RESULTS

RESULTS

Extension growth

Shoot system: Extension growth of shoot system (Table 1) of control plants progressively increased until day 42. The maximum rate of growth was observed between 14th and 28th day. The growth rate however declined thereafter. The extension growth of the plants treated with CCC also followed almost the same pattern as that of control (Table 1). Plants sprayed with 500 ppm CCC did not register any appreciable difference over the control in the extension growth. However, application of CCC at 1000 and 15000 ppm significantly reduced the extension growth of the shoot system (Table 1). The reduction was 31 and 41% at 1000 and 15000 ppm respectively at the end of day 70.

Root system: The linear growth of the root system also registered a similar pattern as that of shoot system (Table 3) CCC administration did not bring about any significant difference in the elongation growth of root system over the control (Table 3), though it enhanced its lateral growth.

Fresh and dry weights

Shoot system: The fresh weight of shoot system (Table 5), increased until day 56 and declined thereafter. Dry matter

accumulation in the shoot system kept on increasing even after the decline of its linear growth rate (Table 7). Plants sprayed with CCC also followed almost the same pattern as that of control (Table 5). Fresh and dry weights of the shoot system of plants sprayed with 1000 ppm CCC registered a marked increase compared to the control values. The fresh and dry weights of shoot system of the plants which received 1000 ppm CCC spray were increased by 39 and 22% respectively over the control on day 56 (Table 5 and 7). But CCC at 500 and 1500 ppm failed to increase the fresh and dry weights of the shoot system.

Root system: Unlike the shoot system, the fresh weight of root system continued to increase till the end of the experiment (Table 9). Dry matter accumulation in the root system, as observed in the case of shoot system, progressively increased till the end of day 70 (Table 11). CCC application at 1000 ppm brought about a significant increase in both fresh and dry weights of the root system as compared to control though it at 500 and 1500 ppm did not evoke any response. The fresh and dry weights of the root system of plants treated with 1000 ppm CCC were increased by 21 and 46% respectively over the control on day 70 (9 and 11).

Total dry matter

The total dry matter production kept on increasing till the end of the experimental period (Figs. 1a and b).

Table 1: Effect of pre flowering spray with CCC on the extension growth (cm.) of shoot system of Mung bean

Treatment CCC ppm	Days after emergence 14	28	42	56	70
0	15.46	35.93_a	49.06_d	53.86_h	57.86_l
500	15.46	32.73_a	45.2_d	49.66_h	56.7_l
1000	15.46	24.6_b	32.73_e	35.96_i	39.66_m
1500	15.46	20.26_c	26.0_f	30_k	34.4_h

In each column values with different letters differ significantly ($P < 0.05$)

Table: 2 Effect of pre and post flowering sprays with CCC on the extension growth (cm) of shoot system of Mung bean

Treatment	Days after emergence					
CCC ppm	14	28	32	42	56	70
0	15.46	35.93 $_{a}$	36.2 $_{c}$	49.06 $_{h}$	53.86 $_{l}$	57.86 $_{p}$
500	15.46	32.73 $_{a}$	34.85 $_{c}$	46.8 $_{h}$	54.00 $_{l}$	56.0 $_{p}$
1000	15.46	24.6 $_{b}$	25.8 $_{b}$	32.0 $_{i}$	36.5 $_{m}$	38.40 $_{q}$
1500	15.46	20.2 $_{c}$	20.5 $_{c}$	25.6 $_{k}$	30.8 $_{n}$	32.2 $_{r}$

In each column values with different letter differ significantly ($p < 0.05$)

Table 3 : Effect of pre flowering spray with CCC on the extension growth (cm) of root system of Mung bean

Treatment	DAYS AFTER EMERGENCE				
CCC ppm	14	28	42	56	70
0	7.24	17.98 a	19.05 b	21.39 b	22.5 b
500	7.24	18.6 a	20.7 b	21.44 b	22.4 b
1000	7.24	19.4 a	20.32 b	21.5 b	22.8 b
1500	7.24	19.8 a	20.34 b	21.68 b	23.0 b

In each column values with different letters differ significantly ($p < 0.05$)

Table 4: Effect of pre and post flowering sprays with CCC on the extension growth (cm) of root system of Mung bean

Treatment	DAYS AFTER EMERGENCE					
CCC ppm	14	28	32	42	56	70
0	7.24	17.98 a	18.2 a	19.05 b	21.34 b	22.5 b
500	7.24	18.6 a	18.62 a	20.1 b	22.6 b	22.8 b
1000	7.24	19.4 a	19.41 b	20.9 b	21.74 b	22.61 b
1500	7.24	19.8 a	19.65 a	20.77 b	21.5 b	22.55 b

In each column values with different letters differ significantly ($p < 0.05$)

Table 5 : Effect of pre flowering spray with CCC on fresh weight (g) of shoot system of Mung bean

Treatment	DAYS AFTER EMERGENCE				
CCC ppm	14	28	40	56	70
0	0.87	2.9 $_{a}$	17.7 $_{c}$	22.33 $_{e}$	19.15 $_{k}$
500	0.87	3.02 $_{a}$	18.58 $_{c}$	24.0 $_{e}$	19.45 $_{k}$
1000	0.87	3.9 $_{b}$	25.46 $_{d}$	31.26 $_{f}$	23.3 $_{l}$
1500	0.87	3.18 $_{a}$	20.4 $_{c}$	24.9 $_{e}$	20.05 $_{k}$

In each column values with different letters differ significantly ($p < 0.05$)

Table 6 : Effect of pre and post flowering sprays with CCC on fresh weight (g.) shoot system of Mung bean

Treatment	DAYS AFTER EMERGENCE					
CCC ppm	14	28	32	42	56	70
0	0.87	2.9_{a}	3.02_{c}	17.7_{e}	22.35_{h}	19.15_{k}
500	0.87	3.02_{a}	3.32_{c}	18.78_{e}	24.1_{h}	19.5_{k}
1000	0.87	3.9_{b}	4.05_{b}	24.87_{f}	29.9_{i}	22.54_{l}
1500	0.87	3.18_{a}	3.61_{c}	20.0_{e}	25.0_{h}	19.89_{k}

In each column values with different letters differ significantly ($p < 0.05$)

Table 7: Effect of pre flowering sprays with CCC on dry weight (g) of shoot system of Mung bean

Treatment	DAYS AFTER EMERGENCE				
CCC ppm	14	28	42	56	70
0	0.246	0.821 $_{a}$	3.48 $_{c}$	5.40 $_{l}$	7.3 $_{h}$
500	0.246	0.838 $_{a}$	3.56 $_{c}$	5.44 $_{e}$	7.35 $_{h}$
1000	0.246	0.978 $_{b}$	4.1 $_{d}$	6.6 $_{f}$	8.35 $_{i}$
1500	0.246	0.856 $_{a}$	3.84 $_{b}$	5.94 $_{e}$	7.4 $_{h}$

In each column values with different letters differ significantly ($p<0.05$)

Table 8 : Effect of pre and post flowering sprays with CCC on dry weight (g) of shoot system of Mung bean

Treatment	DAYS AFTER EMERGENCE					
CCC ppm	14	28	32	42	56	70
0	0.246	0.821_{a}	0.824_{a}	3.48_{d}	5.44_{f}	7.3_{h}
500	0.246	0.838_{a}	0.842_{a}	3.74_{d}	5.49_{f}	7.25_{h}
1000	0.246	0.978_{b}	0.982_{b}	4.39_{e}	6.55_{g}	8.63_{i}
1500	0.246	0.856_{a}	0.864_{b}	3.86_{d}	5.9_{p}	7.54_{h}

In each column values with different letters differ significantly ($p<0.05$)

Table 9 : Effect of pre flowering spray with CCC on fresh weight (g.) of root system of Mung bean

Treatment	DAYS AFTER EMERGENCE				
CCC ppm	14	28	42	56	70
0	0.095	0.334 $_{a}$	0.519 $_{c}$	0.927 $_{e}$	1.19 $_{h}$
500	0.095	0.342 $_{a}$	0.533 $_{c}$	0.937 $_{e}$	1.22 $_{h}$
1000	0.095	0.452 $_{b}$	0.685 $_{d}$	1.030 $_{f}$	1.44 $_{k}$
1500	0.095	0.401 $_{a}$	0.571 $_{b}$	0.959 $_{e}$	1.05 $_{h}$

In each column values with different letters differ singificantly ($p < 0.05$)

Table 10: Effect of pre and post flowering sprays with CCC on fresh weight (g) of root system of Mung bean

Treatment	DAYS AFTER EMERGENCE					
CCC ppm	14	28	32	42	56	70
0	0.095	0.334 $_{a}$	0.339 $_{c}$	0.519 $_{e}$	0.927 $_{h}$	1.19 $_{k}$
500	0.095	0.342 $_{a}$	0.350 $_{c}$	0.530 $_{e}$	0.940 $_{h}$	1.03 $_{k}$
1000	0.095	0.452 $_{b}$	0.467 $_{d}$	0.691 $_{f}$	1.024 $_{i}$	1.40 $_{h}$
1500	0.095	0.401 $_{b}$	0.408 $_{c}$	0.548 $_{b}$	0.981 $_{l}$	1.15 $_{k}$

In each column values with different letters differ significantly ($p<0.05$)

Table 11 : Effect of pre flowering spray with CCC on dry weight (g.) of root system of Mung bean

Treatment	DAYS AFTER EMERGENCE				
CCC ppm	14	28	42	56	70
0	0.0095	0.078 $_{a}$	0.15 $_{c}$	0.219 $_{e}$	0.26 $_{h}$
500	0.0095	0.082 $_{a}$	0.155 $_{c}$	0.22 $_{e}$	0.265 $_{h}$
1000	0.0095	0.115 $_{b}$	0.199 $_{d}$	0.31 $_{f}$	0.380 $_{i}$
1500	0.0095	0.091 $_{a}$	0.164 $_{c}$	0.245 $_{e}$	0.280 $_{h}$

In each column values with different letters differ significantly ($p<0.05$)

Table 12: Effect of Pre and post flowering sprays with CCC one dry weight (g.) of root system of Mung bean

Treatment CCC ppm	DAYS AFTER EMERGENCE 14	28	32	42	56	70
0	0.0095	0.078_a	0.0785_a	0.151_c	0.219_e	0.260_h
500	0.0095	0.082_a	0.084_a	0.157_c	0.226_e	0.270_h
1000	0.0095	0.115_b	0.115_b	0.198_d	0.308_f	0.390_i
1500	0.0095	0.091_a	0.090_a	0.166_c	0.243_e	0.287_h

In each column values with different letters differ significantly ($P < 0.05$)

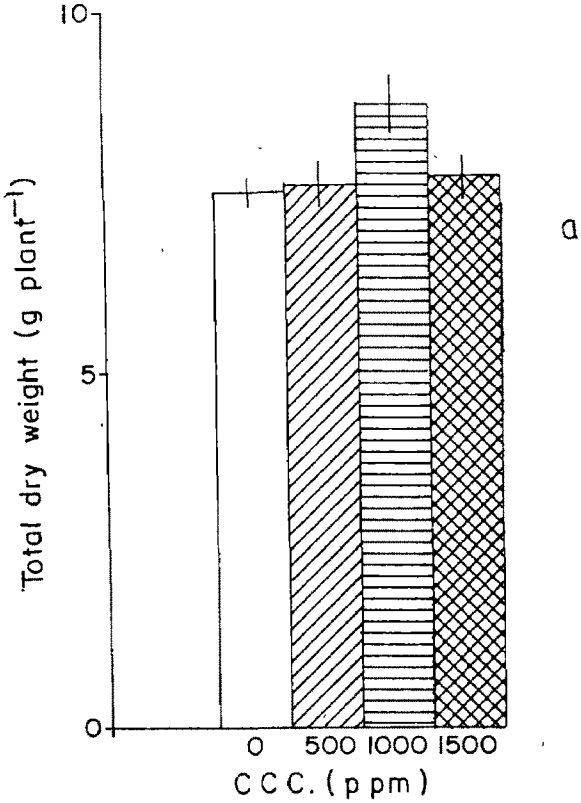
The amount of total dry matter accumulated in plants treated with 1000 ppm CCC was 15.5% more than that of the control. No significant difference was observed in the amount of total dry matter accumulated with respect to the number of CCC sprays.

The length, fresh and dry weights of shoot and root system of plants which received both pre and post flowering sprays of CCC (Tables 2, 4, 6, 8, 10 and 12) were not significantly different from that of plants which received only preflowering spray of CCC.

Internode length

The length of internodes at the end of the experiment is presented in the tables 13 and 14. Out of three concentrations of CCC tested, CCC at 1000 and 1500 ppm brought about a very conspicuous reduction in the length of 3rd, 4th and 5th internodes. The reduction in the length of internode was maximum at 1500 ppm. The 5th internode of CCC treated plants showed the highest percentage of reduction at both the concentrations of CCC i.e. at 1000 (54.8%) and 1500 ppm (67.7%). No appreciable differences was observed between the plants which received single (pre-flowering) and double (pre and post flowering) sprays of CCC with respect to the length of internodes.

Fig.1 Effect of pre flowering (a) and pre and post flowering (b) sprays with CCC on the total dry weight of Mung bean. Vertical bars represent S.E. of the mean.


