella; Nymphae; Pistia; Polygonum; Potamogeton; Proserpinaca; Ranunculus; Rhizophora; Riccia; Ruppia; Sagittaria; Salvinia; Scirpus; Spirogyra; Taxodium; Typha; Trapa; Utricularia; Wolffia; other

ANIMAL ASSOCIATES:

Adults: SEVERAL Genera of Elmids; 1 spm. of N. Family; 1 Lutrochus ?; small convex (phaenonotum like) hydrophilid, 1? hydraenid (in other vial) several genera? of Torridincolidae.

1 scirtid in small pool at shoreline in other glass vial with the N. Family along = tiny hydroptilid larva & other tiny stuff.

Larvae numerous larvae

EST. # SPMS. 100± Actual - 216

Collector Date

PJS-VZ-860224-1

Country Event

PJS-KE-680204-4 1968 — 36th day, 330 days to come

KENYA
Nyeri
II-4-68
Blacklite
Kranbeint
Spangler

pinned:
Trichops - 19
Hymenops - 1
Coleop - 4
Lepa - 13
37

Alcohol
Coleop - 58

PJS-KE-680204-5

KENYA, - Aquatics - stream
Nyeri
II-4-68, stream
P.J.S.

Approx. - 125

PJS-KE-680204-6

KENYA, 10Mi. N. - Hemipa - 13
Thika, II-4-68 Coleop - 2
P.J. Spangler
15

PJS-KE-680205-1 — 37th day, 329 days to come — NANYUKI

1968

Coordinates: 1°20'00" N 36°41'00" E

17 Dec 99

KENYA
17Mi. S.
Nanyuki
II-5-68
P.J.S.

Roadside pond

Sperchens & eggs, Helochares & eggs,
Enochrus, Copelatus, Rhantus
Ochthebius, Laccophilus, Bidessus
Hygrotus, Regimbartia, Coripids
Notonectids, Laccotrephes.

PJS-KE-680205-2

KENYA
10Mi. S.
Nanyuki
II-5-68
P.J.S.

Burguret River - Rhantus
Bidessus, Enochrus, Helochares
Ochthebius, Elmids, Bembideon
+ Clovinia

PJS-KE-680205-3

KENYA
10Mi. S.
Nanyuki
II-5-68
P.J.S.

Roadside seepage area
4000

PJS-KE-680205-4

KENYA
17Mi. S.
Nanyuki
II-5-68
KVK

Hymenop - 10 (4 pinned)
Dip - 8
Hemip - 9
Coleop 11
38

PJS-KE-680205-5

KENYA
10Mi. S.
Nanyuki

Odonata - 7
Hymenop. 21
Hemip 4
Dip 6

M+A-1

PJS-KE-680204-4 1968

36th day 330 days to come

KENYA, Nyeri, II-4-68, Blacklite, Krombein & Spangler

pinned: Trichops - 19, Hymenops - 1, Coleop - 4, Leps - 13; 37

Alcohol: Coleop - 58

PJS-KE-680204-5

KENYA, Nyeri, II-4-68, stream, P.J.S. - Aquatics - stream, Approx. - 125

PJS-KE-680204-6

KENYA, 10 Mi. N. Thika, II-4-68, P.J. Spangler - Hemips - 13, Coleop - 2; 15

PJS-KE-680205-1

to Nairobi

1968

37th day 329 days to come

NANYUKI

Coordinates: 1°20'00"N 36°41'00"E PJS 9 Dec 99

50 ft

KENYA, 17 Mi. S. Nanyuki, II-5-68, P.J.S.

Roadside pool

Sperchius & eggs, Helochares & eggs, Enochrus, Copelatus, Rhantus, Ochthebius, Laccophilus, Bidessus, Hygrotus, Regimbartia, Corixids, Notonectids, Laccotrephes.

PJS-KE-680205-2

KENYA, 10 Mi. S. Nanyuki, II-5-68, P.J.S.

Burguret River - Rhantus, Bidessus, Enochrus, Helochares, Ochthebius, Elmids, Bembidion

PJS-KE-680205-3

Clovenia

KENYA, 10 Mi. S. Nanyuki, II-5-68, P.J.S.

2000

Roadside seepage area

PJS-KE-680205-4

KENYA, 17 Mi. S. Nanyuki, II-5-68

Hymenops - 10 (4 pinned), Dip - 8, Hemip - 9, Coleop - 11; 38

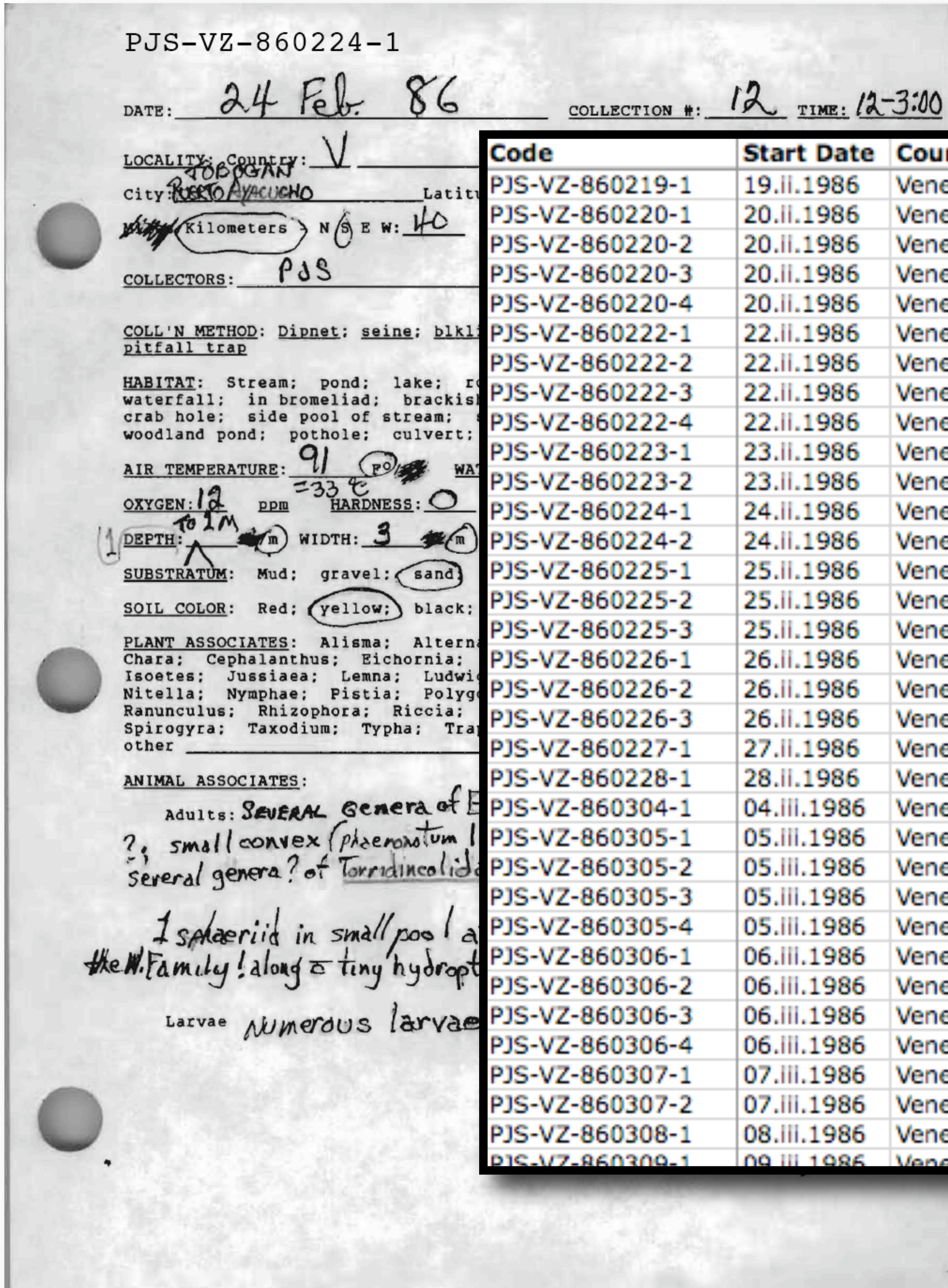
PJS-KE-680205-5

KENYA, 10 Mi. S. Nanyuki

Odonata - 7, Hymenops - 21, Hemip - 4, Dip - 2

M+A - 1

Step 3: Digitize Data + QC


PJS-VZ-860224-1

DATE: 24 Feb. 86 COLLECTION #: 12 TIME: 12-3:00

LOCALITY: Country: V
TOBOGAN
City: PUERTO AYACUCHO Latitu
Kilometers N S E W: 40

COLLECTORS: PJS

COLL'N METHOD: Dipnet; seine; blkli
pitfall trap

HABITAT: Stream; pond; lake; r
waterfall; in bromeliad; brackis
crab hole; side pool of stream;
woodland pond; pothole; culvert;

AIR TEMPERATURE: 91 =33 °C WAT

OXYGEN: 12 ppm HARDNESS: 0

DEPTH: to 1 M (m) WIDTH: 3 (m)

SUBSTRATUM: Mud; gravel; sand

SOIL COLOR: Red; yellow; black;

PLANT ASSOCIATES: Alisma; Altern
Chara; Cephalanthus; Eichornia;
Isoetes; Jussiaea; Lemna; Ludwi
Nitella; Nymphae; Pistia; Polyg
Ranunculus; Rhizophora; Riccia;
Spirogyra; Taxodium; Typha; Tra
other

ANIMAL ASSOCIATES:

