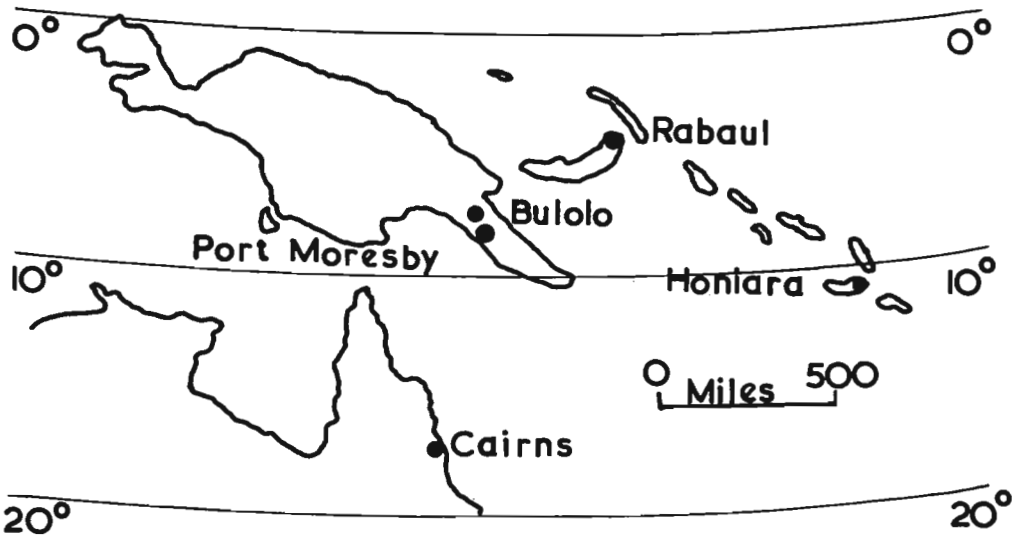
Mather, W.B. University of Queensland, Brisbane, Australia. A fourth race of D. rubida.

It has previously been shown (Mather, 1964 and 1968) that the immigrans group species, D. rubida from Northern Queensland and Papua-New Guinea can be divided into three races on the basis of both chromosome inversion difference and sexual isolation. This paper is a report on a fourth race from Honiara, Solomon Islands and its relationship with races A, B and C.

As well as the stock from Honiara the same stocks from Rabaul, Bulolo and Cairns that were used in the 1964 and 1968 study have been employed (Map).



The methods used for sexual isolation tests (no choice) are given in Mather (1964). All flies used were aged for from 10 to 15 days. The cytological technique used follows Strickberger (1962) and the methods used in inversion analysis are given in Mather (1961).

In all crosses it was found that only very few offspring were produced. On the other hand except in the case of Honiara males x Bulolo females there is very little sexual isolation (Table). Thus Honiara flies are reproductively isolated from other strains by mechanisms other than sexual isolation. It will be noted that an F_1 was produced in all crosses except Honiara females x Bulolo males. In the cases where an F_1 was produced "gene flow" past the F_1 could be established by back-crossing to the original parents or proceeding to the F_2.

Sexual Isolation Tests - Honiara

	Females Tested	Number Insem.	% Insem.	F_1	F_2	R_2
Hon. ♂ x Rab. ♀	96	96	100	+	-	+
Hon. ♀ x Rab. ♂	94	93	99	+	-	+
Hon. ♂ x Bul. ♀	94	32	34	+	+	
Hon. ♀ x Bul. ♂	73	69	95	-		
Hon. ♂ x Cai. ♀	93	93	100	+	-	+
Hon. ♀ x Cai. ♂	89	89	100	+	-	+

Because of the heavy reproductive isolation between Honiara and Cairns the inversion picture could not be obtained by mating Honiara flies to the standard Cairns strain. However, ninety pair matings of Honiara flies showed no heterozygous inversions. Further a single larva from a female Honiara fly x male Cairns fly showed the IIRE and IILA inversions only, thus establishing that Honiara flies are homozygous for IIRE and IILA.

Whereas races A, B and C of D. rubida are separated by strong sexual isolation (Mather 1964, 1968), Honiara flies appear to be separated from other races by reproductive isolating mechanisms other than sexual isolation. Cytologically the unique feature of the Honiara strain is being homozygous for IILA. Homozygosity of IIRE also occurs in Race B from Rabaul

and Race B is heterozygous for IIID.

Thus strong non-sexual reproductive isolation between a strain of D. rubida from Honiara, Solomon Islands, and the three established races of D. rubida together with a unique inversion pattern justifies the designation of a fourth race of D. rubida.

Literature Cited: Mather, W.B. 1961. Chromosomal polymorphism in D. rubida Mather. Genetics Princeton 46: 799-810. Mather, W.B. 1964. Speciation in D. rubida. Evolution Lancaster Pa. 18: 10-11. Mather, W.B. 1968. A third race of D. rubida. Pap. Dep. Zool. Univ. Qd. 3: 75-77. Strickberger, M.W. 1962. Experiments in Genetics with Drosophila. Wiley, London.

Lifschytz, E.* and Falk, R. Hebrew University, Jerusalem, Israel. Some further studies of reversion at the K-pn locus.

A.1. An attempt was made to obtain a dose curve for induced reversions of K-pn (RK's) using X-ray in mature sperm. Preliminary results are given in Table I. Details of the experimental procedures are given in Lifschytz and Falk, Genetics, 1969. The number of females/culture indicates larval density. Each female represents ca. 200 tested zygotes or 400 hatched larvae. At the bottom of the table the averaged result of E.M.S. treatment is given.

Table I

Dose	Female Culture	Replicates	Total Females	No. Revertants	Revertants/Recovered Females
500	4	2	1,020	3	1/340
1,000	4.1	3	924	5	1/185
2,000	3.7	4	1,647	13	1/196
3,000	2.0	2	852	15	1/57
4,000	1.7	3	488	10	1/49
Control					1/3000
			E.M.S.		
0.2%	1.54	2	593	15	1/40

2. The conclusions one can draw are:

a. The induction of RK's mutant (recessive lethals, presumably small deficiencies) follows one hit kinetics.

b. The efficiency of E.M.S. in inducing RK mutation, as compared to the efficiency of X-ray, is 20%. This conclusion is based on the fact that with the same E.M.S. treatment and with the same flies, 48% recessive lethals are induced on the X-chromosome. By extrapolation from the known dose-effect relations for X-ray induced sex-linked-recessive lethals, it is possible to estimate that a dose of X-rays that would produce 48% lethals would produce one RK mutant per 10 females. Moreover, this is an underestimate since with 48% lethals at least one-third of the chromosome carries two lethals.

Assuming that RK's are deficiencies, and X-ray induced lethals are mostly deficiencies, one can hopefully use this system for estimation of the point mutation/deficiencies ratio following different mutagenic treatments.

B. Apart from being all recessive lethals and allelic to each other, about 30 RK mutants both from X-ray and E.M.S. were tested for 2;3 translocation or gross inversions. Surprisingly enough none of them was associated with a translocation or an inversion. The implication of this finding will be discussed elsewhere.

In agreement with previous findings, 15 pairwise combinations of different RK's (hence recessive lethals) that were tested for complementation of the K-pn effect turned out to be noncomplementing.

This has been done using free duplication (Falk and Shamai) for the K-pn gene, thus enabling us to test whether the genotype

$$pn/Y;\frac{RK^1}{RK^2},\ Dp(3;f)ca^+bv^+K\text{-}pn^+$$

is lethal. Up to now none of the $RK^1/RK^2/K\text{-}pn^+$ combinations regain the K-pn/K-pn$^+$ interaction with pn.

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