10
5
0
Total dry weight (g plant⁻¹)
0 500 1000 1500
CCC. (ppm)
a

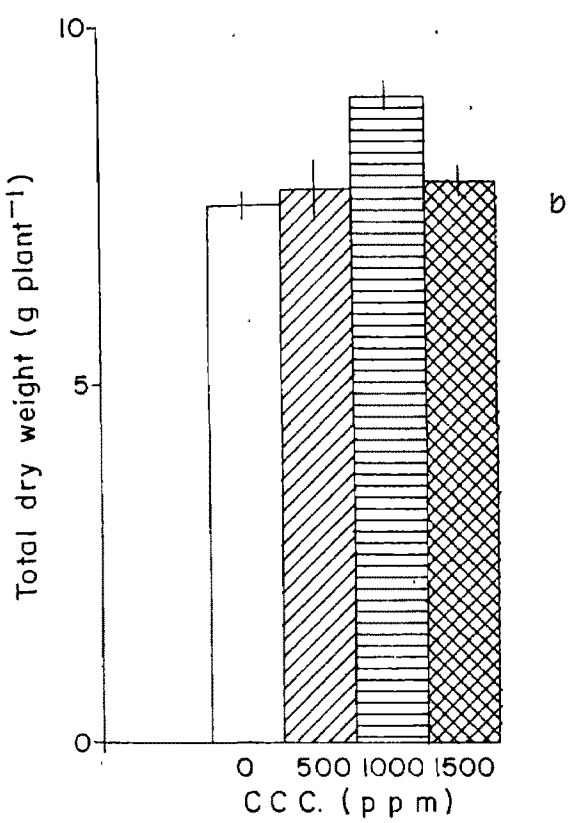

10
5
0
Total dry weight (g plant⁻¹)
0 500 1000 1500
CCC. (ppm)
b

Table : 13. Effect of pre flowering spray with CCC on the length (mm) of internode of Mung bean

Treatment CCC ppm	INTERNODE (70th day) 1st	2nd	3rd	4th	5th	6th
0	32.2 a	29.2 a	48 b	59 c	62.0 c	52.6 d
500	31.8 a	27.8 a	46 b	56 c	59.4 c	45.0 d
1000	29.5 a	20.2 a	24 e	29.2 f	28.8 f	41 g
1500	27.8 a	16.6 h	16 h	26.6 i	21.5 j	39 k

In each column values with different letters differ significantly ($p < 0.05$)

Table 14: Effect of pre and post flowering sprays with CCC on the length (mm) of internode of Mung bean

Treatment	INTERNODE (70th day)					
CCC ppm	1st	2nd	3rd	4th	5th	6th
0	32.2 a	29.2 a	48.6 b	59.9 c	62.0 c	52.6 d
500	28.8 a	26.0 a	45.5 b	56.5 c	60.2 c	50.5 d
1000	26.7 a	21.0 a	24.5 e	30.0 f	28.0 f	40.0 g
1500	26.5 a	16.0 h	15.8 h	26.6 i	20.0 j	38.1 g

In each column values with different letters differ significantly ($p < 0.05$)

Circumference (5th internode)

CCC at 1000 ppm increased the circumference of the 5th internode by 20.8% over the control on 70th day. Other concentrations of CCC, however, did not bring about any appreciable change in the circumference of the internode (Table 15).

Number and fresh and dry weights of nodules

The number of nodules per plant continued to increase till 42nd day followed by a drop thereafter (Table 16). Fresh and dry weights of nodules increased steadily till 56th day and then declined (Tables 18 and 20). Pre flowering sprays with CCC at 1000 ppm significantly increased the number of nodules (Table 16) and nodule mass (Tables 18 and 20) compared to control.

On day 42 the number of nodules per plant treated with 1000 ppm CCC was increased by 17.9% compared to control (Table 15). The fresh and dry weights of nodules when determined on day 56 registered an increase of 20 and 16.4% respectively over the control (Tables 18 and 20). CCC at 500 and 1500 ppm did not bring about any appreciable increase in the number as well as the mass of nodules. Plants which received two sprays of CCC (Pre and post flowering sprays) did not register any significant difference in the number and mass of nodules (Tables 17, 19 and 21) over the plants which received only pre flowering spray of CCC.

Table 15: Effect of CCC on the circumference (mm) of Mung bean

Treatment CCC ppm	Pre flowering spray	Pre and post flowering sprays
0	13.40_a	13.40_a
500	13.51_a	13.21_a
1000	16.20_b	16.08_b
1500	13.82_a	14.00_a

In each column values with different letters differ significantly ($P < 0.05$).

Table 16: Effect of pre flowering spray with CCC on the number of nodules per plant

Treatment CCC ppm	DAYS AFTER EMERGENCE 14	28	42	56	70
0	20.6	60.7_a	66.0_c	50.1_e	28.1_k
500	20.6	63.9_a	68.2_c	51.5_e	28.5_k
1000	20.6	69.0_b	77.1_d	59.1_f	34.9_k
1500	20.6	65.6_a	70.0_c	53.3_e	32.7_k

In each column values with different letters differ significantly ($P < 0.05$)

Table 17 : Effect of pre and post flowering spray with CCC on the number of nodules per plant

Treatment CCC ppm	DAYS AFTER EMERGENCE 14	28	32	42	56	70
0	20.6	60.7_a	60.5_c	66.0_e	50.1_h	28.1_k
500	20.6	63.9_a	63.4_c	68.8_e	51.9_h	30.2_k
1000	20.6	69_b	69.1_d	76.8_f	60.0_i	37.0_l
1500	20.6	65.6_a	65.0_c	70.7_e	53.9_h	33.0_k

In each column values with different letters differ significantly ($p < 0.05$)

Table 18 : Effect of pre flowering spray with CCC on fresh weight (mg) of nodules per plant

Treatment	DAYS AFTER EMERGENCE				
CCC ppm	14	28	42	56	70
0	8.03	58.2_{a}	145.5_{c}	160.3_{e}	120.8_{h}
500	8.03	61.1_{a}	150.0_{c}	164.8_{e}	122.5_{h}
1000	8.03	67.27_{b}	173.2_{d}	192.6_{f}	152.5_{i}
1500	8.03	62.66_{a}	154_{c}	168.5_{e}	129.6_{h}

In each column values with different letters differ significantly ($p < 0.05$)

Table 19 : Effect of pre and post flowering sprays with CCC on fresh weight (mg) of nodules per plant

Treatment	DAYS AFTER EMERGENCE					
CCC ppm	14	28	32	42	56	70
0	8.03	58.2_{a}	64.13_{c}	145.2_{e}	160.3_{h}	120.8_{k}
500	8.03	61.1_{a}	67.20_{c}	149.6_{e}	162.08_{h}	129.8_{k}
1000	8.03	67.27_{b}	73.59_{d}	172.8_{f}	195.6_{i}	161.6_{l}
1500	8.03	62.66_{a}	68.9_{c}	155.3_{e}	166.4_{h}	131.9_{k}

In each column values with different letters differ significantly ($p<0.05$)

Table 20 : Effect of pre flowering sprays with CCC on dry weight (mg) of nodules per plant

Treatment	DAYS AFTER EMERGENCE				
CCC ppm	14	28	42	56	70
0	1.32	9.6_a	23.95_b	26.42_d	24.9_f
500	1.32	10.08_a	24.75_b	27.19_d	24.2_f
1000	1.32	11.09_a	28.5_c	30.77_e	29.16_h
1500	1.32	10.33_a	25.4_b	27.8_d	24.3_f

In each column values with different letters differ significantly ($p < 0.05$)

Table 21 : Effect of pre and post flowering sprays with CCC on dry weight of nodules per plant

Treatment	DAYS AFTER EMERGENCE					
CCC ppm	14	28	32	42	56	70
0	1.32	9.6_a	10.58_b	23.9_c	26.92_e	19.9_h
500	1.32	10.08_a	11.08_b	24.68_c	27.19_e	21.4_h
1000	1.32	11.09_a	12.14_b	28.51_d	31.77_f	26.6_i
1500	1.32	10.33_a	11.3_b	25.4_c	27.45_e	21.7_h

In each column values with different letters differ significantly ($P < 0.05$)

Leaf area and leaf area index

CCC treatment did not alter the number of leaves. The total leaf area (Table 22) of plants increased steadily till 56th day and decreased sharply thereafter. Application of CCC (1000 ppm) significantly increased the total leaf area by 16.6% on day 42 over the control. Leaf area of plants which received two sprays of CCC was almost same as that of plants which received only a single spray (Table 23). A similar trend was observed in leaf area index as well (Tables 24 and 25).

Leaf thickness

Cross section of the middle lamina of the mature trifoliate leaf at the 5th node showed that CCC treatment increased length and size of the palisade and spongy cells with out affecting the number of cell layers (plate 1). Leaf thickness of CCC treated plants was increased by 54.6 (1000 ppm) and 15.9% (1500 ppm) over the control (Table 26).

Root/shoot weight ratio

The root/shoot weight ratio increased till 28th day and declined thereafter. CCC treatment (1000 ppm) significantly increased the root/shoot weight ratio, though the dry weight of the shoot system is also increased considerably following CCC treatment (Tables 27 and 28).

Table 22 . Effect of pre flowering spray with CCC on total leaf area (cm^2) of Mung bean

Treatment	DAYS AFTER EMERGENCE				
CCC ppm	14	28	42	56	70
0	66.8	392.8_a	589.2_c	942.4_e	593.8_h
500	66.8	406.6_a	604.3_c	956.0_e	612.0_h
1000	66.8	474.2_b	687.5_d	1025_f	655_i
1500	66.8	425.0_b	632.5_c	965_e	620_h

In each column values with different letters differ significantly ($p<0.05$)

Table 23 : Effect of pre and post sprays with CCC on total leaf area (cm^2)

Mung bean

Treatment	DAYS AFTER EMERGENCE					
CCC ppm	14	28	32	42	56	70
0	66.8	392.8_a	393.6_c	589.2_e	942.4_h	593.8_h
500	66.8	406.6_a	406.0_c	600_e	954.8_h	618.0_h
1000	66.8	474.2_b	479.8_d	682.1_f	1019.5_i	660.0_m
1500	66.8	435_a	429_c	619.0_e	961.0_k	628.1_h

In each column values with different values differ significantly ($p < 0.05$)

Table 24 . Effect of pre flowering sprays with CCC on leaf area index (cm^2/cm^2) of Mung bean

Treatment	DAYS AFTER EMERGENCE				
CCC ppm	14	28	42	56	70
0	0.142	0.840_a	1.25_c	2.01_e	1.266_h
500	0.142	0.863_a	1.286_c	2.04_e	1.30_h
1000	0.142	1.01_b	1.42_d	2.19_f	1.40_i
1500	0.142	0.90_a	1.30_c	2.05_e	1.31_h

In each column values with different letters differ significantly ($p < 0.05$)

Table 25 . Effect of pre and post flowering sprays with CCC on leaf area index (cm^2/cm^2) of Mung bean

Treatment	DAYS AFTER EMERGENCE					
CCC ppm	14	28	32	42	56	70
0	0.142	0.840_a	0.841_a	1.25_c	2.01_e	1.26_h
500	0.142	0.863_a	0.868_a	1.28_c	2.04_e	1.32_h
1000	0.142	0.01_b	0.024_b	1.41_d	2.17_f	1.395_i
1500	0.142	0.90_a	0.914_a	0.31_c	2.04_e	1.33_h

In each column values with different letters differ significantly ($p < 0.05$)

Plate. 1 : Transverse section of the middle leaflet of the mature fifth trifoliate leaf of mung bean (200 x). a. control. b. CCC 500 ppm, c. 1000 ppm, d. 1500 ppm. (pre flowering application of CCC).

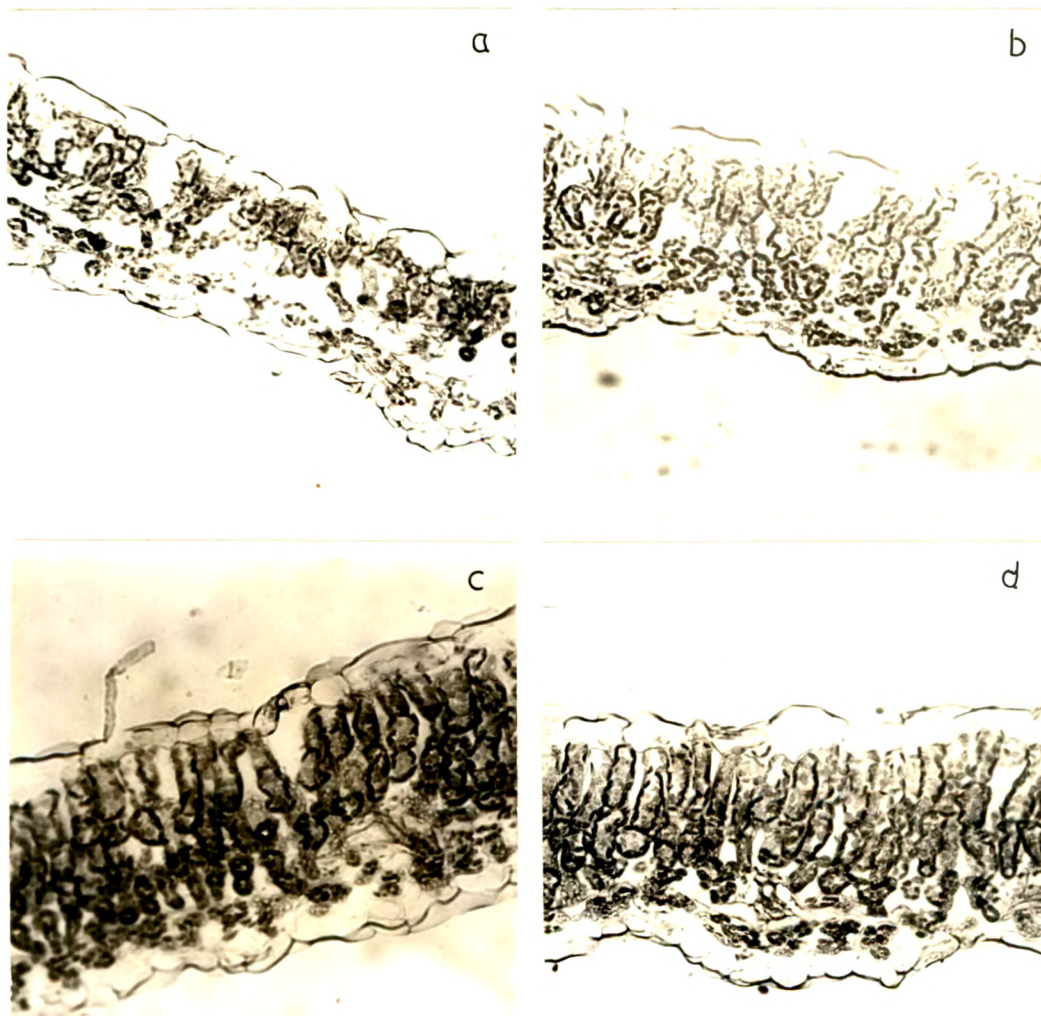

a
b
c
d

Table 26: Effect of CCC on mean leaf thickness (μm) of Mung bean

Treatment CCC ppm			
0	500	1000	1500
104.72	107.6	161.92	121.44

Table 27. Effect of pre flowering spray with CCC on root/shoot weight ratio of Mung bean

Treatment CCC ppm	DAYS AFTER EMERGENCE 14	28	42	56	70
0	0.038	0.095_a	0.043_c	0.040_c	0.035_e
500	0.038	0.097_a	0.043_c	0.040_c	0.036_e
1000	0.038	0.11_b	0.048_d	0.046_d	0.045_d
1500	0.038	0.10_b	0.043_c	0.041_c	0.037_e

In each column values with different letters differ significantly ($P < 0.05$)

Table 28. Effect of pre and post flowering sprays with CCC on root/shoot weight ratio of Mung bean

Treatment CCC ppm	DAYS AFTER EMERGENCE 14	28	32	42	56	70
0	0.038	0.095_a	0.095_a	0.043_c	0.04_e	0.035_h
500	0.038	0.097_a	0.099_a	0.0419_c	0.0411_e	0.037_h
1000	0.038	0.11_b	0.017_b	0.0477_d	0.047_f	0.045_i
1500	0.038	0.10_b	0.105_b	0.043_c	0.041_e	0.038_h

In each column values with different letters differ significantly ($P < 0.05$)

Net assimilation rate

The net assimilation rate is illustrated in Fig. 2a and b). Though CCC treatment did not alter the pattern of net assimilation rate, it at 1000 ppm significantly increased net assimilation rate. On day 42 the net assimilation rate of plants which were given pre flowering spray was 46% more than that of control. No significant change in the net assimilation rate was observed with the number of CCC application.

