Tsetse R01 Progress Report

Sampling and Databasing

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Contents

Specimen database

A multitude of data is associated with each fly collected. The type of information includes the list of tissues collected, the collection date, village name and location, sex, species, trap number, infection status, notes on human activity surrounding the trap, and more. All of this information needs to remain tied to all specimens, materials, and *data* derived from these as the project goes forward.

We are designing and implementing a custom database and web application to manage, track, and facilitate analysis of the thousands of specimen tubes associated with this project that will be generated and exist already. The system consists of a web-based user interface, two SQL-based relational databases, and a layer of custom python functions that connect the two. The web-based

interface uses the open-source Bootstrap web interface components. One SQL database will act as the official storage system for the specimen data, while the second will manage checkout requests by our researchers and update the main storage database upon validation. The custom python code is based on the open-source Flask web-microframework. This code manages the two databases according to requests made through the web-interface. It also manages user registration and permissions along with site-security. Finally, it will also allow us to easily design and run complex analyses with the specimen data encoded in the main database.

Collections Overview

Study sites

The surveys were done in the Ugandan districts of Kole, Oyam, Nwoya, Amuru, Adjumani, Moyo, Arua, Kitgum, Lamwo, and Pader. Additional information on tsetse population distribution was obtained from the District Entomology Offices of the relevant districts.

Data collection

Trapping for tsetse flies were carried out using biconicals traps (Challier, A and Laveissiere 1973). The coordinates for each trap site were taken using a hand-held GPS. Vegetation types and human activities at the trapping sites were also recorded. Each village is at least 5km apart; a single village is taken to be a trapping site (with a number of traps deployed in each).

Dissection and examination

Trapped flies were identified, sexed, counted, recorded and transported to a field dissection site. Live flies were dissected and examined microscopically to determine the presence/absence of trypanosomes in the midguts/salivary glands. The midguts, fly carcass, reproductive parts, and heads were then preserved in parafilm-sealed and labeled cryo-tubes in either 90% ethanol or RNA-preservation solution for further molecular studies.

Collection Results Summary

Kole District (`2014-03-22 to 2014-03-30`)

Five villages were surveyed (Olepo [OLE], Mwanya [MWA], Akayo-debe [AKA], Aputu-Lwaa [APU], and Ocala [OCA]) with a total of 40 traps. 1227 *Gff* were captured (564 M and 663 F) and yielded five infected individuals (1.2% estimated infection rate).

Oyam District (`2014-05-17 to 2014-05-22`)

Nine villages were surveyed (Ocala [OCA], Odworo [OD], Alege [ALE], Acankoma [ACA], Oguk [OGU], Agoba B [AG], Abok[ABO], Ocol [OCL] and Opuyu [OPU]) with 32 traps. 715 *Gff* were captured (298 M and 417 F) and yielded 10 infected individuals (3.0% estimated infection rate).

Oyam and Kole Districts (2014-07-14 to 2014-07-21)

This survey targeted sites that produced infected flies from the previous surveys. The field team deployed 27 traps across four villages that were divided between the two districts: **Oyam:** (Ocala [OCA], Odworo [OD], Acankoma [ACA]) and **Kole:** (Akayodebe [AKA]).

1198 *Gff* were captured (432 M and 766 F) and yielded 27 infected individuals (4.38% estimated infection rate).

Nwoya District (2014-07-22 to 2014-07-26)

The field team deployed 20 traps across two villages (the Uganda Wildlife Authority [UWA] and Te-Okot [TEO]). *Gp* and *Gmm* were trapped in this region in addtion to *Gff*; however only the data for *Gff* is reported here. 728 *Gff* were captured (291 M and 437 F) and three were positive by microscopic examination.

Amuru District (2014-07-27 to 2014-07-29)

Two villages were surveyed (Gorodona [GOR] and Okidi south [OKS]) using 18 traps. 243 *Gff* were captured (67 M and 176 F) and yielded no infected individuals.

Adjumani District (2014-07-30 to 2014-08-02)

Three villages were surveyed (Olobo [OLO], Olwi [OLW], Osugo East and West [OSG]) with 20 traps. 182 *Gff* were captured (60 M and 122 F) and yielded no infected individuals.

Moyo District (2014-06-16 to 2014-06-20)

Five villages were surveyed (Ori [ORI], Orubakulem [ORB], Lea [LEA], Cefo [CE],and Moyipi [MOP]) with 32 traps. 164 *Gff* were captured (63 M and 101 F) and yielded no infected individuals.

Arua District (2014-06-21 to 2014-06-26)

Seven villages were surveyed (Gangu [GAN], Aliodri [ALI], Jaiko [JIA], Duku [DUK], Wende [WEN], Aina [AIN], and Orivu [ORV]) with 34 traps. 681 *Gff* were captured (287 M and 394 F) and yielded three infected individuals (0.87% estimated infection rate).

Kitgum, Lamwo, and Pader Districts (2014-10-06 to 2014-10-19)

In the three districts combined, 534 *Gff* were captured (193 M and 341 F). 59 traps were deployed across 14 villiages. 330 flies were dissected and 5 were found to be infected (1.52% combined estimated infection rate)

Kitgum

Four villages were surveyed (Kitgum town council [KTC], Liba [LIB], Bola [BOL], Tumangu [TUM]) with 18 traps. 281 *Gff* were captured (120 M and 161 F), and 173 dissected. Four infected individuals were detected (2.31% estimated infection rate).

Lamwo

Four villages were surveyed (Lagwel [LAG], Ngomoromo [NGO], Pawor [PAW], Lakwala [LAK]) with 15 traps. 101 *Gff* were captured (37 M and 64 F), and 48 dissected. Zero infected individuals were detected.

Pader

Six villages were surveyed (Alim [ALI], Chua [CHU], Kilak [KIL], Aswa Bridge [ASW], Omido [OMI], Atanga Mission [ATM]) with 26 traps. 152 *Gff* were captured (39 M and 113 F), and 109 dissected. One infected individual was detected (0.92% estimated infection rate).

District	Collection End Date	Villages	Traps	Flies Collected	Males	Females	Flies Dissected	F
Kole	2014-03-30	5	40	1227	564	663	428	
Oyam	2014-05-22	9	32	715	298	417	336	
Kole & Oyam	2014-07-21	4	27	1198	432	766	617	
Nwoya	2014-07-26	2	20	728	291	437	252	
Amuru	2014-07-29	2	18	243	67	176	140	
Adjumani	2014-08-02	3	20	182	60	122	120	
Moyo	2014-06-20	5	32	164	63	101	106	
Arua	2014-06-26	7	34	681	287	394	346	
Kitgum	2014-10-19	4	18	281	120	161	173	
Lamwo	2014-10-19	4	15	101	37	64	48	
Pader	2014-10-19	6	26	152	39	113	109	

References

Challier, A and Laveissiere, C. 1973. “Un nouveau pie’ge pour la capture des glossines (Glossina: Diptera, Muscidae): description et essais sur le terrain.” *Cah ORSTOM Ser Ent Med Parasitol* 11: 251–62.