Appressoria tend to develop in the grooves between adjacent epidermis cells (Fig. 2). The highest count recorded was more than 200 appressoria per mm² of fruit epidermis. By allowing fruits to ripen and counting the numbers of anthracnose lesions which developed, it was clear that only a minor proportion of the total appressoria present give rise to lesions, as reported earlier by Simmonds[3].

This appears to be the first report of attempts to detect latent *Gloeosporium* infections by direct microscopic examination of banana tissues. Other workers detected latent infections by transferring sections of surface-sterilized peel to agar plates or by observing the development of anthracnose lesions on surface-sterilized fruits ripened under aseptic conditions[2,3,11,12]. By means of these various techniques, it may be possible to obtain some idea of the abundance of *G. musarum* infections prior to harvest, and to use this information when determining concentrations and frequency of application of fungicides at present used to control anthracnose and other types of fruit-rot caused by *G. musarum*.

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## Leaf Area Homeostasis in Maize

BLACK[1] showed how in genetically uniform stands of subterranean clover, small differences in seedling size could, owing to interplant competition, lead to progressively greater differences among the plants as growth proceeded. In contrast, observed stands of two $F_1$ maize hybrids which were disappointingly irregular in the early stages of growth became progressively more uniform in appearance. At the flowering stage the plants were strikingly even to the eye, and experimental errors were low in samples taken at maturity to estimate dry weight of tops and grain (coefficients of variation, 7–8 per cent).

This communication presents evidence to suggest that these hybrids possessed the ability to regulate leaf area in such a way that populations in which leaf area was relatively variable in the early stages of growth attained a substantially more uniform leaf area at the end of vegetative growth. The significance of this apparent ability lies in the importance of leaf area as the major variable determining production of dry matter[2]. However, these observations do not necessarily imply a characteristic difference in behaviour between the maize and subterranean clover, since competition may have been more intense in the clover.

In three successive seasons 1959–60, 1960–61, and 1961–62 an $F_1$ hybrid was grown on an approximately quarter acre block on Salisbury Agricultural Experiment Station. One hybrid was used in 1959–60 and a second hybrid in the other two years. In every case seeding rate and management were representative of local practice. Just after flowering in each year a sample of 18 plants was chosen at random for the measurement of leaf area. The majority of plants in all three samples had only 15 leaves ; none had less, and of those with 16 or 17 leaves, the one or two small leaves at the base of the stem were ignored.

In 1959–60, the 15 leaf laminæ of a plant were divided into three groups of five, the lowest, the middle and the top five, and the combined area of each group recorded for every plant in the sample. In the other two years the division was into five successive groups of three laminæ, and again the combined area of each group was recorded for every plant. For 1959–60, the recorded values were added together to obtain the combined areas of 5, 10 and 15 laminæ respectively, counting from the base of the plant. These areas were assumed to represent lamina area per plant successively at the 5-, 10- and 15-leaf stages of growth. Similarly in the other two years, measurements were obtained of lamina area per plant at the 3-, 6-. . . 15-leaf stages.

Fig. 1 depicts variability in lamina area among the plants of a sample (expressed as the coefficient of variation) plotted against successive stages of growth. It will be seen that as growth proceeded, variability in lamina area fell substantially. Thus it appears that plants with small leaf areas during early growth tended to catch up to the extent that at the beginning of the reproductive phase, leaf area and consequently capacity for the accumulation of dry matter to fill the grain was relatively uniform.

Since these hybrids had been selected for high grain yield the foregoing would seem to fit the definition of developmental homeostasis, that is, a tendency of the individuals of a strain to reach a uniform state at maturity despite disturbances during development. This tendency appears to be characteristic of maize hybrids for attributes of selective value[3].