Net primary productivity

Net primary productivity reached its peak on day 42 and decreased gradually thereafter (Fig. 3a and b). Application of CCC (1000 ppm) resulted in a significant increase in the net primary productivity of plants which received pre flowering spray as well as of plants which were given pre and post flowering sprays of CCC.

Total soluble sugars

The shoot system of control plants displayed a progressive increase in its total soluble sugar contents until day 56 and receded to a lower level subsequently (Fig. 4a). The total soluble sugar content of the shoot system of plants treated with CCC exhibited a trend similar to that of control. Pre flowering treatment with CCC (1000 ppm) significantly enhanced the level of total soluble sugars in the shoot system. On day 56, the total soluble sugar content of the shoot system of plants sprayed with 1000 ppm CCC was 35% more than that of

Fig.2. Effect of pre flowering (a) and pre and post flowering (b) sprays with CCC on the net assimilation rate of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●) 1500 ppm (▲). Vertical bars represent S.E. of the mean. Arrow indicates the day of 2nd application of CCC.

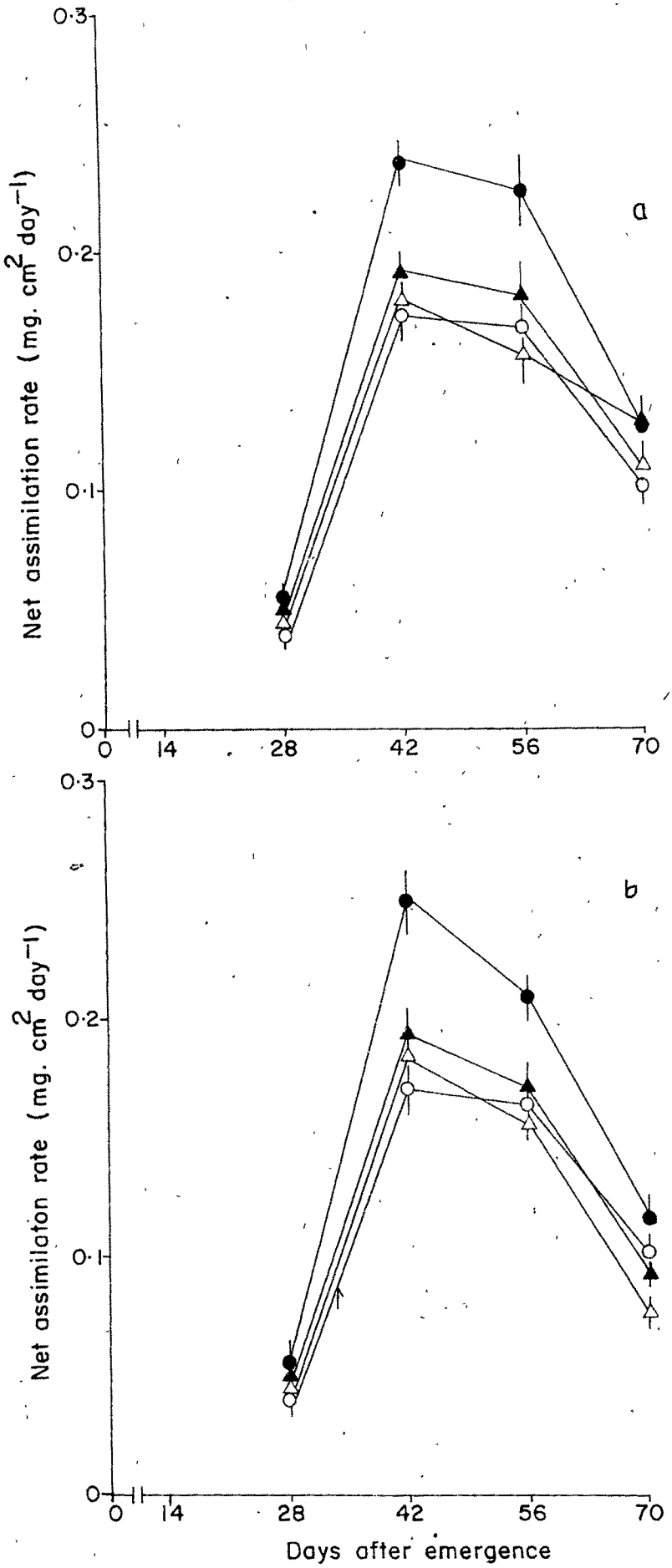
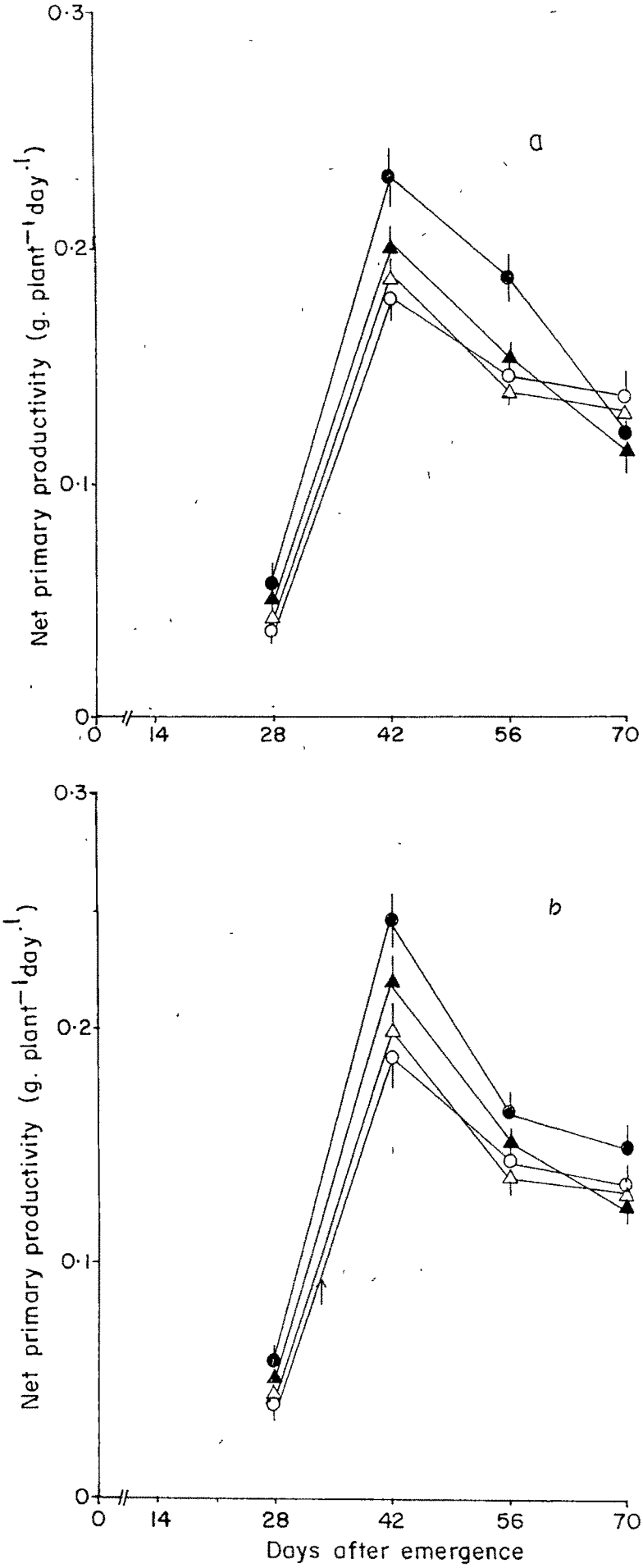

0·3
0·2
0·1
0
Net assimilation rate (mg. cm^2 day^{-1})
a
b
0
14
28
42
56
70
Days after emergence

Fig.3 Effect of pre flowering (a) and pre and post flowering (b) sprays with CCC on the net primary productivity of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●) 1500 ppm (▲). Vertical bars represent S.E. of the mean. Arrow indicates the day of 2nd application of CCC.


a
b
Net primary productivity (g. plant^{-1}day^{-1})
0·3
0·2
0·1
0
0
14
28
42
56
70
Days after emergence

the control. A more or less same amount of total soluble sugars was found in the shoot system of plants which received two sprays of CCC (Fig. 5a).

Total soluble sugar content of root system also increased till the 56th day and decreased gradually to a lower level at the end of the experiment. In the root system also, as observed in the case of shoot system, 1000 ppm CCC administration (pre flowering and pre and post flowering sprays) appreciably increased the content of total soluble sugars (Figs. 4b and 5b).

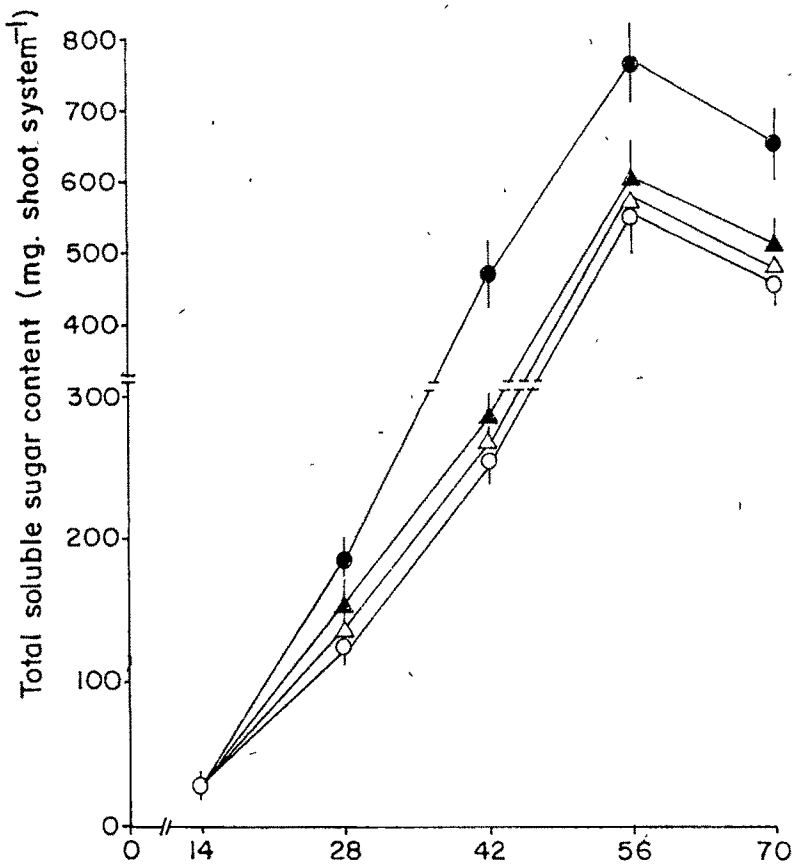
Starch

The starch content of shoot system increased steadily till the end of the experiment (Fig. 6a). A more or less same pattern of starch accumulation was found in the shoot system of the plants treated with CCC. Plants sprayed with 1000 ppm CCC registered a significantly higher rate of starch accumulation than that of control plants. On day 70, the amount of starch present in the shoot system of plants which received single and double sprays of CCC (1000 ppm) was 51.6 and 49.2% respectively more than that of the control (Figs. 6a and 7a).

