CROP TOLERANCE TRIALS WITH TCA

By J. S. YEATES, Massey Agricultural College

THE object was to test the tolerance of various crop seeds to TCA applied under field conditions under the particular conditions of soil and rainfall at the College.

The soil was a silt loam, containing a fair amount of organic matter.

PLAN OF EXPERIMENT

Eighteen plots were laid out, each 13ft. by 9ft. 4in. The plots were in 3 rows separated by paths 2ft. wide. No crop seeds were sown nearer than 11in. from the margin of the adjacent plot. The soil was worked down to make a fine seed-bed.

TCA APPLICATION

Treatments were:—

Control		
5lb. TCA/acre.		
10lb.	"	"
20lb.	"	"
35lb.	"	"
50lb.	"	"
75lb.	"	"
100lb.	"	"
200lb.	"	"
Control		

Application of the TCA was effected by dissolving the appropriate weight for each plot in 1.32 gallons of water and applying it through a watering-can fitted with a rose. Two randomised plots were given each treatment. Date of application was 28 February 1953.

SOWING OF CROP SEEDS

The following crop seeds were sown on 3 and 4 March:—

Broad beans—Cole's Early Dwarf.
Barley—College.
Chou moellier.
Red clover.
Swede—Superlative.
Onion—Pukekohe Long Keeper.
Mangold—Prizewinner.
Turnip.
Oats—Algerian.
Peas—Greenfeast.

One row of each of the crops was sown across each plot. In order to give a better idea of germination percentage an equal number, by

RAINFALL AND SOIL MOISTURE

During the week 28 February to 6 March in which the plots were laid down and for the following 5 days the total rainfall was 0.07in. The totals for each month during which the trial was observed were:—

							Inches
March							1.42
April	..	..	..	..	..	..	2.89
May	..	..	..	..	..	..	4.17
June	..	..	..	..	..	..	2.58
July	..	..	..	..	..	..	3.05
August	..	..	..	..	..	..	1.03
September	..	..	..	..	..	..	3.69
1 October-6 October					..	..	1.20
Total		..	..	..	..	..	20.03

Broad beans: Germination little affected by any dosage of TCA, but with 50lb. and upwards, foliage distorted—leaves twisted and tight in half-expanded state. Brittle. At 200lb. growth very markedly retarded.

Chou moellier: No detrimental effect in plots of 50lb. and less. At 75lb. there was a retardation of growth, and at 100 and 200lb. the foliage yellowed.

Swede: Under all applications this crop appeared to follow normal growth without any obvious detrimental effect appearing.

Mangold: Growth retarded in 75lb. and 100lb. plots, and germination was poor, in addition, in the 200lb. plots.

Oats: As with barley, the numbers emerging in the various plants was very erratic and no conclusion is possible. At the two highest concentrations the plants were invariably small and lacked vigorous appearance. In contrast to barley, germination was not prevented by the 200lb.

Peas: Although emergence was not apparently affected, foliage abnormalities appeared in treatments from 35lb. upwards with gross distortion at 200lb. Distortion similar in nature to that of broad bean.

ADDITIONAL OBSERVATIONS (6 October, 1953)

200lb. rate: The only surviving plants were one plant each of chou moellier, swede, mangold, and some turnips, the last-named by then 4ft. high. There was an 80 per cent. soil cover of weeds, including *Spergula arvensis*, *Crepis capillaris*, *Coronopus didymus*, *Juncus bufonius*, *Gnaphalium*, and *Sonchus oleraceus*.

100lb. rate: One broad bean plant survived, sparse chou moellier up to 2ft., the mangolds were 1ft. 3in. high with bulbs 3in. to 4in. diameter, and turnips were 3ft. 6in. high. The weeds were similar to those in the 200lb. treatment.

75lb. rate: There was one broad bean; a few mangolds with lin. bulbs, and sparse turnips. Weeds as above.

50lb. rate: There were no broad beans; a few plants of barley 3ft. high and heading; mangolds with bulbs 2½in. diameter; turnips 3ft. 6in. high, and sparse oats 2ft. 6in. high. Weeds as above.

35lb. rate: Broad beans 3ft. 6in. high; chou moellier 2ft.; mangolds 2ft. high; oats 2ft. 6in. high; swedes 3ft. 6in. high. Additional weeds included grass weeds.

20lb. rate: Broad beans 3ft. 6in. with pods 4½in. long, chou moellier 3ft. high, good, a few oats to 2ft. high. No grass weeds.

10lb. rate: Beans 2ft. 6in. high, pods 4½in. long; barley 2ft. 6in. high; mangolds sparse, 2½in. bulbs; turnips 3ft. 6in. high; oats 2ft. 6in. high. Grass weeds included prairie grass.

5lb. rate: Beans 3ft. 6in., pods 4½in. long, chou moellier 4ft.; oats 2ft. 6in.; sparse red clover; swedes 3ft. 6in.; turnips 4ft.; mangolds 1ft. high. Weeds good coverage, species as in other plots.

Control: Beans 3ft. 6in. high, pods 5in. long; chou moellier 2ft. high; barley 2ft. 6in. high; red clover sparse; turnip 2ft. 3in. high. Weeds were: *Poa annua*, *Glyceria*, and other weeds mentioned under the 200lb. rate.

Second sowing: A second sowing of the same varieties of crops was made at the end of August, 6 months from time of treatment. Notes made on 6 October showed no apparent remaining effects from the use of TCA on any of the plots.

CONCLUSIONS

The sowings having been made out of season, in autumn, did not give a fair indication as to the ultimate growth of the crops. Onions and peas, for instance, did not survive to October in any plot. Because of erratic final results and also bird damage after sowing no statistical treatment of the results was possible.

The outstanding feature was the resistance of the different crucifers to TCA even at dosages of 100lb. per acre. The mangold also showed considerable resistance to 100lb. per acre. The leguminous crops showed definitely less resistance, a maximum dosage of 35lb. per acre being indicated as safe. Although onions showed high resistance in the first 2 months, their failure to survive to October in any plot leaves their position indefinite.

On the basis of these results an upper limit of 50lb. per acre of TCA would appear to be wise where crucifers are to be planted under conditions similar to those in the trial.

Thanks are due to Messrs. Ivon Watkins, Ltd., for financial help in these trials.