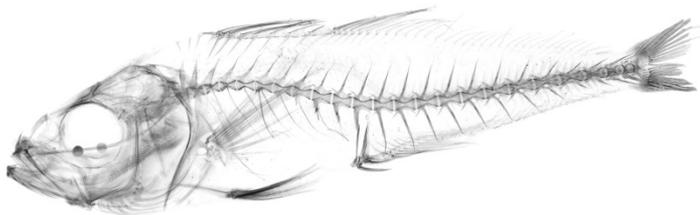
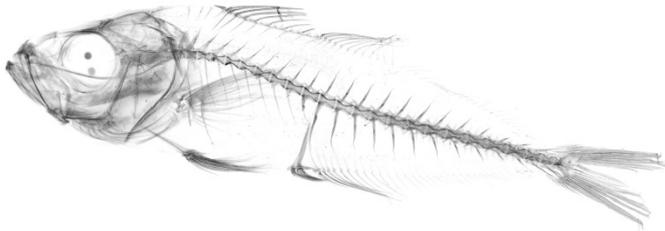
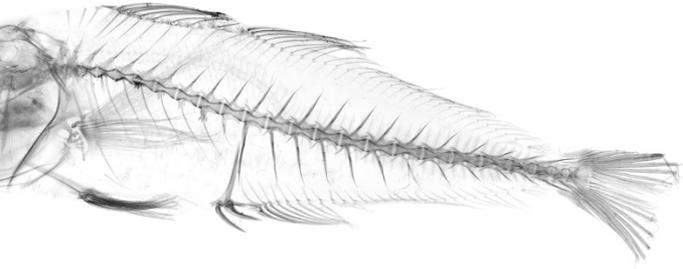


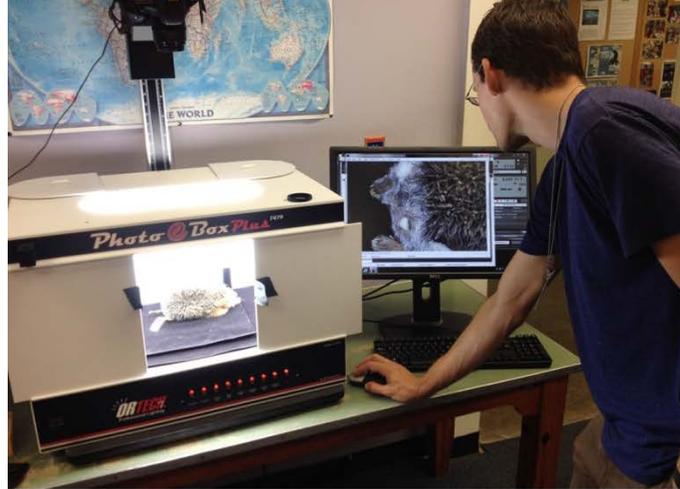
Digitization in Museums: 2D Imaging



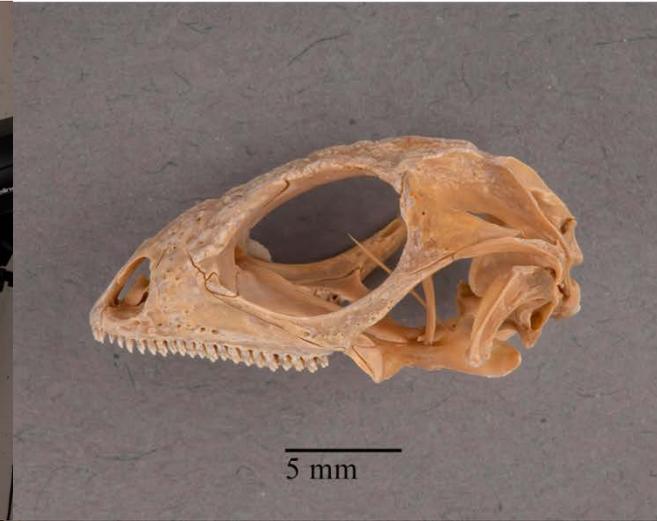
Zach Randall
Ichthyology



Most commonly used imaging stations



Hawksbill
UF 10552



How is the specimen preserved?

- Wet (ethanol, glycerin)
- Dry (skins, skeletons, fossils, eggs, nests etc.)



Bowfin

Copy Stand Dry specimens/wet specimens

- Camera connected to a manual lift that can be raised or lowered
- Stationed between light units (flash or continuous) which are placed to its side
- Option of having direct or diffused lighting
- Tethered to computer

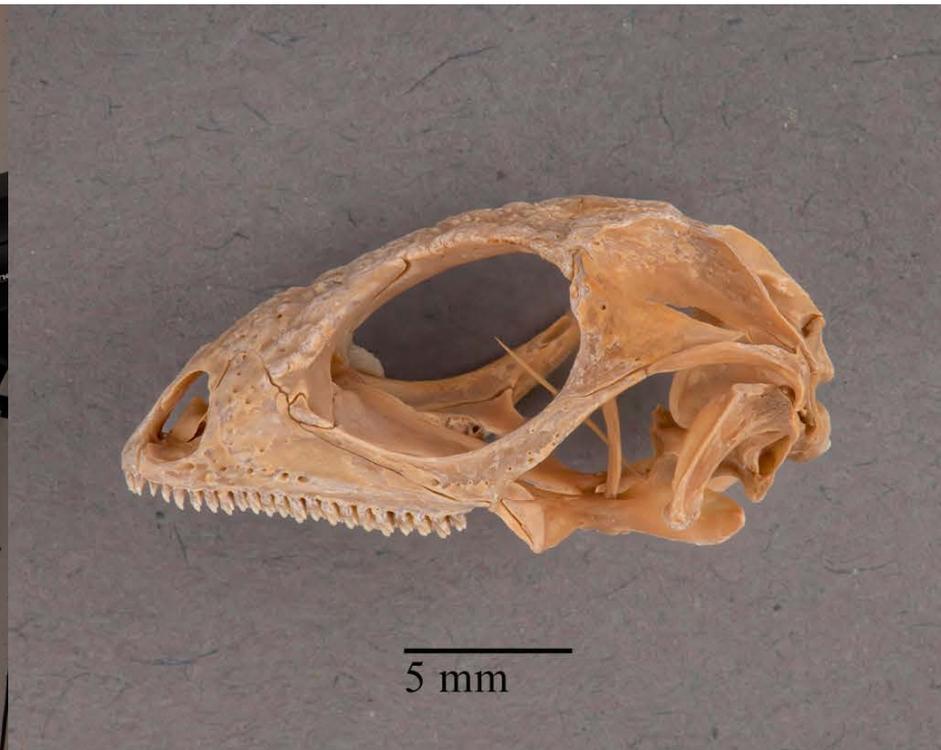
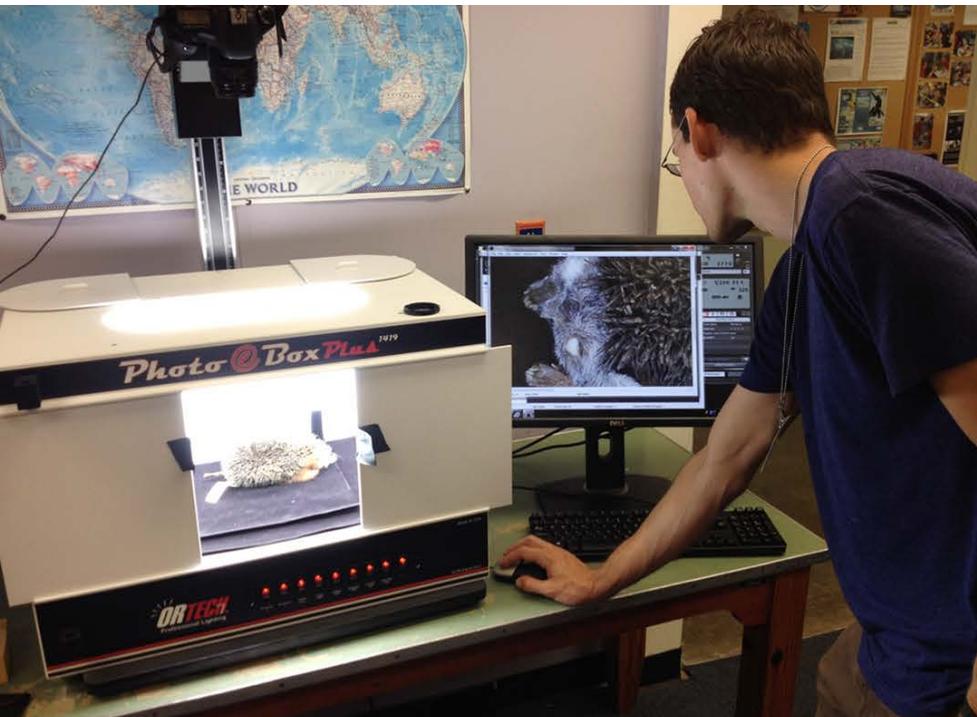


Photo e-Box (Light Box) Dry specimens

- Box lined with continuous fluorescent lighting and 1-foot LED Light Strip
- Diffused light eliminating shadows, reflections, and hotspots
- Camera mounted above the box on a copy stand or in front of the box on a tripod.