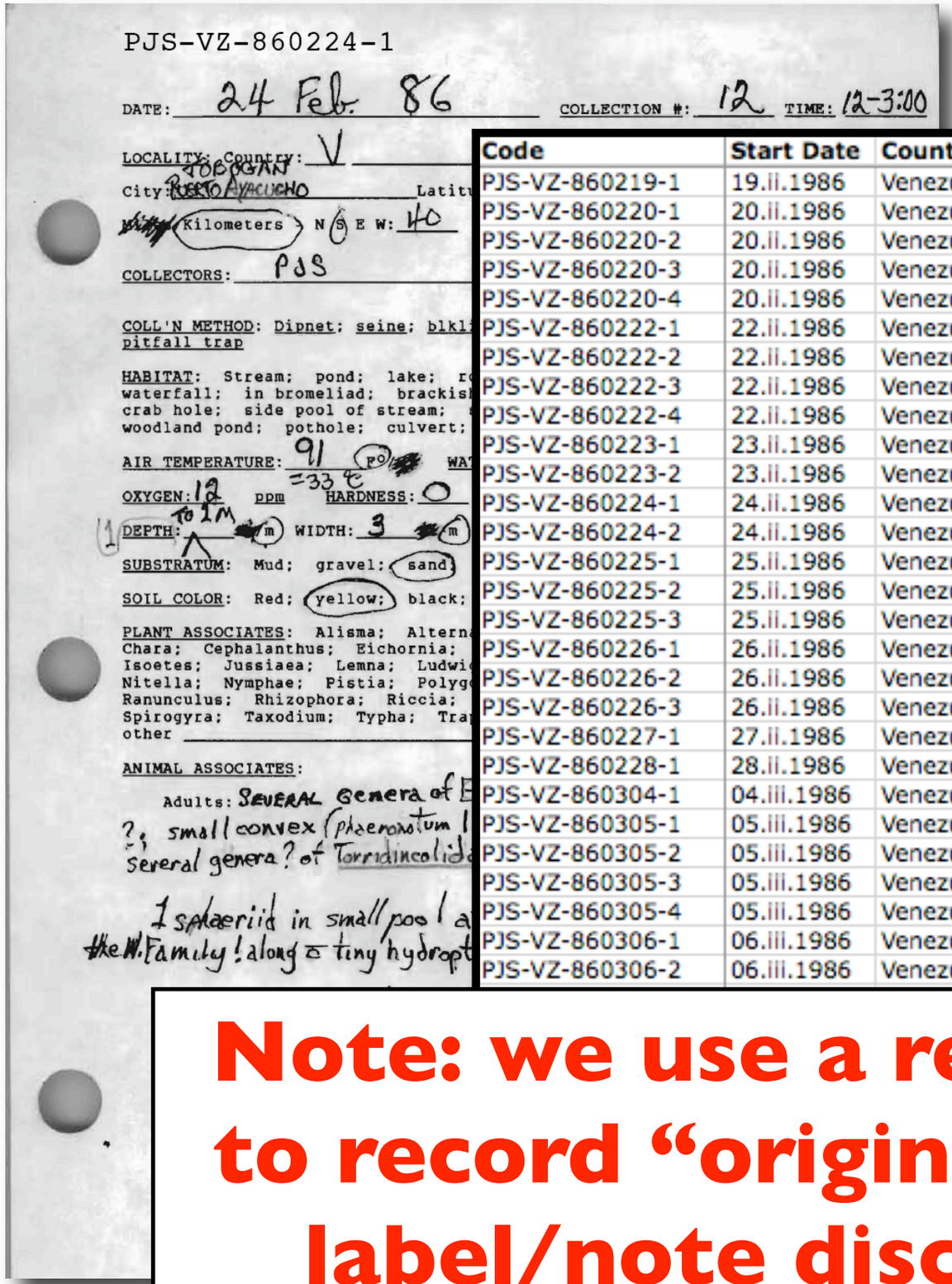
Adults: SEVERAL Genera of
?, small convex (phaeronotum
several genera? of Torridincolid

1 sphaeriid in small pool
the W. Family along a tiny hydrop

Larvae Numerous larvae

Code	Start Date	Country	State	City/ Locality String
PJS-VZ-860219-1	19.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860220-1	20.ii.1986	Venezuela	Amazonas	Gavilan, 37 km SE of
PJS-VZ-860220-2	20.ii.1986	Venezuela	Amazonas	Gavilan, 35 km SE of
PJS-VZ-860220-3	20.ii.1986	Venezuela	Amazonas	15 km S of Puerto Aya
PJS-VZ-860220-4	20.ii.1986	Venezuela	Amazonas	29 km S of Puerto Aya
PJS-VZ-860222-1	22.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860222-2	22.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860222-3	22.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860222-4	22.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860223-1	23.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860223-2	23.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860224-1	24.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860224-2	24.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860225-1	25.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860225-2	25.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860225-3	25.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860226-1	26.ii.1986	Venezuela	Amazonas	29 km S of Puerto Aya
PJS-VZ-860226-2	26.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860226-3	26.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860227-1	27.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860228-1	28.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860304-1	04.iii.1986	Venezuela	Guarico	Hato Masaguaral, 44
PJS-VZ-860305-1	05.iii.1986	Venezuela	Guarico	Hato Masaguaral, 44
PJS-VZ-860305-2	05.iii.1986	Venezuela	Guarico	Hato Masaguaral, 40
PJS-VZ-860305-3	05.iii.1986	Venezuela	Guarico	Hato Masaguaral, 44
PJS-VZ-860305-4	05.iii.1986	Venezuela	Guarico	Hato Masaguaral
PJS-VZ-860306-1	06.iii.1986	Venezuela	Guarico	Hato Masaguaral, 44
PJS-VZ-860306-2	06.iii.1986	Venezuela	Guarico	Hato Masaguaral, 44
PJS-VZ-860306-3	06.iii.1986	Venezuela	Guarico	Hato Masaguaral
PJS-VZ-860306-4	06.iii.1986	Venezuela	Guarico	Hato Masaguaral, 44
PJS-VZ-860307-1	07.iii.1986	Venezuela	Guarico	Hato Masaguaral
PJS-VZ-860307-2	07.iii.1986	Venezuela	Guarico	Hato Masaguaral
PJS-VZ-860308-1	08.iii.1986	Venezuela	Guarico	16 km S of Calabozo
PJS-VZ-860309-1	09.iii.1986	Venezuela	Guarico	16 km S of Calabozo

Step 3: Digitize Data + QC


PJS-VZ-860224-1

DATE: 24 Feb. 86 COLLECTION #: 12 TIME: 12-3:00

LOCALITY: Country: V

City: TOBOGAN PUERTO AYACUCHO Latitu

Kilometers N S E W: 40

COLLECTORS: PJS

COLL'N METHOD: Dipnet; seine; blkli
pitfall trap

HABITAT: Stream; pond; lake; r
waterfall; in bromeliad; brackis
crab hole; side pool of stream;
woodland pond; pothole; culvert;

AIR TEMPERATURE: 91 F° =33 C WA

OXYGEN: 12 ppm HARDNESS: 0

DEPTH: to 1m m WIDTH: 3 m

SUBSTRATUM: Mud; gravel; sand;

SOIL COLOR: Red; yellow; black;

PLANT ASSOCIATES: Alisma; Alterna
Chara; Cephalanthus; Eichornia;
Isoetes; Jussiaea; Lemna; Ludwi
Nitella; Nymphae; Pistia; Polyg
Ranunculus; Rhizophora; Riccia;
Spirogyra; Taxodium; Typha; Tra
other

ANIMAL ASSOCIATES:

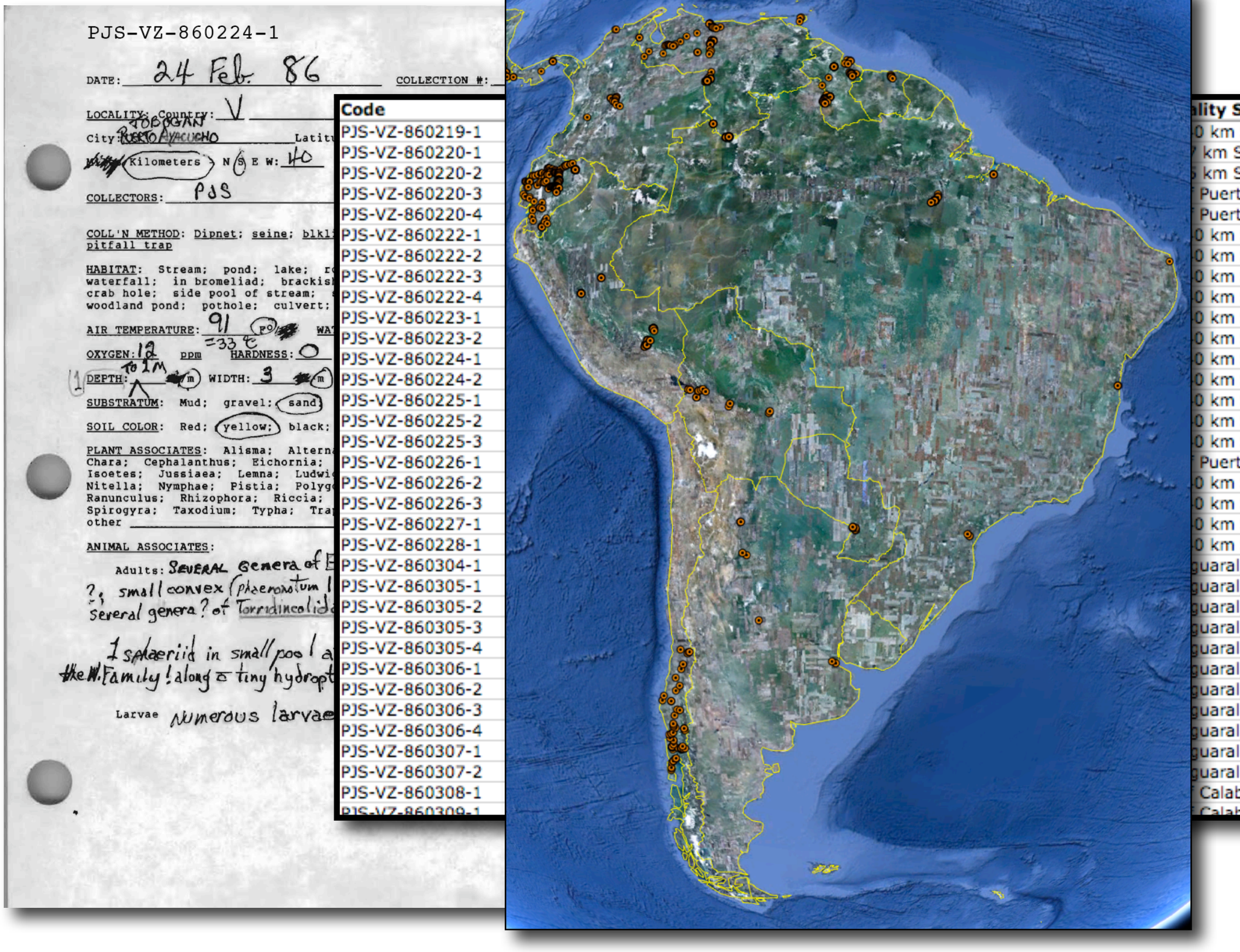
Adults: SEVERAL Genera of E
?, small convex (phaeonotum
several genera? of Torridincolid