The starch content of the root system gradually increased until day 42 and then registered a steady increase thereafter (Fig. 6b). In the root system also, as observed in the shoot system CCC treatment did not bring about any

Fig.4 Effect of pre flowering spray with CCC on the total soluble sugar contents in the shoot (a) and root (b) systems of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.

a


Total soluble sugar content (mg. shoot system⁻¹)
800
700
600
500
400
300
200
100
0
0
14
28
42
56
70

b

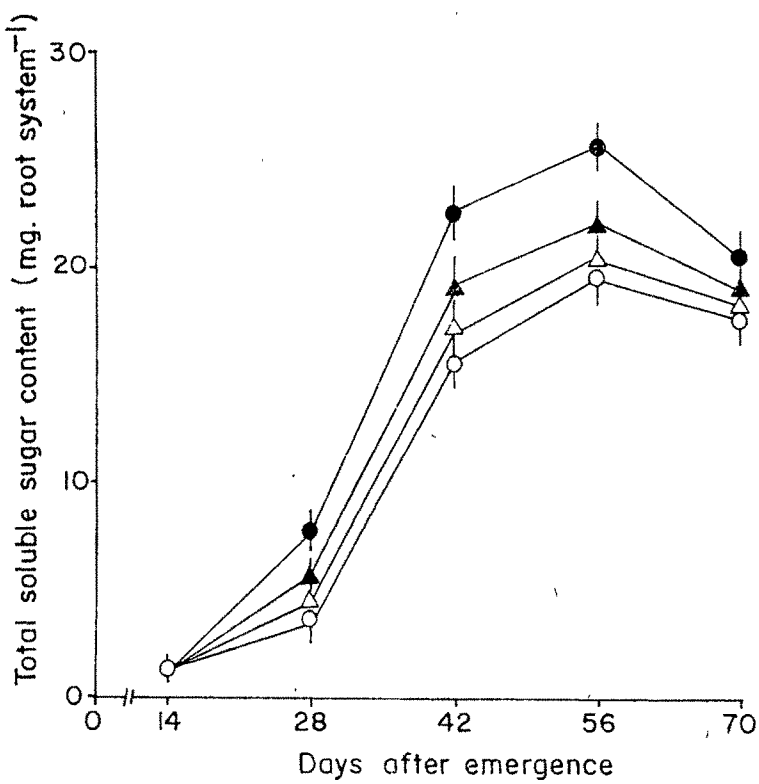
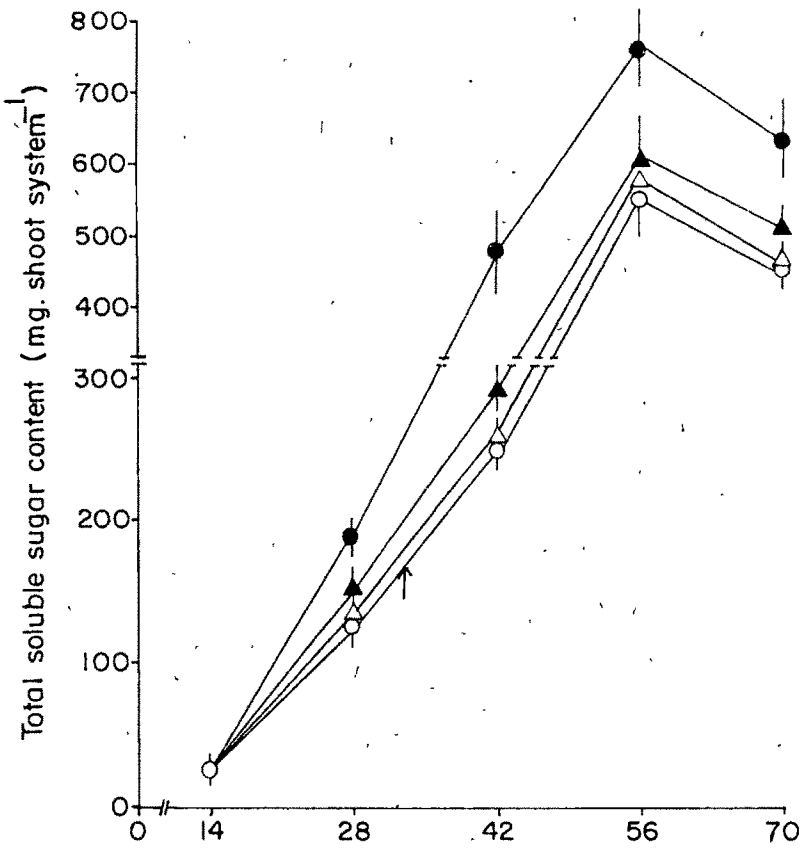

Total soluble sugar content (mg. root system⁻¹)
30
20
10
0
0
14
28
42
56
70
Days after emergence

Fig.5 Effect of pre and post flowering sprays with CCC on the total soluble sugar contents in the shoot (a) and root (b) systems of mung bean. Control (O), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean. Arrow indicates the day of 2nd application of CCC.


a
Total soluble sugar content (mg. shoot system⁻¹)
800
700
600
500
400
300
200
100
0
0
14
28
42
56
70

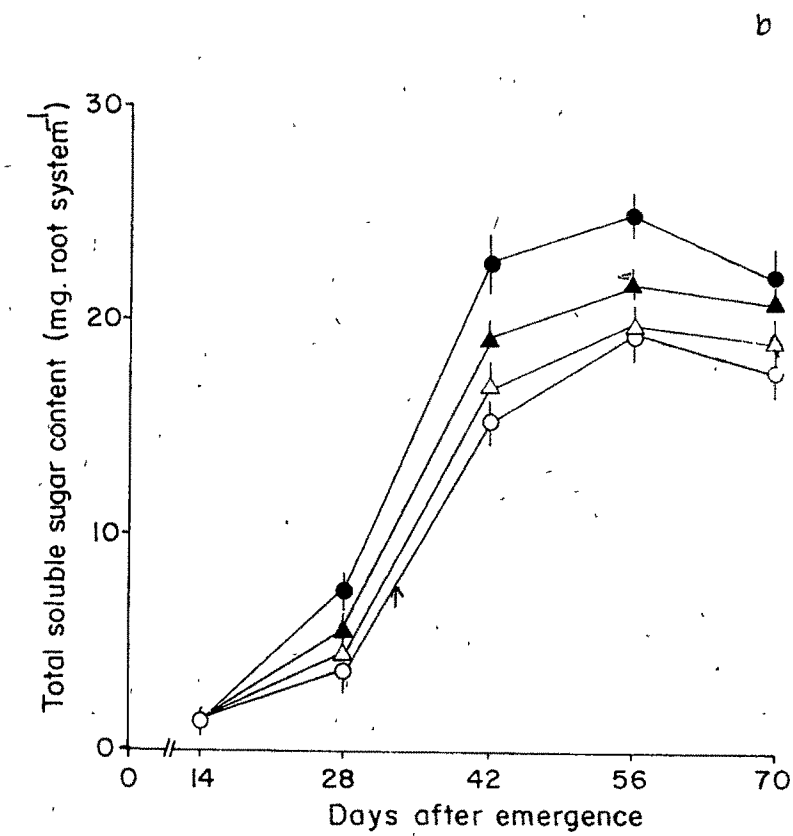

b
Total soluble sugar content (mg. root system⁻¹)
30
20
10
0
0
14
28
42
56
70
Days after emergence

Fig.6 Effect of pre flowering spray with CCC on the starch content in the shoot (a) and root (b) systems of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.

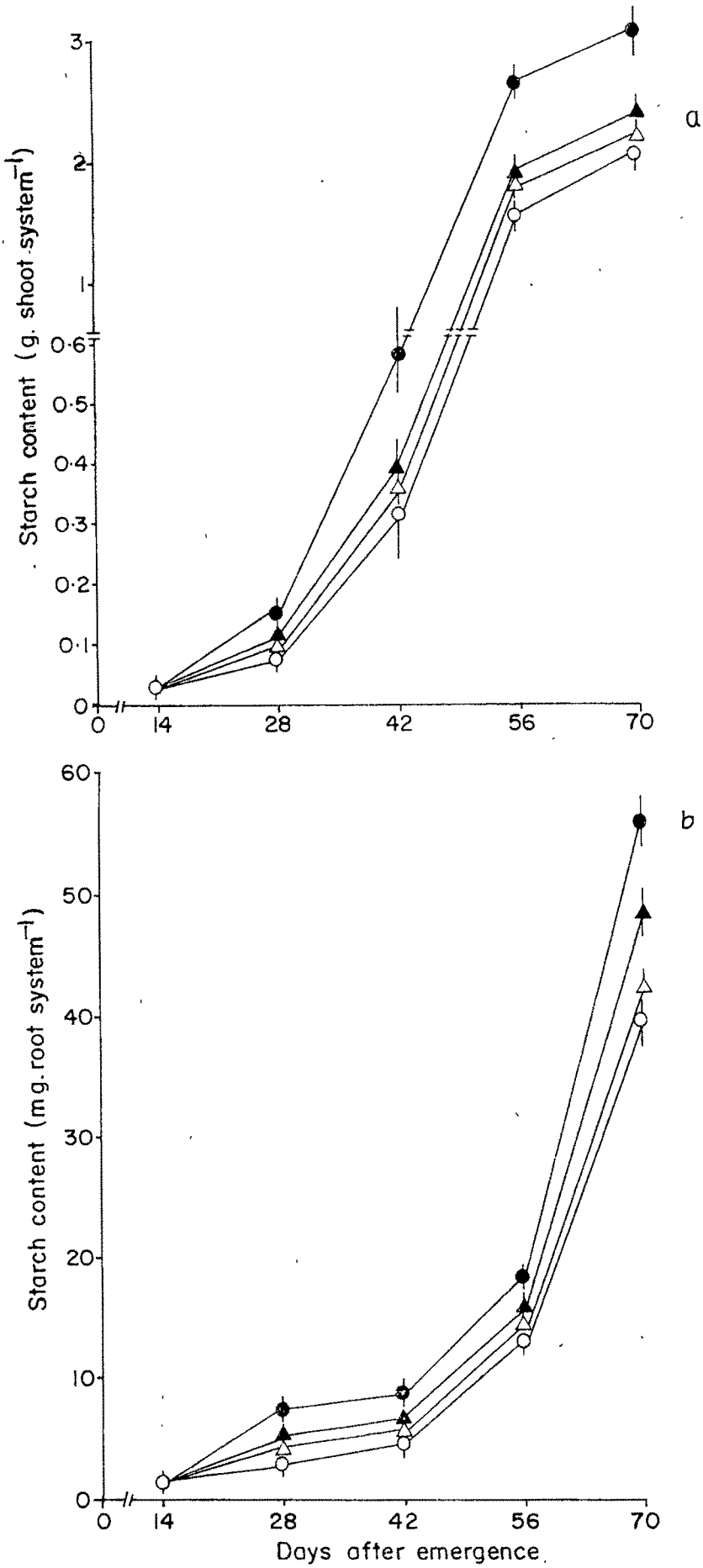
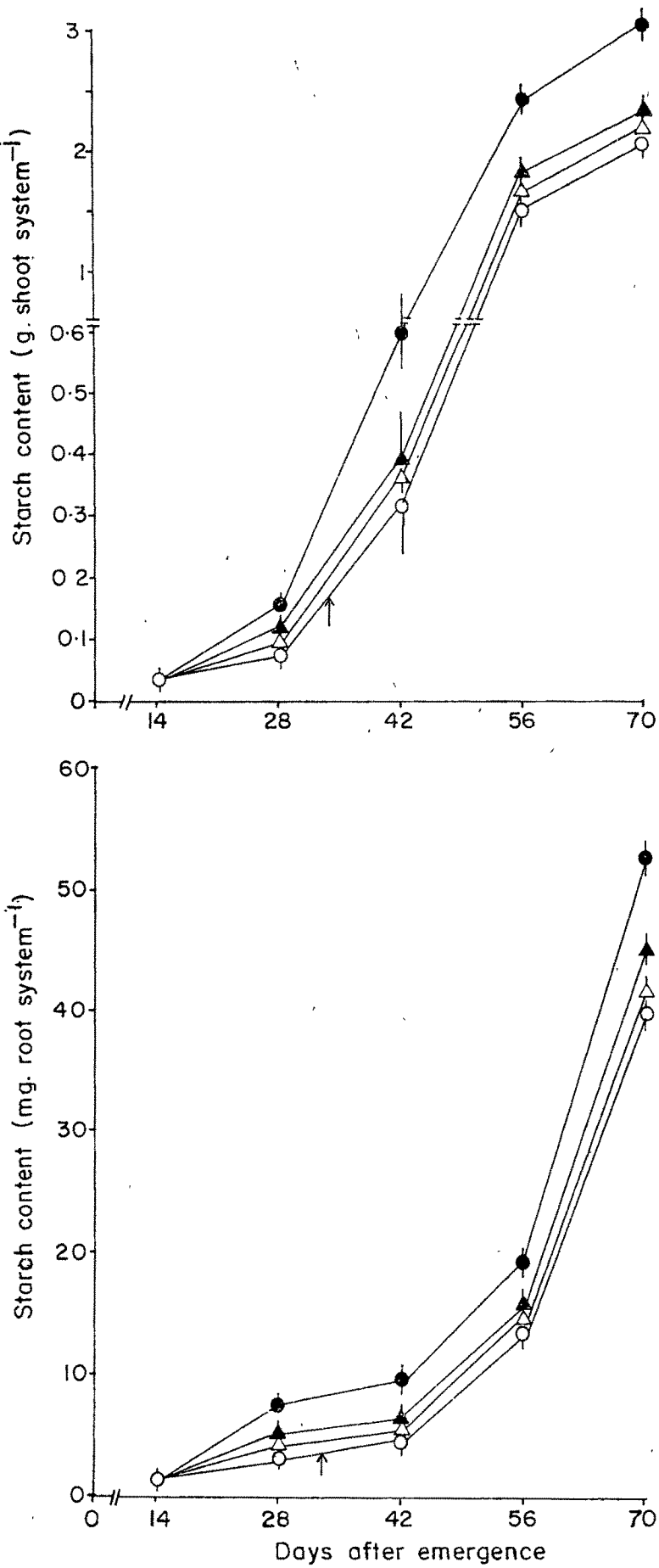

a
Starch content (g. shoot system^{-1})
3
2
1
0·6
0·5
0·4
0·3
0·2
0·1
0
0
14
28
42
56
70
b
Starch content (mg. root system^{-1})
60
50
40
30
20
10
0
0
14
28
42
56
70
Days after emergence

Fig.7 Effect of pre and post flowering sprays with CCC on the starch content in the shoot (a) and root (b) systems of mung bean. Control (○) CCC 500 ppm (△), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean. Arrow indicates the day of 2nd application of CCC.


a
Starch content (g. shoot system^{-1})
3
2
1
0·6
0·5
0·4
0·3
0 2
0·1
0
14
28
42
56
70
b
Starch content (mg. root system^{-1})
60
50
40
30
20
10
0
0
14
28
42
56
70
Days after emergence

change in the pattern of starch accumulation. However, CCC application (1000 ppm) considerably enhanced the starch content in the root system. At the end of the experiment the amount of starch accumulated in the root system of plants which received single (pre flowering spray) and double (pre and post flowering sprays) sprays of 1000 ppm CCC was 38.5 and 36.9% respectively more than that of control plants (Figs. 6b and 7b).

Total nitrogen

The shoot system of control plants displayed a steady increase in its total nitrogen content till the end of the experimental period. Shoot system of CCC treated plants also exhibited a similar trend to the control, though CCC application at 1000 ppm considerably increased the nitrogen content (Fig. 8a). The shoot system of plants which received single and double sprays of CCC (1000 ppm) recorded a 62.2 and 64% increase respectively in their total nitrogen content over the control plants at the end of 70 day period of growth (Figs. 8a and 9a).