Squeeze Tank

Wet specimens

- Glass/plexiglass tank held together with silicone with separate moveable glass plate used to “squeeze” specimen in place.
- Filled with distilled water or 70% ethanol
- Stationed between light units placed to the sides and slightly above the squeezebox
- Camera mounted on a tripod in front of tank



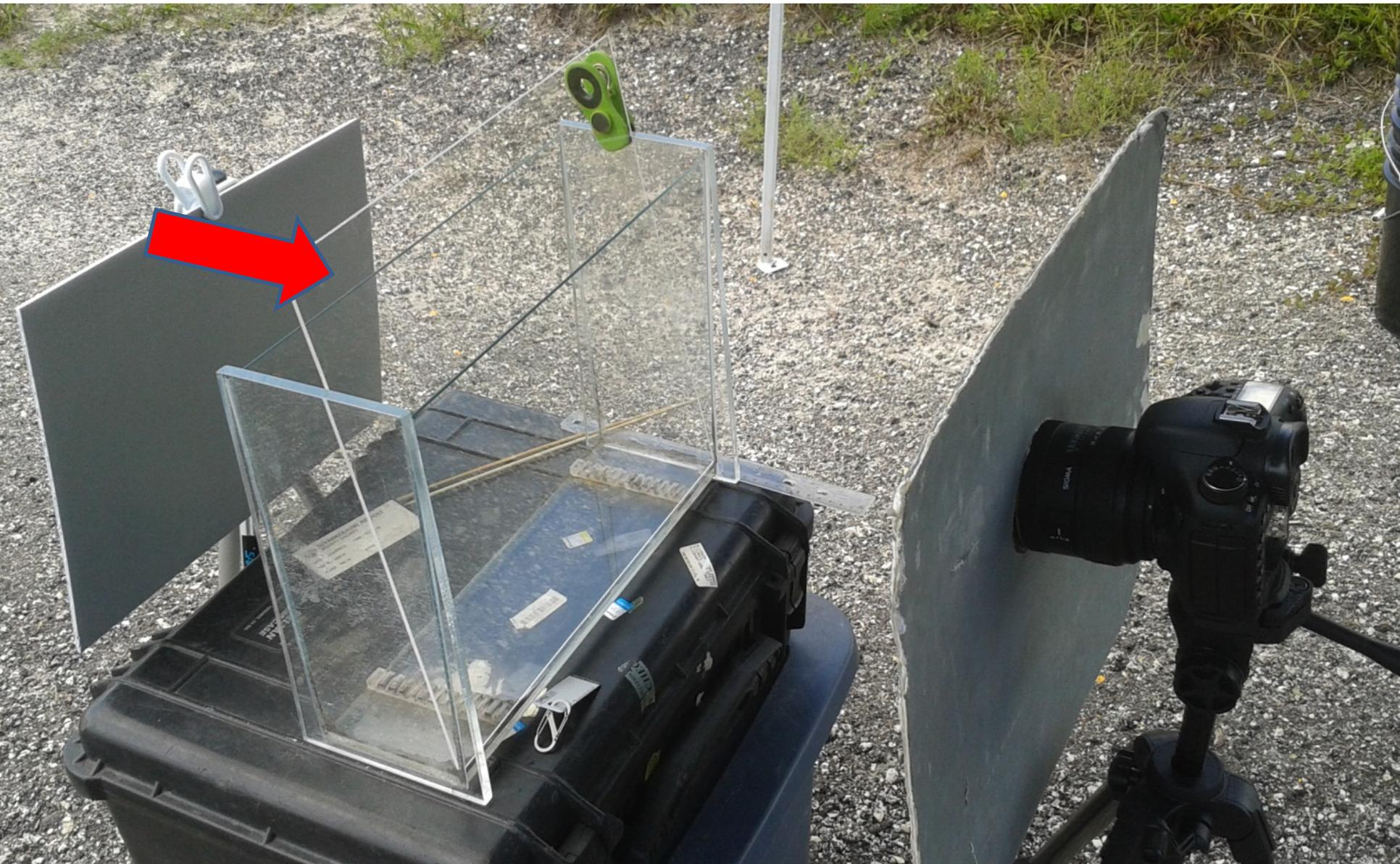
Squeeze tank

- Prevents specimen from drying out
- Prevents glare
- Will accommodate ca. 90% of specimens in the wet collections



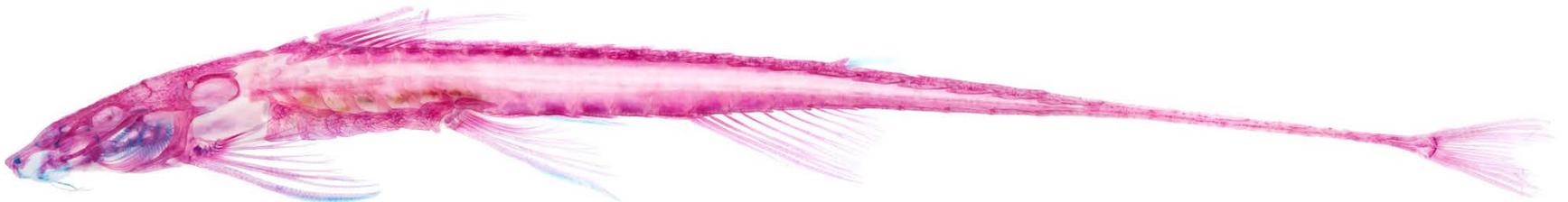
Whale Shark

Field Setup



Setup

- Customize tank size (Glass / plexiglass/ silicon)
 - Front-glass (minimal scratching)
 - All other sides plexiglass
 - Dimensions 38 x 30 x 12 cm
- Computer setup to tether image files
 - Optional (more time efficient)
- Lighting
 - Flash; Natural light
- Average 6 minutes per specimen





OTO BOX
NDS
FF
CKO

Labels

B.M. (N.H.) reg. no. 172053
Chiton laqueatus
 Sowerby, 1842
 TYPE + 4 PARALOTYPES
 Sowerby, 1842. Proc. Zool.
 Lond. (84): 104
 CUMING colln.
 5 specs. Acc. no: 1829
 Japan
 Solor Islands
 Philippines.
 TYPE selection in
 track, 1993. J. Malac. Soc.
 14: 23

B.M. (N.H.) reg. no. 172053
Chiton (Chitonellus)
 burrowsi Smith, 1884
 TYPES
 Smith, 1884. Rep. Zool.
 Colln. U.S. Akrt 1881-82: 85
 H. CUMING colln.
 4 specs. Acc. no: 1829
 Port Adelaide
 S. Australia.
 fig'd. in Reeve, 1847. Corals
 Icon. # Chitonellus,
 sp. 3, pl. 1, fig. 3
 as larvaeformis.

British Museum (Natural History)
Chiton platessa
 Gould, 1846
 Nilandau Atoll, Maldive Is.
 36 fms

British Museum (Natural History)
Chiton burrowsi
 Detailed notes 91.11.10.10, animal in
 spirit. Not Puthz, Queensland. (offprint)
 When found.

Cancer productus (Randall)
 37.14
 Concordia
 Canceridae
 Cancer productus (Randall)
 10.14
 1492 42

ALLAN HANCOCK FOUNDATION
 ACC. NO. _____ CAT. NO. _____
Cancer productus Randall
 South Bay, Cape Arago State Park,
 Coos Co., Oregon
 July 30, 1942 shore
 ID. BY J. H. STA. NO. 1492-42
 THE UNIVERSITY OF SOUTHERN CALIFORNIA