1 Sphaeriid in small pool a
the N. Family! along a tiny hydrop

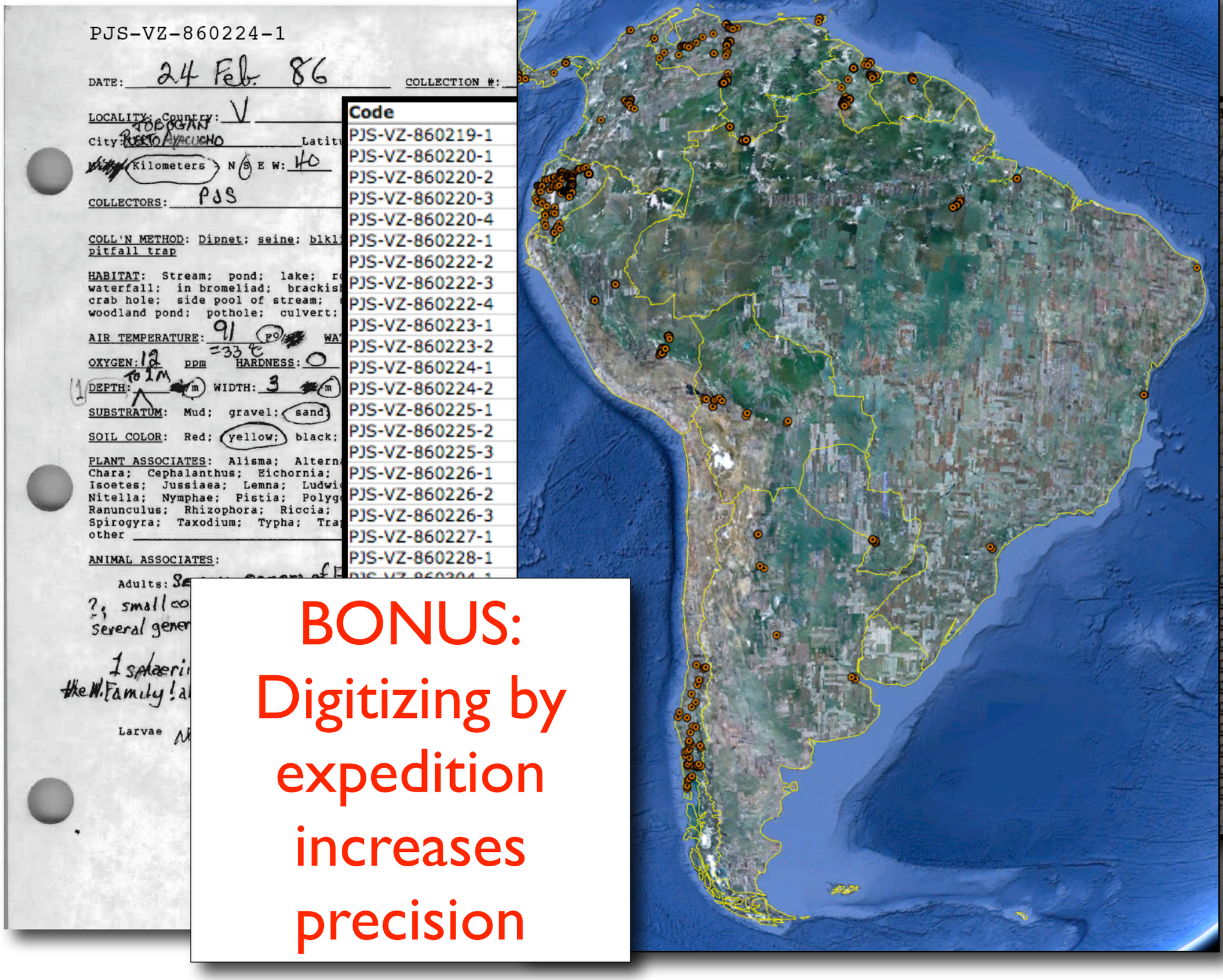
Code	Start Date	Country	State	City/ Locality String
PJS-VZ-860219-1	19.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860220-1	20.ii.1986	Venezuela	Amazonas	Gavilan, 37 km SE of
PJS-VZ-860220-2	20.ii.1986	Venezuela	Amazonas	Gavilan, 35 km SE of
PJS-VZ-860220-3	20.ii.1986	Venezuela	Amazonas	15 km S of Puerto Aya
PJS-VZ-860220-4	20.ii.1986	Venezuela	Amazonas	29 km S of Puerto Aya
PJS-VZ-860222-1	22.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860222-2	22.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860222-3	22.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860222-4	22.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860223-1	23.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860223-2	23.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860224-1	24.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860224-2	24.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860225-1	25.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860225-2	25.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860225-3	25.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860226-1	26.ii.1986	Venezuela	Amazonas	29 km S of Puerto Aya
PJS-VZ-860226-2	26.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860226-3	26.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860227-1	27.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860228-1	28.ii.1986	Venezuela	Amazonas	Tobogan, 40 km S of
PJS-VZ-860304-1	04.iii.1986	Venezuela	Guarico	Hato Masaguaral, 44
PJS-VZ-860305-1	05.iii.1986	Venezuela	Guarico	Hato Masaguaral, 44
PJS-VZ-860305-2	05.iii.1986	Venezuela	Guarico	Hato Masaguaral, 40
PJS-VZ-860305-3	05.iii.1986	Venezuela	Guarico	Hato Masaguaral, 44
PJS-VZ-860305-4	05.iii.1986	Venezuela	Guarico	Hato Masaguaral
PJS-VZ-860306-1	06.iii.1986	Venezuela	Guarico	Hato Masaguaral, 44
PJS-VZ-860306-2	06.iii.1986	Venezuela	Guarico	Hato Masaguaral, 44
				Hato Masaguaral
				Hato Masaguaral, 44
				Hato Masaguaral
				Hato Masaguaral
				16 km S of Calabozo

Note: we use a remarks field to record “original errors” & label/note discrepancies

Step 4: Georeference as necessary



Step 4: Georeference as necessary



BONUS:
Digitizing by expedition increases precision

PJS-KE-680204-4 1968 36th day 330 days to come

KENYA Nyeri II-4-68 Blacklite Krombein+ Spangler — pinned — Trichops - 19, Hymenops - 1, Coleop - 4, Leps - 13 = 37 — Alcohol Coleop - 58

PJS-KE-680204-5

KENYA, Nyeri II-4-68, stream P.J.S. — Aquatics - stream Approx. - 125

PJS-KE-680204-6

KENYA, 10 Mi. N. Thika, II-4-68 P.J. Spangler — Hemips - 13, Coleop - 2 = 15

PJS-KE-680205-1 to Nairobi 1968 37th day 329 days to come NANYUKI

Coordinates: 1°20'00"N 36°41'00"E PJS 21 Dec 99

KENYA, 17 Mi. S. Nanyuki II-5-68 P.J.S. — Roadside pool 5000' — Sperchens c eggs, Helochares c eggs, Enochrus, Copelatus, Rhantus, Ochthebius, Laccophilus, Bidessus, Hygrotus, Regimbartia, Corixids, Notonectids, Laccotrephes.

PJS-KE-680205-2

KENYA 10 Mi. S. Nanyuki II-5-68 P.J.S. — Burguret River - Rhantus, Bidessus, Enochrus, Helochares, Ochthebius, Elmids, Bembideon

PJS-KE-680205-3

Clovenia

KENYA 10 Mi. S. Nanyuki II-5-68 P.J.S. — Roadside seepage area 7000

PJS-KE-680205-4

KENYA 17 Mi. S. Nanyuki II-5-68 — Hymenops - 10 (4 pinned), Dip - 8, Hemip - 9, Coleop - 11 = 38

PJS-KE-680205-5

KENYA 10 Mi. S. Nanyuki — Odonata - 7, Hymenops - 21, Hemip - 4, Dip - 2 — m+a - 1

SPANGLER LEGACY PROJECT
P. J. SPANGLER FIELD NOTE SCANS

The attached PDF is a scan of original field documentation for collections of insects made by Paul and Phyllis Spangler, past curator of Coleoptera at the US National Museum of Natural History, Smithsonian Institution, or their associates.

Scanning procedures
Grayscale scans of the original field notes and logs were made at resolutions of 300, or more frequently, 600 DPI. The reverse sides of all field notebook pages were scanned regardless of whether they were used or blank (often, an approximate list of specimens was written on the backs of the pages once the sample was sorted). Loose pieces of paper and other inserted notes (if present) were scanned and placed as front matter in each expedition PDF. Original scans have been archived; this PDF has been optimized to reduce file size.

Collecting Event Codes
Each identifiable, discrete collecting event has been assigned a unique identifier to facilitate cross-referencing and databasing efforts. This code has been stamped in the upper left of each field note page (front and back). These codes are standardized by incorporating the country abbreviation and the date of collection. If more than one event occurred on the same day, these are numbered sequentially (in chronological order if that order is evident). For example, the third discrete collection event for 17 June 1967 in Costa Rica would be automatically formulated as PJS-CR-670617-3. Please note that separate collecting events do not signify different localities, but a unique combination of data as decided by the Spanglers at the time.

Accuracy
These notes were scanned as they were received from the Spanglers. They have not been altered, corrected, or verified. As with any field notes, they contain occasional errors such as place-name misspellings, etc. When detected, these are corrected in the database file during transcription.

Additional Information
The core information for each collecting event (locality information, date, collectors, habitat, method of collection) has been transcribed and edited in a separate master database file. The majority of events have been georeferenced and covered into KML files. These files are available upon request.

