EFFECT OF MCPB ON HEREDITY OF PEAS

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Summary

The suggestion has been made that the use of MCPB for weed control in peas causes an increase in the incidence of certain abnormalities in succeeding generations. William Massey peas were sprayed with MCPB at two rates of application, one being about twice and the other about four times the rate normally used. Two generations of peas were sprayed and the progeny studied for any change in characteristics. Nothing was discovered to indicate that spraying with MCPB had any effect on heredity.

INTRODUCTION

THE SUGGESTION has been made from time to time that the use of a phenoxy-butyric herbicide on pea crops might interfere with the hereditary characteristics of the crop. One particular manifestation of this effect was claimed to be an increased proportion of albino plants and yellow seeds in the William Massey variety.

A pot trial was established with the aim of determining whether MCPB was likely to cause any observable change in the heredity of treated plants.

EXPERIMENTAL DETAILS

A total of 420 pots were sown, allowing 60 pots for each of seven treatments. The seed used had, as far as could be determined, a history free of MCPB application. The sodium salt of MCPB was applied at two rates of application to three stages of plant growth using 16 gal of water per acre as the diluent. Rates of herbicide are expressed throughout in terms of active ingredient per acre.

Treatments were:

1. MCPB 2 lb at 5-6 node stage.
2. MCPB 2 lb 8 days later (early bud stage).
3. MCPB 2 lb 7 days later (full flowering stage).
4. MCPB 4 lb at 5-6 node stage.
5. MCPB 4 lb 8 days later.
6. MCPB 4 lb 7 days later.
7. Untreated control.

Pots were removed from the glasshouse for spraying.

RESULTS FIRST SEASON

The distortion normally associated with MCPB on peas followed treatment, being more severe at the higher rate. Application at the flowering stage caused the flowers to drop. A second flowering occurred, making these treatments later-maturing than the others.

Seed was, however, collected from all treatments for sowing the next season.

SECOND GENERATION

Seed harvested from the pots was sown in plots the following spring using a split-plot layout. Four applications were left unsprayed and four were treated with MCPB sodium salt at 2 lb at the five-node stage.

RESULTS

No albino plants appeared in any plot.

Five pounds of pods were picked from each plot and the shelled peas cooked.

Yellow seeds were said to show up after cooking, but in fact they could all be detected during shelling.

The number of yellow seeds produced from each line is set out in Table 1, the treatment numbers being those relating to the original treatments.

TABLE 1: NUMBERS OF YELLOW SEEDS, SECOND GENERATION

<i>Treatment No.</i>	<i>Original Treatment (lb)</i>	<i>2nd Generation Sprayed (MCPB 2 lb)</i>	<i>2nd Generation Unsprayed</i>
1	2	2	3
2	2	5	3
3	2	0	8
4	4	5	0
5	4	0	2
6	4	3	3
7	Control	3	0

At the same time seed from Blenheim, understood to have had no MCPB spraying, was grown at Lincoln. In these plots — which were not sprayed — two albino plants occurred but did not survive to produce seed.

THIRD GENERATION

To study effects on the third generation, seed from certain lines was sown, and the pods produced were examined for yellow seeds. Table 2 describes the lines used and the numbers of yellow seeds which resulted.

TABLE 2: NUMBERS OF YELLOW SEEDS, THIRD GENERATION

<i>History of Seed</i>	<i>Yellow Seeds</i>
Harvested from Treatment No. 4 (sprayed twice)	2
Harvested from Blenheim seed (unsprayed)	5
Harvested from Treatment No. 1 (sprayed twice)	5
Harvested from Treatment No. 7 (unsprayed)	6

No albino plants occurred, nor were differences observed in growth or plant characteristics in any line. Some of the yellow seeds were planted but failed to germinate.

DISCUSSION AND CONCLUSION

When seed from the original plants was sown and half of each plot sprayed, samples from the sprayed plots yielded a total of 18 yellow seeds against 19 from the unsprayed ones. It is true that the unsprayed plants from Treatment 7 (Table 1) produced no yellow seeds, but in the same trial the situation is reversed in Treatment 3. There, a line of seed sprayed with MCPB at 2 lb originally, followed by 2 lb the next season, also yielded no yellow seeds.

In the third generation, yellow seeds appeared in lines of peas with, and without, a history of spraying.

The appearance of an occasional albino plant and a small proportion of yellow seeds is not uncommon in certain varieties of peas. These trials produced no evidence to connect the use of MCPB herbicide with the incidence of such abnormalities or, for that matter, any other observable change in the heredity of the pea crop.