1000551 LACM MBC


NATURAL HISTORY MUSEUM
 LOS ANGELES COUNTY
 MARINE BIODIVERSITY CENTER

TH 16-15
 17.03710
 100.36888
 Lam Nam
 Kwaei Noi
 19 Jan. 2016

Megalopinus
cavifrons
 det. V. Puthz 1998

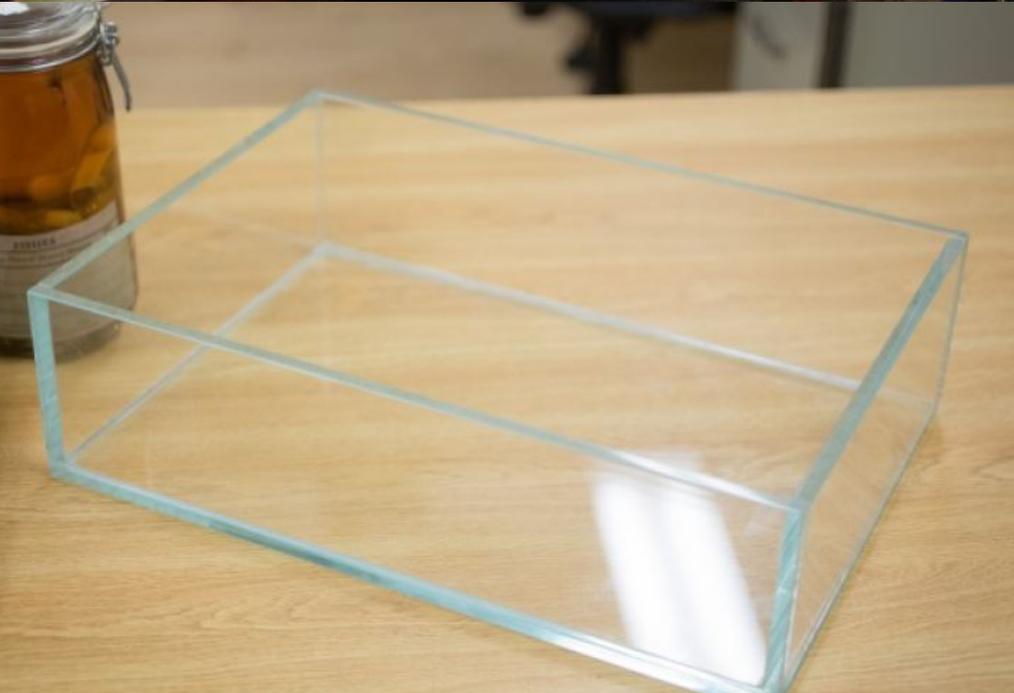
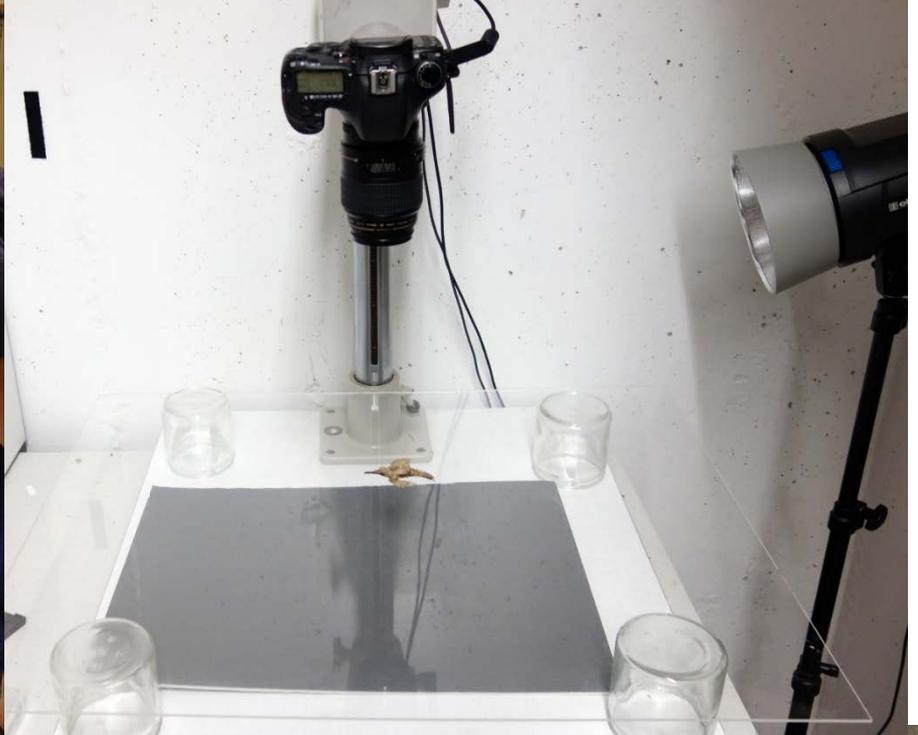
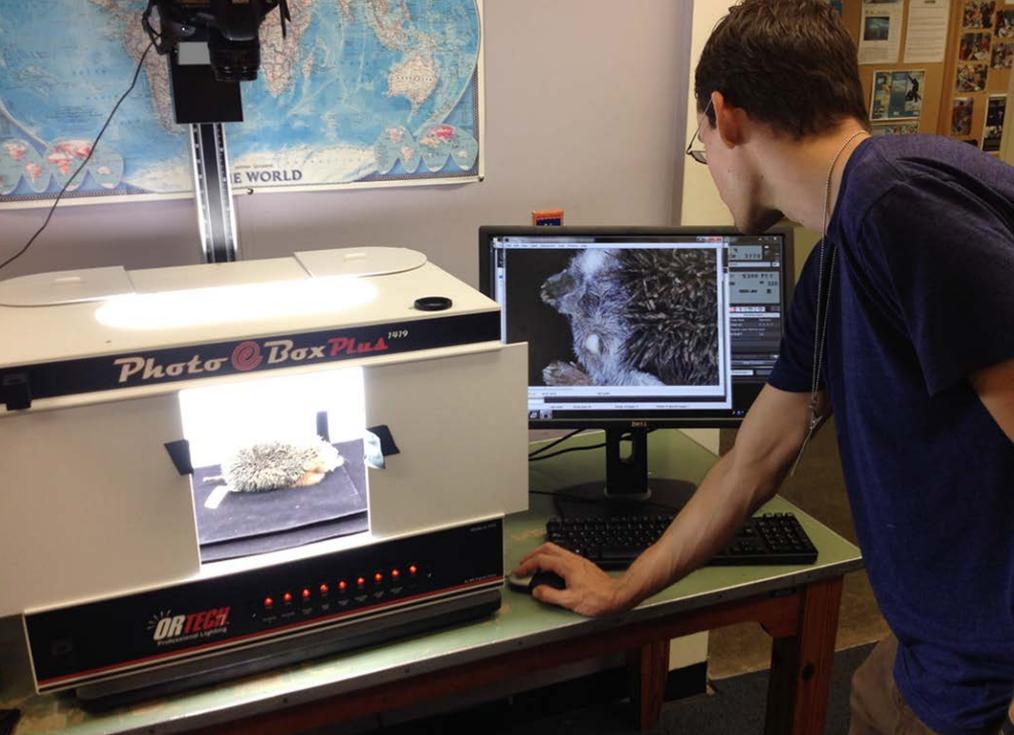
♂ HOLOTYPE

HOLOTYPE
 teste A. Westrich 2015
 GDI Imaging Project

Nova Teutonia, Sta.
 Catharina, BRAZ,
 XI - 1953
 Friez Plaumann leg.


 FMNHINS
 3047974
 FIELD MUSEUM
 Pinned

PHOTOGRAPHED
 A. Westrich 2015
 EMu Catalog





Inselect

- Identifies individual specimens & associated labels
- Places a bounding box cropping each specimen-level image
- Captured metadata such as catalogue numbers, location within the collection, and possibly information on labels
- Associating metadata with the cropped images



TH 16-15

17.03710

100.36888

Lam Nam
Kwaei Noi

19 Jan. 2016



- Name
- TH16-28
- TH16-29
- TH16-30
- TH16-31
- TH16-32
- TH16-33
- TH16-34
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- TH16-56
- TH16-57
- TH16-58
- TH16-59
- TH16-61
- Copy of TH16 locality data.xlsx

	A	B	C	D	E	F	G	H	I
1	FIELD NO	DATE	LOCALITY	DRAINAGE	DISTRICT (AMP	PROVINCE (CHA	COUNTRY	LATITUDE	
2	TH16-01	10 Jan 2016	Khong River at Rt. 1095 approx. 7.5 km N	Pai River	Pai	Mae Hong Son	Thailand	19.424591	
3	TH16-02	10 Jan 2016	Khong River at Ban Huai San on Rt. 1095	Pai River	Pang Mapha	Mae Hong Son	Thailand	19.535783	
4	TH16-03	10 Jan 2016	Pai River at Mae Hong Son Inland Fisheries	Salween River	Mueang Mae H	Mae Hong Son	Thailand	19.255453	
5	TH16-04	11 Jan 2016	Surin River approx. 1.5 km N of Ban Mae S	Pai River	Khun Yuam	Mae Hong Son	Thailand	18.927690	
6	TH16-05	11 Jan 2016	Yuam River at Ban Mae Tia on Rt. 108	Salween River	Mae La Noi	Mae Hong Son	Thailand	18.298351	
7	TH16-06	12 Jan 2016	Market at Mae Sariang	Salween River	Mae Sariang	Mae Hong Son	Thailand	18.158562	
8	TH16-07	12 Jan 2016	Sam Laep River at Ban Mae Sam Laep	Salween River	Sop Moei	Mae Hong Son	Thailand	17.978262	
9	TH16-08	12 Jan 2016	Moei River at Rt. 105 approx. 7 km SE of E	Salween River	Tha Song Yang	Tak	Thailand	17.516345	
10	TH16-09	15 Jan 2016	Mae Chaem River at Rt. 108 bridge approx	Ping River	Hot	Chiang Mai	Thailand	18.222638	
11	TH16-10	15 Jan 2016	Mae Chaem River at Ban Om Kood on Rt.	Ping River	Mae Chaem	Chiang Mai	Thailand	18.276885	
12	TH16-11	17 Jan 2016	Yom River SSW of Ban Nong Muang Khai	Nan River	Nong Muang Kl	Phrae	Thailand	18.252339	
13	TH16-12	17 Jan 2016	Yom River below dam at Ban Nun Nuea	Nan River	Song	Phrae	Thailand	18.484272	
14	TH16-13	18 Jan 2016	Yom River approx. 3 km N of Ban Khlong	Nan River	Sawankhalok	Sukhothai	Thailand	17.200491	
15	TH16-14	18 Jan 2016	Yom River at bridge off Rt. 101 approx. 3	Nan River	Si Satchanalai	Sukhothai	Thailand	17.551068	
16	TH16-15	19 Jan 2016	Khwa Noi River off Rt. 1026 approx. 7.5	Nan River	Wat Bot	Phitsanulok	Thailand	17.035996	
17	TH16-16	19 Jan 2016	Wang Thong River at Rt. 12 approx. 22 km	Krong Kreng Ri	Wang Thong	Phitsanulok	Thailand	16.852211	
18	TH16-17	19 Jan 2016	Nan River at Ban Bang Sai on Rt. 1063	Chao Phraya R	Mueang Phitsar	Phitsanulok	Thailand	16.682376	
19	TH16-18	20 Jan 2016	Pa Sak River at Rt. 12 bridge	Chao Phraya R	Lom Sak	Phetchabun	Thailand	16.729801	
20	TH16-19	20 Jan 2016	Loei River at Loei	Mekong River	Mueang Loei	Loei	Thailand	17.508872	
21	TH16-20	20 Jan 2016	Loei River at bridge S of Ban Wang Saphur	Mekong River	Wang Saphung	Loei	Thailand	17.287783	
22	TH16-21	21 Jan 2016	Kong Si River at bridge ESE of Ban Kumph	Lam Pao River	Kumphawapi	Udon Thani	Thailand	17.096920	
23	TH16-22	21 Jan 2016	Phai Chan Yai River at Rt. 2035 bridge	Lam Pao River	Nong Han	Udon Thani	Thailand	17.216134	
24	TH16-23	22 Jan 2016	Luang River at bridge N of Ban Sam Phrao	Mekong River	Mueang Udon T	Udon Thani	Thailand	17.455778	
25	TH16-24	22 Jan 2016	Mong River at Rt. 2348 bridge	Mekong River	Ban Phue	Udon Thani	Thailand	17.712757	
26	TH16-25	22 Jan 2016	Mekong River at NNW edge of Ban Phon S	South China Se	Tha Bo	Nong Khai	Thailand	17.819783	
27	TH16-26	23 Jan 2016	Mekong River at Nong Khai	South China Se	Mueang Nong k	Nong Khai	Thailand	17.882349	
28	TH16-27	24 Jan 2016	Mekong River approx. 70 km NW of Tha B	South China Se	Sangkhom	Nong Khai	Thailand	18.111062	
29	TH16-28	24 Jan 2016	Trib. of Mekong River at Rt. 211 bridge ap	Mekong River	Sangkhom	Nong Khai	Thailand	18.151070	
30	TH16-29	24 Jan 2016	Mekong River at confluence with Mong Ri	South China Se	Tha Bo	Nong Khai	Thailand	17.851984	
31	TH16-30	25 Jan 2016	Songkhram River at bridge W of Ban Na Si	Mekong River	Charoen Sin	Sakon Nakhon	Thailand	17.729470	
32	TH16-31	25 Jan 2016	Un River at Rt. 222 bridge	Songkhram Riv	Phang Khon	Sakon Nakhon	Thailand	17.442618	
33	TH16-32	26 Jan 2016	Un River at bridge approx. 3 km E of Ban	Songkhram Riv	Na Wa	Sakon Nakhon	Thailand	17.480165	
34	TH16-33	26 Jan 2016	Songkhram River near confluence with Ur	Mekong River	Si Songkhram	Nakhon Phanom	Thailand	17.634146	
35	TH16-34	27 Jan 2016	Trib. of Mekong River downstream of Rt.	Mekong River	Mueang Bueng	Bueng Kan	Thailand	18.332383	
36	TH16-35	27 Jan 2016	Mekong River at Ban Tha Pho on Rt. 212	South China Se	Mueang Bueng	Bueng Kan	Thailand	18.338504	
37	TH16-36	27 Jan 2016	Mekong River at Ban Huai Sueam Nuea or	South China Se	Mueang Bueng	Bueng Kan	Thailand	18.416475	
38	TH16-37	28 Jan 2016	Mao River below dam at Rt. 212 bridge ap	Mekong River	Mueang Bueng	Bueng Kan	Thailand	18.282598	
39	TH16-38	28 Jan 2016	Mekong River at Ban Bung Khla	South China Se	Bung Khla	Bueng Kan	Thailand	18.301226	
40	TH16-39	28 Jan 2016	Thuai River at Rt. 212 bridge S of Tha Uth	Mekong River	Tha Uthen	Nakhon Phanom	Thailand	17.562192	
41	TH16-40	28 Jan 2016	Bo River at confluence with Mekong River	Mekong River	Mueang Nakhon	Nakhon Phanom	Thailand	17.490645	

