population enters a new population (perhaps as the result of human alteration of the environment) the trait could spread very rapidly as the new population may not have evolved a suppressing system. In these conditions a population could become predominantly female in quite a short time, but the sex ratio should return to normal again once suppressors have been evolved. If suppressors are not evolved the population could become extinct, although there are other possible ways of avoiding extinction, such as increased fitness of normal females, multiple matings by males (which are known to occur[1]) and non-random mating. In Uganda, one predominantly female population did become extinct, while another population seemed to become extinct but was apparently revived by butterflies arriving from elsewhere[1].

Acraea encedon is not a pest of crops—indeed, it is capable of defoliating an important agricultural weed—but the sex ratio phenomenon described here could have implications in the control of insect pests. Females that produce only females could be introduced into pest populations and numbers would then be regulated. Provisional sampling suggests that similar distortions of the sex ratio, always in favour of the females, occur in other African butterflies. All the species so far examined are characteristic of disturbed agricultural areas.

My results will be published in full elsewhere as part of a wider investigation.

D. F. OWEN

Department of Zoology,
Fourah Bay College,
University of Sierra Leone,
Freetown.

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Alkaloids of an *Ipomoea* Seed known as *Kaladana* in Pakistan

Ipomoea muricata Jacq. (*Calonyction muricatum* G. Don) has now been confirmed as the biological origin of the *Ipomoea* seed mentioned in a previous communication[1]. Seeds of Indian origin (obtained by courtesy of Dr O. Fervidi, Simes Servizi Scientifici, Milan), identical to those from Pakistan, showed on germination in Beirut the typical shape and size of the cotyledonary and first leaves of *Ipomoea muricata* Jacq. described by Kassner[2]. The identity was further confirmed by the characteristically tubercled stem[3] and the aristate sepals[4]. *Kaladana* seeds, obtained from Pakistan (Gohar and Co., Karachi) in 1965 and 1967, differed from the original seeds (and those from India) in being hairy and greyish-black but otherwise identical to the original seeds in size and shape. All the seeds, however, had identical alkaloid chromatograms. A few of the 1967 seeds were grown in Lafayette. in 1968 (by courtesy of Dr J. E. Robbers, Purdue University, Lafayette). Seeds obtained from these plants and grown in Beirut produced plants identical to those obtained from the Indian seeds. Strangely enough, the seeds obtained from Lafayette were devoid of alkaloids. In this connexion it is interesting to note that Der Marderossian[5] reports no indole alkaloids from "*I. muricata*". Besides lysergol and chanoclavine-I, reported[1] as present in *Kaladana* seed, other alkaloids were also found but in much smaller amounts[6].

CHARLES I. ABOU-CHAAR

School of Pharmacy,
American University of Beirut,
Beirut, Lebanon.

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Achene Spacing of Strawberries as an Aid to calculating Potential Yield

THERE have been attempts to determine potential biological yield on the basis of the size and efficiency of the photosynthetic apparatus. Economic yield, however, depends on the successful partition of assimilates to useful parts of the plant and, in the case of fruit crops, to the reproductive organs[1,2]. In the strawberry, one component of yield is fruit size, which we have shown to be determined by the number of fertilized ovules (achenes) on the surface and the degree of receptacle expansion associated with each achene. Berry weight is highly correlated with achene spacing and achene number, so that for each value of achene spacing there is a linear relation between berry weight and achene number (Table 1).

Table 1. LINEAR REGRESSION RELATING BERRY WEIGHT, NUMBER OF ACHENES AND ACHENE SPACING FOR REDGAUNTLET BERRIES

No. achenes/cm²	6	7	8	9	10
Slope of line	0·109	0·093	0·081	0·073	0·072
Constant	82	78	48	67	87
Correlation coeff. r	0·98	0·92	0·95	0·91	0·96
Achene spacing × slope	0·654	0·655	0·645	0·660	0·657
Percentage shortfall in berry weight	0	14·3	25·0	33·3	40·0

A general formula for berry weight has been developed:

$$\text{Berry fresh weight (g)} = \frac{(\text{Total No. achenes} - C)F}{\text{No. achenes/cm}^2}$$

where C is the mean constant of the regression lines and F is the mean value for achene spacing × slope. It follows that for an individual berry where the total number of achenes is unalterable and constant, fresh weight × achenes/cm² is constant[3]. For the variety Redgauntlet, C and F have the values 67 and 0·653 respectively.

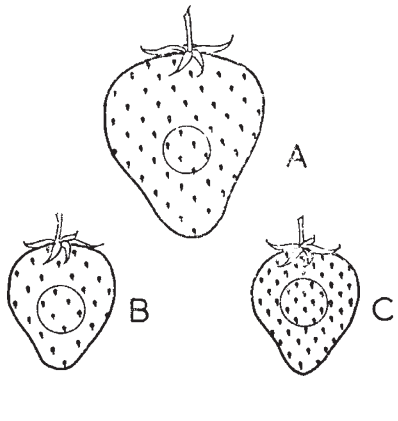

Fig. 1. Diagram showing relation of achene spacing to strawberry fruit size. Circles represent 1 cm².

All the data so far available to us show that a limit to surface expansion is reached at about 6 achenes/cm², so that it is now possible to calculate the potential maximum weight of a berry. In Fig. 1, berries A and B have