

NEW YORK STATE

Parasitology Proficiency Testing Program

Blood Smears Only 5 February 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 February 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-A

Correct identification: *Brugia malayi*.

Results of Participating Laboratories Who Perform Parasite Identification

	# of labs reporting	% of labs reporting	Referee results	Status
<i>Brugia malayi</i>	20/21	95	10/10	Correct
<i>Loa loa</i>	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	2/2	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories agreed that *Brugia malayi* was the correct response (95 and 100%). Quality control examination of 4% of this sample showed an average of 10 microfilaria per slide. They have a pink staining sheath and sub-terminal and terminal nuclei. The overall staining quality is good.

Diagnostic Characteristics



Brugia malayi is an arthropod-borne worm that resides in the lymphatic system of humans. Infection is spread by an arthropod intermediate host, in this case the mosquito. Adult female worms produce large numbers of sheathed larvae called microfilariae, which can be detected in the peripheral blood. These microfilariae range in size from 177-230 μm and have a clearly visible pink sheath when stained with Giemsa stain. *Wuchereria bancrofti* and *Loa loa* also have sheaths but they are not well stained with Giemsa. *Brugia malayi* is also characterized by the presence of two terminal nuclei the second of which is located in the tip of the tail. *Wuchereria bancrofti* has no nuclei in the tip of the tail while *Loa loa* has a continuous row of nuclei extending all the way to the tip.

13B-B

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	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
No Parasites Seen	2/2	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories agreed that **No Parasite Seen** was the correct response (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-C

Correct identification: *Plasmodium falciparum*.

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
<i>Plasmodium falciparum</i>	19/21	90	10/10	Correct
<i>Plasmodium malariae</i>	1	5	0	Incorrect
<i>Plasmodium vivax</i>	1	5	0	Incorrect

Results of Participating Laboratories Who Perform Parasite Screen

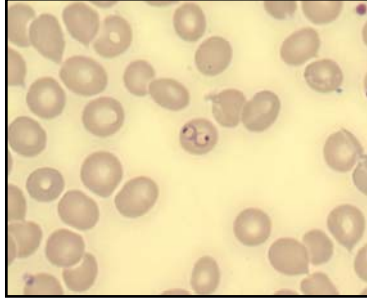
Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	2/2	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories agreed that *Plasmodium falciparum* was the correct response (90 and 100%). Quality control examination of 4% of this sample showed ring stage parasites in

nearly every 100 X oil immersion field. The infected cells are not enlarged nor do they exhibit Schüffner's dots. The overall staining quality is good.

Diagnostic Characteristics



Plasmodium falciparum is one of the four species of Plasmodium known to infect humans. It causes the most dangerous and severe form of malaria and is always considered to be a medical emergency. Death may occur rapidly if proper treatment is not started immediately. *P. falciparum* distribution is limited to the tropics, primarily in Africa and Asia. Because this species invades all ages of RBCs the parasitemia can exceed 50%. The usual stages seen in the peripheral blood are rings and gametocytes. Schizogony occurs in the internal organs so it is rare to see other stages, although they may be present in cases of severe malaria. The

infected RBCs are not enlarged nor do they contain Schüffner's dots. The rings are generally small, and may have one or two chromatin dots. Appliqué forms are also characteristic. Gametocytes are rounded to banana-shaped and contain a single well-defined chromatin and coarse rice-grain like pigment.

13B-D

Correct identification: *Babesia* sp.

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
<i>Babesia</i> sp.	20/21	95	10/10	Correct
<i>Plasmodium falciparum</i>	1	5	0	Incorrect

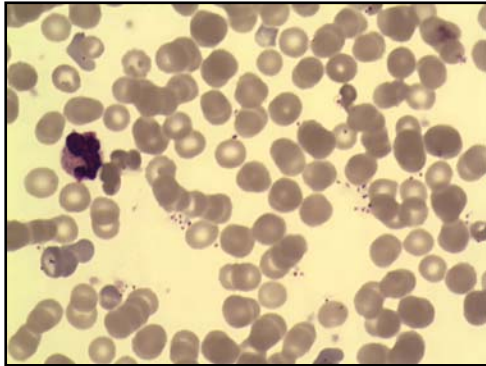
Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	2/2	100	10/10	Correct

Quality Control and Referee Information

Participating and referee laboratories agreed that *Babesia sp.* was the correct response (95 and 100%). Quality control examination of 4% of this sample showed multiple organisms per 100 X oil immersion field. The parasites are small pleomorphic rings and are seen both inside and outside the red blood cells. The staining quality is fair.