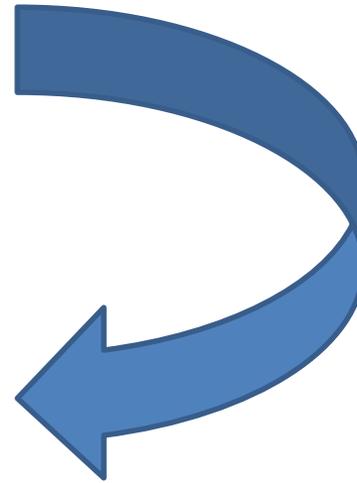
Storage

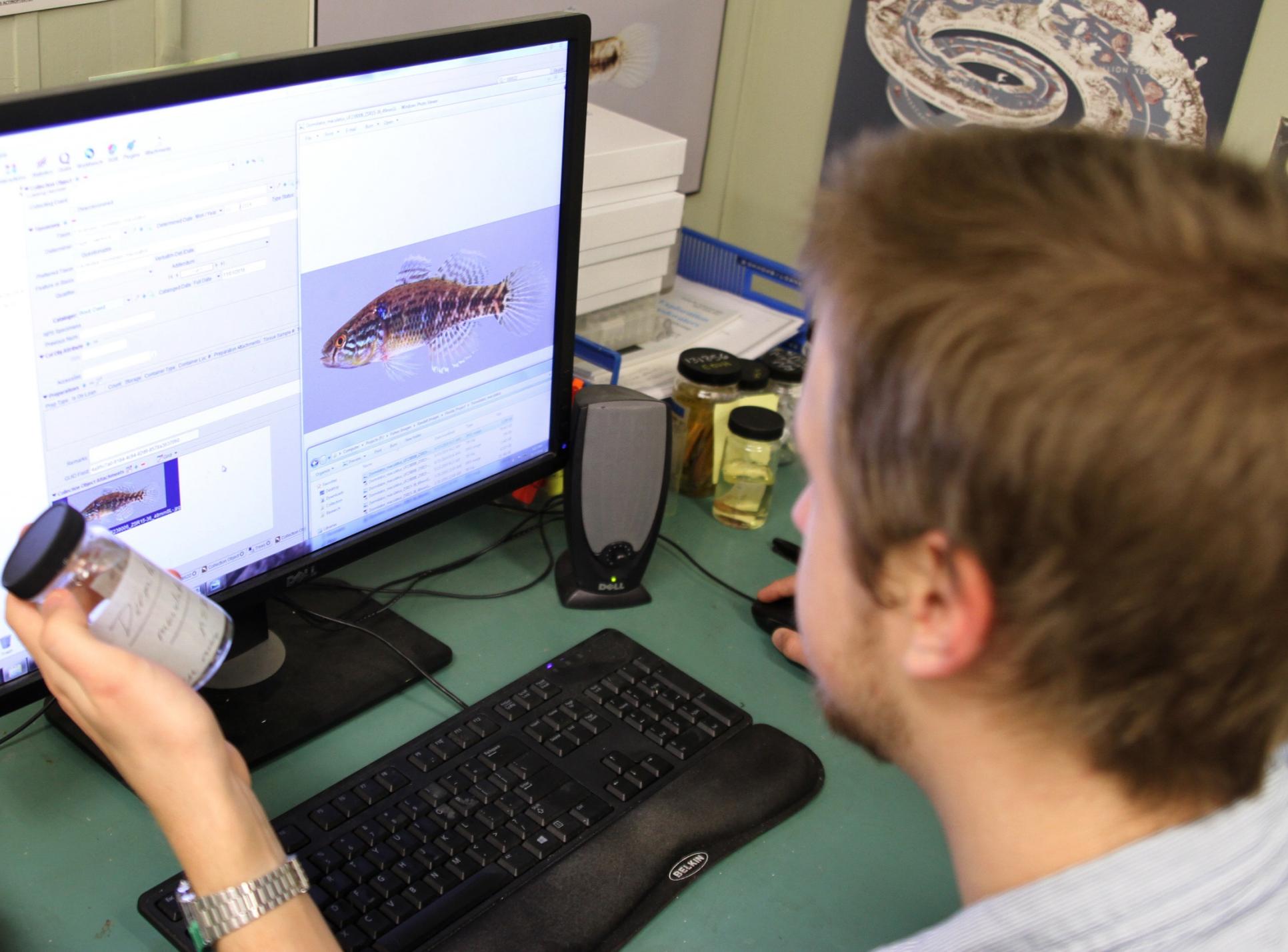
Field photography

External hard drives

Lab photography

Internal Network Drive





File Naming

Field (use Field number)

Default image number (IMG_4137)

Cataloged

- Institution_Collection Code_Catalog number_Field number

UF_Fish_192227_TH18-15

- Or collection image: Institution_Collection Code_Catalog number

UF_Fish_192227_Head

Create/L

 Col Col Tax Age Geo Loc Mor

Record :

 All Har Lep

Preparations

Prep Ty...	Is On Lo...	Co...	Stora...	Container T...	Container Lo...	Preparation Attachm...	Tissue Sampl...	Tissue Sou...
EtOH	No	33		standard jar				
photo	No	1						
tissue	No	1					ICH-00062	Left pectoral
tissue	No	1					ICH-00060	Right pelvic

Remarks:

GUID Field: ff7c51db-4161-453a-bdd0-18ad1cd266ee

Collection Object Attachments Grid ▼



Gagata_dolichonema_UF188261_TH16-07_IMG_5531.jpg

 Welcome × taxon query × Query Results × Collection Object ×

Trash

 Welcome × taxon query × Query Results × Collection Object ×

Specify Online Web portal

FLMNH Fishes Specify Web Portal



Records

Images

Map

Preview (100 of 1797 items)