In order to explain this behaviour it was assumed that production of dry matter at a particular stage of growth was determined by the leaf area present at that stage. From this it followed that plants with a small leaf area, early on, could only catch up by producing later leaves with a greater area per unit of weight than did those plants which possessed large leaf areas initially. Data obtained in 1960–61 lend some support to this supposition. Here the 18 plants referred to above formed part of a larger group of 120 taken from 12 randomly positioned plots each containing 10 plants. Five plants per plot were used to estimate the mean area per plot of the lower six laminæ and the upper nine laminæ respectively (from the regression of area on fresh weight calculated from the 18 plants actually measured for area). The other five plants of a plot were used to estimate mean dry weight per plot of the lower six and upper nine laminæ.

From the values thus obtained, correlations ($n = 12$) were calculated between: lower lamina area and upper lamina area ($r_1 = -0{\cdot}23$, $P \doteqdot 0{\cdot}50$); lower lamina area and upper lamina dry weight ($r_2 = 0{\cdot}51$, $P \doteqdot 0{\cdot}09$); lower

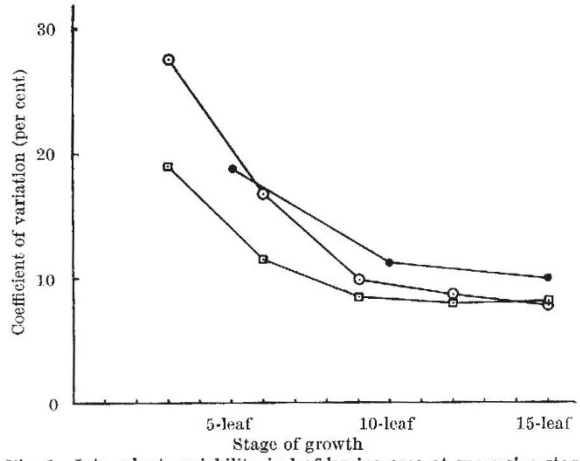


Fig. 1. Inter-plant variability in leaf-lamina area at successive stages of growth. ●, 1959–60; ○, 1960–61; □, 1961–62

lamina area and upper lamina area/upper lamina dry weight ($r_3 = -0{\cdot}51$, $P \doteqdot 0{\cdot}09$). From the value of $r_1$ it is evident that there was little association between the areas of the lower and upper laminæ. On the other hand, $r_2$ and $r_3$, although of doubtful significance, suggested that the dry weight of the upper laminæ was to some extent dependent on the area of the lower laminæ and that the area per unit weight of the upper laminæ was greater in plants with small lower lamina area. Moreover, it is thought possible that closer correlations might have been obtained if both area and weight had been measured on the same plants rather than estimated separately from the two halves of a plot.

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## MICROBIOLOGY

### Isolation of Diploid Strains of *Dictyostelium discoideum* from Haploid Populations

Ploidal composition is a clonally inherited property in *D. discoideum*[1]. Three types of strains exist: stable haploid, stable diploid, and metastable. In the last, each clone contains appreciable proportions of haploid and diploid cells indicating a rate of interconversion substantially higher than in the first two types. Each of these ploidal varieties can be isolated from the others[2].

Two stable diploid stocks, heterozygotic for two pigment markers, have been isolated from mixed cultures of the respective mutant (metastable) strains, and these in turn have yielded, at very low frequency ($10^{-3}$–$10^{-2}$), stable haploid progeny which fell into the four expected segregant classes[2]. Several unmarked diploid stocks have also been isolated from cultures of the haploid wild-type. However, these represent rare events and the conditions for their isolation have not been clearly understood. The present communication describes a method by which diploid clones can be isolated from stable haploid cultures at relatively high frequency. The results indicate that the individuals capable of yielding these diploid clones are to be found, after the cessation of growth, among the amoebae which fail to enter the cell aggregates and, thus, the fruiting bodies formed by the predominantly haploid population.