The root system which showed a gradual build up of total nitrogen until day 42 registered a sharp increase until day 56. The nitrogen content, however, remained steady thereafter (Fig. 8b). On day 70 the total nitrogen content of the root system of plants which were given CCC treatment (1000 ppm) was 51% more than that of the control. Here also,

as observed in the shoot system, no marked difference in the total nitrogen was found between the root systems of plants which received pre flowering and pre and post flowering sprays of CCC (Figs. 8b and 9b).

Total ureides

The content of total ureides in the shoot system also showed a similar pattern of accumulation as that of total nitrogen (Fig. 10 a). The CCC treatment (1000 ppm) brought about a conspicuous increase in the content of total ureides. At the end of the experiment i.e. on day 70, the amount of ureides in the shoot system of CCC treated plants was 61.9% more when compared to control. Plants which received double sprays with CCC did not show any difference with respect to their ureide content compared to those which received only a single spray (Fig. 11a).

The ureide content in the root system increased till the end of the experiment (Fig. 10b). CCC did not alter the pattern of ureide build up in the root system of CCC treated plants. A considerably high amount of total ureide was found in the root system of plants which received pre flowering and pre and post flowering sprays of CCC (1000 ppm) (Figs. 10b and 11b).

Total protein

The protein content of the shoot system of control plants increased progressively till the end of the experiment

Fig.8 Effect of pre flowering spray with CCC on the total nitrogen content in the shoot (a) and root (b) systems of mung bean. Control (O) CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.

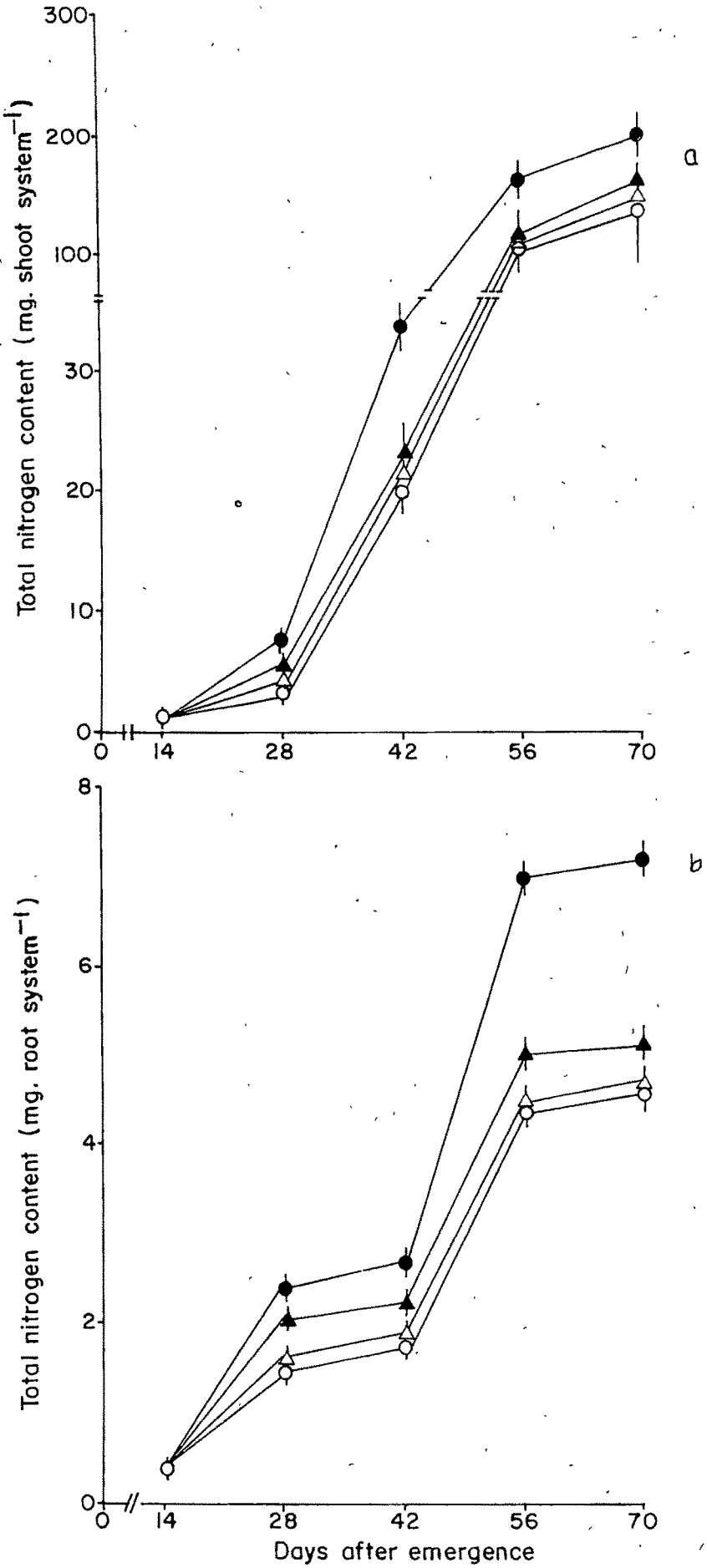
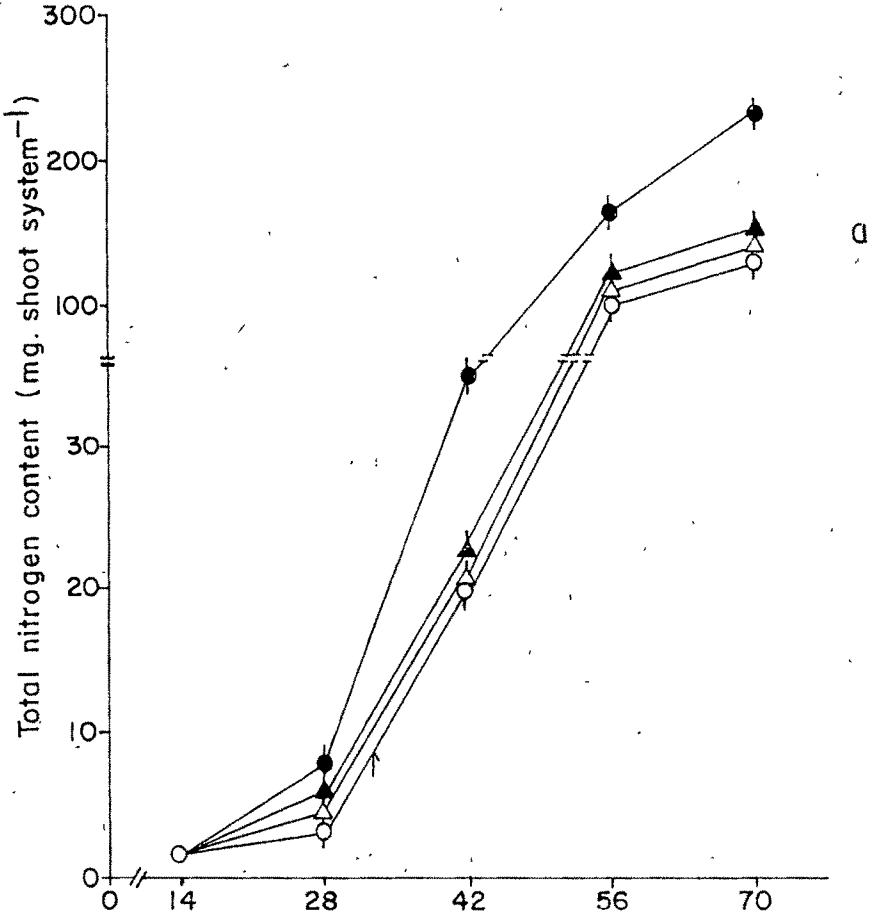

Total nitrogen content (mg. shoot system⁻¹)
300
200
100
30
20
10
0
a
Total nitrogen content (mg. root system⁻¹)
8
6
4
2
0
b
0
14
28
42
56
70
Days after emergence

Fig.9 Effect of pre and post flowering sprays with CCC on the total nitrogen content in the shoot (a) and root (b) systems of mung bean. Control (o) CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean. Arrow indicates the day of 2nd application of CCC.


300
200
100
30
20
10
0
0
14
28
42
56
70
Total nitrogen content (mg. shoot system^{-1})
a

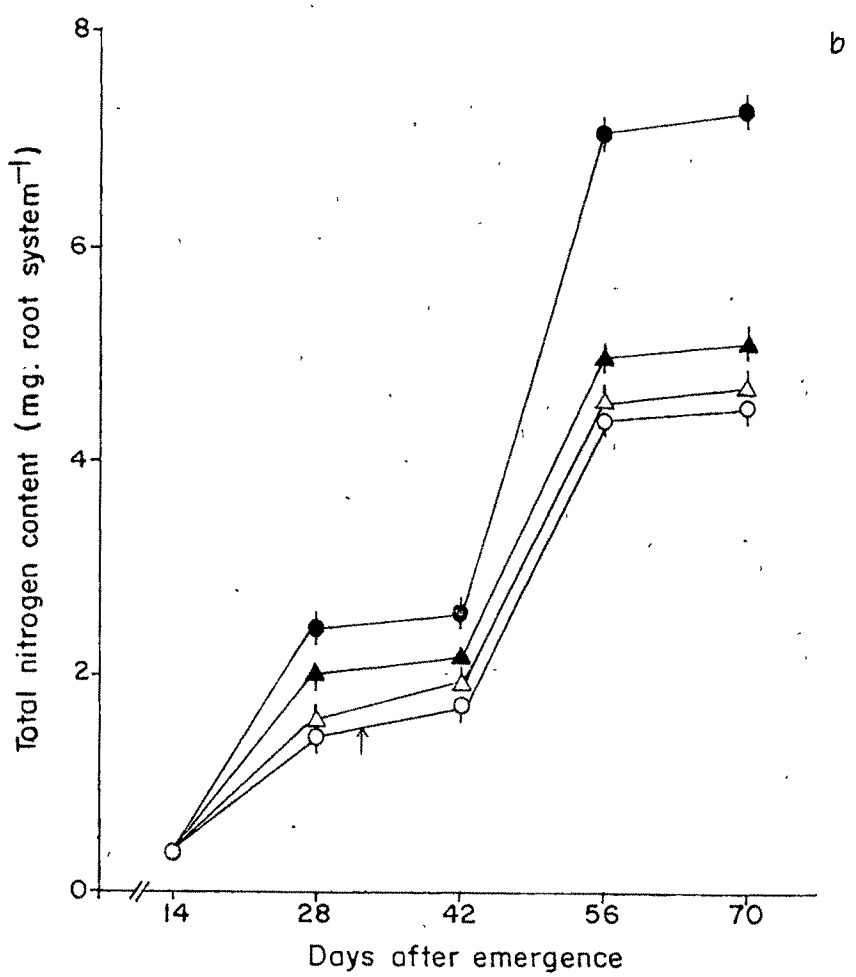

8
6
4
2
0
14
28
42
56
70
Days after emergence
Total nitrogen content (mg. root system^{-1})
b

Fig.10 Effect of pre flowering spray with CCC on the total ureide content in the shoot (a) and root (b) systems of mung bean. Control (O), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.

