and *A. albimanus* must consider not only variations in behavior and physiology of the mosquito in different parts of its range but also the possibility of differences within a localized population related to time and/or environmental pressures. Initial studies are underway on the possible association of these morphologic variations with physiologic characteristics and will include the susceptibility to malaria and the response to insecticides of the several types.

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SEASONAL DISTRIBUTION AND VARIATIONS IN DIURNAL ACTIVITY OF TABANIDAE IN THE REPUBLIC OF ZAMBIA

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ABSTRACT. Three Malaise traps baited with CO_2 were used to study the seasonal distribution and variation in diurnal activity of tabanids in a *Glossina*-infested woodland in the Republic of Zambia. Seasonal flight activity coincided with the warm rainy season. Peak diurnal activity was recorded during the period 0900–1500 hours. Nocturnal activity was noted.

INTRODUCTION. The investigation of tabanid species present and their seasonal and diurnal patterns was undertaken because of their role as vectors in the mechanical transmission of trypanosomiasis in cattle in the Republic of Zambia. (Personal communication; Department of Veterinary and Tsetse Control Services.) Records of previous tabanid collections in Zambia have been documented (Le Roux 1945, 1947, Clarke 1968). Le Roux's investigations were limited to species identifications, while Clarke etxended his studies to seasonal abundance. Furthermore, both authors carried out their investigations in the same locality, Mazabuka, on the southern edge of the Kafue flats, where tree cover is sparse; the habitat is composed of woodland-savannah, and flood plain grassland. It is located approximately 15° 50′S and 27° 42′E.

Detailed investigations were made during the period, November 1973—October, 1974 on the seasonal distribution and diurnal activity of tabanids at our field station, located approximately 15° 13′S and 29° 15′E. It is a *Glossina*-infected miombo woodland, at an elevation of approximately 1110m. The vegetation has been extensively described (Okiwelu 1975). Climatically, the seasons are divided into 3 overlapping ones: November-April

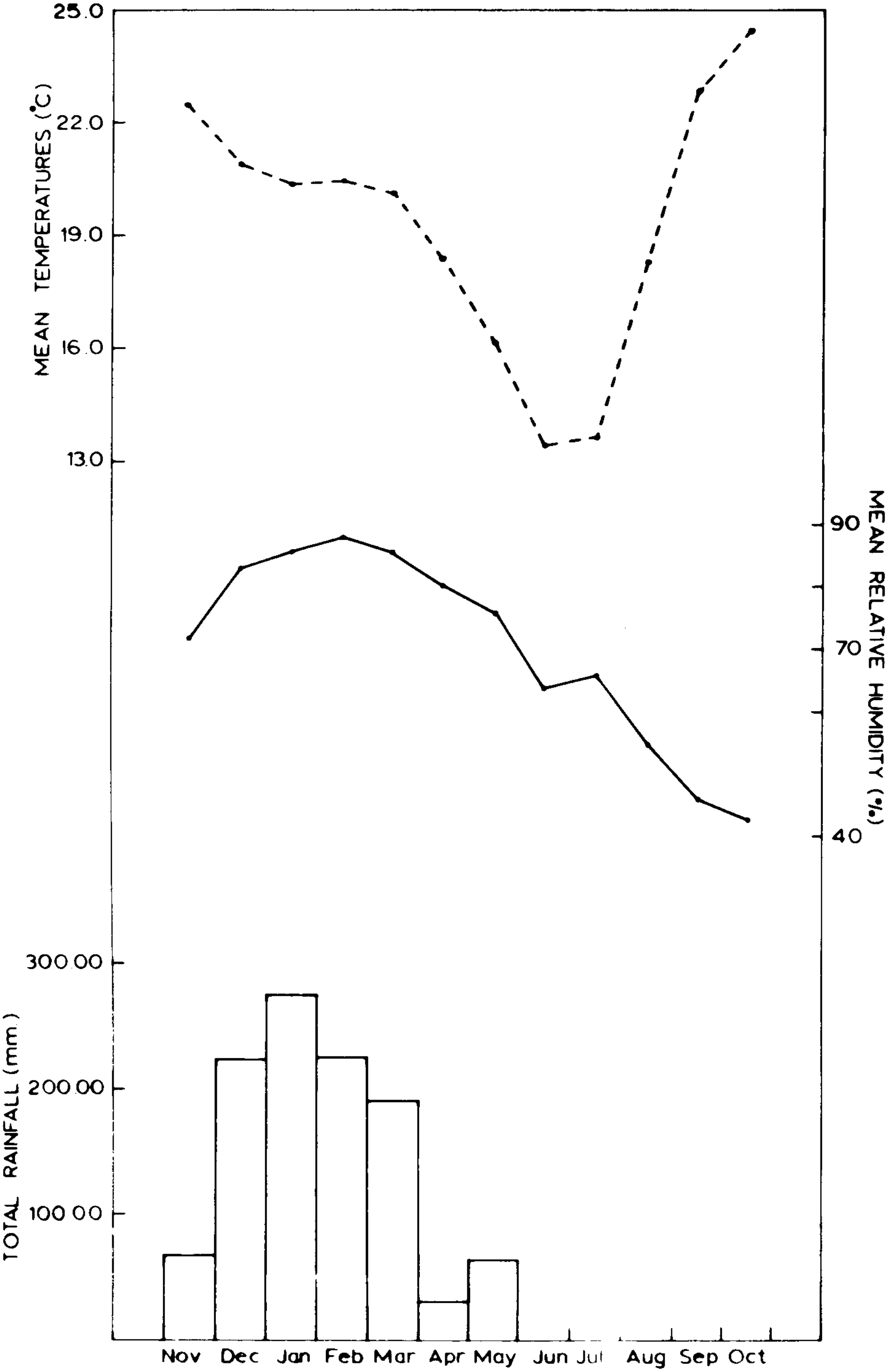

Fig. 1. Rainfall, relative humidity and temperature of experimental area, Chakwenga Game Reserve, Gambia, 1973–74.