FLORIDA MUSEUM
Ichthyology Collection

Search Tools

Geo Coords Images

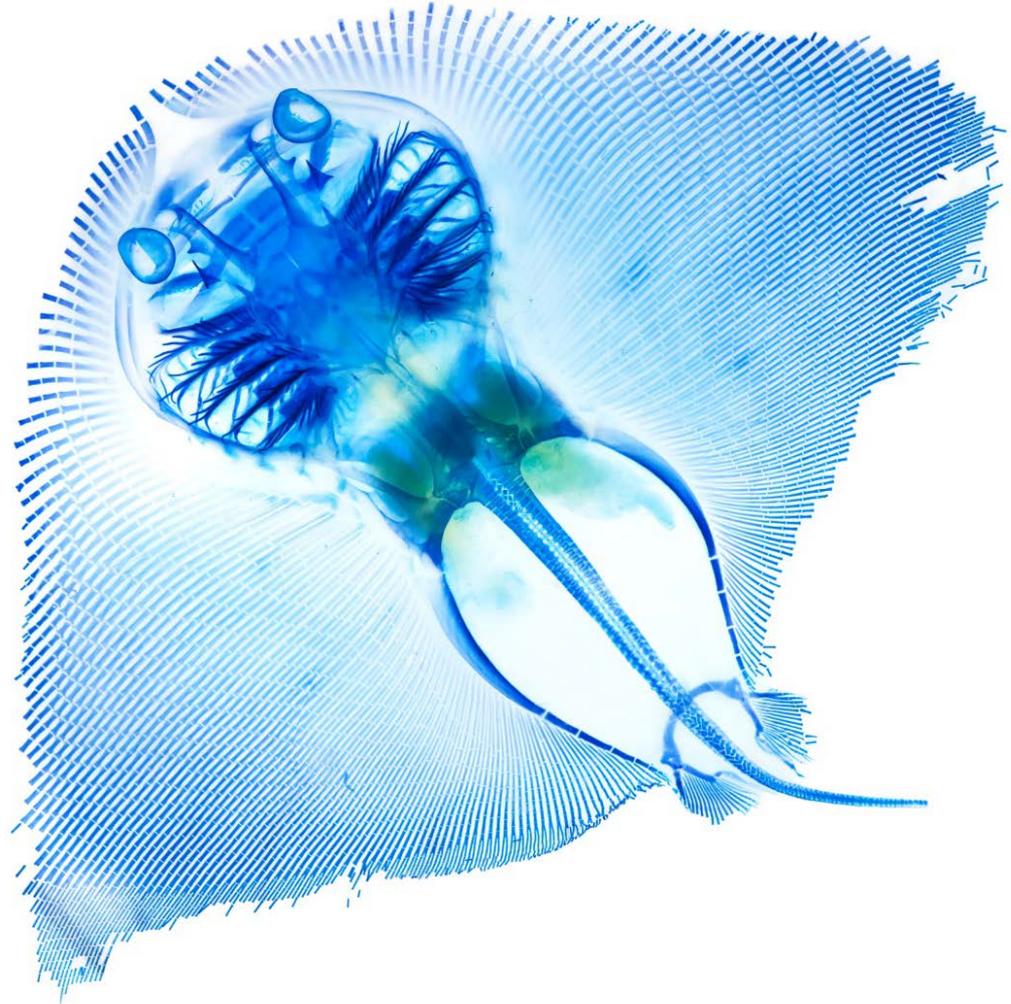
Advanced

Catalog Number:		=	▼
Genus:		=	▼
Species:		=	▼
Subspecies:		=	▼
Type Status:		=	▼
Preparations:		=	▼
Continent:		=	▼
Country:		=	▼
State:		=	▼
County:		=	▼
Locality:		=	▼
Drainage:		=	▼
Depth of Capture:		=	▼
Latitude:		=	▼
Longitude:		=	▼

Email: zrandall@flmnh.ufl.edu



@Zach__Randall



Getting Started

Find & Download Datasets

BROWSE or

enter search terms 

Useful Info

- [About MorphoSource](#)
- [Information for Users](#)
- [Information for Contributors](#)
- [Terms](#)
- [User Guide](#)

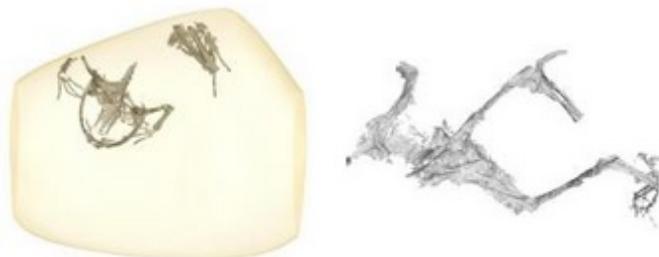
LOGIN OR REGISTER

Recently Published

Frogs in amber from the Cretaceous of Myanmar

[See all project specimens](#)

[Read the published article](#)



foot of Daubentonia madagascariensis scanned at 38micron resolution at Duke Evolutionary Anthropology department's new high resolution microCt facility. [Click here if you are interested in details on the facility](#)

Welcome

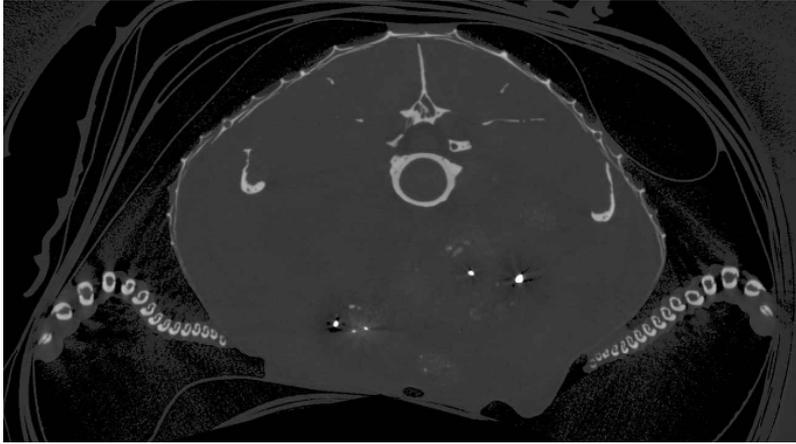
MorphoSource is a project-based data archive that allows researchers to store and organize, share, and distribute their own 3d data. Furthermore any registered user can immediately search for and download 3d morphological data sets that have been made accessible through the consent of data authors.

The goal of MorphoSource is to provide rapid access to as many researchers as possible, large numbers of raw microCt data and surface meshes representing vouchered specimens.

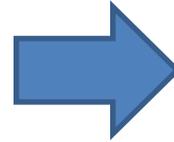
File formats include tiff, dicom, stanford ply, and stl. The website is designed to be self explanatory and to assist you through the process of uploading media and associating it with meta data. If you are interested in using the site for your own data but have questions about security or anything else contact the site administrator.

Otherwise please download whatever data you need and check back frequently to see what's new.

Import Specimen Metadata



NEW SPECIMEN



UF-Fish-166109



iDigBio Results

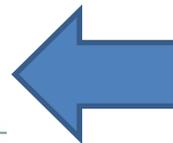
Showing 1 iDigBio Result

uf-fish-166109, *balitoropsis ophiolopis*

[View on iDigBio](#)

IMPORT SPECIMEN

Darwin Core
Metadata

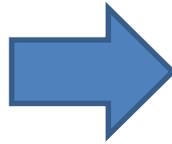


Search API

Data Tracking/Reporting



UF-Herp-64720
(M38313)



RSS Feed (via referenceID)
Media/Downloads/Requests
Audobon Core Metadata



Add to IPT

Specimen Record

Animalia > Chordata > Amphibia > Anura

Conraua goliath

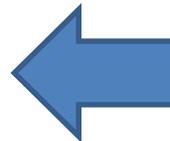
From University of Florida Herpetology



Continent Africa
Country Cameroon
Locality Or Equatorial Guinea

Institution Code Uf
Collection Code Herp
Catalog Number 64720

Media



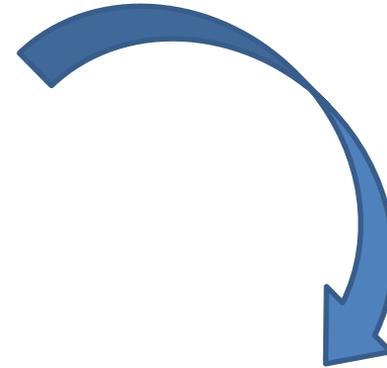
2D Imaging/Specify

UF 10138



Specimen

Catalog Number	10138
Preparations	photo - 1; CT Scan - 1; EtOH - 38
Institution Code	UF
Collection Code	Fish
Occurrence ID	93012271-2DB8-4603-B313-753246039C78
Basis of Record	PreservedSpecimen



New Prep Type: CT Scan

Preparations

Prep Ty...	Is On Lo...	Co...	Stora...	Co
CT Scan	No	1		
EtOH	No	38		st
photo	No	1		

Remarks: Original n=41; count made 08/08/2017, n=38. One Loan 06141); one maintained in vial, presumably by