Diagnostic Characteristics



Babesia sp. has a widespread distribution, which includes at least 18 counties in New York State. Parasites are transmitted by *Ixodes scapularis* or deer ticks. Like malaria the parasites infect red blood cells. They appear as small, pleomorphic rings which can be confused with the early stage of *Plasmodium falciparum*. *Babesia sp.* is distinguished by the absence of pigment, lack of any stage other than the ring stage, and the presence of parasites outside the RBC. Infected cells are not enlarged and do not exhibit stippling or Mauer's dots. Occasionally tetrads may be seen, but parasites are often seen outside the red blood cells as shown in the image at left.

13B-E

Correct identification: *Plasmodium vivax*.

Results of Participating Laboratories Who Perform Parasite Identification

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
<i>Plasmodium vivax</i>	17/21	81	9/10	Correct
<i>Plasmodium ovale</i>	3	14	1	Incorrect
<i>Plasmodium malariae</i>	1	5	0	Incorrect

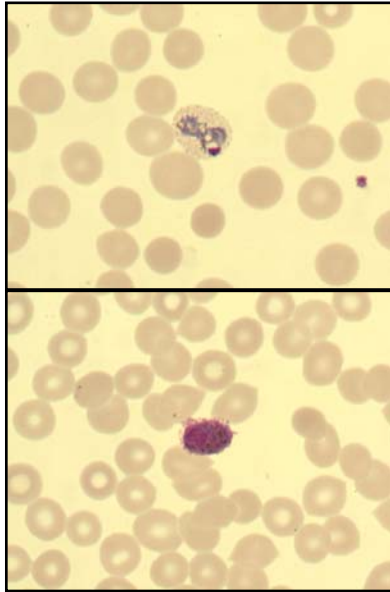
Results of Participating Laboratories Who Perform Parasite Screen

Organism reported	# of labs reporting	% of labs reporting	Referee results	Status
Parasites Seen	2/2	100	10/10	Correct

Quality Control and Referee Information

Participating and Referee laboratories agreed that *Plasmodium vivax* was the correct response (81 and 90%). Quality control examination of 4% of this sample showed parasites in every 4-5 100 X oil immersion fields. Infected cells are enlarged and have Schüffner's stippling. The parasites are amoeboid and the pigment is scattered and fine. The two stages observed were mature trophozoites and gametocytes. The staining quality is good.

Diagnostic Characteristics



Plasmodium vivax is the most common species of malaria to infect humans. It may account for as much as 80% of all malaria cases. It also has the widest distribution. Infected red cells are usually enlarged and stain paler than uninfected ones. They may also contain Schüffner's dots. The trophozoites, like the one in the image at left above, are generally amoeboid and have a large chromatin. Occasionally cells will contain more than one parasite. Mature schizonts contain 12-24 merozoites and gametocytes, like the one in the lower left image, are round and fill the entire cell. Pigment is fine and scattered. While *Plasmodium ovale* also enlarges the cell and has Schüffner's dots it generally has more compact cytoplasm, coarser pigment and infected cells can be fimbriated. *Plasmodium malariae* does not enlarge the cell, in fact infected cells are usually smaller than uninfected ones, nor is Schüffner's stippling present.

Scoring Information

Distribution of Scores

Score	# of labs	% of labs
100	16/23	70
80-89	6	26
60-69	1	4

Answer Key

Sample	Correct Answer	Points
13B-A	<i>Brugia malayi</i>	20
13B-B	No Parasites Seen	20
123-C	<i>Plasmodium falciparum</i>	20
13B-D	<i>Babesia</i> sp.	20
13B-E	<i>Plasmodium vivax</i>	20

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:

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

Important Reminders

The next Parasitology Proficiency Test is scheduled for **May 7, 2013**. You are responsible for notifying us **before May 14, 2013** if you do not receive your samples. Proficiency test results must be electronically submitted through EPTRS by **May 21, 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/lep/ProgramGuide/WebGuide.pdf>