This document was scanned, edited, and annotated in the
Short Lab at the University of Kansas
Department of Ecology & Evolutionary Biology & Biodiversity Institute

Fieldwork Files

About the Digitization Process: [Download PDF]

Master KML file

Version 1.0: 10 May 2011 [Download KMZ file here]

Master Excel file

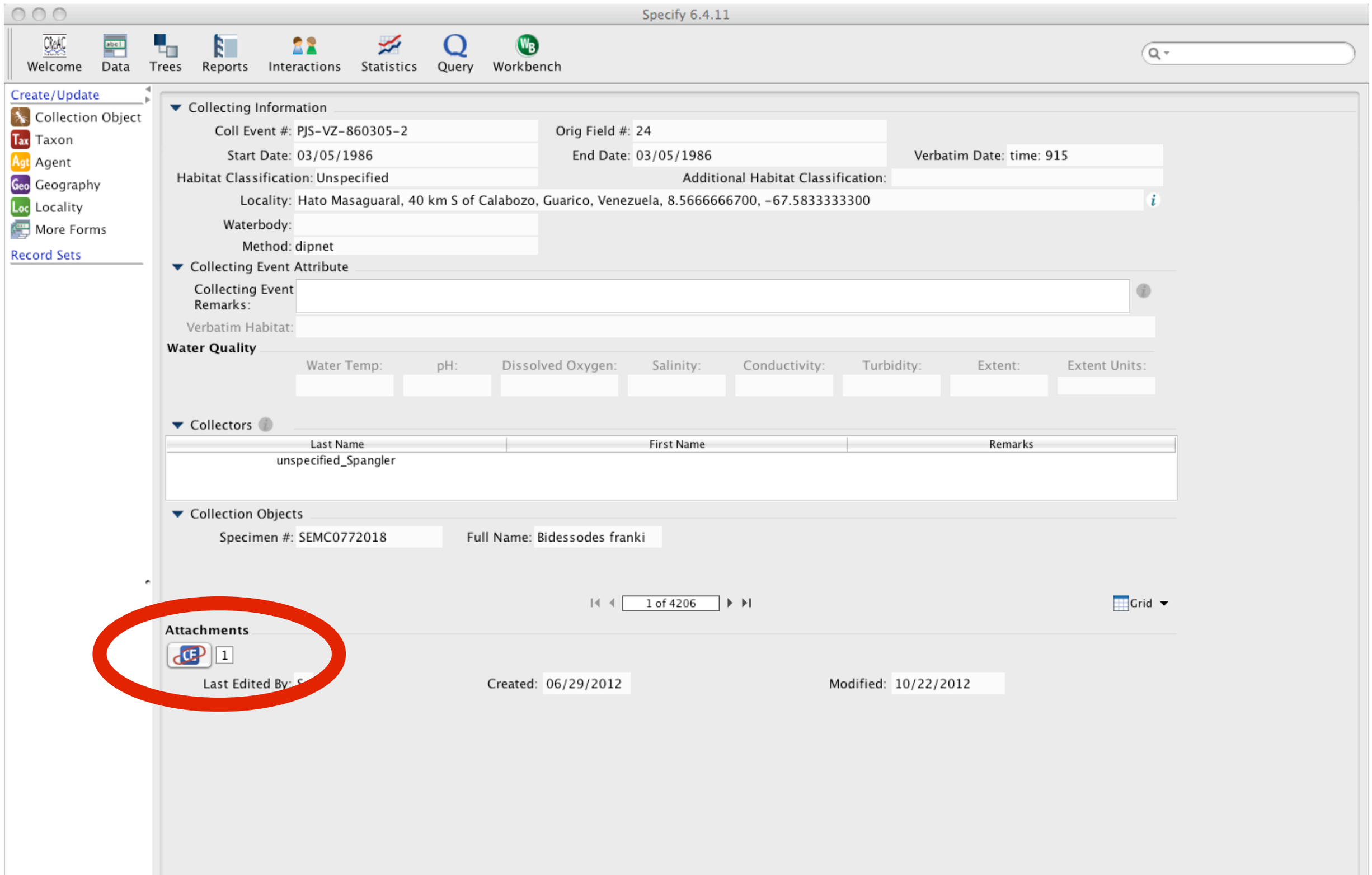
Version 1.0: 10 May 2011 [download .xml format]/ [download .xlsl format]

Original Field Note Scans (PDF format) (branded with retroactive collecting event numbers)

[Note: You can sort this list by column]

Showing **44** items

Step 5: Associate scans in database



Step 6: Associate Specimens

Step 6: Associate Specimens

Actual Label:

VENEZUELA, Guar.
Calabozo (40 km S)
Hato Masaguaral
5 March 1986
PJSpangler, colln#24

→ PJS-VZ-860305-?

Specify 6.4.11

Welcome | Data | Trees | Reports | Interactions | Statistics | Query | Workbench

Create Query

- Agent
- Collecting Information
- Collection Object
- Loan
- Locality
- Taxon
- More Tables

Saved Queries

- Agent Query
- Basic Specimen query
- General Collecting Information Query
- General Collection Object Query
- General Locality Query
- Habitat Classification Query
- Short Query 1
- Taxon Query
- Waterbody Query

Trash

Collecting Information

- ✓ Coll Event #
- Collecting Event Attachments
- Collecting Event Attribute
- Collection Objects
- Collectors
- Created
- ✓ End Date
- End Date (Day)

Search For Event

		Not	Operator	Criteria	Sort	Show	Prompt	Always	
CE	Coll Event #	☐	Contains	860305	●	☑	☑	☐	⊗
CE	Orig Field #	☐	Contains		●	☑	☑	☐	⊗
CE	Start Date	☐	=		▲	☑	☑	☐	⊗
CE	End Date	☐	=		▲	☑	☑	☐	⊗
Loc	Locality Name	☐	Contains		●	☑	☑	☐	⊗
Geo	State	☐	=		●	☑	☑	☐	⊗
Geo	Country	☐	=		●	☑	☑	☐	⊗
CE	Method	☐	=		●	☑	☑	☐	⊗
Agt	First Name	☐	Contains		●	☑	☑	☐	⊗
Agt	Last Name	☐	Contains		●	☑	☑	☐	⊗
CE	Habitat Classification	☐	=		●	☑	☑	☐	⊗
AH	Original Filename	☐	Contains		●	☑	☑	☐	⊗

? ☑ Search Synonyms ☐ Distinct ☐ Count Search Save

Welcome ⊗ | General Collecting Information Query ⊗ | Collecting Information ⊗ | Query Results ⊗

Entomology | CReAC | aezshort

Specify 6.4.11

Welcome | Data | Trees | Reports | Interactions | Statistics | Query | Workbench

Record Sets

Search Results – 4

Coll Event #	Orig Field #	Start Date	End Date	Locality Name	State	Country	Method	First Name	Last Name	Original Filename
PJS-VZ-860305-1	23	03/05/1986	03/05/1986	Hato Masaguaral, 44 km S of Calabozo	Guarico	Venezuela			unspecified_Spangler	S:\Creac\PJS-VZ-860305-1FN.p
PJS-VZ-860305-2	24	03/05/1986	03/05/1986	Hato Masaguaral, 40 km S of Calabozo	Guarico	Venezuela	dipnet		unspecified_Spangler	S:\Creac\PJS-VZ-860305-2FN.p
PJS-VZ-860305-3	25	03/05/1986	03/05/1986	Hato Masaguaral, 44 km S of Calabozo, Gate Lagoon	Guarico	Venezuela			unspecified_Spangler	S:\Creac\PJS-VZ-860305-3FN.p
PJS-VZ-860305-4	26	03/05/1986	03/05/1986	Hato Masaguaral	Guarico	Venezuela			unspecified_Spangler	S:\Creac\PJS-VZ-860305-4FN.p

Select All | Deselect All

Tell me more about these results.

Trash

Welcome | General Collecting Information Query | Collecting Information | Query Results

Entomology | CReAC | aezshort

Specify 6.4.11

Welcome | Data | Trees | Reports | Interactions | Statistics | Query | Workbench

Record Sets

Search Results – 4

Coll Event #	Orig Field #	Start Date	End Date	Locality Name	State	Country	Method	First Name	Last Name	Original Filename
PJS-VZ-860305-1	23	03/05/1986	03/05/1986	Hato Masaguaral, 44 km S of Calabozo	Guarico	Venezuela			unspecified_Spangler	S:\Creac\PJS-VZ-860305-1FN.p
PJS-VZ-860305-2	24	03/05/1986	03/05/1986	Hato Masaguaral, 40 km S of Calabozo	Guarico	Venezuela	dipnet		unspecified_Spangler	S:\Creac\PJS-VZ-860305-2FN.p
PJS-VZ-860305-3	25	03/05/1986	03/05/1986	Hato Masaguaral, 44 km S of Calabozo, Gate Lagoon	Guarico	Venezuela			unspecified_Spangler	S:\Creac\PJS-VZ-860305-3FN.p
PJS-VZ-860305-4	26	03/05/1986	03/05/1986	Hato Masaguaral	Guarico	Venezuela			unspecified_Spangler	S:\Creac\PJS-VZ-860305-4FN.p

Select All | Deselect All

Tell me more about these results.

VENEZUELA, Guar.
Calabozo (40 km S)
Hato Masaguaral
5 March 1986 PJSpangler
colln#24

Trash

Welcome | General Collecting Information Query | Collecting Information | Query Results

Entomology | CReAC | aezshort

Specify 6.4.11

Welcome | Data | Trees | Reports | Interactions | Statistics | Query | Workbench

Record Sets

Search Results – 4

Coll Event #	Orig Field #	Start Date	End Date	Locality Name	State	Country	Method	First Name	Last Name	Original Filename
PJS-VZ-860305-1	23	03/05/1986	03/05/1986	Hato Masaguaral, 44 km S of Calabozo	Guarico	Venezuela			unspecified_Spangler	S:\Creac\PJS-VZ-860305-1FN.p
PJS-VZ-860305-2	24	03/05/1986	03/05/1986	Hato Masaguaral, 40 km S of Calabozo	Guarico	Venezuela	dipnet		unspecified_Spangler	S:\Creac\PJS-VZ-860305-2FN.p
PJS-VZ-860305-3	25	03/05/1986	03/05/1986	Hato Masaguaral, 44 km S of Calabozo, Gate Lagoon	Guarico	Venezuela			unspecified_Spangler	S:\Creac\PJS-VZ-860305-3FN.p
PJS-VZ-860305-4	26	03/05/1986	03/05/1986	Hato Masaguaral	Guarico	Venezuela			unspecified_Spangler	S:\Creac\PJS-VZ-860305-4FN.p

Select All | Deselect All

Tell me more about these results.

