STUDY REPORTS

5. Title: The Hepatocystis of the white–cheeked gibbon (Hylobates Concolor)

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Objective Hepatocystis has not previously been reported as infecting higher primates and the finding of naturally infected Hylobates concolor is of considerable interest. It appears to be a new species and the object of this study has been to elucidate the morphologic characters of its various growth stages as well as its biologic behavior in the gibbon host. Since only gametocytes are found invading the erythrocytes Hepatocystis might serve as a useful model for tracing the development of gametogony and for investigating whether there is antibody directed to gametocytes.

Progress and Description Two Hylobates concolor reputedly from Laos were found infected wiht a Hepatocystis. Both animals died before they could be purchased from the dealer. Seven more H. concolor were obtained by the dealer and were said to have come from Northwest and West Central Thailand, i.e. near the Laotion border. All seven animals were found to have gametocytes of Hepatocystis in their peripheral blood. All were young animals and on the basis of dentition the Veterinary Officer stated them to be between 1 and 2 years of age. Three animals were purchased for further study.

To the present time only blood forms have been studied. A liver biopsy was made on animal, S100, but study of the Giemsa–Collophonium stained sectioned material has not, so far, revealed a merocyst. It is planned to obtain the entire liver of at least one animal so that a thorough search for the asexual developmental stages can be made. Taxonomic diagnosis cannot be given without a description of the merocyst.

The blood stages are typical of Hepatocystis. The earliest forms are seen as a compact deep red staining Chromatin dot. The cytoplasm is difficult to distinguish. As growth proceeds the chromatin often breaks up into two or three parts. It is common to find three small traingularly arranged dots. The cytoplasm surrounding the vacuole is very wispy and stains a rather prominent red, it may send off one or more delicate filamentous extrusions. With development the cytoplasm becomes more filamentous in appearance. Only when growth is about one half to three quarters complete does the organism's cytoplasm assume a blue stain. Just prior to maturation a relatively thick, deep red staining membranous boundry appears, surrounding the gametocyte. This membranous structure disappears with final maturation of the gametocyte. The mature micro and macrogametocytes are typical and resemble the description of these of H. kochi as given by Garnham (1966, "Malaria parasites and other Haemosporidia", Blackwell Publ.).

Parasitaemia has been studied in the following manner. Thin blood films are stained in Giemsa buffered at pH 7.2. Two hundred fields are examined using a $\times 50$ oil immerasion objective and $\times 10$ eyepieces (Leitz Ortholux). The number of mature microgametocytes, macrogametocytes and immature forms in the 200 fields are recorded.

One infected animal (S101) has, to date, been examined successively in this manner for 25 days. The results are shown in Fig. 3. It will be seen that during this period there were two major peaks of parasitaemia of immature forms occurring at an interval of about 10 days. From March 15th to April

1st there was a progressive rise in macrogametocytes. However, considering the numbers of circulating immature forms the mature gametocytes never attained the expected density. Two possible explanations can be offered: (I) there is a relatively high rate of destruction of parasitized cell by humoral antibody and/or phagocytic cellular elements; (II) some mature gametocytes are sequestered in the deep vasculature Fig. 3 also indicates that maturation of the microgametocyte proceeds more slowly than that of the macrogametocyte and its peak density is of a much more transient nature. Furthermore, at practically all days of examination there were at least 2 to 3.5 times as many macrogametocytes as microgametcytes.

In order to determine whether the parasite exhibits any periodic behavior blood slides were made from two animals (S99 and S101) every two hours for a period of 36 hrs. The results are shown in Figs. 4 & 5. No immature forms were seen in S99 during this period. Increase of gametocytes in the peripheral blood were noted at 1600 hrs, 2400 hrs and 1400 hrs. In S101 there were both mature and immature gametocytes. A rise in mature gametocytaemia was observed between 1800 and 2400 hrs. There are preliminary observations and further studies are being carried out. An intensive search for the asexual stage in the liver is being made.

