The observation of mosquitoes caught revealed that, average density of An.gambiae in a room was 25.2 mosquitoes in 1994 as opposed to 6.1 in 1974. Similar values for An. funestus were 0.0 and 0.7 respectively. Only An. gambiae were found inhabiting puddles along the lake margin at a density of 0.1-1.0 larvae per dip. Dissection for sporozoites in 1994 indicated that 3.4% (5/147) An. gambiae were positive for sporozoites, unlike in 1974 when none out of 471 An. gambiae was found with sporozoites. The 32 An. funestus dissected in 1994 were found to have no sporozoites. In 1974 there were no An. funestus caught in the survey. Informal observation and discussion suggested that several people appreciated the protective utility of bednets against mosquitoes but only a few used bednets.

Discussion, Conclusion and Recommendations
The present 1994 study showed that malaria had increased from mesoendemic to hyperendemic level with parasite rate of 59.3% among the 2-9 year olds. These children harboured higher numbers of parasites than before lake was formed. This suggests that there was increased malaria transmission. The higher numbers of indoor resting mosquitoes found and the presence of many infective mosquitoes explains the changed pattern of malaria indicators among the children as well as adults observed. It is of interest to note that for 1974 and 1994 the levels of haemoglobin as measured by PCV did not differ much despite increased malaria infection. This could be attributed to the iron compensatory effect of fish eating enjoyed by the majority of the people.

In view of the increased malaria transmission to Mtera area, and the influx of people including non-immunes in fishing and other businesses to Mtera, it is considered quite justifiable to promote the use of insecticide treated nets among the people in the area. This is particularly important in that by 1992 P. falciparum chloroquine resistance (and perhaps resistance to other antimalarials) in the nearby Pawage Division had already reached higher levels at 30.3% (Aliilio et al., 1992). Thus there is a need of people being protected from infective and other mosquitoes with the use of insecticide treated mosquito nets.

Reference

OBSERVATIONS ON THE CROSS-RESISTANCE STATUS BETWEEN DDT AND PERMETHRIN IN ANOPHELES GAMBIAE S.L. FROM ZANZIBAR, TANZANIA.

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Permethrin and other pyrethroids have become very useful in malaria control following their superiority as insecticides of choice in the treatment of bednets and other fabrics against mosquitoes that transmit malaria. Some insects which are resistant to DDT have been shown to exhibit cross-resistance to permethrin. Among mosquito species, Culex tarsalis possibly possesses a gene that confers resistance to both DDT and pyrethin. Field evidence for cross-resistance in mosquitoes was reported in Aedes aegypti in Bangkok, Thailand.

Similarities between DDT and pyrethroid insecticides have led to speculations that cross-resistance between them might limit the usefulness of the latter. Both insecticides act as neurotoxins on sodium channels and both DDT and pyrethroids exhibit two types of effect on insects, an initial knockdown (kd) effect that renders the insect motionless and a subsequent lethal effect.

The extensive use of DDT in both agriculture and public health has led to cross-resistance with synthetic pyrethroids and pyrethrin insecticides and the gene concerned was given the name knock down resistance (kdr). Fears on the usefulness of pyrethroids for impregnation of bednet and other fabrics in controlling malaria in areas with DDT resistant mosquitoes have been expressed. An. gambiae from Zanzibar, United Republic of Tanzania show DDT resistance which was presumably selected by the DDT spraying programmes in the 1960s and 1980s. If this resistance conferred cross-resistance to pyrethroids it would threaten the
future use of insecticide treated nets in Zanzibar and this paper reports a test of whether this strain is also resistant to pyrethroids. A DDT-resistant strain of *Anopheles gambiae* from Mwera, Zanzibar was therefore tested for the possibility of cross-resistance with permethrin.

The *Anopheles gambiae* mosquito strain was collected from Mwera village, Zanzibar. Half and fully gravid mosquitoes were collected by indoor hand catch using an aspirator. Three hundred mosquitoes were collected and brought to the laboratory where they were kept in cages at 27±1 °C, 75±5% RH and light regime of LD 12:12. The mosquitoes were fed on 10% glucose solution. Selection pressure was applied for one generation to half of the mosquitoes collected using standard WHO adult susceptibility kits. Groups of twenty mosquitoes were exposed to 4% DDT impregnated papers for four hours followed by a 24 hours holding period. Those that survived were allowed to lay eggs in a petri-dish lined with a wet filter paper. These mosquitoes comprised the DDT-selected line. The other half of mosquitoes was also allowed to lay eggs in the laboratory and these formed the DDT non-selected line.

Eggs from both lines were hatched separately in plastic trays containing water (to a depth of 5cm). Larvae were fed on “Farex a” baby food every day until pupation. Pupae were removed from the trays using a dropper pipette within 24 hours of pupation and transferred to a 0.3L cup of water placed in mosquito cages. Newly emerged adults were kept in these cages before testing for cross-resistance. To examine for cross-resistance, batches of twenty mosquitoes from the F1 of the DDT-selected and non-selected lines were exposed to 0.25% permethrin impregnated papers for one hour and then left for a twenty four hour holding period after which mortalities were recorded. Another group of mosquitoes from each line was tested with DDT to check for the status of resistance. These tests were conducted when the mosquitoes were one week old by which age part of their resistance would be expected to have been lost.

Results from these studies indicate that the *An. gambiae* strain from Zanzibar is resistant to DDT. There appears to be an increase in DDT resistance in the offspring of DDT selected parents. On exposing both lines to 0.25% permethrin for one hour, mortality was 100% in both lines. The results therefore show that there was no evidence for cross resistance between DDT and permethrin in *An. gambiae* from Mwera, Zanzibar. This is good news for the malaria control community as the results indicate that the use of permethrin for treatment of bednets in Zanzibar is therefore not threatened by presence of DDT resistant strains of *An. gambiae* on the islands.

SEASONAL DISTRIBUTION OF MOSQUITO TRANSMITTING MALARIA, AND THEIR MALARIA PARASITE INOCULATION RATES IN THE LOWLAND AND HIGHLAND AREAS OF MUHEZA DISTRICT, TANGA REGION NORTH-EASTERN

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Introduction

The entomology inoculation rate (EIR) is one of the main transmission indicators used in epidemiological studies to estimate the intensity of malaria transmission in a certain area. Indeed, EIR reflects the level of a risk of exposure to the infective bites of mosquitoes in a community at any given time, a person living in a malaria areas would expect to get. Estimation of EIR depends, on the accurate assessment of the proportion of the mosquito vector population harboring infectious sporozoites, and the number of vector mosquitoes coming to feed on human each night. Salivary gland dissections and enzyme immunoassay (ELISA) are the only techniques used so far to measure the proportion of infectious mosquito population.

Muheza district is an area holoendemic for malaria transmission, morbidity and mortality among the under five year's children. The area is perhaps one of the few districts in Tanzania where extensive malaria related researches have been carried out for more than four decades hitherto. Recently there has been a growing interest in studying malaria in the highland of Muheza. It is therefore the objective of this paper to make a comparative examination of the pattern of EIR between the highland and lowland area of Muheza district.

Study Area

Muheza, which is 35km from Tanga, is one of six districts in Tanga region. Topographically the district is divided into hot and humid lowland (c.200m from sea level),