DIRECT EVIDENCE FOR THE SPECIFIC DISTINCTNESS OF FORMS A, B AND C OF THE *ANOPHELES GAMBIAE* COMPLEX *

by

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The critical evidence for regarding populations of two or more forms as belonging to separate species is that they can coexist without losing their genetic integrity by hybridization. This widely accepted definition is not invalidated by rare hybridization since so tenuous a gene exchange does not affect the integrity of the gene pool of the populations of the species (MAYR, LINSLEY, & USINGER, 1953).

Until now the evidence for regarding the three freshwater breeding forms of the *Anopheles gambiae* complex as separate species has been based mainly on the fact that they have been observed to coexist in nature. Although this evidence is perfectly acceptable (MAYR et al, 1953), it is still desirable to have direct evidence for the absence of gene-flow between coexisting populations of these forms.

In the village of Chirundu on the Zambesi River the three forms A, B and C have been found to coexist (PATERSON et al, 1963) under conditions which indicate that no extrinsic barriers prevent hybridization. The evidence (table 1) shows that it is likely that the three forms are always present, and that none of them is rare. In the dry season breeding of all three forms is restricted to sandy pools at the edge of the river.

An examination of the males and sex-ratios of individual broods from 174 wild-mated females caught in houses and in a sheep-shed at Chirundu revealed no evidence for believing that any of these natural matings were heterogamic (table 2). Criteria for fertility were the observation of sperm in the vasa deferentia, normal sex-ratio and latterly, the absence of asynapsis in the salivary-gland chromosomes. To place this finding in perspective it is of interest to calculate the number of heterogamic matings which would be expected if random mating and equal abundance of the three forms is assumed. Under these conditions about 116 heterogamically mated females would have been expected. This is very strong evidence in favour of the view that the mating of forms A, B and C is assortative. If hybridization does occur between them it must occur at a very low frequency and is unlikely to lead to a break-down in the integrity of the gene-pools. Thus we have direct evidence for believing that forms A, B and C are distinct biological species. The significance of this conclusion in the fight against malaria has been underlined on previous occasions (e. g. PATERSON, 1963).

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TAB. n° 1 Details of mosquitoes which have been firmly identified from Chirundu.

Date of Sample	Source	Numbers of each form		
		A	B	C
XII.1962	Huts	1	0	0
II.1963	Huts	1	1	0
VI.1963	Sheep Shed	0	2	3
III.1964	Huts	1	4	0
IV.1964	Sheep Shed	0	0	2
IV.1964	Larvae	1	0	0
V.1964	Huts	0	1	0
	TOTALS	4	8	5

TAB. n° 2 Details of broods from females of the *Anopheles gambiae* complex which had been inseminated in nature at Chirundu, N. Rhodesia. Presence of fertile males in a brood together with a normal sex ratio was evidence for homogamic mating.

Month of Sample	Source	Broods examined	Broods with fertile males	Heterogamic matings
I.1964	Huts	31	31	0
III.1964	Huts	67	67	0
IV.1964	Sheep Shed	33	33	0
V.1964	Huts	35	35	0
VIII.1964	Sheep Pen	8	8	0
	TOTALS	174	174	0

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