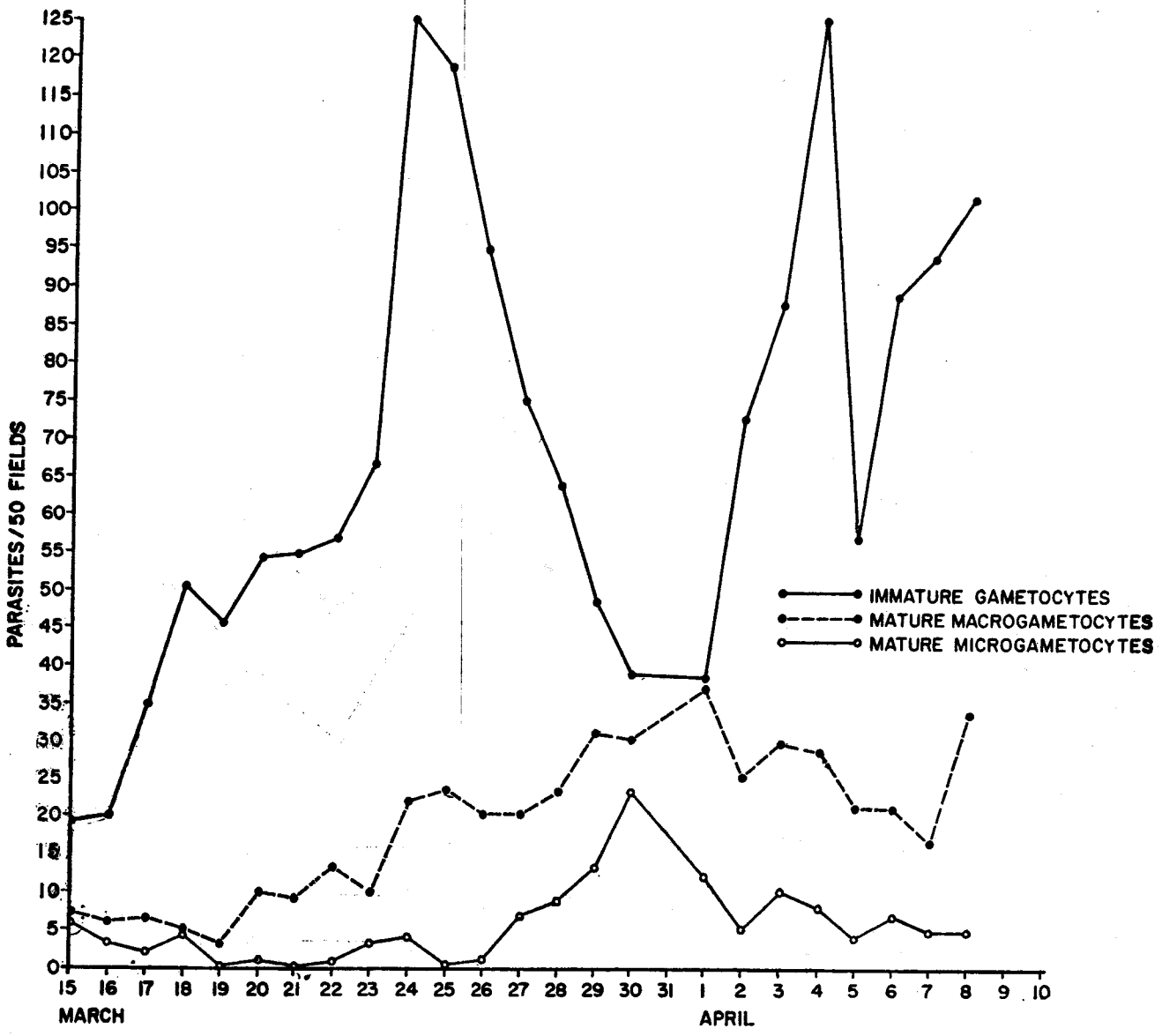

Figure 3. Gametocytemia in Hylobates concolor S101 over a 25 day period.

