II. REPORTS FROM COOPERATORS

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1. Studies on nucleic acid of maize hybrids and mutants.

In 1958 we first reported our tests on biologically active materials, among them the nucleic acid, found in seeds of maize hybrids and parental lines.

Data of similar character have been found in the investigations of Cherry et al (1961) as well. In his tests Semenenko (1964) has determined the base composition of RNA in the seeds of some single crosses and the parental lines.

Our tests were extended, in addition to the RNA, to the base composition and base proportion of the DNA as well.

In the course of our investigations the single steps of the preparation and determination of the matter were performed with the methods of Schneider-Schmith-Tannhauser 1945, La Page 1957, Brown 1962, and Martyn-Doby 1949.

In our tests a Radi Rac fraction collector was used. The data given are the average values of 3-6 investigations with $\pm$ 5 per cent of error possibility.

The results of the two crosses (Table 1) show a significant deviation. As early as 1958 our data showed that the total nucleic acid content of the combination C5 x O14 essentially surpassed the related values of the parental lines. This fact has been confirmed by the recent data. At the same time, in the other single cross the values for the F_1 were intermediate.

As for the proportion $\frac{A + C}{C + D}$, the value of the first single cross is nearer that of the mother; that of the second one essentially surpasses even the better paternal line.

The RNA values show a trend similar to that of DNA. The correlation of the $\frac{A + C}{C + D}$ is lower than that of the parents in the first combination; in the second one the value is higher than that of the parents.

Although we cannot draw any general conclusions from studies of two combinations, nevertheless it seems to be probable that the quantitative correlation of the single bases, without regard to the sequence of bases, cannot account for the substantial factors of the phenomenon of heterosis. However, these data can be considered reliable characteristics of the lines and their hybrids.

Table 1
The DNA and RNA base composition of corn lines, single crosses and mutants

Populations	DNA Mol %				$\frac{A+G}{C+T}$	RNA Mol %				$\frac{A+G}{C+U}$
	A	C	T	G		A	C	U	G	
Lines and single crosses										
C5	4.576	4.280	3.251	4.301	1.178	35.464	12.509	16.046	13.387	1.710
C5 x 014	16.133	13.801	10.736	11.352	1.120	36.166	15.867	32.258	21.274	1.123
014	5.824	7.097	4.583	5.698	0.986	23.426	9.680	14.903	14.300	1.534
T18	8.684	7.220	4.299	5.170	1.202	17.225	7.294	25.600	18.062	1.072
T18 x WF9	10.621	6.765	5.434	7.007	1.445	29.055	8.942	28.274	20.482	1.331
WF9	16.770	12.607	6.568	8.305	1.307	33.735	16.506	35.976	25.542	1.129
Mutants										
WF9K	16.770	12.607	6.568	8.305	1.307	33.735	16.506	35.976	25.542	1.129
WF9/1	17.095	18.352	14.129	16.962	1.048	30.836	23.124	50.998	46.387	1.041
WF9/2	16.250	9.188	5.481	5.357	1.472	50.661	16.568	36.761	37.774	1.658

WF9/1 - mutant with broad leaves

WF9/2 - dwarf mutant

In the formation of morphological changes we think the differences in base composition are characteristic in the case of the mutants. Some substantial differences were seen in the base composition of the morphologically deviating forms, derived from the WF9 line in 1961 with 7,000 r X-ray, and even in the formation of the base correlations as well. The trends were similar in both nucleic acids. Additional tests will yield data as to whether a quantitative change in the base composition appears in every case during a mutational change, or whether the values obtained must be considered as exceptional.

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1. Chromosome knobs in maize types from the North-Eastern Frontier Area (NEFA) of India.

Chromosome knobs in two maize types from Nefa were reported earlier (MNL 39: 185, 1965). More types from this area are now investigated and reported below.

M 34: 8 knobs were observed, one each on the long arm of chromosomes 2, 3, 5, 6 and 7, two on chromosome 8 and one on the short arm of chromosome 9. There is a chromomere on the short arm of chromosome 1 and three near the end of the long arm of chromosome 4.

M 35: 6 knobs were observed, one each on the long arm of chromosomes 2, 6 and 7, two on chromosome 8 and one on the short arm of chromosome 9. There is a chromomere on the short arm of chromosome 1.

M 37: 7 knobs were observed, one each on the long arm of chromosomes 2, 4, 5, 6, 7 and 8 and one on the short arm of chromosome 9. Two chromomeres are present on the short arm of chromosome 1 and on the long arm of chromosome 3 and one each on the long arm of chromosomes 4, 6 and 9.

M 38: 5 knobs were observed, one each on the long arm of chromosomes 2, 4, 6 and 8 and one on the short arm of chromosome 9. There is a chromomere on the short arm of chromosome 1, two on the long arm of chromosome 5 and one each on the long arm of chromosomes 6 and 8.

Except the knob on the short arm of chromosome 9 which is terminal, the rest are interstitial in all the above types.

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