Table 1. Number of Coffee Seedlings of the Various Classes obtained from Crosses of Heterozygotes $\frac{Am\ An}{am\ an}$ with Coffee Plants of the Constitution $\frac{am\ An}{am\ An}$

Hybrids	Total No. of coffee seedlings	No. of plants in the classes			
		$\frac{Am\ An}{am\ An}$	$\frac{am\ an}{am\ An}$	$\frac{Am\ an}{am\ An}$	$\frac{am\ An}{am\ An}$
H 3277 12-1-18-3-1 × *H* 1591-1	82	40	26	9	7
H 3287 12-1-18-6 × *H* 1591-1	52	19	23	6	4
H 3351 662 × *H* 1591-3	71	31	26	9	5
H 3352 662 × *H* 1591-4	23	7	9	2	5
H 3378 837 × *H* 1591-1	44	17	20	4	3
H 3379 837 × *H* 1591-3	25	14	5	3	3
H 3457 1184 × *H* 1591-1	51	24	21	1	5
H 3458 1185 × *H* 1591-1	116	53	49	1	13
H 3459 1215 × *H* 1591-1	40	27	11	0	2
H 3460 1216 × *H* 1591-1	112	50	49	0	13
H 3501 12-1-18-3-1 × *H* 1591-1	21	10	7	0	4
Total	637	292	246	35	64

The *anomala* mutant also affects the plant growth, its type of branching, the shape and size of the leaves, and the morphology of flowers, fruits and seeds. The number of flowers and fruits is very low and the occurrence of locules with more than one seed is, however, very high in some years. The *anomala* is recessive (*an an*), the F_1 being almost normal, with the exception that, occasionally, a pair of leaves develops with slightly misshaped apex.

The F_1 hybrids of *anormalis* and *anomala* are like *anormalis* heterozygotes; sometimes they have smaller and more irregular leaves, indicating a certain interaction of both factors. Back-crosses with *typica* or *bourbon* plants with the genotype *am am An An* gave indication (Table 1) of linkage of the two factors involved, with a recombination value of about 15 per cent. Due to difficulties in the separation of the classes $\frac{Am\ An}{am\ An}$ from $\frac{Am\ an}{am\ An}$, this recombination value is not precise and can be anywhere between 10 and 20 per cent. Back-crosses with the double-recessive type are difficult to obtain, due to the small number of flowers that it produces.

It is to be noted that the *anormalis* and *anomala* genes, producing rather similar phenotypes and having a very intensive pleiotropic effect, are, up to now, the only factors to give indication of linkage in *Coffea arabica*.

A. Carvalho

Department of Genetics,
Instituto Agronomico,
Campinas, S.P., Brazil.

Linkage between Deficiency of Glucose-6-phosphate Dehydrogenase and Colour-blindness

Hereditary susceptibility to hæmolysis by drugs and fava beans is believed to be due to a single sex-linked gene. This mode of inheritance would best explain the familial and population data, as summarized recently by Childs and Zinkham[1]. The main element of uncertainty regarding this hypothesis arises from the great variability of the measured blood abnormalities in heterozygous females (*in vitro* glutathione stability test and glucose-6-phosphate dehydrogenase activity).

However, sex-linkage of a trait may be established if it fails to show free assortment with a known *X*-linked character, like colour-blindness. Such a linkage study is being carried out in some of the Jewish communities in Israel which exhibit a high frequency of the enzyme deficiency[2].

Families characterized by a colour-blind son were investigated for enzyme activity. Only families in which both mutant characters segregated with their normal alleles were included in the investigation; each sibship exhibited only one type of colour blindness, according to the rough classification of the Ishihara tables.

Thirty-seven brothers of ten such families were found to segregate as shown in Table 1.

Table 1

Colour vision:	Number of brothers				
	Normal		Deficient		Total
Enzyme activity:	Normal	Deficient	Normal	Deficient	
Family No. 1		2	3		5
,, 2		2	1		3
,, 3		1	2		3
,, 4		2	1		3
,, 5		1	3		4
,, 6		2	1		3
,, 7		2	2		4
,, 8		1	1		2
,, 9		2	3		5
,, 10	1	—	—	4	5
Total	1	15	17	4	37

Each of these ten families thus comprises only two classes of sons, and there is complete lack of re-assortment between the two characters investigated. At the present stage, I am unable to account for the excess of repulsion between the two mutant genes.

These results indicate, therefore, a fairly close linkage between the loci determining colour-blindness and enzyme deficiency, and testify strongly against autosomal inheritance of the latter. They do not exclude partial sex-linkage of this trait, since families in which the trait would have been passed on from a father to all his sons in his *Y*-chromosome would have been excluded from the investigation because of lack of segregation.

I wish to thank Prof. Elisabeth Goldschmidt, of the Department of Zoology, Hebrew University, Jerusalem, for her advice and criticism, and Dr. Ch. Sheba, director of the Hospital and chief of the Department of Medicine (C), for his suggestions and encouragement.

The work was supported by grants from the United States Public Health Service (Grant *A-2740–Hema*) and the Rockefeller Foundation (Re: *GA BMR* 5936).

A. Adam

Government Hospital,
Tel-Hashomer,
Israel.

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