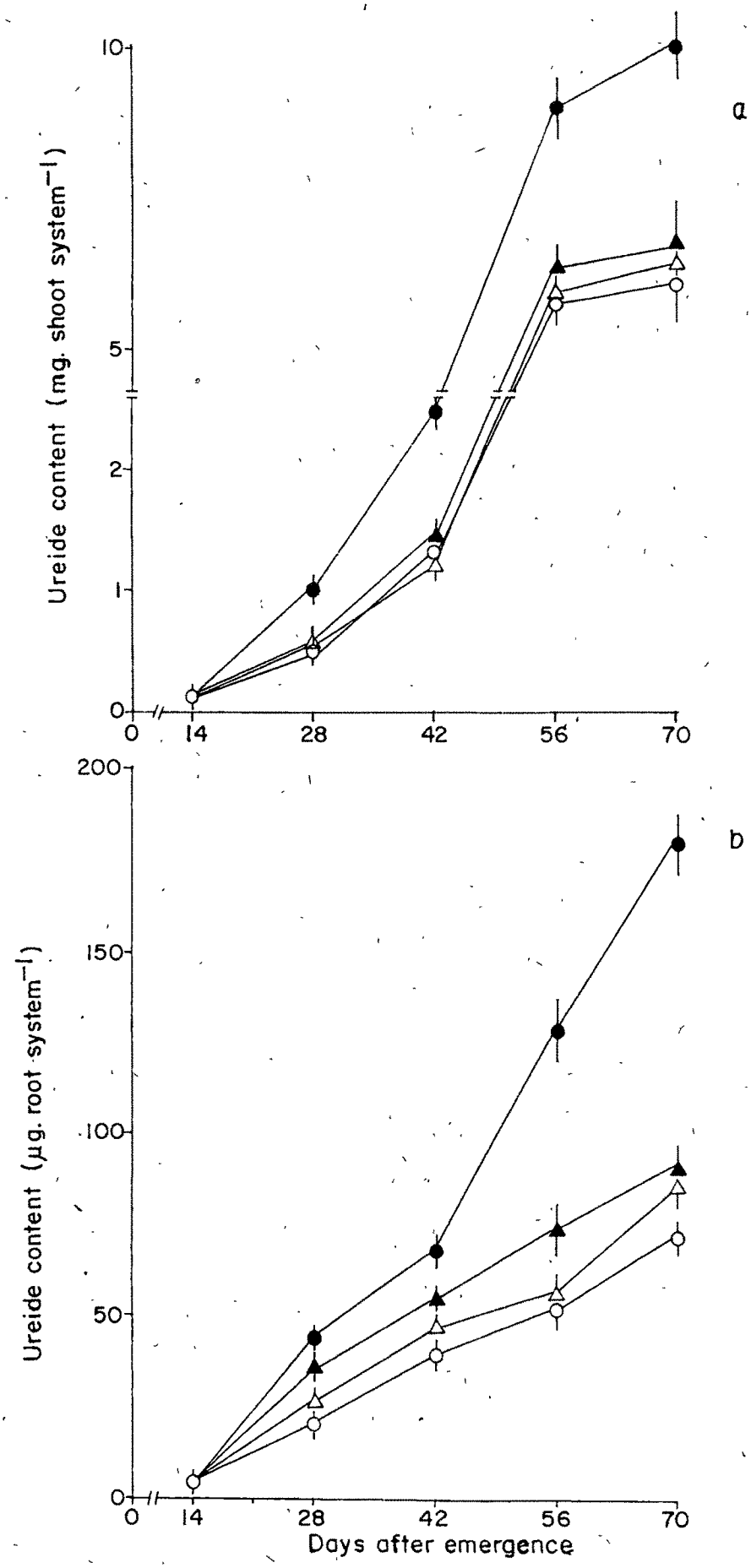
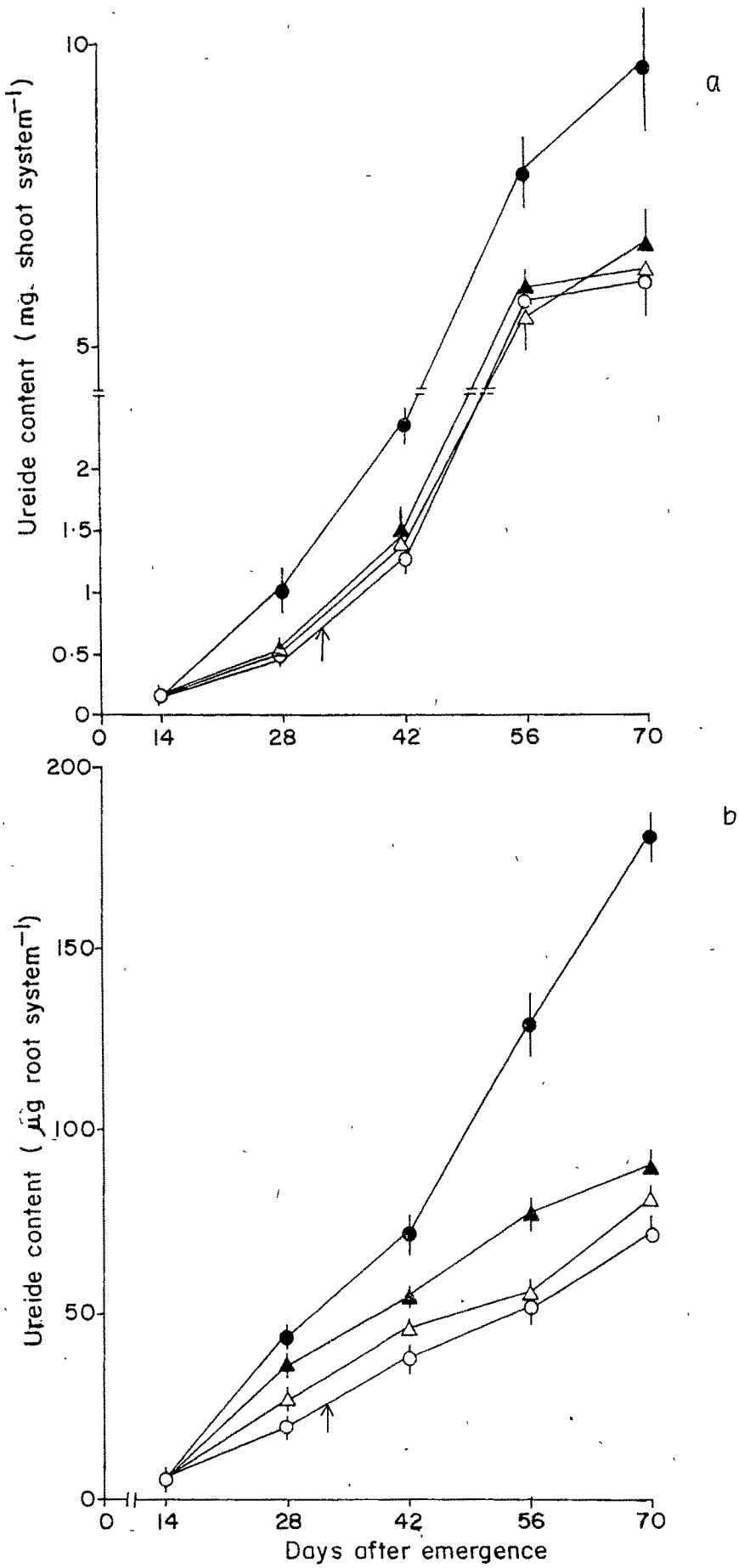

a
Ureide content (mg. shoot system^{-1})
10
5
2
1
0
0
14
28
42
56
70
b
Ureide content (µg. root system^{-1})
200
150
100
50
0
0
14
28
42
56
70
Days after emergence

Fig.11 Effect of pre and post flowering sprays with CCC on the total ureide content in the shoot (a) and root (b) systems of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean. Arrow indicates the day of 2nd application of CCC.


a
Ureide content (mg. shoot system^{-1})
10
5
2
1·5
1
0·5
0
0
14
28
42
56
70
b
Ureide content (µg root system^{-1})
200
150
100
50
0
Days after emergence

(Fig. 12a). The shoot system of CCC treated plants contained considerably higher amount of protein than the untreated ones. On day 70, the amount of protein in the shoot system of plants which received pre flowering CCC spray (1000 ppm) was 61% more than that of the control. No significant change in the content of protein was observed with the number of CCC applications (Figs. 12 a and 13a).

The total protein content of root system also registered an increase till the end of the experiment (Fig. 12b). In the root system also, as observed in the shoot system, CCC at 1000 ppm brought about a conspicuous increase in the total protein content. At the end of the experiment, i.e. on day 70, the protein content in the root system of plants which received CCC spray (1000 ppm) was 59.1% more than that of the control. No marked difference in the protein content was recorded between the root systems of plants which received pre flowering and pre and post flowering sprays of CCC (Figs. 12b and 13b).

Total chlorophyll content

Figure 14a shows the changes in the total chlorophyll content subjected to different treatments. The maximum content of chlorophyll was present on day 42 in control as well as CCC treated plants. Treatment with CCC did not change the pattern of chlorophyll accumulation in plants. However, application of CCC at 1000 ppm markedly increased the

Fig.12. Effect of pre flowering spray with CCC the total protein contents in the shoot (a) and root (b) systems of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.

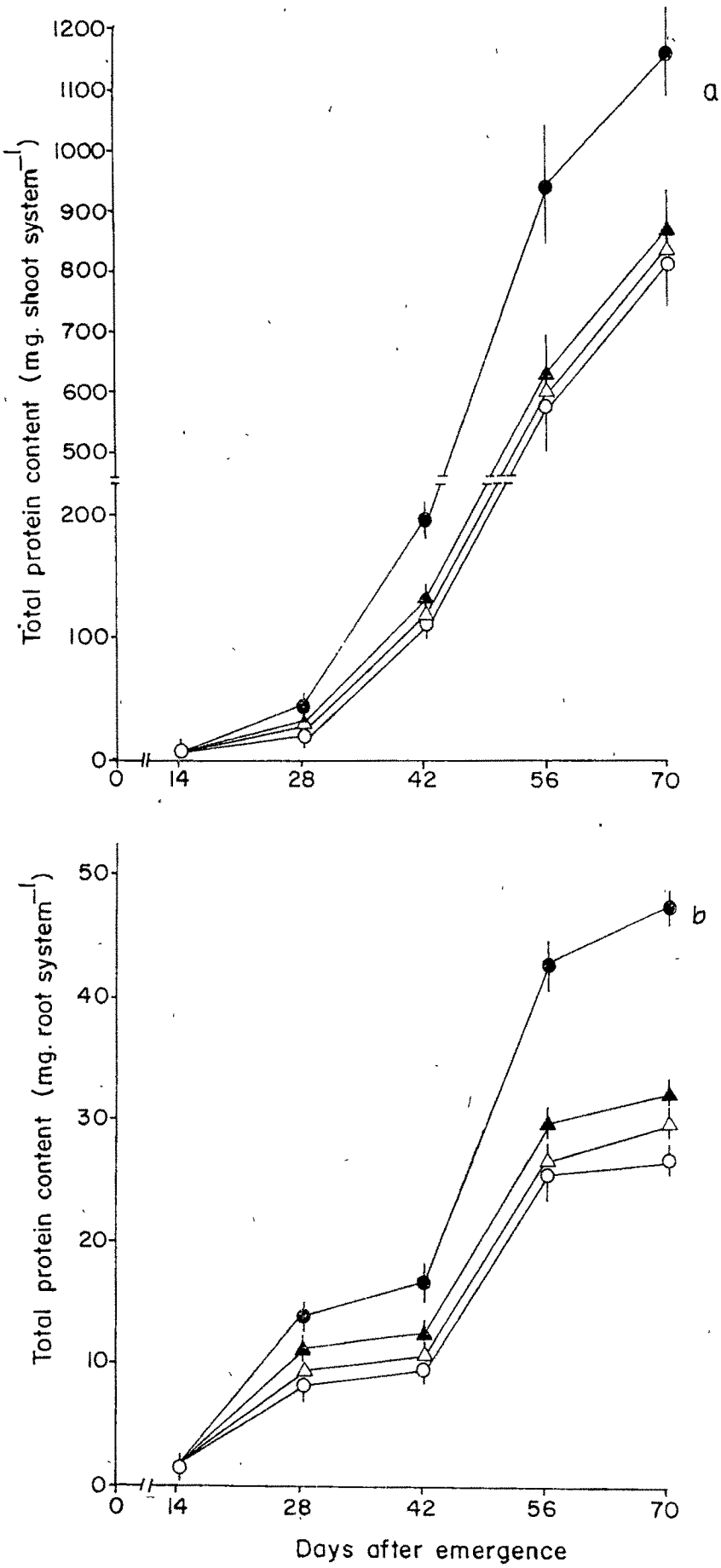
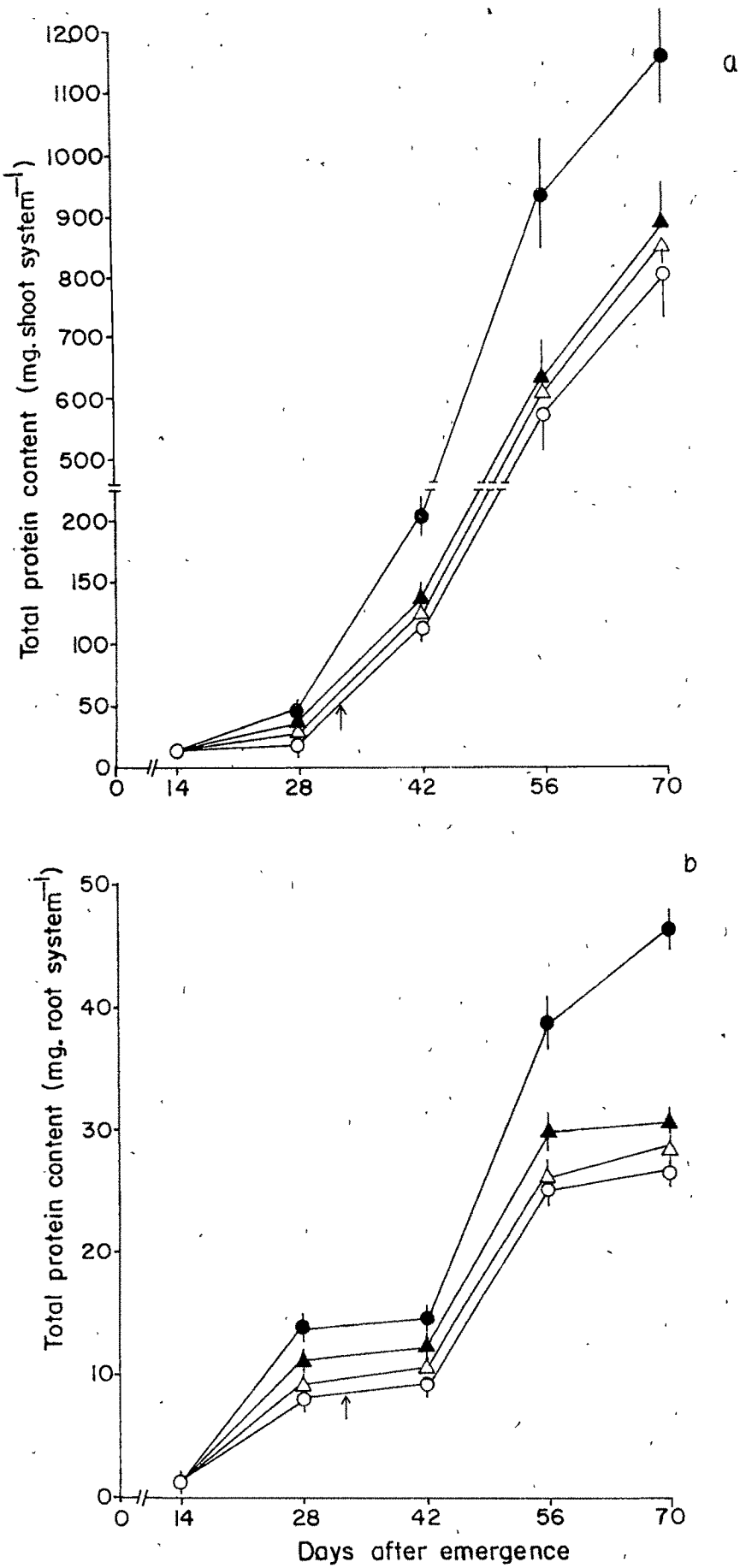

a
Total protein content (mg. shoot system⁻¹)
1200
1100
1000
900
800
700
600
500
200
100
0
0
14
28
42
56
70
b
Total protein content (mg. root system⁻¹)
50
40
30
20
10
0
0
14
28
42
56
70
Days after emergence

Fig.13. Effect of pre and post flowering sprays with CCC on the total protein content in the shoot (a) and root (b) systems of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲), Vertical bars represent S.E. of the mean. Arrow indicates the day of 2nd application of CCC.


a
Total protein content (mg. shoot system^{-1})
1200
1100
1000
900
800
700
600
500
200
150
100
50
0
0
14
28
42
56
70
b
Total protein content (mg. root system^{-1})
50
40
30
20
10
0
0
14
28
42
56
70
Days after emergence

total chlorophyll content in the leaves. By day 42 chlorophyll level was increased by 52.6% as compared to control plants as a result of CCC (1000 ppm) administration. No appreciable difference in the chlorophyll content was observed between plants which were given pre flowering and pre and post flowering sprays of CCC (Figs. 14a and b).