VENEZUELA, Guar.
Calabozo (40 km S)
Hato Masaguaral
5 March 1986 PJSpangler
colln#24

Trash

Welcome | General Collecting Information Query | Collecting Information | Query Results

Entomology | CReAC | aezshort

VENEZUELA, Guar./Calabozo (40 km S)/Hato Masaguaral/ 5 March 1986/ PJSpangler/ colln#24

PJS-VZ-860305-2

DATE: 5 Mar 86 COLLECTION #: 24 TIME: 0915 To

LOCALITY: Country: Venez. State/Dept.: Guarico

Hato Masaguaral

City: Calabozo Latitude: ___°___" Longitude: ___°___

Miles/Kilometers - N S E W: 40 River/Brook name:

COLLECTORS: PHOTO: *✓ Yes No

[crossed out handwritten line]

COLL'N METHOD: Dipnet; seine; blklite; blklite trap; flight trap; malaise; pitfall trap

HABITAT: Stream; pond; lake; roadside ditch; rut in road; spring seepage; waterfall; in bromeliad; brackish pool; mineral water pool; hot spring; crab hole; side pool of stream; stockpond; stock tank; swim pool; woodland pond; pothole; culvert; leaf packs; wet wood; other

Pond

AIR TEMPERATURE: 106 F° WATER TEMPERATURE: 81 F° pH: 7

OXYGEN: 3 ppm HARDNESS: 20 TURBIDITY: clear ALTITUDE: ___ft/m

DEPTH: 1/3 m WIDTH: 10m x 150m VELOCITY: 0 ft/sec. SHADED - SUNNY

SUBSTRATUM: Mud; gravel; sand; peaty; leafy; boulders; other -

SOIL COLOR: Red; yellow; black; brown.

PLANT ASSOCIATES: Alisma; Alternanthera; Anacharis; Azolla; Brasenia; Chara; Cephalanthus; Eichornia; Eleocharis; Hibiscus; Hydrodictyum; Isoetes; Jussiaea; Lemna; Ludwigia; Marsilea; Mougeotia; Myriophyllum; Nitella; Nymphae; Pistia; Polygonum; Potamogeton; Proserpinaca; Ranunculus; Rhizophora; Riccia; Ruppia; Sagittaria; Salvinia; Scirpus; Spirogyra; Taxodium; Typha; Trapa; Utricularia; Wolffia; other ___; grass

ANIMAL ASSOCIATES: INCREDIBLY RICH!

Adults: Berosus, Derallus, Hydrochus, Helochares, Helobata, Enochrus(?), Tropisternus, Dibolocelus, Hydrocanthus, Derovatellus, Macrovatellus, Anodocheilus, Bidessonotus, Laccophilus, Celina, Copelatus, Thermonectus, Pachydrus, Desmopachria, Hydrovatus(?), Neobidessus, other bidessines.

Suphisellus, Hydrocanthus, Belostoma, Plea(?),

Larvae

EST. # SPMS. ~~3000~~ 5460

*: end of 1 roll of 400X + first few of 100X roll – pond c Pistia

In 2 plastic bottles

PJS-VZ-860305-2

COLEOPTERA

Aquatic

Helobata	3
Helochares	6
Enochrus	11 A
	2 L
Berosus	1
Tropesternus (3 sp.)	22
Derallus	365
Hydrochus	97
Laccophilus	162 + 2
Laccomimus	8 A
	3 L
Macrovetallus	4
Derovetallus	47
Thermonectus	4
Dibolocelus	1
Copelatus	4
Celina	1
Anodocheilus (2 sp.)	33
Neobidessus	107
"	1
Pachydrus	12
Desmopachria	201
Bidessodes	31
"	896
"	2028
Microbidessus	1
Notomicrus	13
Suphis L	1
Hydrocanthus	7
Suphisellus	11
"	654
"	16
"	671
Hydraena	9

Σ=5435

TERRES

Helodid L	13

HEMIPTERA

Belostomatid	1
Hebrid nymph	1
Notonectid immature	1
Naucoridae	1
Gerrid. nymph	1
Plea	2
Corixidae	1
Microvelia	2

Σ=10

DIPTERA 1

ARACHNID 1

5460

Bonus Step: Ecological Classification

All Events Assigned one of the following:

Lotic
Lentic (general)
Lentic (riparian)
Hygropetric
Phytotelmata
Non-Aquatic
Passive Trapping
Unspecified

Bonus Step: Ecological Classification

Specify 6.4.11

lcome | Data | Trees | Reports | Interactions | Statistics | Query | Workbench

d Sets

Search Results - 28

Habitat Classification	Coll Event #	Country	Locality Name	Verbatim Habitat
Phytolemata	AS-04-005	Costa Rica	Tapanti National Park, 9.6 km after scientific gate	Heliconias and small muddy roadside drainage area
Phytolemata	CR10-0318-SG1	Costa Rica	Tapanti National Park, pipeline crossing	Heliconia infloresences
Phytolemata	CR1ABF00 075	Costa Rica	San Ramon EB, San Ramon RB, 27 km N & 8 km W San Ramon	Heliconia inflorescence
Phytolemata	PJS-EC-770508-3	Ecuador	Puyo	Heloconia
Phytolemata	PJS-EC-770607-1	Ecuador	Limoncocha	collected in Heloconia inflorescences
Phytolemata	NIC1BFC02 023	Nicaragua	Matagalpa, 6 km N, Selva Negra Hotel	Heliconia fruits
Phytolemata	NIC1BFC02 045	Nicaragua	Matagalpa, 6 km N, Selva Negra Hotel	Heliconia fruits
Phytolemata	NIC1BFC02 061	Nicaragua	Matagalpa, 16 km N, Matagalpa-Jinotega Rd	Heliconia fruits
Phytolemata	NIC1BFC02 091	Nicaragua	San Carlos, 60 km SE, Refugio Bartola	Heliconia fruits
Phytolemata	PAN1AB96 087	Panama	Cana Biological Station	Heliconia flowers
Phytolemata	PAN1AB96 118	Panama	Cana Biological Station	Heliconia "flowers"
Phytolemata	PAN1C00 029	Panama	Barro Colorado Island	Heliconia flrs.
Phytolemata	PAN1C00 068	Panama	Barro Colorado Island	Heliconia flrs.
Phytolemata	PAN1C00 098	Panama	Barro Colorado Island	Heliconia flrs.
Phytolemata	PER-11-CSC-004	Peru	CICRA Field Station, trail 1, G5	Heliconia leaf roll
Phytolemata	PJS-PE-890910-1	Peru	Pakitza, Troca Dos, Troca Dos	in dead leaves of Socrates palm flowers, along river, some aquatic and some terr
Phytolemata	SUR1F99 105	Suriname	Brownsberg Nature Preserve, Entrance Road	premontane tropical forest Heliconia flower bracts
Phytolemata	PJS-US-620806-4	United States	Mississppi Palisades State Park	flower blossums
Phytolemata	PJS-US-620829-1	United States	Ogallala, 9 mi N	helicanthus?
Phytolemata	AS-08-033	Venezuela	Perija National Park, Tukuko, trail to Rio Manantial	mixed heliconia flowers
Phytolemata	PJS-VZ-850205-2	Venezuela	Cerro Neblina	Brocchinia bromeliad
Phytolemata	PJS-VZ-850207-1	Venezuela	Cerro Neblina	Brocchinia bromeliad
Phytolemata	VEN1ABH98 013	Venezuela	Pico Periquitos, Rancho Grande Biological Station, Henri Pittier National Park	rolled leaves of Heliconia sp.
Phytolemata	VEN1ABH98 035	Venezuela	Portachuelo Pass, Rancho Grande Biological Station, Henri Pittier National Park	Heliconia inflorescence
Phytolemata	VEN1ABH98 152	Venezuela	San Cristobol, 22.5 SE, Chorro El Indio National Park	Heliconia inflorescence
Phytolemata	VZ09-0704-01A	Venezuela	Perija National Park, Tukuko, Rio Manantial	yellow heliconia inflorecenses (spherical)
Phytolemata	VZ09-0704-01B	Venezuela	Perija National Park, Tukuko, Manantial trail	red heliconias
Phytolemata	VZ09-0716-06A	Venezuela	El Tama National Park, Rio Negro @ bridge crossing	red heliconia inflorecenses

Select All | Deselect All

Tell me more about these results.

CReAC

Collection **Re**sources for **A**quatic **C**oleoptera

Current Stats:

- 125,000 specimens
- Original Field notes from c. 2500 events
- More than 3000 habitat photographs

University of Kansas – Biodiversity Institute

University of Kansas – Biodiver...

demo.silvercollection.silverbiology.com/portal_dev/waterbeetles/

Google

KU BIODIVERSITY INSTITUTE
The University of Kansas

Online Collection

Support | About | English | Help | Report Bug

SilverBiology Network | All Collections | Share

Welcome | Browse Collection | Search Collection | Checklist | Images | Reports

Filters

Phylum:
Class:
Order:
Family: Hydrophilidae
Genus:
Species:
Country: Venezuela
State:
Parish/County:
Locality:
Catalog #:
Collector:
Collector #:
Collected Start:
Collected End:
Type Status:
Images:
Coordinates:

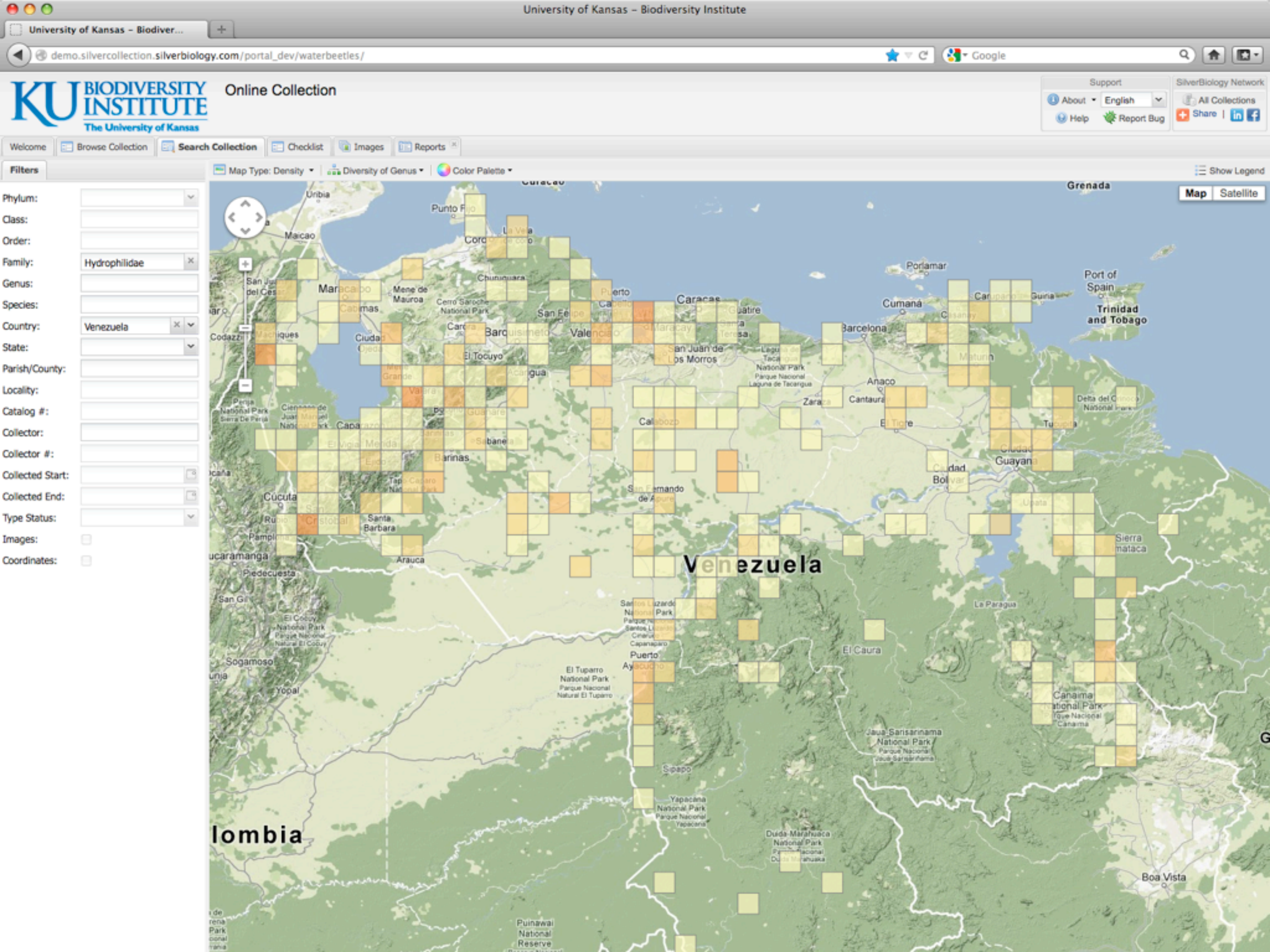
Map Type: Density | Aggregate Data | Color Palette | Show Legend

