during the rainy season and by March it was observed at one site that 60 per cent of the plants were at least partly chlorotic.

I have concluded from these results that *B. homblei* will serve as a convenient and very suitable experimental plant for further investigations of copper accumulation and of the effects of the metal on metabolism of plant cells.

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Phenotypic Restoration of Fertility in a Male-sterile Mutant by Treatment with Gibberellic Acid

THE Tokyo group[1] tested gibberellin on tobacco inflorescences and found them to grow faster and to elongate further; elongation has so far been the most striking plant response to treatment with gibberellins. Floral differentiation, including parthenocarpy, however, has been observed by several workers, among whom are Bonde[2], Wittwer and Bukovac[3], Yakar-Olgun[4] and Zatyko[5]. Phatak *et al.*[6] reported that gibberellic acid induced the formation of anthers and the development of pollen in a stamenless tomato mutant. This type of differentiation and development of floral parts is very important in propagating homozygous recessive mutants which involve sterility in one of the sexes in an amphimictic plant species. I describe here my attempts to restore fertility in a spontaneous male-sterile mutant of the barley variety 'Maris Baldric'.

Plants grown in a glasshouse were treated with a single spray of gibberellic acid (GA_3) at concentrations of 0 (control), 10 p.p.m., 100 p.p.m. or 300 p.p.m. It was applied to leaves of two male-sterile plants when the tip of the bottom awns reached the top of the spike. All ears were bagged just before anthesis. One floret from each of the plants treated at 100 p.p.m. and also one floret from each of the plants treated at 300 p.p.m. had grains formed as a result of the treatment.

Four grains, two from the 100 p.p.m. treatment and two from the 300 p.p.m. treatment, were sown in pots in a glasshouse. One of the grains from the 100 p.p.m. treatment failed to germinate, the other gave a plant which was entirely male-sterile. The two grains from plants treated at the 300 p.p.m. rate germinated and both produced progeny which set from 0 to 12 grains per ear, parts of which were male-sterile.

When the experiment was repeated (results in Table 1) the higher rate showed signs of developing seeds in about 8 days while the lower rate showed these signs in about 14 days. Both the early and the late tillers remained male-sterile.

Spikelets, with restored male-fertility, had anthers which were larger than the normal male-steriles. These enlarged anthers contained pollen with a limited amount of viability—detected by staining with benzedine (J. N. R. Kasembe, unpublished results). Self-fertilization, following the viable pollen formation, resulted in the production of seed which gave homozygous male-sterile plants. These were checked by progeny testing.

Table 1. FERTILITY RESTORATIONS IN SPIKELETS OF MALE STERILE BARLEY FROM 'MARIS BALDRIC' BY A SINGLE SPRAY WITH GIBBERELLIC ACID

Concentration	Trial	Total No. of ears	Ears with grains	Total No. of grains
0 p.p.m.	1	16	0	0
100 p.p.m.	1	11	2	10
	2	9	3	21
300 p.p.m.	1	8	5	15
	2	11	8	37

This observation may be important in the production of hybrid barley either as an aid in cereal breeding or in the synthesis of commercial hybrids.

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PSYCHOLOGY

Genetic Relationships, Choice Models, and Sucrose Preference Behaviour in Mice

BEHAVIOURAL geneticists have criticized mathematical models of learning and choice which do not consider genetic and other individual difference parameters[1,2]. No one, however, has demonstrated empirically that genetically related variables aid in determining how well a given model will fit the data. I have found it necessary to include familial parameters within the framework of probabilistic models.

Luce[3] developed a simple and powerfully flexible model of individual choice behaviour, when he derived equations which utilize data from one experiment to predict the choice of the same subject in an entirely different experiment. Equation (1), adapted from Luce's model, was used in this sucrose preference study for such predictions

$$\hat{P}(i|i,k) = \frac{1}{1 + \left(\frac{P(K|i,j,k)}{P(i|i,j,k)}\right)} \qquad (1)$$

where $\hat{P}(i/i,k)$ is the estimate of the probability of selecting solution i, when the animal is given a simultaneous choice of concentrations i and k (two bottle experiment). $P(i|i,j,k)$ is the probability of selecting solution i, when the same subject is given a simultaneous choice of concentrations i, j and k (three bottle experiment). This equation is an application of Luce's results concerning the independence of irrelevant alternatives and his constant ratio rule. It is relatively common in studies of preferences for liquids to use the proportion of total liquid intake from a solution as an index of preference. To interpret Luce's model in this context, the proportion of liquid intake from a solution will be taken as an operational definition of probability.

The same animals were used in both investigations. In the prediction experiment thirty-seven subjects were taken from a four way cross population ($AR \times CD$) derived from $A/Crg1$, $RIII/Crg1$, $C57BL/Crg1$ and $DBA/Crg1$ strains of mice. These animals fell into four full-sib families, with more than one litter in each family, and ranged in age from 99 to 174 days at the start of the experiment.

Each subject was placed in a single cage and simultaneously presented with a choice of 30 per cent, 45 per cent and 60 per cent (w/v) concentrations of sucrose. The