Nitrogenase activity (Acetylene reduction)

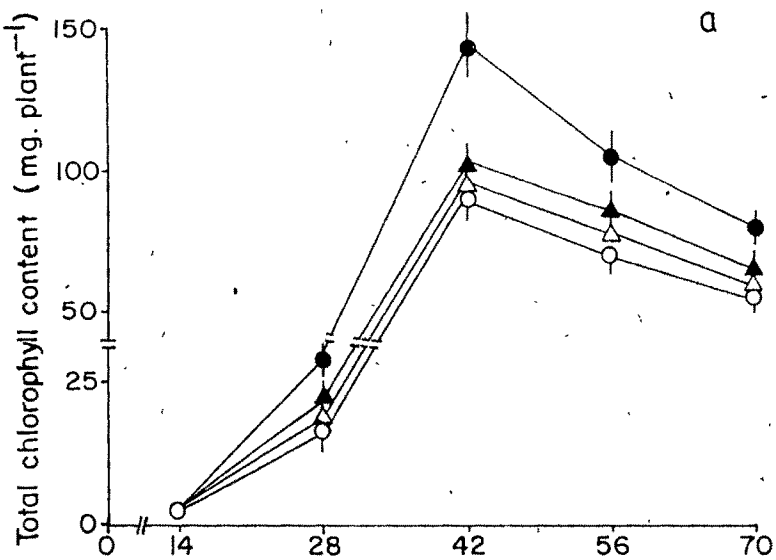
The activity of nitrogenase (acetylene reduction) of nodules increased gradually until day 42 and declined thereafter (Fig. 15a). Nitrogenase activity of nodules of the CCC treated plants also exhibited the same trend of control. CCC at 1000 ppm increased the nitrogenase activity (acetylene reduction) by 38% over the control on the day 42. The activity of the nitrogenase measured in the nodules of the plants which were subjected to pre flowering sprays of CCC was almost equal to that of the plants which received pre as well as post flowering sprays (Figs. 15a and b).

Pod Growth

Area of the source leaf (leaf subtending the pods)

The area of the source leaf registered a steady increase till day 52 and it remained almost constant thereafter. The pattern of leaf expansion of CCC treated plants also was comparable with that of control. Among different concentrations of CCC tried, the maximum increase in leaf area was

Fig. 14. Effect of pre flowering (a) and pre and post flowering (b) sprays with CCC on the total chlorophyll content of mungbean. Control (o), CCC 500 ppm (△), 1000 ppm (●) and 1500 ppm (▲). Vertical bars represent S.E. of the mean, Arrow indicates the day of 2nd application of CCC.


a
Total chlorophyll content (mg. plant⁻¹)
150
100
50
25
0
0
14
28
42
56
70

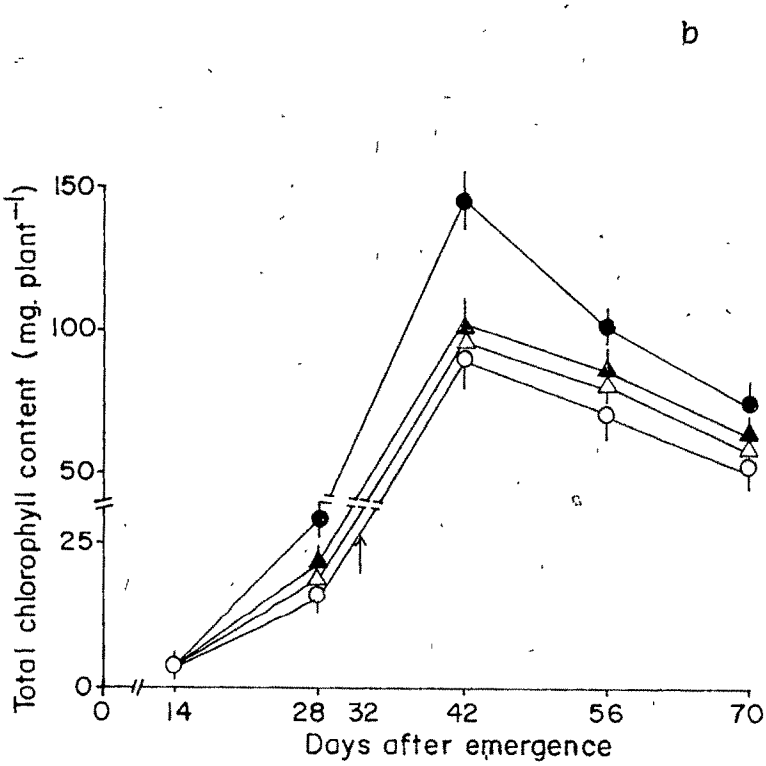
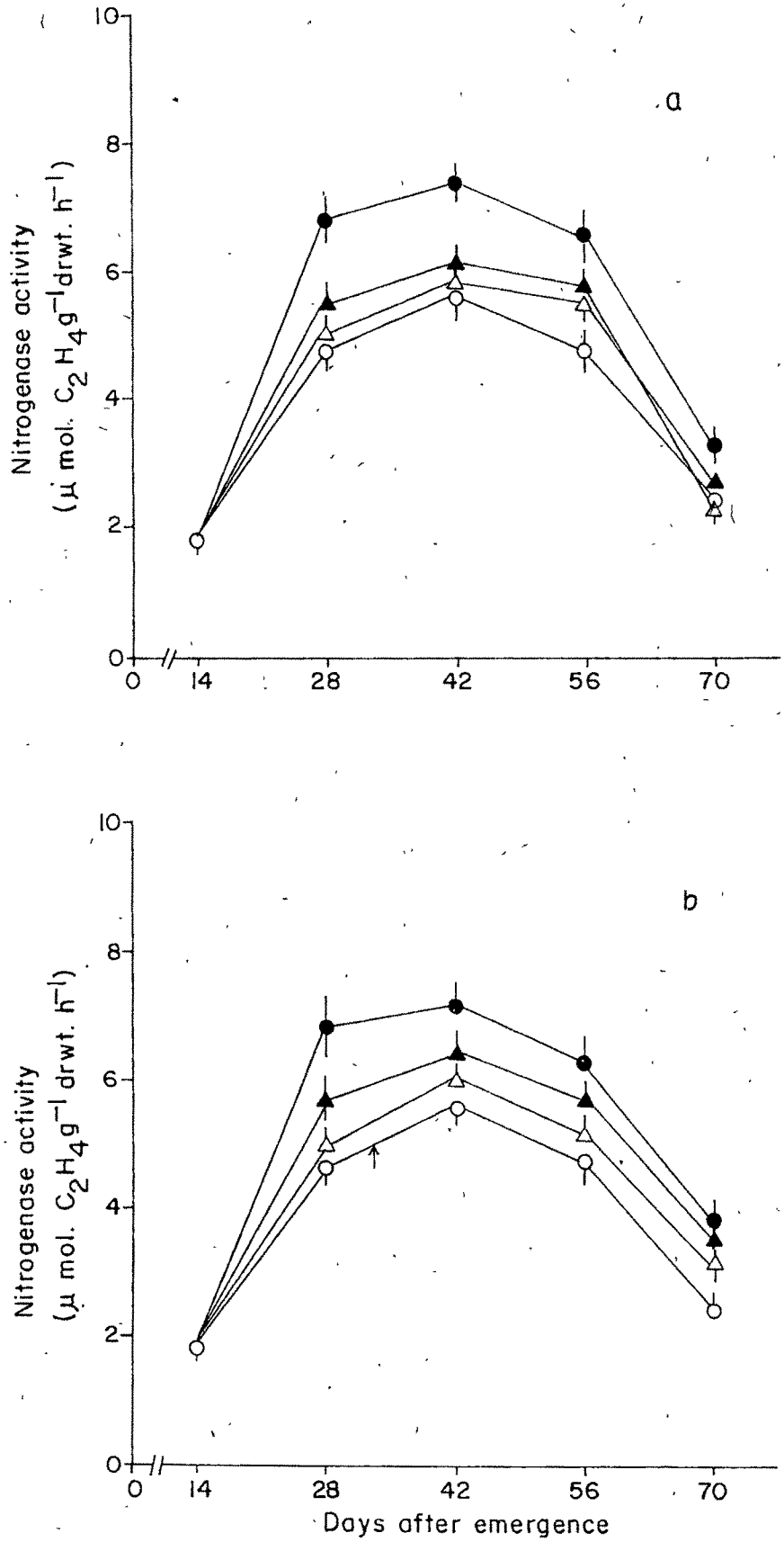

b
Total chlorophyll content (mg. plant⁻¹)
150
100
50
25
0
0
14
28
32
42
56
70
Days after emergence

Fig. 15. Effect of pre flowering (a) and pre and post flowering (b) sprays with CCC on the activity of nitrogenase (acetylene reduction) in the nodules of mung bean. Control (O), CCC 500 ppm (Δ), CCC 1000 ppm (●), 1500 ppm (▲), Vertical bars represent S.E. of the mean. Arrow indicates the day of 2nd application of CCC.


a
b
Nitrogenase activity
(μ mol. $C_2H_4g^{-1}$drwt. h^{-1})
0
2
4
6
8
10
0
14
28
42
56
70
Days after emergence

observed at a concentration of 1000 ppm on day 42 and the increase was more than 31% over the untreated one (Figs. 16a and b).

Total chlorophyll content of the source leaf

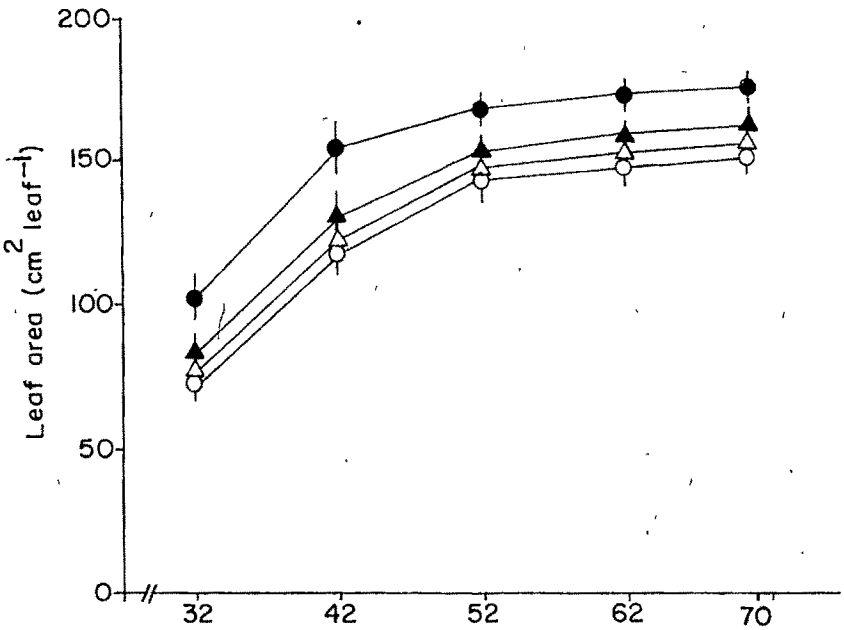
The changes in the total chlorophyll content of the source leaf is illustrated in the Figs. 17a and b. Maximum accumulation of chlorophyll content was observed on the 42nd day and declined gradually thereafter. Treatment with CCC (1000 ppm) considerably increased the chlorophyll content of the source leaf irrespective of the number of treatments given. The amount of chlorophyll accumulated on the 42nd day in the CCC treated leaf (1000 ppm) was 48% more than that of the control.

Total amylase activity

The activity of total amylase in the source leaf (subtending leaf) rose sharply registering the peak on the 42 day and declined thereafter to reach a low level on day 70. Treatment of plants with CCC did not alter the pattern of enzyme action during the leaf expansion. As in the case of leaf expansion maximum stimulation of the enzyme activity under the influence of CCC was also observed on day 42 and the increase in activity was more than 13% over the control (Figs. 18a and b).

Fig. 16. Effect of pre flowering (a) and pre and post flowering sprays (b) with CCC on the area of the source leaf of mung bean. Control (○), CCC 500 ppm (△), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.

