

The ly_{β} effect, one of the dominance components has an increasing effect on yellow colour which counteracts the effect of ly_{δ} & Y_{β} .

Interaction effects are mainly $\alpha\alpha$ or additive x additive at -4.86, but $\alpha\beta$ & $\beta\alpha$ or additive x dominance effects of 2.28 & 0.42 help to counteract the $\alpha\alpha$ effect.

Using the data on amylase content, the obviously greater effect of Wx over Du is highlighted.

Using WxWxWx DuDuDu as an example.

$$\begin{aligned} \text{Expected Value} &= lx\mu + 3xDu_{\alpha} - lxDu_{\beta} + lxDu_{\delta} \dots - lxDu_{\delta} \quad Wx_{\beta} \\ &= lx21.05 + 3x-0.975 - lx-0.975 + lx-0.225 + 3x4.340 - lx6.275 + lx1.09 + \\ &\quad 9x-0.175 - 3x-0.200 - 3x-0.04 + lx-0.400 + 3x-0.103 - lx-0.125 + lx-0.024 + \\ &\quad 3x-0.035 - lx-0.150 \\ &= 26.372 \end{aligned}$$

These figures show that the positive Wx $_{\alpha}$ effect = +13.02 has an effect about 4½ times greater than the negative Du $_{\alpha}$ effect = -2.93.

Similarly the Wx dominance effect is about 6 times greater than the Du dominance effect. The use of Cockerham's model allows a numerical comparison to be made, rather than a subjective one.

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1. Centromeric meiotic abnormalities in experimental maize plants.

For about six years maize plants have been grown in growth chambers in this laboratory for sporocyte collection in connection with recombination and other studies. Until last May cytological abnormalities in the collected sporocytes were restricted to occasional asynchronies (with probable retardation of some cells) and occasional cellular disintegration, both apparently attributable to damage of parts roughly handled during the collection of other parts. Since last May meiotic abnormalities have been sporadically, and to date unpredictably, observed in growth chamber microsporocyte material. These have included synaptic failures, irregularities of chromosome contraction, and loss of chiasmate association to produce univalents recombinant for a heterozygous knob

(reported briefly elsewhere). More recently we have repeatedly found an abnormality which (to my knowledge) has never been observed elsewhere. It appears that bivalents cooriented on the metaphase I plate may separate into pairs of dyads in which the centromeres of individual chromatids then orient on the plate. The ensuing first meiotic division then seems to be equational. Some second division anaphases then give the appearance of resolution of one or more chiasmata, and numerical distribution may be either very irregular (i.e. 15 from 5) or 10 from 10. We are currently searching for the cause of the abnormalities. Our original techniques have not been changed. Many normal anthers are usually found in samples in which some have abnormal cells. Seed from the same ear which has yielded many completely normal plants has produced plants with the abnormality. We are currently testing instruments and materials used in growing and handling the plants for a source of a causative agent.

Marjorie Maguire

2. Premeiotic mitosis in maize: Evidence for alignment of homologues.

Many acetocarmine squash preparations were studied of the last premeiotic mitosis in sporogenous tissue of anthers of KYS stock. This division is poorly synchronized and of short duration relative to the premeiotic interphase. At the early prophase of this division there was no obvious association of homologues or heterologues; at mid-prophase a configuration commonly observed seemed to involve many of the chromosomes by distal associations in chains (these distal associations extending proximally well into the chromosome arms). At prometaphase to metaphase observations of numerous cells suggested increasingly close side-by-side, parallel arrangement of matching chromosomes in pairs and absence of apparent non-homologous associations. Side-by-side alignment of matching pairs at anaphase was found more frequently than chance expectation would predict but not so frequently as at metaphase. It is tempting to speculate that parallel alignment of homologues is the rule in the premeiotic mitosis (at least by metaphase), that synapsis at meiosis is thus facilitated and that this alignment tends to be disrupted by the squashing procedure, particularly at anaphase.

Marjorie Maguire