Map | Satellite

Venezuela

Colombia

Caracas
Maracaibo
Barquisimeto
Valencia
Barcelona
Cumaná
Maturín
Ciudad Bolívar
Ciudad Guayana
Cúcuta
Barinas
Trinidad and Tobago
Port of Spain
Grenada


University of Kansas – Biodiversity Institute
demo.silvercollection.silverbiology.com/portal_dev/waterbeetles/
KU BIODIVERSITY INSTITUTE
The University of Kansas
Online Collection
Support
About
English
Help
Report Bug
SilverBiology Network
All Collections
Share
Welcome
Browse Collection
Search Collection
Checklist
Images
Reports
Filters
Map Type: Density
Diversity of Genus
Color Palette
Show Legend
Map
Satellite
Phylum:
Class:
Order:
Family:
Hydrophilidae
Genus:
Species:
Country:
Venezuela
State:
Parish/County:
Locality:
Catalog #:
Collector:
Collector #:
Collected Start:
Collected End:
Type Status:
Images:
Coordinates:
Venezuela
lombia
Caracas
Barcelona
Cumana
Port of Spain
Trinidad and Tobago
Grenada
Maracaibo
Valencia
Barinas
Cúcuta
Guayana
Ciudad Bolívar
San Fernando de Apure
Puerto Ayacucho
Boa Vista
Canaima National Park
El Tuparro National Park
Yapacana National Park
Duida-Marahuaca National Park
Jaua Sarisariñama National Park
Puinawai National Reserve
Sogamoso
Yopal
Arauca
Bucaramanga
Maturín
Porlamar

KU BIODIVERSITY INSTITUTE
The University of Kansas

Online Collection

- Guyana (2,369)
- Honduras (48)
- India (244)
- Indonesia (68)
- Kazakhstan (53)
- Kenya (97)
- Madagascar (49)
- Malaysia (49)
- Mexico (826)
- Myanmar (42)
- Namibia (231)
- New Caledonia (468)
- New Zealand (33)
- Nicaragua (697)
- Panama (1,544)
- Papua New Guinea (46)
- Paraguay (393)
- Peru (1,731)
- Philippines (1)
- Puerto Rico (3)
- Romania (15)
- Suriname (5,271)
- Taiwan (6)
- Trinidad and Tobago (4)
- United States (17,648)
- Uruguay (1)
- ☑ Venezuela (62,567)
  - ☐ **Blank Value** (662)
  - ☑ Amazonas (6,057)
  - ☐ Anzoategui (583)
  - ☑ Apure (3,136)
  - ☐ Aragua (2,671)
  - ☑ Barinas (3,834)
  - ☑ Bolivar (6,061)
  - ☐ Carabobo (160)
  - ☑ Cojedes (1,848)
  - ☑ Delta Amacuro (1,741)
  - ☐ Falcon (2,791)
  - ☐ Federal (6)

Phylum	Family	Genus	Species	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7
Arthropoda	Dytiscidae	Neobidessus		✓ 160	✓ 6	✓ 17	✓ 2	✓ 19	✓ 46	✗
Arthropoda	Dytiscidae	Neobidessus	alternatus	✓ 36	✓ 16	✗	✗	✓ 18	✗	✗
Arthropoda	Dytiscidae	Neobidessus	bolivari	✓ 101	✗	✓ 11	✓ 2	✓ 1	✗	✓ 1
Arthropoda	Dytiscidae	Neobidessus	bordoni	✓ 160	✓ 1	✓ 19	✗	✓ 13	✗	✗
Arthropoda	Dytiscidae	Neobidessus	phyllisae	✓ 949	✓ 2	✓ 29	✗	✓ 139	✗	✓ 1
Arthropoda	Dytiscidae	Neobidessus	surinamensis	✓ 325	✓ 132	✗	✗	✓ 164	✗	✗
Arthropoda	Dytiscidae	Neobidessus	VZ_sp_A	✓ 118	✗	✗	✗	✗	✗	✗
Arthropoda	Dytiscidae	Neobidessus	VZ_sp_B	✓ 10	✓ 10	✗	✗	✗	✗	✗
Arthropoda	Dytiscidae	Neobidessus	VZ_sp_C	✓ 1	✓ 1	✗	✗	✗	✗	✗

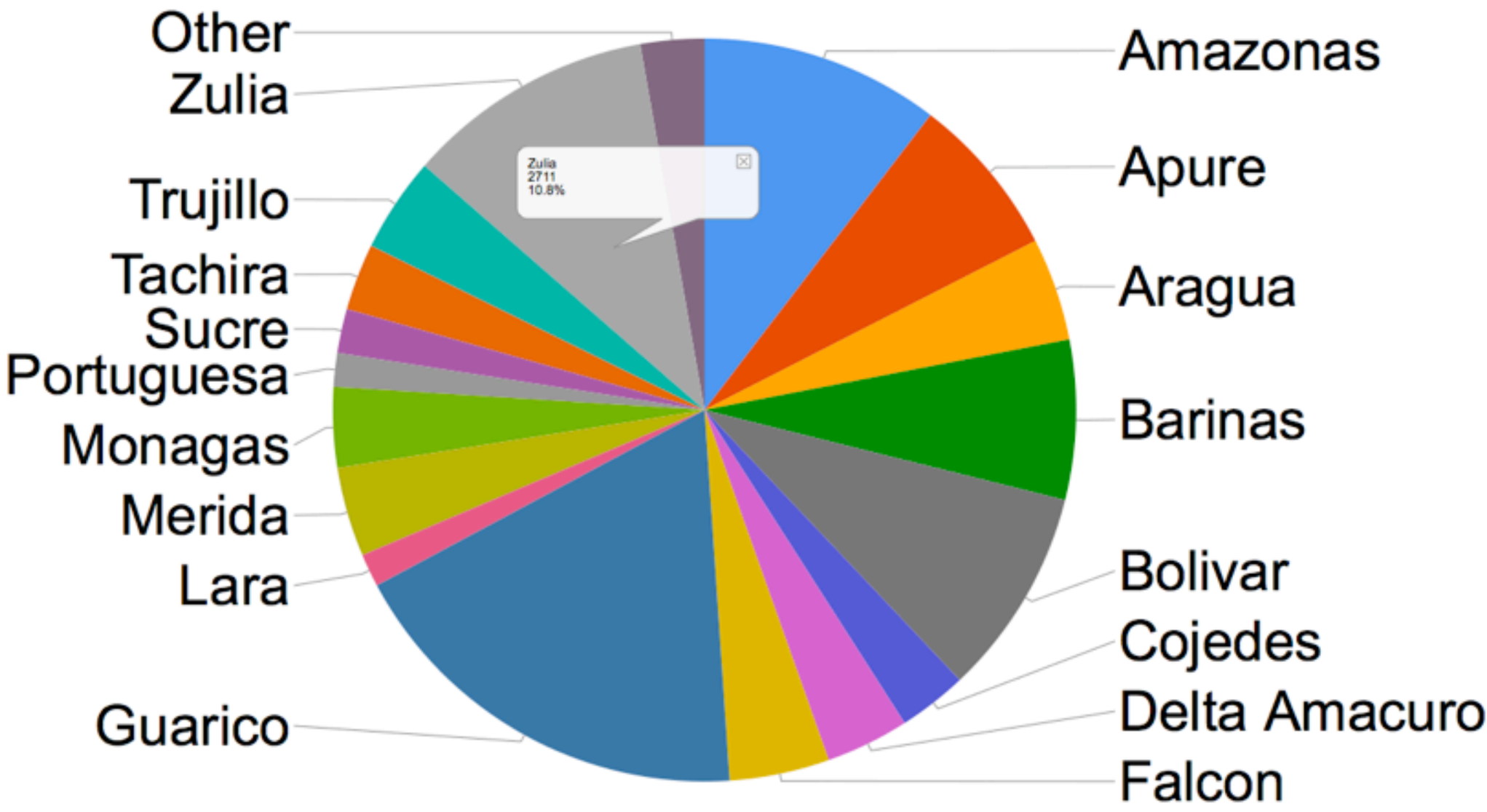
KU BIODIVERSITY INSTITUTE
The University of Kansas

Online Collection

Report Menu

- Collected by Date Range
- Specimens by Year Growth
- Collected Months by Decade
- Collected Months by Date Range
- Taxonomy
- Regions
  - Venezuela
    - Amazonas
    - Anzoategui
    - Apure
    - Aragua
    - Barinas
    - Bolivar
    - Carabobo
    - Cojedes
    - Delta Amacuro
    - Falcon
    - Federal
    - Guarico
    - Lara
    - Merida
    - Meridas
    - Mirada
    - Monagas
    - Portuguesa
    - Sucre
    - Tachira
    - Trujillo
    - Yaracuy
    - Zulia