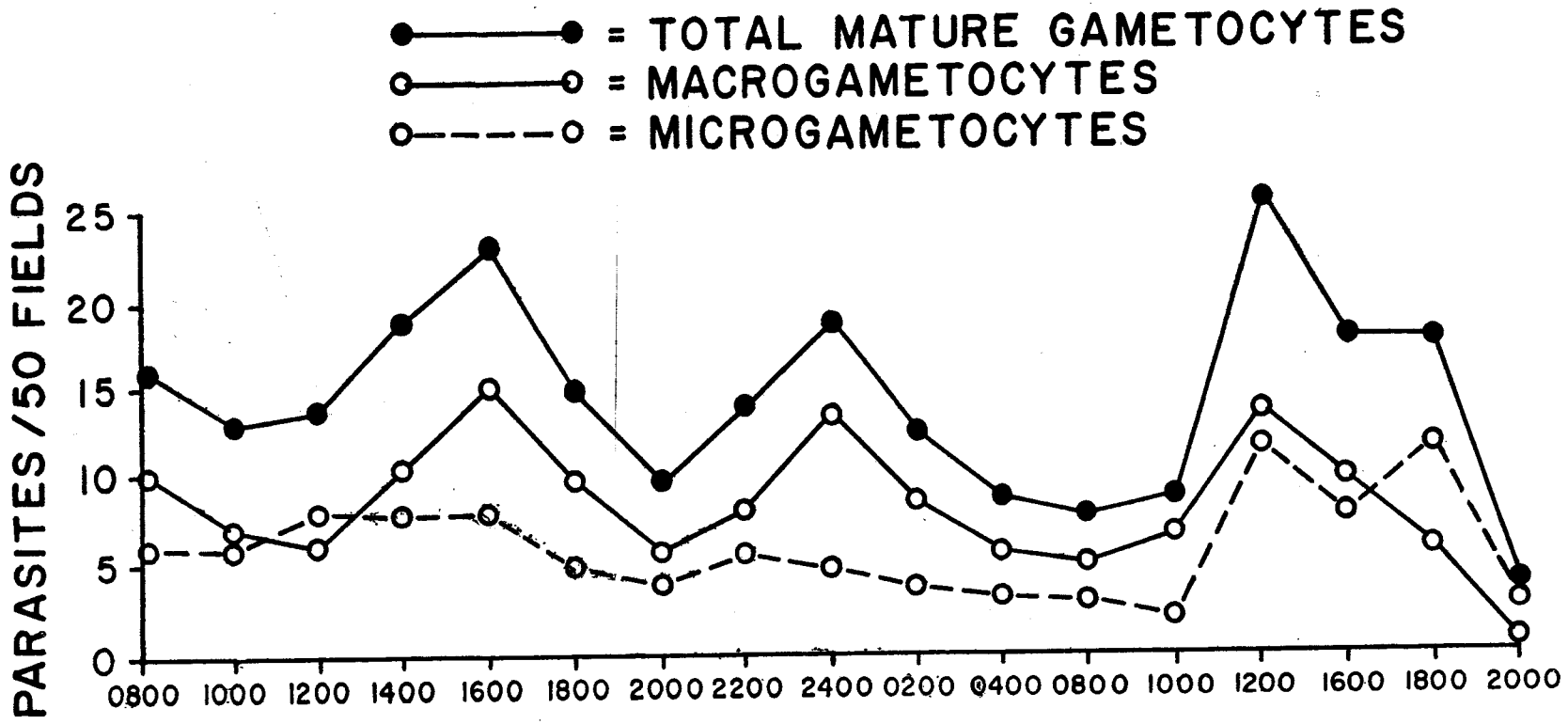

Figure 4. Gametocytemia in S99 over a 36 hour period.

