

Plasmodium ovale in Zambia

by H. L. WOLFE, *Malariologist, Ministry of Health, Box 205, Lusaka, Zambia*

In the last 15 years the attention and efforts of most malariologists throughout the world have been mainly directed towards the eradication of malaria. However, in the areas of the world where the eradication of malaria cannot yet be attempted, and especially in Africa south of the Sahara, a World Health Organization Expert Committee on Malaria^a advocated, among other activities, the pursuit of basic malaria research. There is therefore renewed interest in the species diagnosis of malaria parasites. Although Stephens^b described *Plasmodium ovale* nearly 50 years ago, Brumpt,^c nearly 30 years later, was able to record only 105 cases in the whole world during that period; he therefore described *P. ovale* as a rare parasite.

The distribution of *P. ovale* in the French-speaking countries of West Africa has been summarized by Lacan.^d In East Africa, Onori^e described the distribution of this parasite in Uganda, and Clyde & Mluba^f recorded the presence of *P. ovale* in Tanzania on its border with Zambia. Lysenko & Beljaev^g described the world-wide distribution of *P. ovale* and they concluded, in brief, that *P. ovale*, as at present diagnosed with certainty, was more or less confined to the tropical regions of Africa and to islands of the Western Pacific, within the same latitudes. They gave reasons for doubting the validity of the reported diagnosis of *P. ovale* from other parts of the world. They did not, however, include Zambia within the area of distribution of *P. ovale*.

P. ovale in Zambia

In 1949 Brumpt^c recorded that *P. ovale* had been diagnosed in Tanganyika and the then Belgian Congo which both border on Zambia. Southern Rhodesia, which also borders on Zambia, has a

climate and other malariological factors similar to those in Zambia and Brumpt^c also recorded that *P. ovale* has been described by Blair^h and Alvesⁱ in Southern Rhodesia. *P. ovale* has, therefore, been recorded in most of the countries which border on Zambia. In Zambia itself, 15 cases of *P. ovale* infection in the Balovale area of western Zambia have been described by Beet,^j who is not quoted by Lysenko & Beljaev.^g A malaria research laboratory is now being established in Zambia and already, from a small number of investigations in the last few months, it is clear that *P. ovale* is present in many areas of Zambia. Recently, Allen & Lowenthal^k studied the species diagnosis of malaria parasites in patients treated for malaria in the Ndola hospital. Of the 274 slides which were positive for malaria, 6 (2.2%) were reported as being positive for *P. ovale*. In the last few months, 1 slide received by the Malaria Research Laboratory from Mufulira was confirmed as positive for *P. ovale*. During a current trial of suspected chloroquine-resistance in Kabwe (Broken Hill) 1 case of *P. ovale* infection was diagnosed out of 61 malaria cases admitted to the Kabwe Hospital. The most interesting recent survey is, however, from Chilubi Island. This is an isolated island in Lake Bangweulu some 50 miles (80 km) to the east of Mansa (Fort Rosebery). During a leprosy survey of this island, blood slides were obtained from asymptomatic children and the results are shown in the accompanying table.

Discussion

In Zambia, as in most of the tropical countries of Africa, *P. falciparum* is by far the most common species of malaria parasite: it is usually present in about 98% of positive malaria slides. *P. malariae*

^a WHO Expert Committee on Malaria (1967) *Wld Hlth Org. techn. Rep. Ser.*, 357.

^b Stephens, J. W. W. (1922) *Ann. trop. Med. Parasit.*, 16, 383.

^c Brumpt, E. (1949) In: Boyd, M. F., *Malariology*, Philadelphia and London, Saunders, 113.

^d Lacan, A. (1963) *Bull. Wld Hlth Org.*, 29, 415.

^e Onori, E. (1967) *Bull. Wld Hlth Org.*, 37, 665.

^f Clyde, D. F. & Mluba, S. (1964) *E. Afr. med. J.*, 41, 375.

