Pak. J. Bot., 10 (2): 157–159, 1978.

EFFECT OF (2-CHLOROETHYL) TRIMETHYL AMMONIUM CHLORIDE ON THE YIELD OF OKRA *(ABELMOSCHUS ESCULENTUS).*

KHALIL AHMAD KHAN AND ASRAR-UL-HAQ

Department of Botany, University of Agriculture, Faisalabad.

Abstract

The effect of (2-Chloroethyl) trimethyl ammonium chloride (CCC) on the yield of *Abelmoschus esculentus* was studied. Seeds of *A. esculentus* were soaked in 400, 800 and 1200 ppm of CCC for 24 hours. Treatment of Okra with 400 ppm did not influence the time taken for flowering and fruit set, 800 and 1200 ppm of CCC delayed the flower initiation and fruit set. Number of flowers was not influenced by 800 ppm CCC whereas it decreased significantly in 400 and 1200 ppm. 800 ppm produced significantly higher number of fruits. Fruit yield increased by 12.55 per cent. Dry weight of the seeds and number of seeds per fruit increased slightly but non-significantly at three concentrations. No significant effect was observed on fruit size.

Introduction

Okra (*Abelmoschus esculentus*) is one of the important vegetable crops but its average yield is relatively low. Yield is an interplay of various genetic, physiological and environmental factors and one of the possible reason for the low yield of Okra may be the excessive vegetative growth. It is possible to reduce the plant height by chemicals. The effect of CCC have been widely studied (Humpheries, 1968a). CCC is usually applied to crop plants as foliar spray but it has also been used as seed dressing (Philpotts, 1972). CCC retards the flower initiation (Ganashan & Whittington, 1975) but increases the fruit yield (Maurer. *et al.* 1969). Many instances of improvement of grain yield in wheat have been reported by Humpheries (1968b) and Philpotts (1972).

The effect of CCC on *Abelmoschus esculentus* plant does not appear to have been studied. The present paper reports the yield response of *A. esculentus* an important vegetable crop to soaking tratment of CCC

Materials and Methods

Seeds of *Abelmoschus esculentus* L. Var. Ahmadabadi were soaked in 400, 800 and 1200 ppm of CCC for 24 hours. Untreated seeds were soaked in distilled water only. The seeds were then sown in the field. The design of the experiment was com-

pletely randomized with 3 replications. The size of the individual plot was 16'–8" x 8'–3", and row to row distance was 2'–1" and plant to plant 8". In each row fifty seeds (25 on one side and 25 on the other) were sown in April, 1974 in the Botanical Garden, University of Agriculture, Faisalabad. The date of appearance of first flower in treated and untreated plants was noted. Ten plants from each treatment were earmarked to study the number of flowers and fruits and other yield characters. Field was irrigated twice and no fertilizer, herbicide, insecticide or fungicide was applied. Data for different characters were analysed statistically by analysis of variance (Fisher, 1958) and the effect of treatments and harvests were compared by the Duncan's New Multiple Range Test (Le-Clarge *et al.*, 1962).

Results and Discussion

Treatment of Okra plants with 400 ppm CCC did not influence the time taken for flowering and fruit set. However, the flowering and fruit set was delayed by 4 and 3 days respectively in plants treated with 800 and 1200 ppm. This indicates that CCC delayed the flower formation and setting of fruit. The results of the present investigation are in conformity with the observations of Ganashan & Whittington, (1975) who noted that CCC delayed the flowering in Rice. Kalapwijh (1966) has reported that CCC retarded the flower initiation in young pot grown tomato plants.

The number of flowers was not influenced by 800 ppm CCC, although, there was non-significant increase (Table 1). The number decreased significantly in plants treated with 400 and 1200 ppm. An increased number of flowers have been reported by Mishra & Pradhan (1972) in tomato plants. Plants treated with 800 ppm produced significantly higher number of fruits and consequently increased the fruit yield. The number decreased significantly in plants treated with 1200 ppm. The increase in pod yield have also been observed by Maurer *et al* (1969) who reported that 50 ppm CCC increased the pea yield. However, Adedipe *et al* (1969) observed that 100 ppm CCC had no significant effect on pea yield.