(warm and wet), May-August (cool and wet) and September-October (hot and dry). Seasonal rainfall and temperature data are shown in Fig. 1.

METHOD. Collections of tabanids were made by 3 Malaise traps baited with CO_2, flowing at the rate of 2 litres per min. The traps were similar to those of Blume et al. (1972). Roberts (1970, 1971) found the Malaise trap a very useful tool for studies on diurnal and seasonal abundance of tabanids. Collections were made at 0600, 0900, 1200, 1500 and 1800 hours. However, the 0600 and 1800 collections coincided with sunrise and sunset, to enable a more accurate determination of possible nocturnal activity.

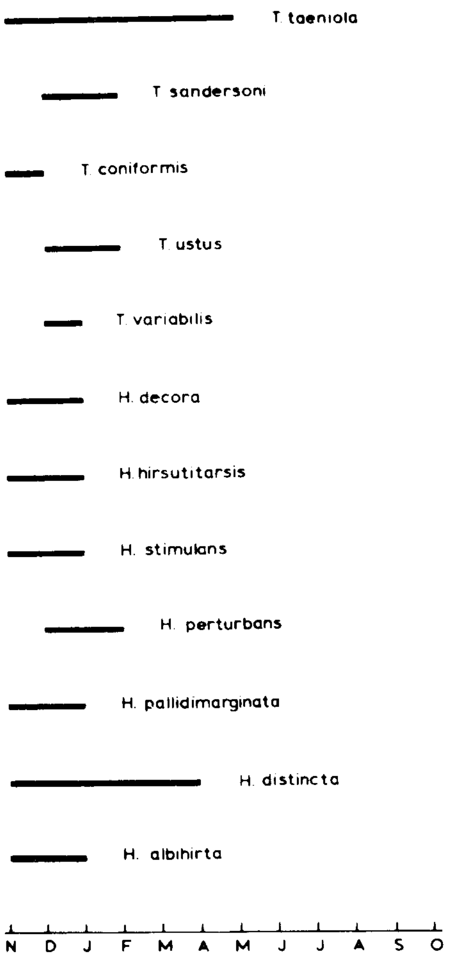

Fig. 2. Seasonal presence of species of *Tabanus* and *Haematopota*, Chakwenga Game Reserve, Zambia, 1973–74.

RESULTS AND DISCUSSION. Fig. 2 shows the seasonal appearance of species of *Tabanus* and *Haematopota*. Abundance coincided with the warm rainy season. However, a single specimen of *T. taeniola* was collected in each of the months, August-October; these were considered insignificant and were not included in the diagrammatic representation of seasonal appearance. The increased abundance of tabanids during the rains has been recorded by several workers in Africa: Vanderplank (1944), Glasgow (1946) and Chapman (1960) in Tanganyika (Tanzania) and Clarke (1968) in Zambia. The wet season abundance must be related to the well-known association of tabanid immature stages with water (Neave 1915, Marchand 1920). All collected species appear to be univoltine although a longer life cycle cannot be ruled out. The single peak of abundance of *T. taeniola* in January contrasts with the 2 peaks in November and March-May noted by Clarke in Mazabuka. The longer flight season of *T. taeniola* at Mazabuka may be related to the longer duration of moist soil conditions associated with the permanent Kafue river system. The observation of year-round abundance of tabanids by Harley (1965) in his studies on the shores of Lake Victoria, Uganda must have been related to the regular rains throughout the period of his investigations.

Nocturnal activity was noted for all but 2 species, *T. variabilis* and *H. hirsutitarsis* (Table 1). Haddow et al. (1950), Haddow (1952) and Haddow and Corbet (1960) also noted nocturnal activity of tabanids. Peak period of diurnal activity was around mid-day, between 0900–1500 hours. Similar observations were made by Vanderplank (1944) and Harley (1965).

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Table 1. Tabanids of the genera *Tabanus* and *Haematopota* collected during different periods of day, Chakwenga Game Reserve, Zambia, 1973–74.

Species	Period of day				
	1800–0600	0600–0900	0900–1200	1200–1500	1500–1800
T. coniformis	2	8	30	118	60
T. taeniola	12	35	103	153	147
T. sandersoni	8	12	25	50	32
T. ustus	14	25	93	143	14
T. variabilis	0	7	17	26	19
H. decora	14	18	82	123	14
H. hirsutitarsis	0	19	28	40	0
H. stimulans	3	14	45	31	22
H. perturbans	17	8	143	287	71
H. pallidimarginata	17	240	315	440	289
H. distincta	14	13	108	95	48
H. albihirta	1	7	15	29	17

collections. I wish to thank the Secretary General, National Council for Scientific Research, for permission to publish.

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