NEW YORK STATE

Parasitology Proficiency Testing Program

Blood Smears Only
14 May 2013

The purpose of the New York State Proficiency Testing Program in the category of Parasitology - Blood Smears Only is to monitor the performance of applicant laboratories that detect and identify parasites on blood films. This document reports the results for the May 2013 proficiency test in Blood Smears Only.

This category is divided into two sub-categories. **Parasite Identification** is intended for labs that identify parasites and report them to the species level on patient reports. **Parasite Screen** is intended for labs that report "Parasites Seen" and never report organisms to the species level on patient reports. Participants in both sub-categories examine the same samples, however the scoring criteria for the two sub-categories are different. When reading this critique, ensure that you are comparing your performance to other laboratories in your sub-category

Sample Preparation and Quality Control

All slides used in this test were prepared and stained by a commercial source. Samples of each test specimen were selected at random by the Parasitology Laboratory of the Wadsworth Center, NYSDOH, and were assayed for quality and confirmation of contents. Extensive quality control tests were also conducted by the supplying vendor and a detailed quality control report was submitted to the Parasitology Laboratory for inspection and verification. Samples were authenticated by 80% of participating laboratories and/or referee laboratories.

13B-F

Correct identification: *Trypanosoma brucei.*

Results of Participating Laboratories Who Perform Parasite Identification

	# of labs reporting	% of labs reporting	Referee results	Status
Trypanosoma brucei	21/21	100	10/10	Correct

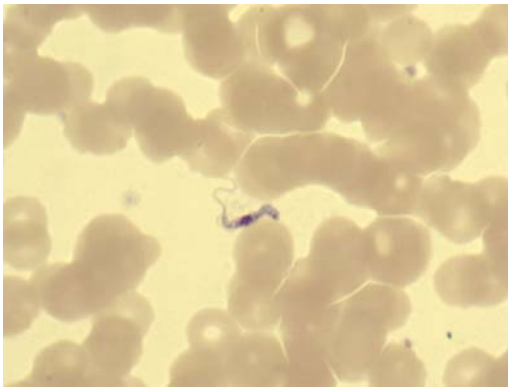
Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	3/3	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories agreed that ***Trypanosoma brucei*** was the correct response (100%). Quality control examination of 4% of this sample showed parasites in every 8-10 100 X oil immersion fields. They have a central nucleus and a small posterior kinetoplast. The overall staining quality is fair.

Diagnostic Characteristics



Trypanosoma brucei is the causative agent of African sleeping sickness. It is limited to the tsetse fly endemic area of Central Africa where it has caused serious economic and social problems. Trypomastigotes are detected in the blood on thick and thin giemsa stained smears. They measure 14-33 µm long and in some cases the undulating membrane and flagellum may be seen. The nucleus is located in the middle of the organism while the kinetoplast, and base of the flagella are located at the blunt posterior end. On a giemsa stained smear the cytoplasm will stain blue and the nucleus and kinetoplast will stain red or purple. Trypomastigotes of *T. cruzi* are similar but are generally shorter, have a 3-5X larger, more prominent kinetoplast at a pointed posterior end and often assume a C or U shape.

13B-G

Correct identification: *Plasmodium malariae.*

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Plasmodium malariae	16/21	76	6/10	Unauthenticated

Plasmodium vivax	1	5	1	No Penalty
Plasmodium sp.	1	5	0	No Penalty
No Parasites Seen	3	14	3	Incorrect

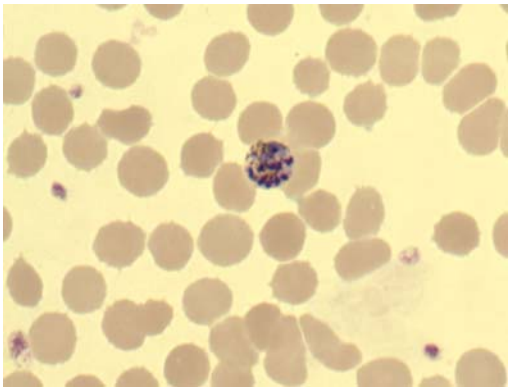
Results of Participating Laboratories Who Perform Parasite Screen

