

were different. A significant value was found only for the cross involving T6-94505-4 at the one per cent level. The data from the progenies involving T6-94505-4 (6L.13 and 9 ctr.) were as follows: starchy seeds gave 55 normals and 49 spl; waxy seeds gave 77 normal and 23 spl giving a $\chi^2 = 11.94$ and a P-value of less than .01. Within the waxy class there was a significant deviation from the expected (50%) ratio of small plants ($\chi^2 = 29.16$, $P < .01$).

D. V. Glover

4. The effects of dimethylsulfoxide (DMSO) upon germination in *Zea mays* L.

Dimethylsulfoxide (DMSO) is known as a universal solvent for protein and carbohydrate materials. Biological materials are very permeable to this solvent and reports have indicated that DMSO is an effective carrier and reports have indicated that DMSO is an effective carrier for some systemic herbicides. These characteristics of DMSO suggested the possibility of using it as a carrier for alkylating mutagen agents in treating mature seed of *Zea mays*.

In chemical mutagen experiments using mature seed it is desirable to obtain rapid absorption and uptake of mutagen solutions and subsequent interaction with active groups. Some alkylating agents possess a short half-life and therefore soon lose their potency as a mutagen if not incorporated rapidly by the seed.

A small experiment was initiated to determine the effects of DMSO on seed germination prior to using it as a carrier in mutagen experiments. Mature corn seeds of the single cross W23/L317 were soaked for 4, 12 and 24 hours in 0, 5, 10, 15, 20, 25, 50, 75 and 100 per cent by volume concentrations of DMSO in phosphate-buffer solutions. Fifty ml treatment solutions were used. The pH ranges varied from 6.1 for buffer solutions without DMSO to 11.4 for 100% DMSO solutions. Each treatment consisted of 20 seeds. After treatment the seeds were washed with deionized water for 3 minutes and germinated for 7 days on folded blotter germination paper.

The results of the treatments are shown in table 1. Treatments at concentrations greater than 50% V/V for 4 hours or more were completely lethal to the mature seed. The data suggested an increasing lethal effect with increased treatment time; however some of this effect may have been confounded with oxygen effects on germination. The control showed decreased germination with increased treatment time, suggesting the effect of insufficient oxygen. The results of mutagen treatments of mature seed using DMSO as a carrier are being analyzed.

D. V. Glover

Table 1
The effect of several dosage rates of dimethylsulfoxide (DMSO)
upon the germination of Zea mays L. (W23/L317)

Treatment No.	DMSO treatment Conc. % V/V	DMSO treatment Time hrs.	pH of treatment solution	Per cent germination
1	100	4	11.4	0
2	100	12	11.4	0
3	100	24	11.4	0
4	75	4	9.0	0
5	75	12	9.0	0
6	75	24	9.0	0
7	50	4	8.25	100
8	50	12	8.25	30
9	50	24	8.25	0
10	25	4	6.9	100
11	25	12	6.9	90
12	25	24	6.9	70
13	20	4	6.75	90
14	20	12	6.75	95
15	20	24	6.75	80
16	15	4	6.6	80
17	15	12	6.6	90
18	15	24	6.6	60
19	10	4	6.4	100
20	10	12	6.4	85
21	10	24	6.4	70
22	5	4	6.4	100
23	5	12	6.4	90
24	5	24	6.4	80
25	0	4	6.1	100
26	0	12	6.1	95
27	0	24	6.1	90