Specimens By Regions

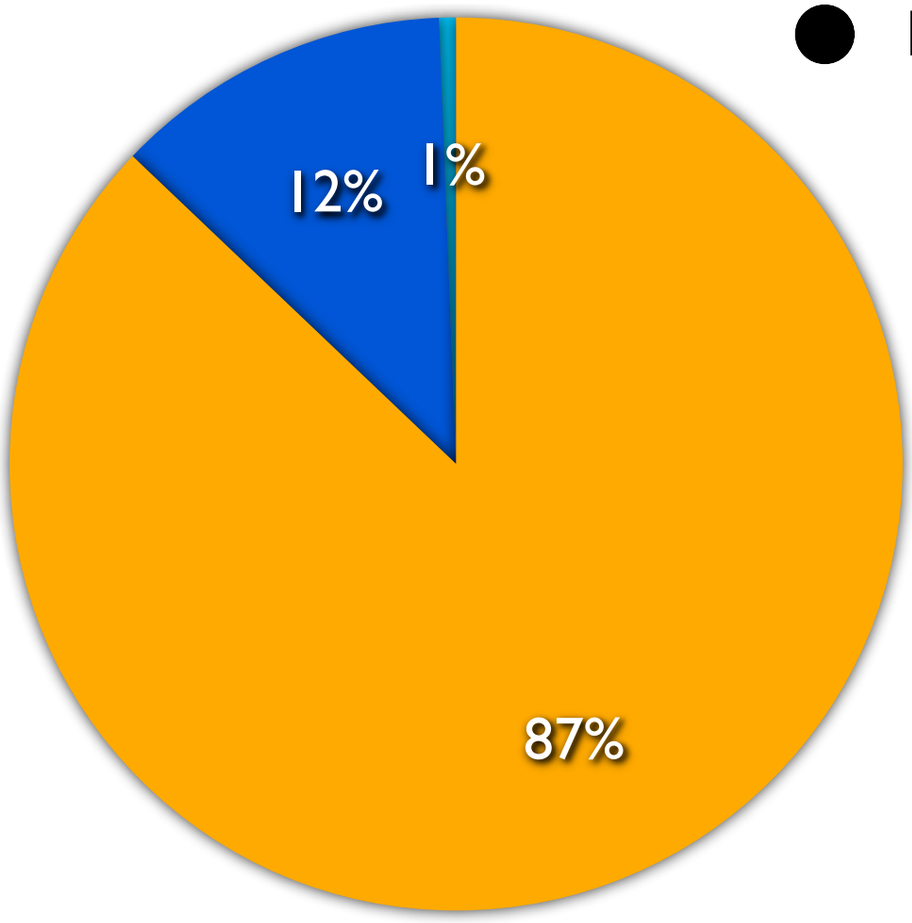


Oocyclus

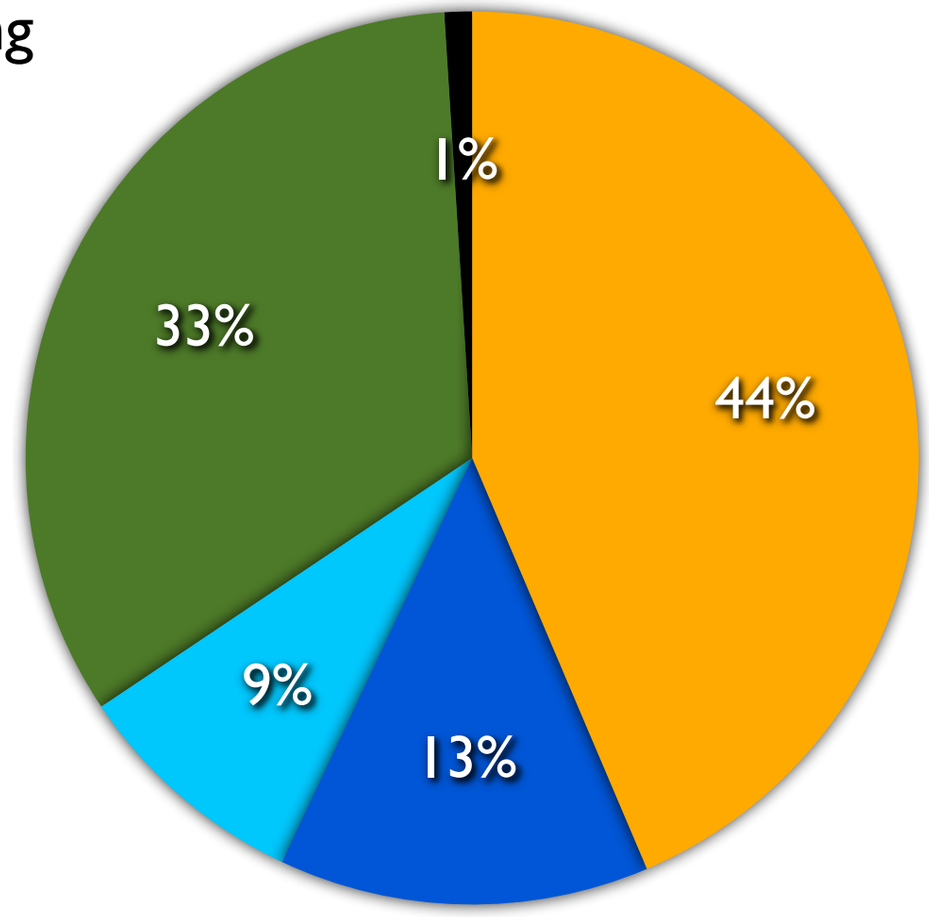
Specimen records by Habitat

Anacaena

- Hygropetric
- Lotic
- Lentic (Riparian)
- Lentic (General)
- Passive Trapping



n=977

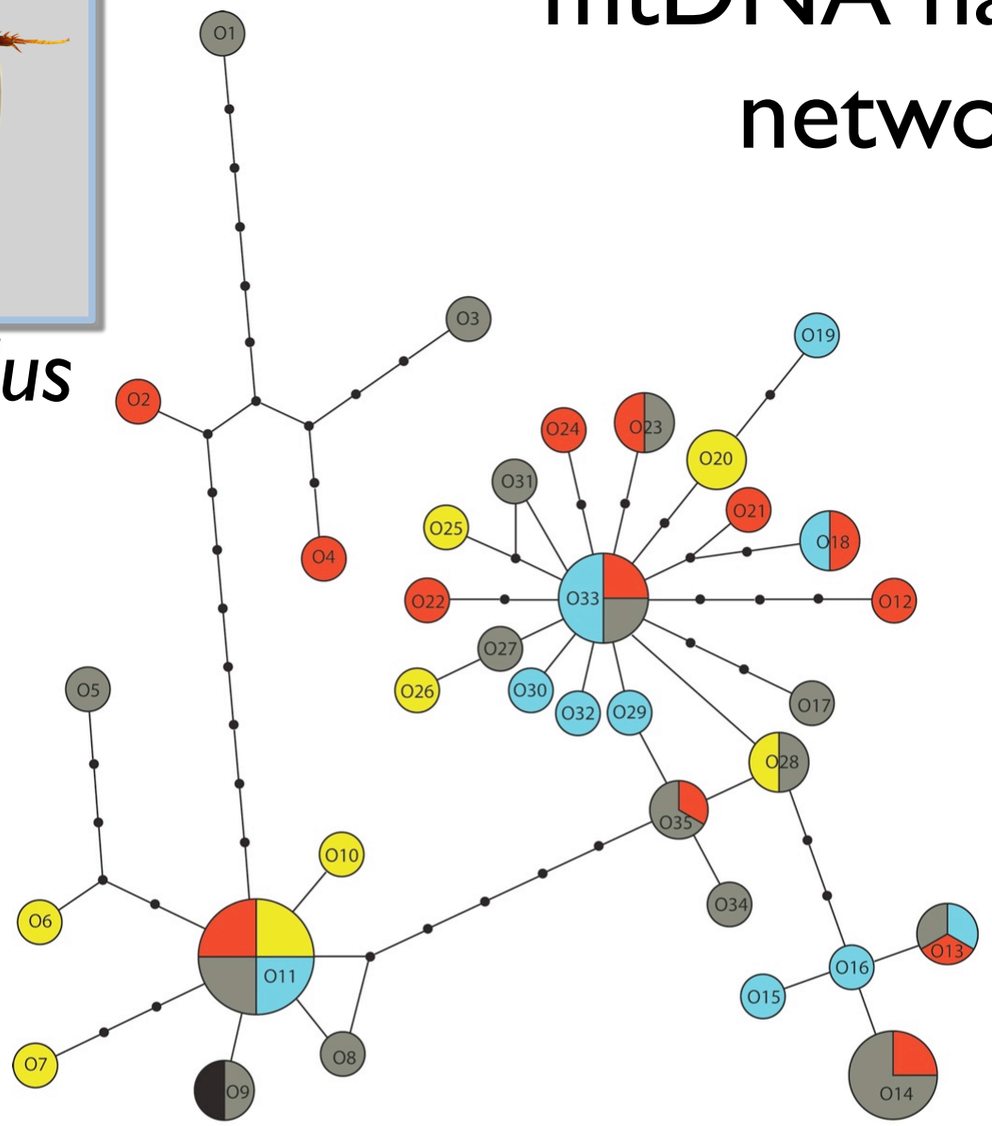


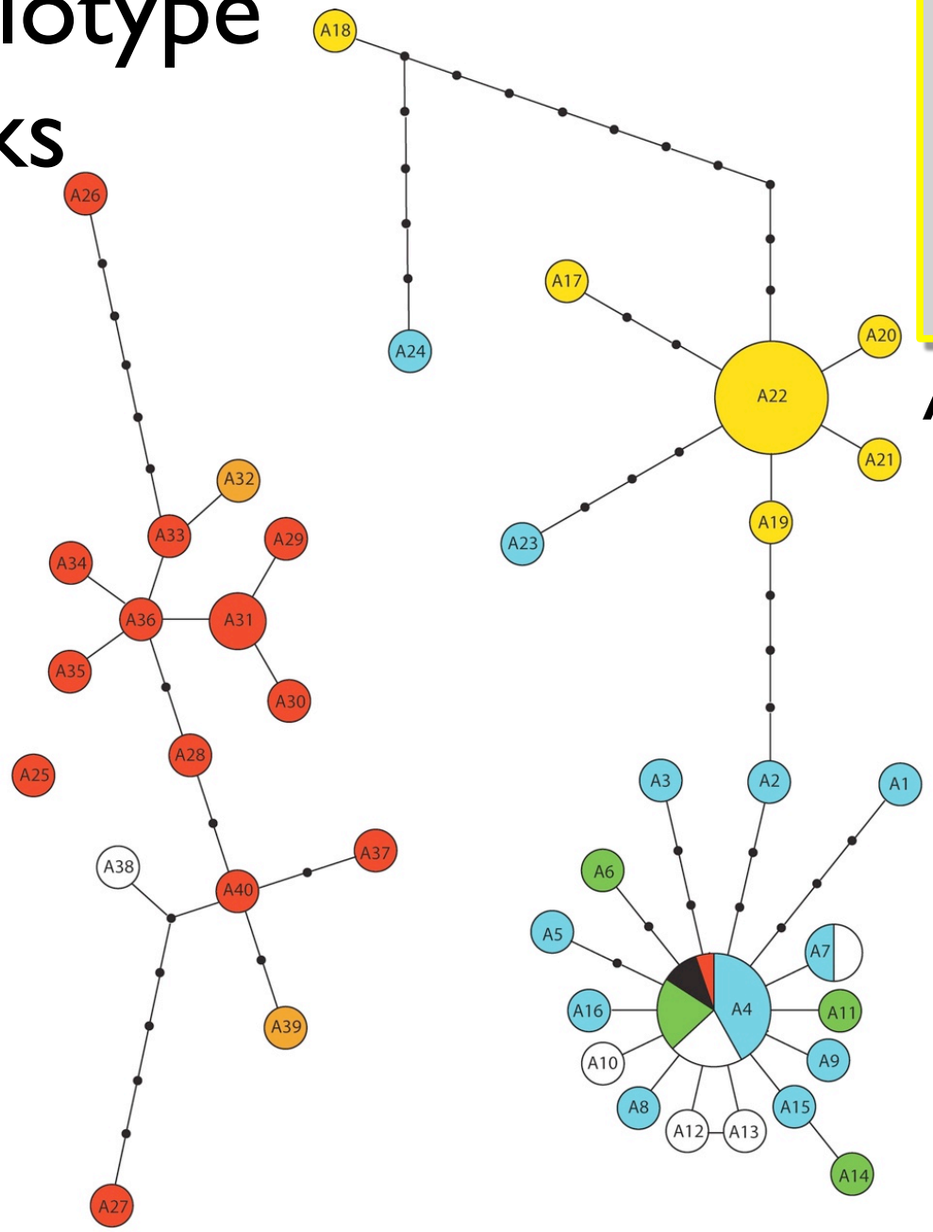
n=500

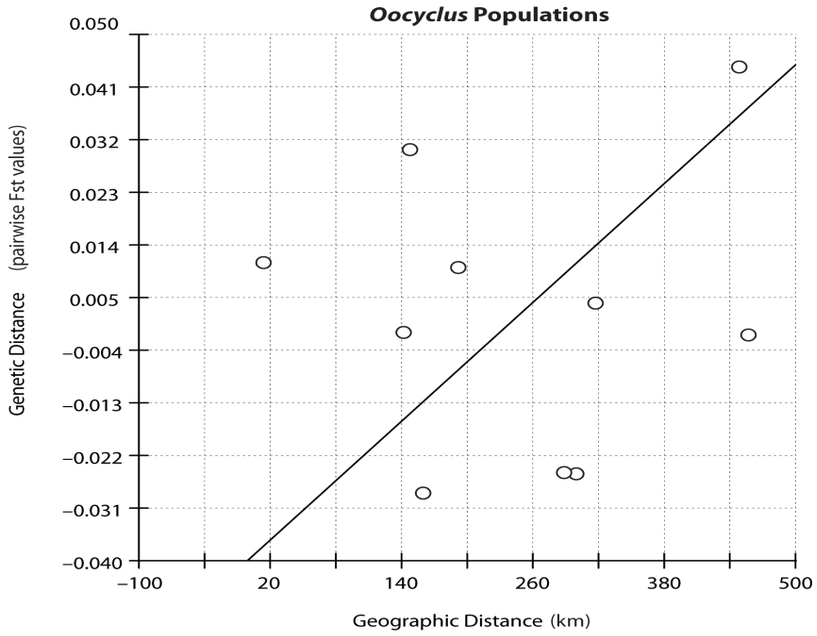
mtDNA haplotype networks

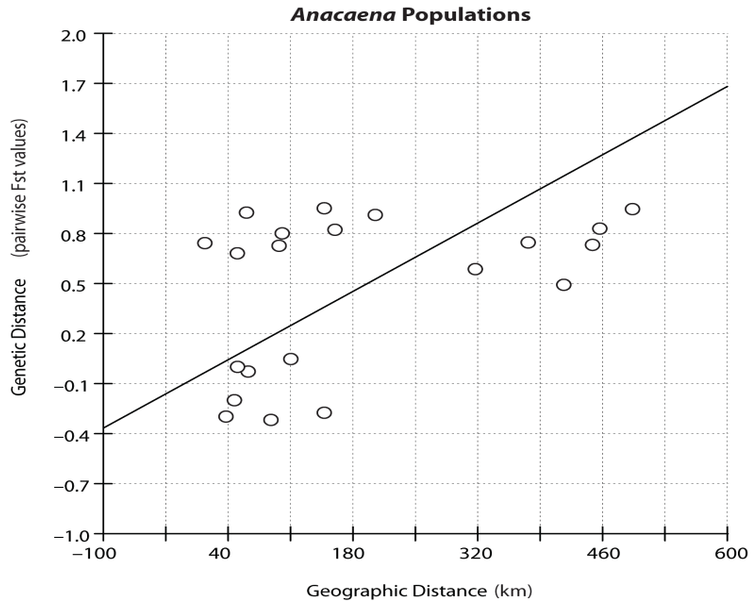
Oocyclus

Anacaena







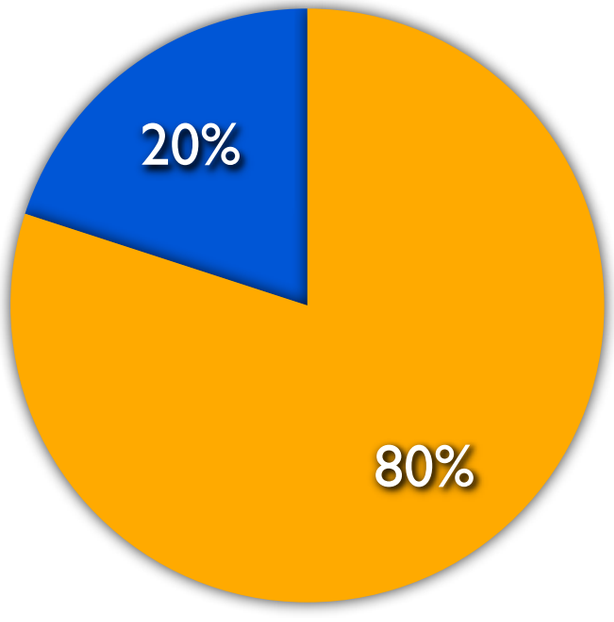


CReAC

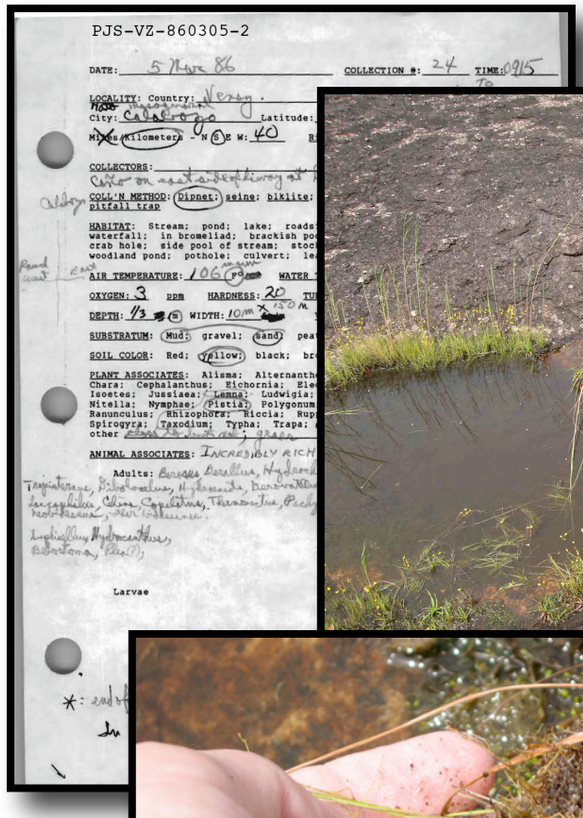
Collection **Re**sources for **A**quatic **C**oleoptera

Radicidus sp. A

- Hygropetric
- Lotic
- Lentic (Riparian)
- Lentic (General)
- Passive Trapping



n=40


PJS-VZ-860305-2

DATE: 5 Mar 86 COLLECTION #: 24 TIME: 0915

LOCALITY: Country: Mexico

City: Cuernavaca Latitude:

Miles/Kilometers N S E W: 40

COLLECTORS:

COLL'N METHOD: Dipnet; seine; biklite; pitfall trap

HABITAT: Stream; pond; lake; roads waterfall; in bromeliad; brackish po crab hole; side pool of stream; stoc woodland pond; pothole; culvert; le