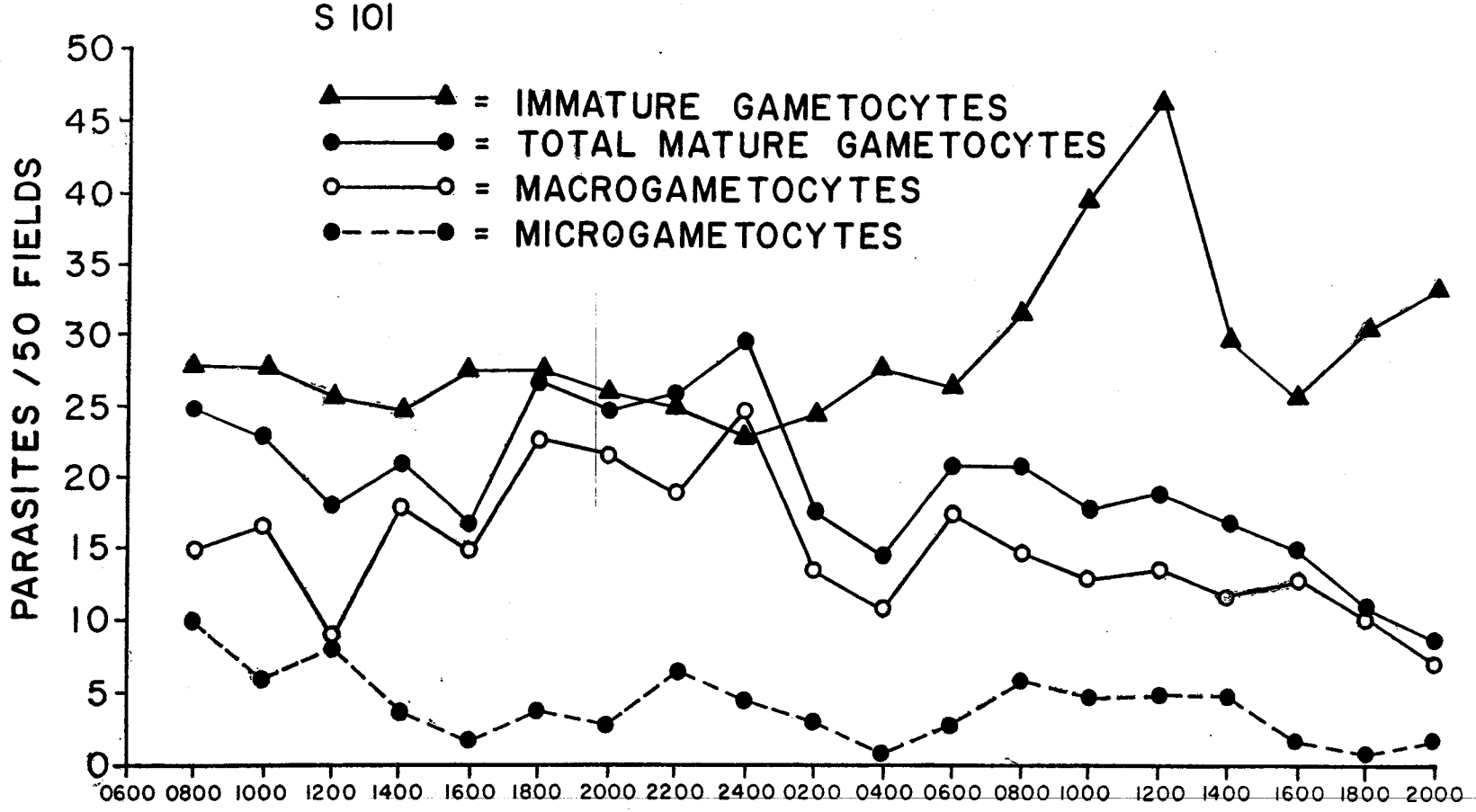

Figure 5. Gametocytemia in S101 over a 36 hour period.