A stable haploid white mutant of *D. discoideum*, *Wh*–1, was used in work recorded here. This ensured that the diploid strains derived from such cultures could not have been contaminants from diploid strains already at hand since all the latter form fruiting bodies possessing the wild-type (yellow) pigment. The stock was grown on *SM* agar[3] in association with *Aerobacter aerogenes*. The mature fruiting bodies that appeared were removed and the unaggregated amoebae that remained were used as the inoculum for the next passage. Two serial passages were accomplished in this manner. After each passage, unaggregated amoebae were isolated with a micromanipulator, placed on fresh agar, grown with *A. aerogenes* and the ploidal compositions of the resultant clones were determined[1,2]. Table 1 is a summary of the data. The normal incidence of cells capable of yielding diploid clones in stable haploid stocks cultivated from a spore inoculum (passage 1) has been estimated as $< 10^{-4}$ (ref. 2). In contrast, two serial passages using unaggregated amoebae as the inocula resulted in a frequency, among the unaggregated cells, of 18 per cent stable diploid and metastable strains. In the absence of selective markers for the isolation of heterozygotes, the method described here may be of value.

Table 1

| Passage | Inoculum | No. of clones derived from unaggregated cells | Ploidal composition of the clones: Stable haploid | Stable diploid | Metastable |
|---|---|---|---|---|---|
| I | Spores | 62 | 62 | 0 | 0 |
| II | Unaggregated cells | 74 | 73 | 1 | 0 |
| III | Unaggregated cells | 76 | 62 | 9 | 5 |

This work was supported by grant (*G*–12900) from the U.S. National Science Foundation.

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## ANTHROPOLOGY

### Haptoglobin Types in Inhabitants of Easter Island

Since the discovery by Smithies[1] of the polymorphic character of haptoglobins a widespread interest has arisen in the distribution of haptoglobin, types among various ethnic groups. In this connexion Easter Island natives, who represent a maritime isolate in Eastern Polynesia, 2,000 miles from the coast of South America, are of particular interest.

The first contact of these inhabitants with the occidental world occurred in the eighteenth century when the total population of Easter Island is estimated to have been approximately 3,000. During the decade 1860–70, the population underwent a steady decrease as the result of Peruvian slave raids, smallpox epidemics and migration to Tahiti and Mangareva. Only about 200 or 300 natives remained in 1871. After 1871, a steady population increase has been observed, with the immigration of Euro-

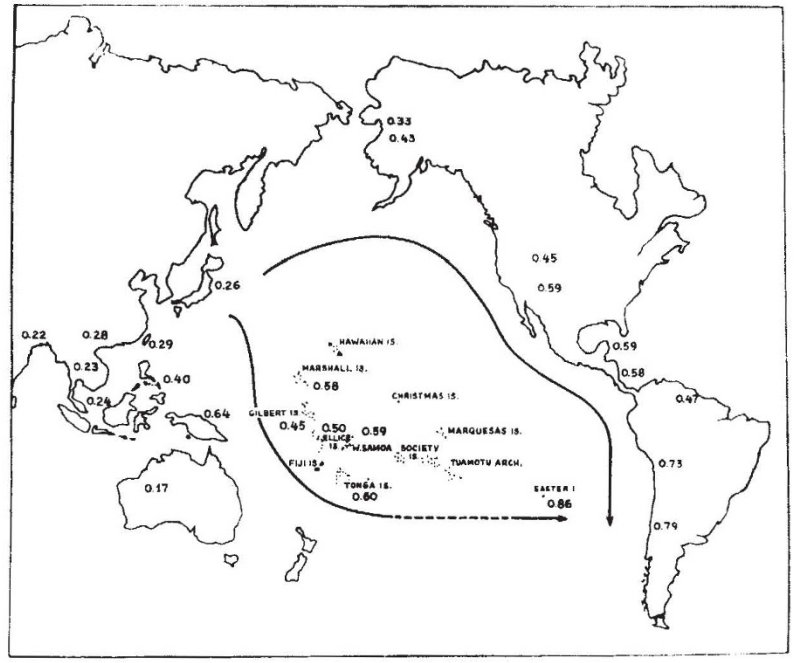


Fig. 1. Hp[1] gene frequency distribution in Pacific populations modified from E. Giblett (ref. 4)