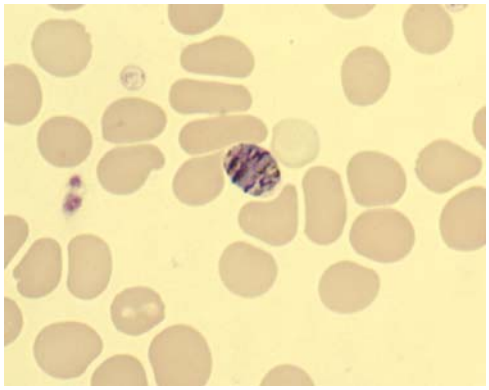
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	3/3	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories failed to agree that ***Plasmodium malariae*** was the correct response (76 and 60%) but did authenticate this sample to the genus level (86 and 70%). Quality control examination of 4% of this sample showed parasites in every 15-20 100 X oil immersion fields. Infected cells are not enlarged and no stippling is present. The predominant stages seen were mature trophozoites and schizonts. The overall staining quality is good.

Diagnostic Characteristics





Plasmodium malariae is the least common species of malaria to infect humans, and is sporadic in distribution. It tends to infect older red blood cells and so the parasitemia is often low. The ring stage is short lived so it is not usually seen. The most common stages seen are mature trophozoites and schizonts. The infected cells are not enlarged and may actually be smaller than uninfected cells. There is no stippling. The trophozoites are not amoeboid and often appear as compact rounded or band forms. The schizonts contain 6-12 merozoites usually arranged in a rosette although they may be in an irregular cluster.

Correct identification: No Parasites Seen.

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
No Parasites Seen	20/21	95	10/10	Correct
Plasmodium vivax	1	5	0	Incorrect

Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
No Parasites Seen	3/3	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories agreed that **No Parasites Seen** was the correct response (90 and 100%). Quality control examination of 4% of this sample showed erythrocytes of normal size and staining characteristics. Normal blood elements are present and exhibit typical staining characteristics. The overall staining quality is good

13B-I

Correct identification: *Loa loa*.

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Loa loa	5/21	24	3/10	Unauthenticated
Mansonella sp.	14	67	7	No Penalty
Microfilaria seen	1	5	0	No Penalty

No Parasites Seen	1	5	0	Incorrect

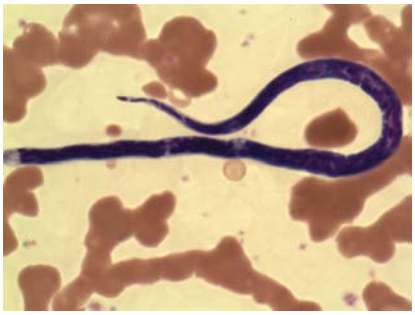
Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	3/3	100	10/10	Correct

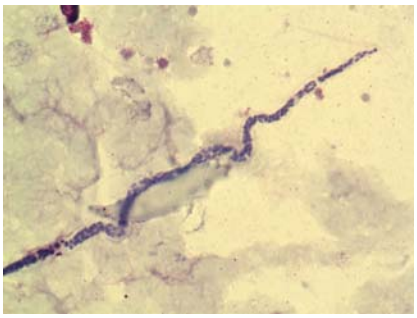
Quality Control and Referee Information

Participating and referee laboratories failed to agree that ***Loa loa*** was the correct response (24 and 30%) but did agree that microfilaria were present (95 and 100%). Quality control examination of 4% of this sample showed an average of 10 microfilaria per slide. Nuclei extend to the tapered tail tip but unfortunately the sheaths are not visible. The staining quality is fair.

Diagnostic Characteristics



Loa loa, also called the African eye worm, infects humans when they are bitten by infected deer or mango flies. The larvae are deposited into the bite wound and develop into adults within 6-12 months. Adults migrate beneath the conjunctiva or the skin, or through subcutaneous tissues. Years after the initial infection the adults give rise to microfilariae which can be detected in the blood. The microfilariae are sheathed and measure between 250-300 µm. They have nuclei that extend all the way to the tip of the tail.



