The cucurbitacins have been reported to possess pronounced laxative⁸, anthelmintic⁹ and antitumour activity^{6,10,11}, but so far their regulatory effects on plant growth processes have not been reported.

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only be applied to normally distributed characters and gives erroneous results if applied to a character with a very skewed distribution. For example, the distribution of spot numbers on the under wings of *Maniola jurtina* is very skewed. As I have shown³, the quadratic fitness function gives a value for the variance in fitness which is very close to the observed value but the nor-optimal fitness function gives a value which is too large by a factor of two. Manly¹, however, quotes this example as one to which the quadratic fitness function should not be applied.

In practical applications of the formulae derived from the quadratic and nor-optimal fitness functions, the question of the period of time over which the selection is observed is seldom relevant. Anybody using these fitness functions to compare the selection acting in different populations would have to assume (or preferably ensure) that he was comparing the same period of the life cycle, for the fitness functions might be very different at different periods. Thus it would be necessary to assume that $t' = t$.

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Reference Abbreviations

FROM September 1 it is *Nature's* intention that all abbreviations of references should conform to the style of the *World List of Scientific Periodicals*, fourth ed. (Butterworth, 1963-65). The changeover will be gradual and authors submitting manuscripts from now on are asked to ensure that the references are written appropriately.

Validity of the Quadratic Fitness Function

MANLY¹ has questioned whether the quadratic fitness function can be applied in general to the measurement of selection for quantitative characters. As he points out, if individuals survive with a probability w per day, then after t days the probability of survival is w^t . If then the fitness function is quadratic, we have

$$w^t = 1 - \alpha - K(\theta - x)^2$$

But after t' days, the fitness function would then be

$$(w)^{t'/t} = \{1 - \alpha - K(\theta - x)^2\}^{t'/t}$$

which is not quadratic. Manly argues that selection cannot therefore be generally described by a quadratic fitness function. Selection can only be quadratic if $t' = t$. Manly prefers the "nor-optimal" fitness function^{2,3} which takes the form of the normal frequency density and which does not change its form when raised to any power.

Manly's arguments, though obvious enough, are without foundation as criticisms of the use of the quadratic fitness function. He has not apparently noticed that K must always be very small. Thus to a very good approximation

$$(w)^{t'/t} = (1 - \alpha)^{t'/t} - (t'/t)(1 - \alpha)^{(t'/t)-1} K(\theta - x)^2$$

which is still quadratic. It is for this reason that both quadratic and nor-optimal fitness functions give almost identical results for characters that are normally distributed as I have previously shown³. Unfortunately the nor-optimal fitness function can

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