AIR TEMPERATURE: 106 (F) WATER

OXYGEN: 3 ppm HARDNESS: 20

DEPTH: 1/3 WIDTH: 10m x 150 m

SUBSTRATUM: Mud; gravel; sand; pea

SOIL COLOR: Red; yellow; black; br

PLANT ASSOCIATES: Alisma; Alternanthe Chara; Cephalanthus; Eichornia; Ele Isoetes; Jussiaea; Lemna; Ludwigia; Nitella; Nymphae; Pistia; Polygonum Ranunculus; Rhizophora; Ricia; Rupp Spirogyra; Taxodium; Typha; Trapa; other

ANIMAL ASSOCIATES: INCREDIBLY RICH

Adults:

Larvae

Acknowledgments

Sarah Schmits, University of Kansas

Andy Bentley, University of Kansas
Michael Giddens, SilverBiology

Students: Taro Eldredge, Crystal Maier, Frazier Graham, Clay McIntosh

Institutional Collaborations:
Smithsonian Institution (David Furth, Warren Steiner, Charyn Michelli)
Universidad Central de Venezuela (Jose Clavijo, Marco Gaiani, Luis Joly)
Universidad del Zulia, Venezuela (Jesus Camacho)
National Zoological Collection of Suriname (Paul Ouboter)
Santa Barbara Museum of Natural History (Michael Caterino)