^g Lysenko, A. Ja. & Beljaev, A. E. (1966). Unpublished

mimeographed document WHO/Mal/66.577. A limited number of copies of this document is available to persons officially or professionally interested on request to Distribution and Sales, World Health Organization, 1211 Geneva, Switzerland.

^h Blair, D. M. (1938) *Trans. roy. Soc. trop. Med. Hyg.*, 32, 229.

ⁱ Alves, W. (1939) *S. Afr. med. J.*, 13, 250.

^j Beet, E. A. (1945) *E. Afr. med. J.*, 22, 85.

^k Allen, A. V. H. & Lowenthal, M. N. (1968) *Med. J. Zambia*, 2, 55.

MALARIA PARASITE PREVALENCE AND SPECIES DIAGNOSIS IN CHILDREN
ON CHILUBI ISLAND IN JANUARY 1968

Age-group (years)	No. slides examined	No. and percentage positive for malaria	Of positive slides, no. and percentage positive for:				
			<i>P. falciparum</i>	<i>P. malariae</i>	<i>P. ovale</i>	<i>P. vivax</i>	Mixed infection
0-5	88	69 (81.8%)	67 (97.1%)	7 (10.1%)	7 (10.1%)	Nil	12 (17.4%)
6-14	87	68 (78.2%)	67 (98.5%)	3 (4.4%)	1 (1.5%)	Nil	3 (4.4%)

is the next most important malaria parasite and *P. vivax* is rare or even absent. With skilled laboratory diagnosis, *P. malariae* usually accounts for 2%-4% of infections and it is frequently mixed with *P. falciparum*. Occasionally, local pockets of *P. malariae* may account for 10% or more of infections either as a pure infection or mixed with *P. falciparum*. *P. malariae* is also always more common in the younger age-groups.

Because of the recorded cases of *P. ovale* in countries bordering on Zambia, it is no surprise to find occasional *P. ovale* infections in Zambia and 15 of these have already been described in north-western Zambia by Beet,^j who considered *P. ovale* to be common in that area.

From recent work it is clear that *P. ovale* is more widespread than has been previously reported. It is, however, somewhat surprising to find that *P. ovale* is present in the blood of 8% of all children examined aged 0-5 years in Chilubi Island and is present in 10.1% of all the positive malaria slides in that age-group.

Lysenko & Beljaev^g consider that the prevalence of *P. ovale* may be associated with the annual rainfall and it is thus relevant to record that the mean annual rainfall in Chilubi Island is about 56 in (1400 mm).

The results shown in the table tend to agree with the observation of Onori^e in Uganda that infection with *P. ovale* shows a higher prevalence in children under the age of about 5 years, compared with older children and adults, but statistical significance

cannot be established with the small number of positive slides obtained from Chilubi Island.

It would seem that in many developing countries in Africa, such as Zambia, *P. ovale* is not often diagnosed because general hospital laboratories are overworked and under-staffed. The dominant malaria parasite is *P. falciparum* and a mixed infection is, therefore, not often diagnosed. The present practice of using thick films also makes the diagnosis of *P. ovale* difficult, except for an experienced malaria-microscopist, but, in a well-stained slide, the presence of a faint pink halo around the parasite may assist in the diagnosis of *P. ovale*. The apparent absence of *P. ovale* in certain areas of Africa may therefore be due to the use of thick films for diagnosis combined with a lack of microscopists skilled in the species diagnosis of the malaria parasite. Hasty diagnosis, in overworked general laboratories where there is a preponderance of *P. falciparum* infections, also undoubtedly leads to mixed infections being missed and particularly to a failure to diagnose *P. ovale*.

* * *

Above all, I am grateful to Mr J. A. Hudleston, WHO Laboratory Technician, for the diagnosis of the *P. ovale* infections in Chilubi Island and Kabwe. I am also grateful to Mr P. G. Shute of the Malaria Reference Laboratory, Horton, England, for his confirmation of the diagnosis of these slides. I am indebted to Dr A. C. McDougall for obtaining the slides from Chilubi Island. I would thank the Permanent Secretary, Zambian Ministry of Health, for his permission to publish this paper.