GUID Field: 93012271-2DB8-4603-B313-753246039C78

Collection Object Attachments

UF_10138_Codoma_ornata_IMG_0040_cropped.jpg

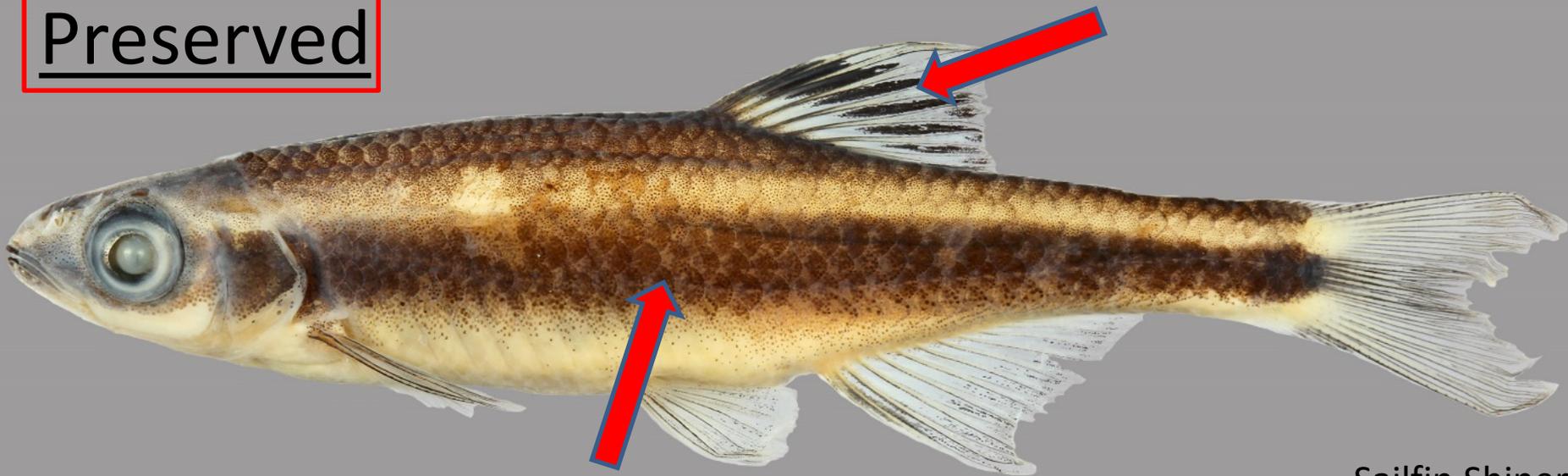
Welcome | taxon query | Query Results



Alive

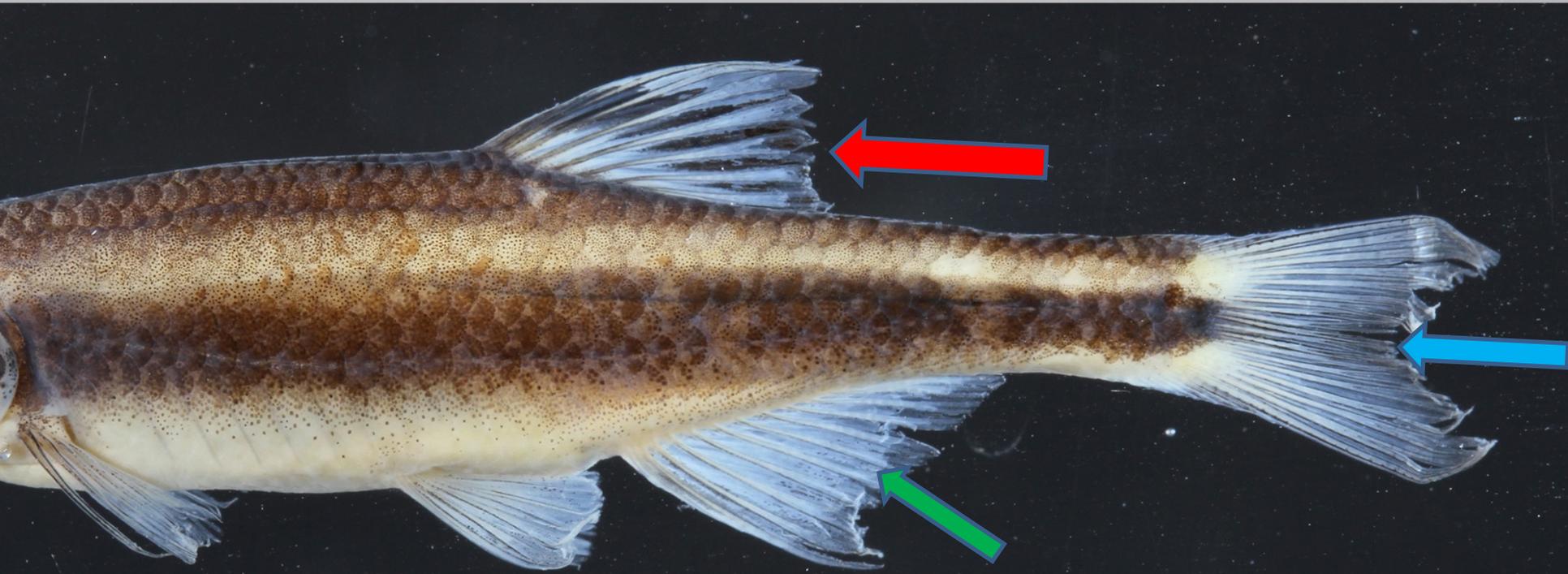
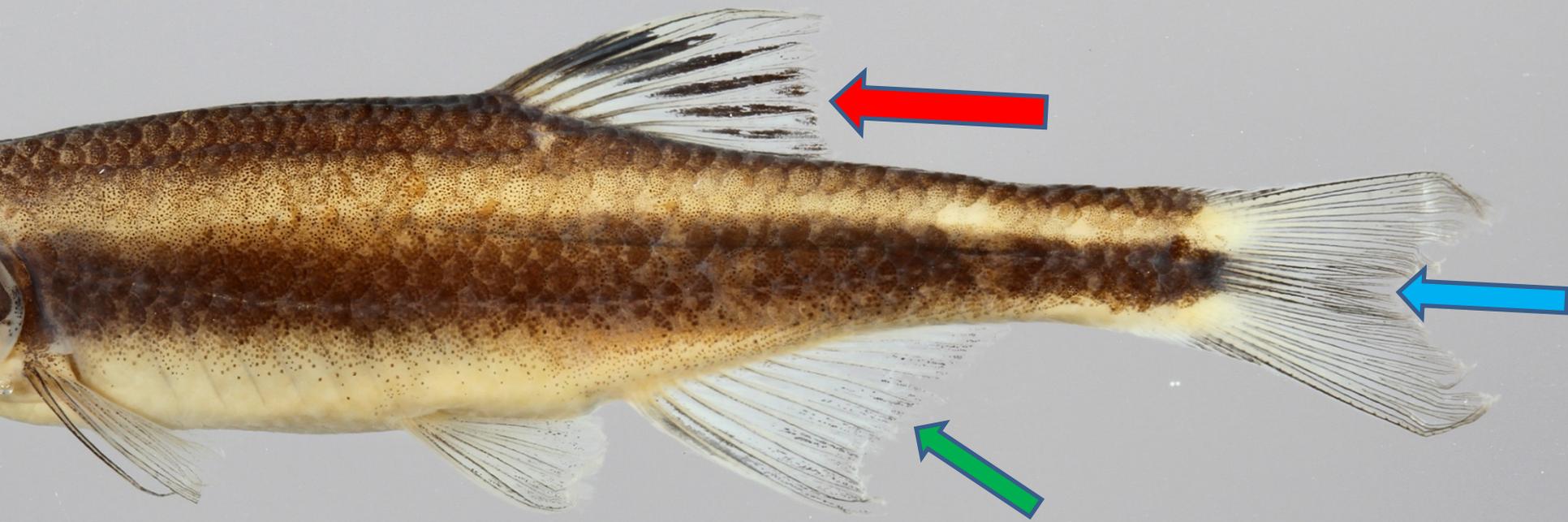


Preserved



Sailfin Shiner
UF 187751





- ★ Favorites
- Downloads
- Desktop
- Dropbox
- Timeline Explorer
- Recent Places
- Libraries
 - Documents
 - Music
 - Pictures
 - Videos
- Computer
 - Local Disk (C:)
 - Removable Disk (E:)
 - Projects (P:)**
 - Shared3 (R:)
 - Shared (S:)
 - zach150 (U:)
- Network

- Name
- Erethistes_filamentosus
 - Gagata_dolichonema
 - Gonorynchus_bicornis
 - Opsarius_infracasciatus
 - Osteobrama_cunma
 - Parambassis_vollmeri
 - Random
 - Schistura_poculi
 - IMG_5476.CR2
 - IMG_5476.JPG
 - IMG_5477.CR2
 - IMG_5477.JPG
 - IMG_5478.CR2
 - IMG_5478.JPG
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 - IMG_5479.JPG
 - IMG_5480.CR2
 - IMG_5480.JPG
 - IMG_5481.CR2
 - IMG_5481.JPG
 - IMG_5482.CR2
 - IMG_5482.JPG
 - IMG_5483.CR2
 - IMG_5483_USE.JPG
 - IMG_5484.CR2
 - IMG_5484.JPG
 - IMG_5485.CR2
 - IMG_5485.JPG
 - IMG_5486.CR2
 - IMG_5486_USE.JPG**
 - IMG_5489.JPG

Type: JPG File
Size: 1.45 MB
Date modified: 1/11/2016 10:30 AM



IMG_5486_USE.JPG Date taken: 1/11/2016 10:30 AM
JPG File Tags: Add a tag

Rating: ☆☆☆☆☆
Dimensions: 2592 x 1728

Size: 1.45 MB
Title: Add a title

Authors: Add an author
Comments: Add comments

Offline availability: Not available
Offline status: Online

- Name
- IMG_5531_USE.JPG
- IMG_5532.JPG
- IMG_5532.CR2
- IMG_5530.JPG
- IMG_5530.CR2
- IMG_5529.JPG
- IMG_5529.CR2
- IMG_5528.JPG
- IMG_5528.CR2
- IMG_5527.JPG
- IMG_5527.CR2
- IMG_5526.JPG
- IMG_5526.CR2
- IMG_5525.JPG
- IMG_5525.CR2
- IMG_5524.JPG
- IMG_5524.CR2
- IMG_5531_84mmSL.tif
- Gagata_gasawyuh_TH16-07_IMG_5531_84mmSL.png
- Gagata_gasawyuh_TH16-07_IMG_5531.tif
- Gagata_dolichonema_UF188261_TH16-07_IMG_5531....
- Gagata_dolichonema_UF188261_TH16-07_IMG_5531....