This image of *Mansonella perstans* shows that they are much smaller, usually measuring 190-200 µm, than *Loa loa* and that although the nuclei of both organisms extend to the tail tip it is bluntly rounded in *Mansonella* and tapered in *Loa loa*.

13B-J

Correct identification: *Trypanosoma cruzi.*

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Trypanosoma cruzi	21/21	100	9/10	Correct

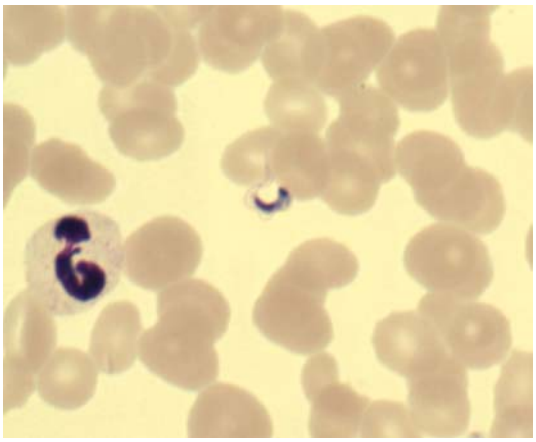
Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	3/3	100	10/10	Correct

Quality Control and Referee Information

Participating and Referee laboratories agreed that ***Trypanosoma cruzi*** was the correct response (100%). Quality control examination of 4% of this sample showed parasites in nearly every 100 X oil immersion field. They have a central nucleus and a large posterior kinetoplast. Both rounded and elongated forms were seen. The staining quality is good.

Diagnostic Characteristics



Trypanosoma cruzi is the causative agent of the zoonosis Chaga's disease. It is a major health problem in Latin America. The organism is transmitted through the feces of the reduviid bug when it takes a blood meal. Trypomastigotes are detected in the blood on thin and thick smears. They measure approximately 20 µm and usually are C or U shaped. The nucleus is located in the middle of the organism and a large kinetoplast (a network of mitochondrial DNA) is located at the posterior end. A flagellum arises from the posterior near the kinetoplast and follows the undulating membrane to the anterior end where it projects as a free flagellum. On giemsa stained smears the cytoplasm stains bluish while the nucleus and kinetoplast stain purple or red. *Trypanosoma cruzi* is distinguished from *Trypanosoma brucei* primarily by the prominence of the kinetoplast, which is much larger in *Trypanosoma cruzi.*

Scoring Information

Distribution of Scores

Score	# of labs	% of labs
100	19/24	79
80-89	5	21

Answer Key

Sample	Correct Answer	Points
13B-F	*Trypanosoma brucei*	20
13B-G	*Plasmodium malariae**	20
123-H	No Parasites Seen	20
13B-I	*Loa loa***	20
13B-J	*Trypanosoma cruzi*	20

* Validated to genus only
** Validated to microfilaria present only

TOTAL POSSIBLE POINTS 100

Grading

The answer key was derived from the response of all participating laboratories as per **CLIA Regulations**, Part 493, Subpart I, Section 493.917. These regulations can be viewed at www.phppo.cdc.gov. These regulations state that 80% or more of participating laboratories **or** referee laboratories must identify the parasite for it to be correct. Similarly, reporting of a parasite identified by less than 10% of the participating laboratories **or** referees finding parasites or ova is an incorrect response. Organisms reported by more than 10% but less than 80% of the participating laboratories **or** referees are "Unauthenticated", and are not considered for grading.

Each sample has a maximum value of 20 points. Credit is given according to the formula:

$$\frac{\text{Number of correct responses by lab}}{\text{\# Correct Parasites Present + \# Lab's Incorrect Answers}} \times 100$$

Important Reminders

The next Parasitology Proficiency Test is scheduled for **October 1, 2013.** You are responsible for notifying us **before October 8, 2013** if you do not receive your samples. Proficiency test results must

be electronically submitted through EPTRS by **October 15, 2013** or the laboratory will receive a score of zero. These requirements are stated in the NYS Proficiency Testing Handbook provided by the NYS Clinical Laboratory Evaluation Program or can be accessed via the Internet at:

http://www.wadsworth.org/labcert/clep/ProgramGuide/WebGuide.pdf