TABLE 1. Effect of CCC on different characters of *Abelmoschus esculentus.*

CCC Concentration ppm.	No. of flowers per plant	No. of fruits per plant	Size of fruit (cm.)	Dry weight per fruit (gm.)	Weight of seeds per fruit (gm.)	No. of seeds per fruit	Fruit yield ten plants. (gm.)
0	13.00a	12.70b	14.99a	3.70a	2.26a	45.66a	127.00b
400	11.00b	11.20b	15.02a	4.10a	2.61a	49.33a	112.00b
800	14.00a	14.30a	14.90a	3.70a	2.41a	50.00a	143.00a
1200	9.00c	9.50c	14.69a	3.57a	2.47a	49.00a	95.00c

Means with same alphabet are not significantly different at $P > 0.05$.

Treatment of seeds with 400, 800 and 1200 ppm CCC did not significantly influence the dry weight of fruit and seeds and number of seeds per fruit and the size of the fruit. There is slight but non-significant increase in the weight of fruit and seeds and number of seeds per fruit. Slight increase in the dry weight of fruit has been recorded by Humpheries (1963) who reported that the dry weight of fruit of *Raphanus sativus* was not much affected by the application of CCC. Humpheries *et al* (1965) found little or no difference in response to 2.8 or 5.6 kg per ha. on wheat. Large amounts may affect the yields adversely and winter wheat requires more CCC than spring wheat. However, Caldicott & Lindley (1964) found that number of fertile spikelets, grains per ear and grains per fertile spikelet were not affected by the CCC.

References

Adedipe, N.O., D.P. Ormrod, and A.R. Maurer. 1969. The response of pea plants to low concentrations of CCC, Phosphon and B9. J. Amer. Soc. Hort. Sci., 94: 321-323.

Caldicott, J.J.B. and C.D. Lindley. 1964. The use of CCC to prevent lodging in wheat. Proc. 7th British Weed Control Conf. 1964, 1: 49-56.

Fisher, R.A. 1958. Statistical Methods for Research Workers. Oliver and Boyd, Edinburgh: 248-298.

Ganashan, P., and W.J. Whittington. 1975. Effects of Chloromequat Chloride on related tall and dwarf rice varieties. Ann. Appl. Biol. 81: 219-225.

Humpheries, E.C. 1963. Effect of CCC on plant growth, leaf area and net assimilation rate. Ann. Bot., 27: 517 532.

Humpheries, E.C., P.J. Welbank, and K.G. Witts. 1965. Effect of CCC on growth and yield of spring wheat in the field. Ann. Appl. Biol., 56: 351-361.

Humpheries, E.C. 1968a, CCC and Cereals. Field Crop Absts., 21: 91 99.

Humpheries, E.C. 1968b, The beneficial Effects of CCC on wheat yields in dry condition. Euphytica 17: 275 279.

Kalapwijh, D. 1966. The action of CCC on the growth of young tomato plants. Mededel Directive Tuinbouw, 29: 272-279.

Le Clarg, E.L., W.H. Leonard, and A.G. Clark. 1962. Field plot technique, Burgess Pub. Co., Minnesota: 144-146.

Maurer, A.R., D.P. Ormord, and N.O. Adedipe. 1969. Yield response of peas to foliar applications of Dimethyl Sulphonamide and CCC. J. Hort. Sci., 4: 301-302.

Mishra, D., and G.C. Pradhan. 1972. Effect of transpiration reducing chemicals on growth, flowering and stomatal opening of tomato plants. Plant Physiol., 50: 271-274.

Philpotts, H. 1972. The Effect of (2-Chloroethyl) Trimethyl Ammonium Chloride (CCC) and pre-sowing drought hardening on growth and yield of wheat. Australian Jour. Exp. Agri. & Animal Husbandry, 12: 70 74.