

were all diploid. A few have been crossed with standard normal diploids. These will be grown this summer. The colchicine treatments will be repeated.

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1. Frequency of sector size for R alleles.

The expression of R alleles, reflecting their regulation, is complex; study of somatic pigment expression in the intensity and pattern of cell sectors in aleurone tissue may provide a basis for understanding the processes involved in regulation and in the paramutation phenomenon.

Studies were carried out on kernels carrying a single dose of R^{st} , R^r , $R^{r'}$ (R^r exposed once to stippled) and $R^{r''''}$ (R^r exposed multiple times to stippled) to analyze the size of sectors, their frequency, and the intensity of pigment in the cells.

Stippled (R^{st}) produces mostly uniform sectors and uniform pigmentation surrounded by extremely light colored cells presumably due to diffusion. Fig. 1 shows the relationship between size of sector and frequency. The most distinct feature observed was that peaks were prevalent for sectors having an even number of cells: 2, 4, 6, 8, 10 etc. The highest frequency was observed for 4-cell sectors.

In contrast to stippled, R^r (mottling), $R^{r'}$ and $R^{r''''}$ show a quite different pattern of sectors containing non-uniform and unevenly distributed cells of three color levels that are distinguishable under the microscope. There were significant differences in the frequencies of color levels among these R alleles. Following is the distribution of the three types of cells in percentage:

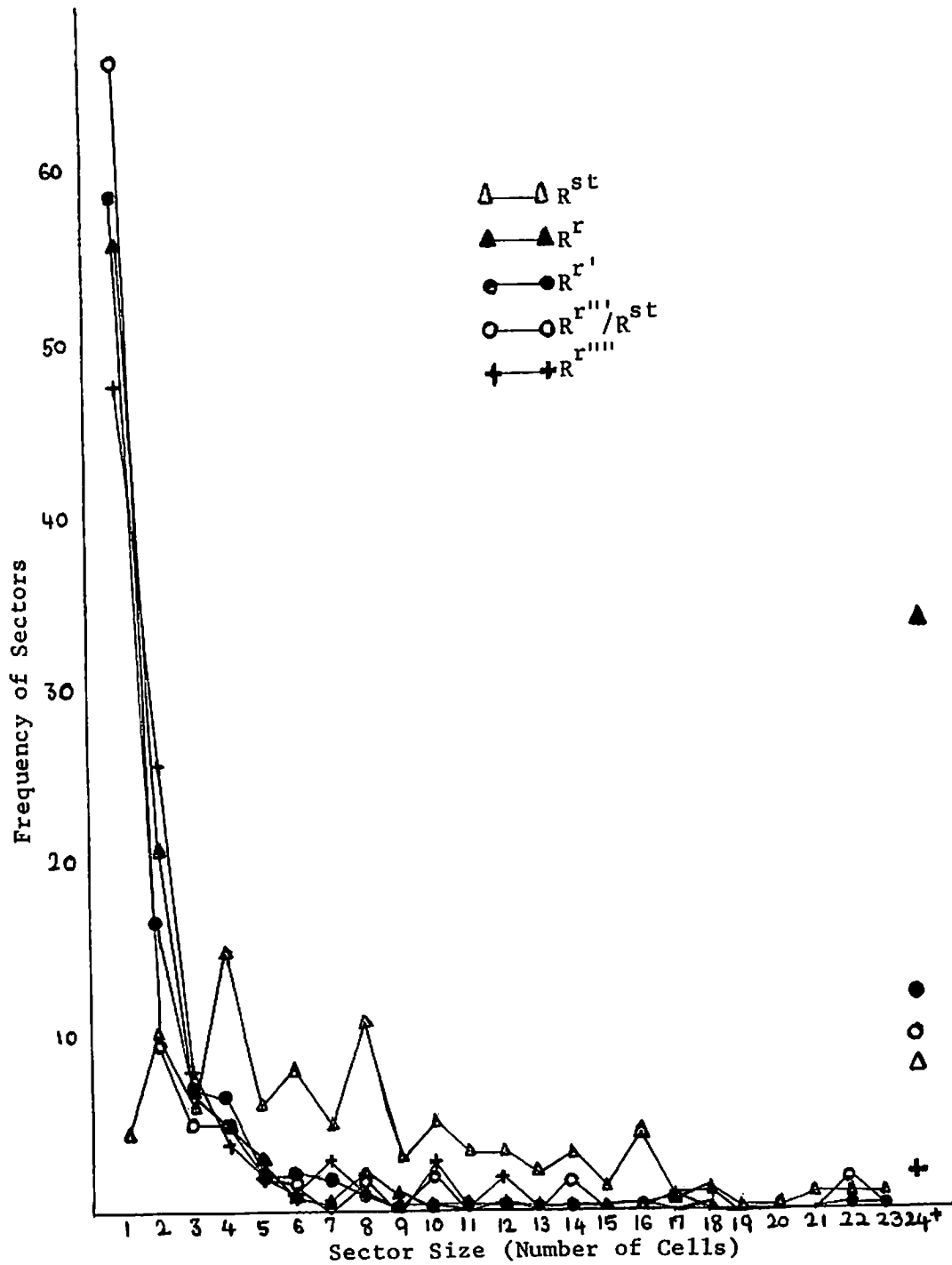


Fig. 1. Distribution of sector size for R alleles. Connected points show percentages of individual sector sizes in a total of all sectors up to 23 cells. Points for 24^+ cells are based on the percentage in the total of all sectors.

\underline{R}^r Source	Percent Colored Cells			Colored Cells
	Dark	Medium	Light	Frequency in Percent
$\underline{R}^r \underline{R}^r$	69.93	9.47	20.43	52.90
$\underline{R}^r \underline{R}^{st}$	51.13	17.27	31.59	13.24
$\underline{R}^{r''''} \underline{R}^{r''''}$	44.52	12.43	43.04	0.037
$\underline{R}^{r''''} \underline{R}^{st}$	49.79	13.59	36.61	0.037

There was a significant rise in the proportion of medium and light colored cells in $\underline{R}^{r'}$ and $\underline{R}^{r''''}$ compared to \underline{R}^r , while the frequency of colored cells dropped significantly from \underline{R}^r to $\underline{R}^{r'}$ to $\underline{R}^{r''''}$.

The \underline{R}^r allele showed a distribution very different from that for \underline{R}^{st} (Fig. 1), but all of the \underline{R} alleles were similar in distribution of sector size. Their most frequent sector type was single cell; the distribution drops rapidly and tapers. Small peaks were notable at 4, 8, and 16-cell size.

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2. Effects of extractables from whole pollen on pollen function.

Toward analysis of the "population effect" found earlier for pollen suspended in aqueous media (see 1969 Newsletter), a test for effects of rapidly extractable substances was conducted in 1969. The control series used one ml of pollen suspended in 25 ml of aqueous medium, held for 40 seconds and then applied to ears with a brush at 10 second intervals. The treated series used the same proportions and timings, but the aqueous medium was derived by first mixing 25 ml with 10 ml of pollen; this mixture was held for 5 minutes and filtered. The clear filtrate was then brought to 25 ml with aqueous medium and used for the experimental pollen. Figure 2 shows the changes in seed set with time, as a running average of 5 ears. The effects of extractables are in agreement with those reported last year for the "population effect"--namely, that long-term survival is influenced, though not