31_USE.JPG Date taken: 1/11/2016 11:17 AM Rating: ☆☆☆☆☆ Dimensions: 2592 x 1728 Size: 741 KB Title: Add a title Authors: Add an author Comments: Add comments Offline availability: Not available Offline status: Online Camera maker: Canon

Genus_species_UF_Catalog#_IMG#

- Name
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- Gagata_dolichonema_UF188261_TH16-07_IMG_...
- Gagata_gasawyuh_TH16-07_IMG_5531.tif
- Gagata_gasawyuh_TH16-07_IMG_5531_84mmSL
- Gagata_gasawyuh_TH16-07_IMG_5531_84mmSL
- IMG_5524.CR2
- IMG_5524.JPG
- IMG_5525.CR2
- IMG_5525.JPG
- IMG_5526.CR2
- IMG_5526.JPG
- IMG_5527.CR2
- IMG_5527.JPG
- IMG_5527_Scale_84mmSL.tif
- IMG_5528.CR2
- IMG_5528.JPG
- IMG_5529.CR2
- IMG_5529.JPG
- IMG_5530.CR2
- IMG_5530.JPG
- IMG_5531_USE.JPG
- IMG_5532.CR2
- IMG_5532.JPG

Gagata_gasawyuh_TH16-07_IMG_5531_84mmSL.tif
Type: TIF File
Size: 83.2 MB
Date modified: 6/28/2016 1:27 PM



_gasawyuh_TH16-07_IMG_5531_... Date taken: 1/11/2016 11:17 AM
Tags: Add a tag

Rating: ☆☆☆☆☆
Dimensions: 5184 x 3456

Size: 83.2 MB
Title: Add a title

Authors: Add an author
Comments: Add comments

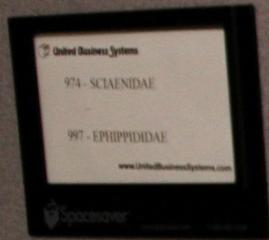
Offline availability: Not available

Camera settings

- Manual mode, ISO 100, F.11, Shutter 1/200th
- File types: RAW & JPG (low-med resolution)
- Automatic white balance (shoot with WhiBal gray card when possible)



Collection imaging



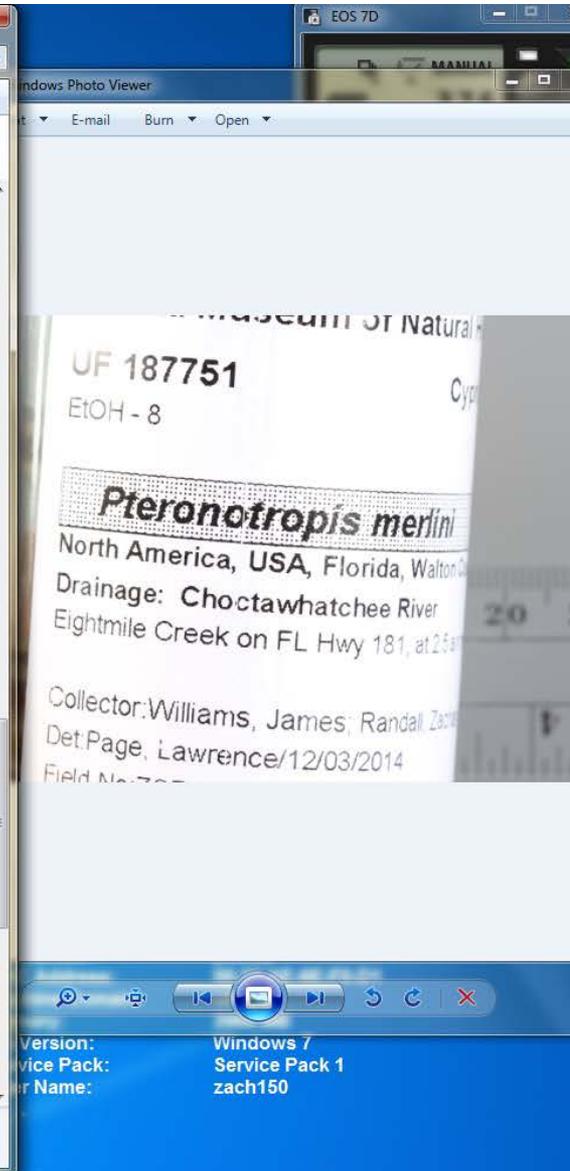
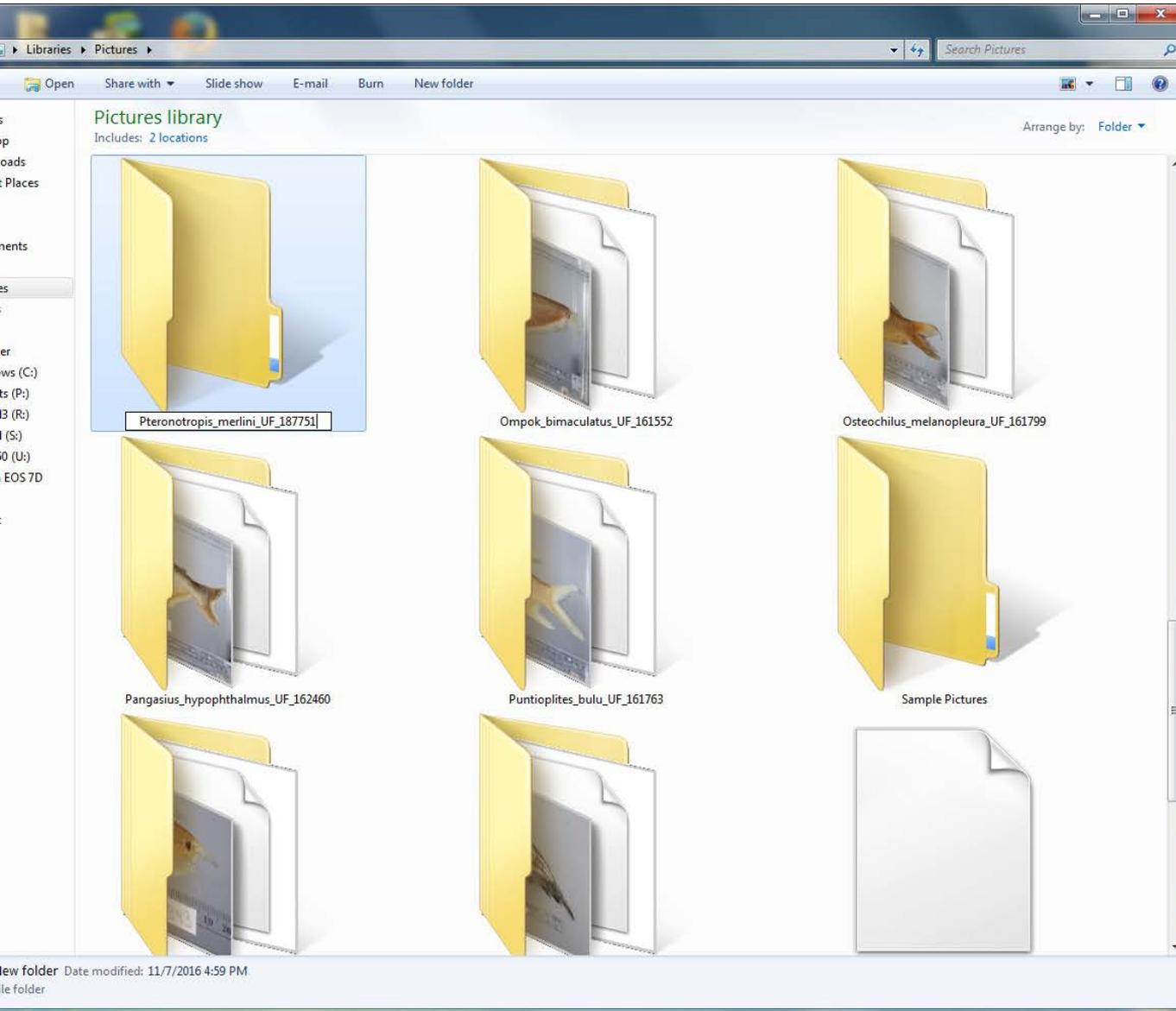
53





Camera is tethered to Canon Utilities (default camera software)

Recommended to automatically import images to Lightroom (adjust exposure, add metadata, and convert RAW file to DNG)



Unedited jpg (3MB)+RAW (21 MB)



13

14

15

16

17

18

Unedited jpg (3MB)+RAW (21 MB)



Genus_species_UF_Catalog#_IMG#

Create/Update

- Collection Object
- Collecting Event
- Taxon
- Agent
- Geography
- Locality
- More Forms
- Record Sets**
- All Lepomis tissue
- Handpaint
- Lepomis tissue

Collection Object + -

 Deaccessioned

Taxonomy + -

Taxon: CurrentDeterminer: Determined D... Type Sta... QuestionablePreferred Ta... Feature or B... Verbatim Det./... Qualifier: Addendum:

1 of 1

Grid

Cataloger: Cataloged D... NPS SpecimensPrevious Num:

Col Obj Attribute + -

Size: Accession:

Preparations + -

Prep Ty...	Is On Lo...	Co...	Stora...	Container T...	Container Lo...	Preparation Attachm...	Tissue Sampl...	Tissue Sou...	Invent...
EtOH	No	8		standard jar					Found



Form

Remarks: GUID Field:

Collection Object Attachments Grid



Pteronotropis_merlini_UF_187751_IMG_0221.JPG

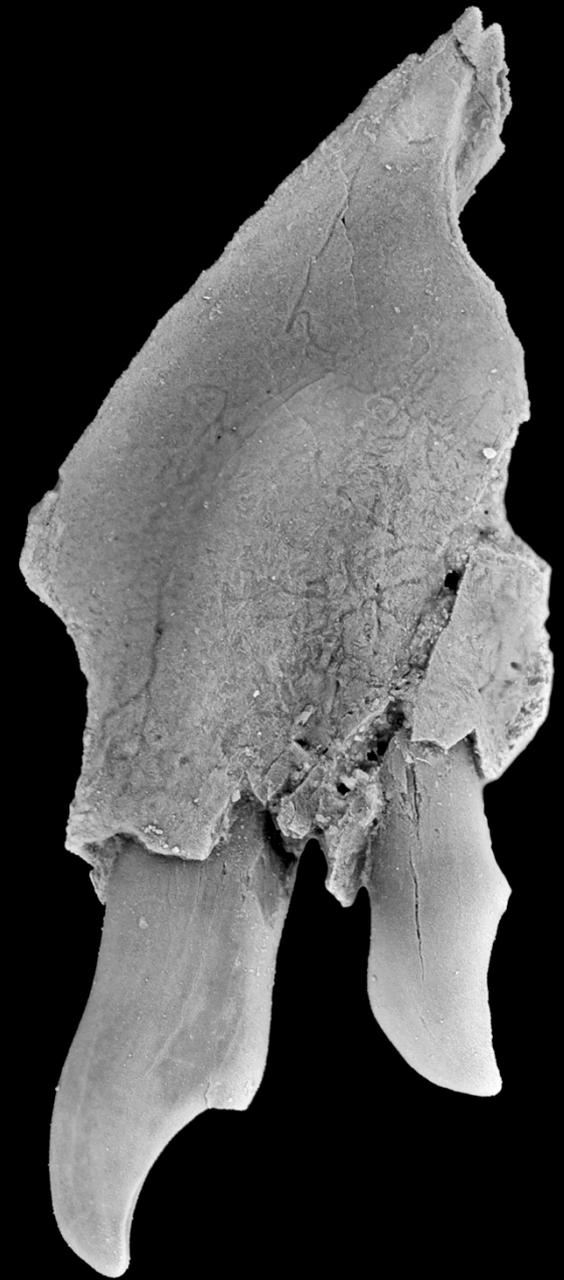
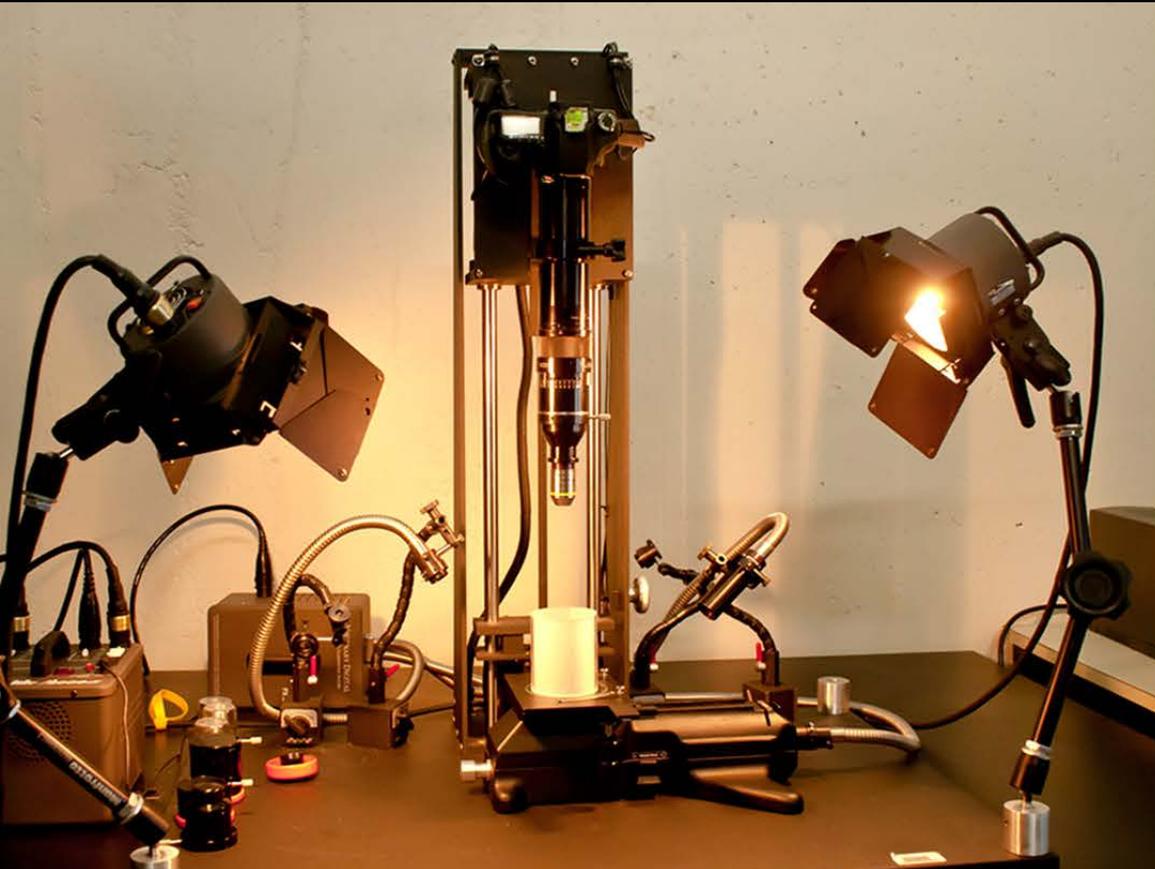
1 of 1



Trash

Macrophotography

- Automated copy stand with stacking capabilities
- Nice images of specimens ca. 1 mm



2 mm

Type Species



Type specimen



Type species

Tissue Vouchers

GenBank



[Syncrossus beauforti isolate CTOL01535 interphotoreceptor retinoid-binding protein 2 \(IRBP2\) gene, exon 1 and partial cds](#)

849 bp linear DNA

Accession: FJ650482.1 GI: 257124439

[Protein](#) [PubMed](#) [Taxonomy](#)

[GenBank](#) [FASTA](#) [Graphics](#) [PopSet](#)

[Syncrossus beauforti isolate CTOL01535 rhodopsin \(RH\).gene., partial cds](#)

768 bp linear DNA

Accession: FJ650470.1 GI: 257124415

[Protein](#) [PubMed](#) [Taxonomy](#)

[GenBank](#) [FASTA](#) [Graphics](#) [PopSet](#)



[Syncrossus beauforti isolate CTOL01535 early growth response 3 \(EGR3\).gene, exon 2 and partial cds](#)

900 bp linear DNA

Accession: FJ650456.1 GI: 257124264

[Protein](#) [PubMed](#) [Taxonomy](#)

[GenBank](#) [FASTA](#) [Graphics](#) [PopSet](#)

[Syncrossus beauforti isolate CTOL01535 early growth response 2B \(EGR2B\).gene, exon 2 and partial cds](#)

795 bp linear DNA

Accession: FJ650440.1 GI: 257124232

[Protein](#) [PubMed](#) [Taxonomy](#)

[GenBank](#) [FASTA](#) [Graphics](#) [PopSet](#)

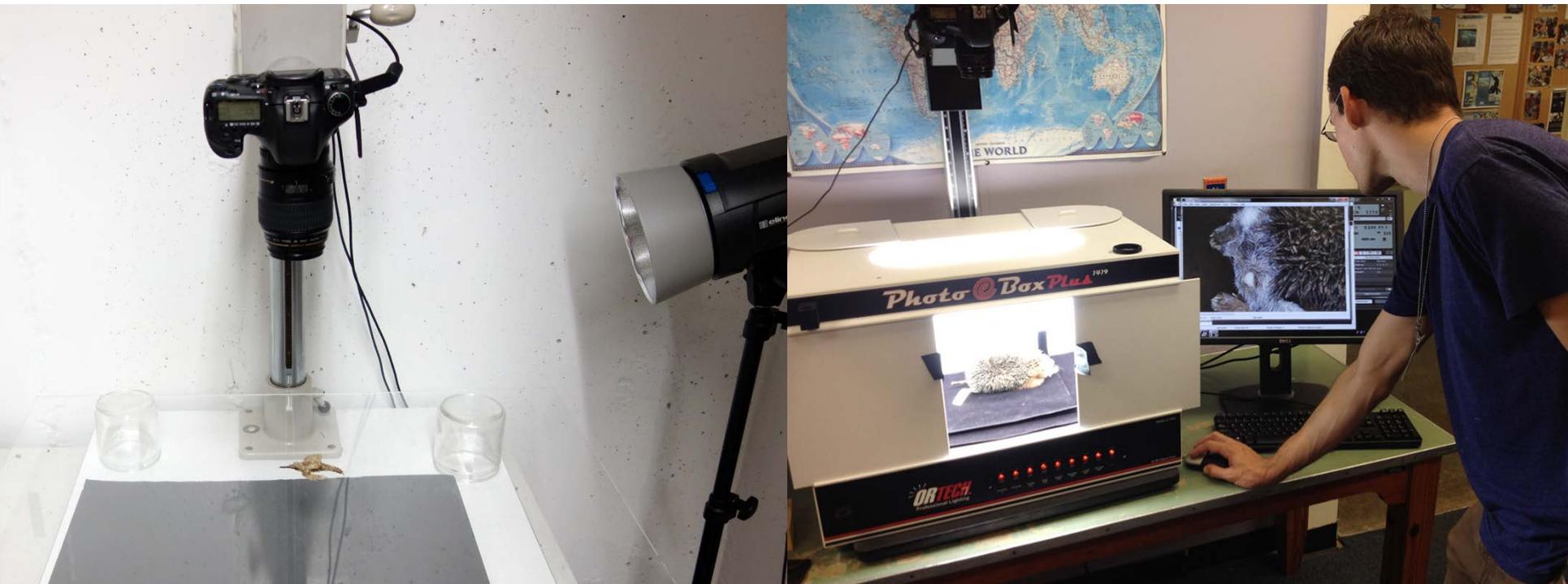
Lighting

Copy Stand

- Flash, **Continuous**
- Shadows, **No shadows**
- Contrast, **Diffused light**

Light box

- Continuous
- No shadows
- Diffused light



Diffused light



1 inch

Florida Museum of
Natural History

3 cm

Direct light



1 inch

Florida Museum of
Natural History

3 cm

Diffused light



1 inch

Florida Museum of
Natural History

3 cm

Direct light



1 inch

Florida Museum of
Natural History

3 cm