a


200
150
100
50
0
Leaf area (cm^2 leaf^{-1})
32
42
52
62
70

b

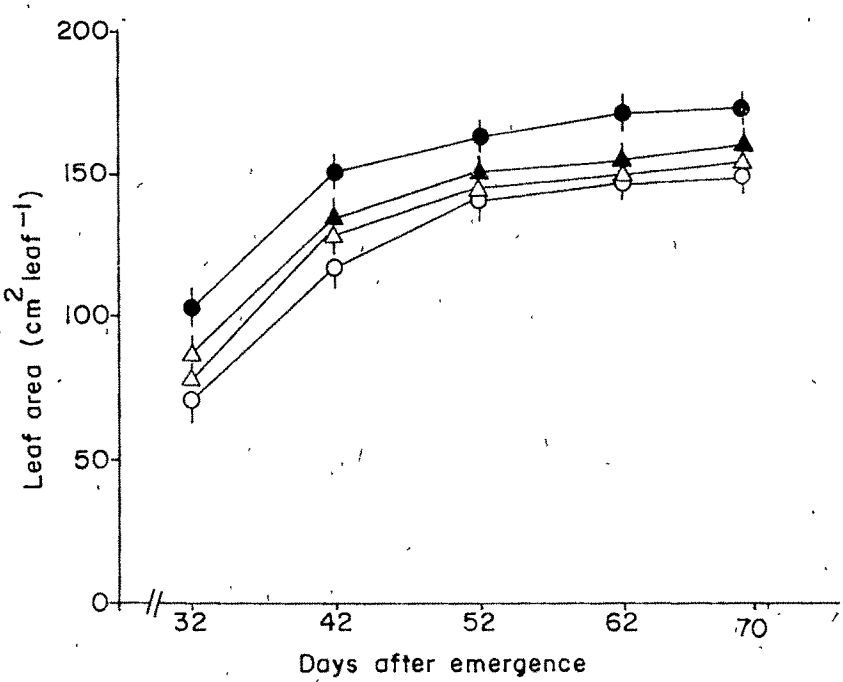
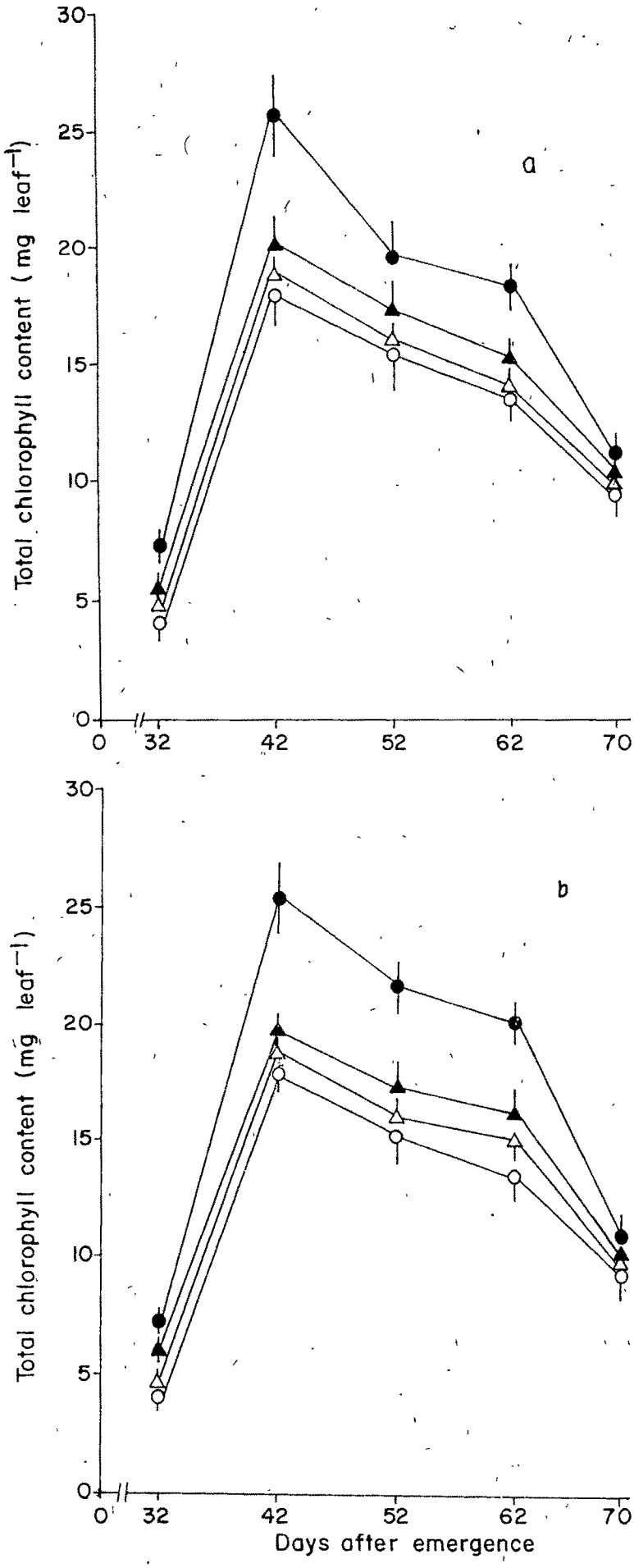

200
150
100
50
0
Leaf area (cm^2 leaf^{-1})
32
42
52
62
70
Days after emergence

Fig. 17. Effect of pre flowering (a) and pre and post flowering (b) sprays with CCC on the total chlorophyll content of the source leaf of mung bean. Control (O), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.


a
b
Total chlorophyll content (mg leaf^{-1})
Total chlorophyll content (mg leaf^{-1})
30
25
20
15
10
5
0
0
32
42
52
62
70
Days after emergence

Invertase activity

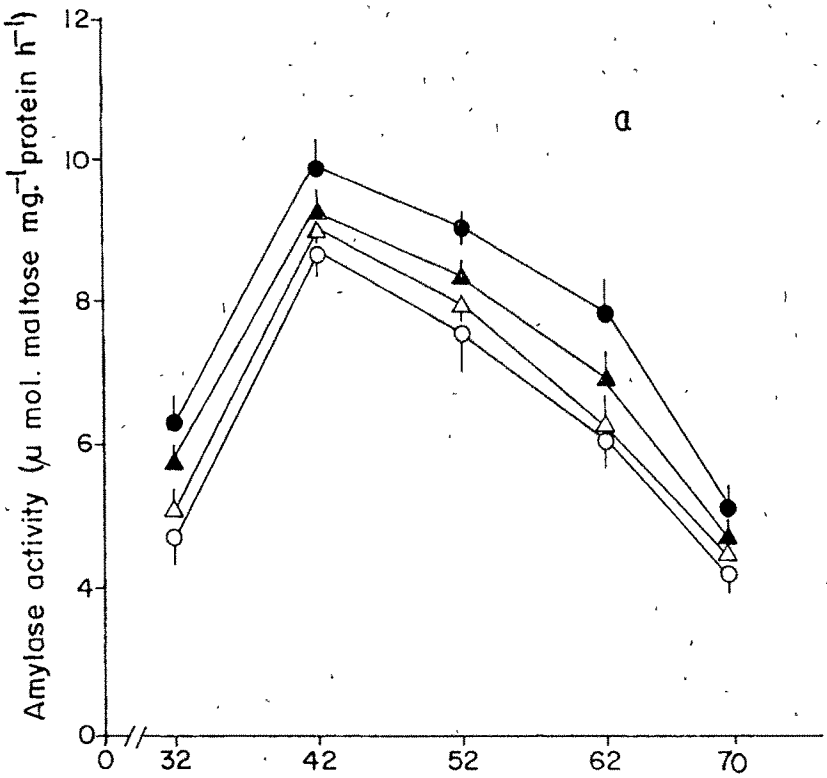
The invertase activity in the subtending leaf (source leaf) rose steadily from day 32 and registered its peak on day 42 which corresponds to the period of highest rate of leaf expansion. Application of CCC at a concentration of 1000 ppm remarkably changed the invertase activity. However, the pattern of enzyme activity remained the same as that of control. The activity of invertase on 42nd day recorded a 48% increase over the control as a result of CCC (1000 ppm) applications (Figs. 19a and b).

Dry weight of the source leaf and pods

The pattern of accumulation of dry matter in the source leaf is shown in the Figs. 20a and 21a. The increase in dry weight of the source leaf reached its peak on 52 nd day and then declined till the end of the experiment. Application of CCC at a concentration of 1000 ppm substantially increased the dry weight of thesource leaf. A rapid rate of depletion of dry matter was observed in the source leaf which received CCC spray (1000 ppm) than that of the control.

The dry matter accumulation of pods followed a sigmoid pattern in all the treatments. The highest rate of dry matter accumulation in the pods was recorded between 52nd and 62nd days. After 62nd day the build up of dry matter declined considerably. CCC administration (1000 ppm) resulted in a significant increase in the dry matter of pods when compared to control (Figs. 20b and 21b).

Fig. 18. Effect of pre flowering (a) and pre and post flowering (b) sprays with CCC on the activity of total amylase in the source leaf of mung bean. Control (O), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.


a
Amylase activity (μ mol. maltose mg.⁻¹ protein h⁻¹)
12
10
8
6
4
0
0
32
42
52
62
70

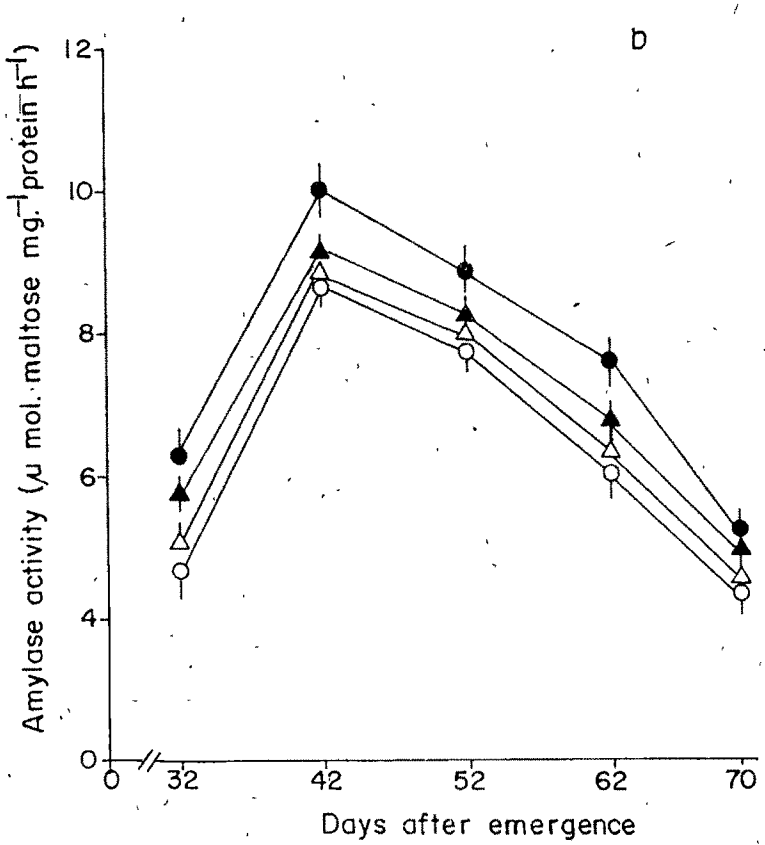
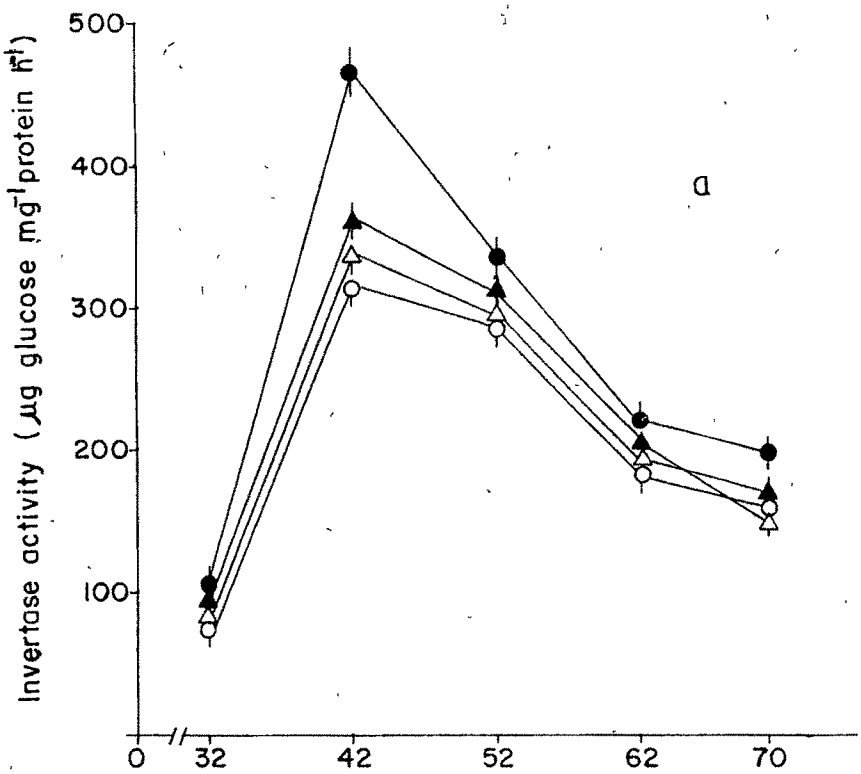

b
Amylase activity (μ mol. maltose mg.⁻¹ protein h⁻¹)
12
10
8
6
4
0
0
32
42
52
62
70
Days after emergence

Fig. 19. Effect of pre flowering (a) and pre and post flowering (b) sprays with CCC on the activity of invertase in the source leaf of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.


Invertase activity (µg glucose mg⁻¹protein h⁻¹)
500
400
300
200
100
0
32
42
52
62
70
a

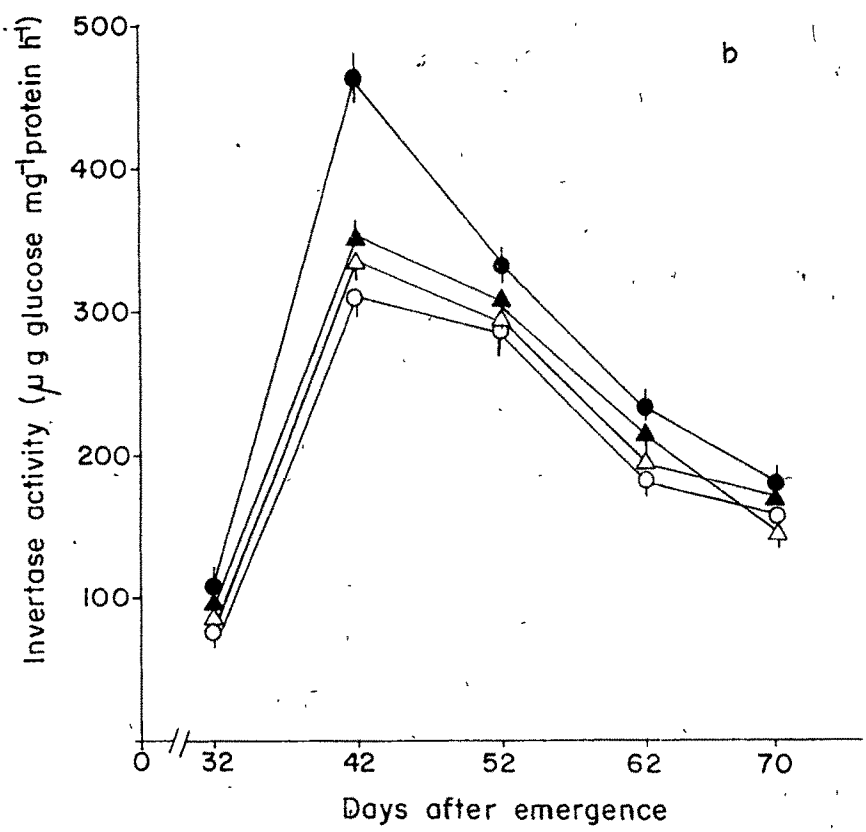

Invertase activity (µ g glucose mg⁻¹protein h⁻¹)
500
400
300
200
100
0
32
42
52
62
70
b
Days after emergence

Fig. 20. Effect of pre flowering spray with CCC on the dry weight of source leaf (a) and pods (b) of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars reOresent S.E. of the mean.

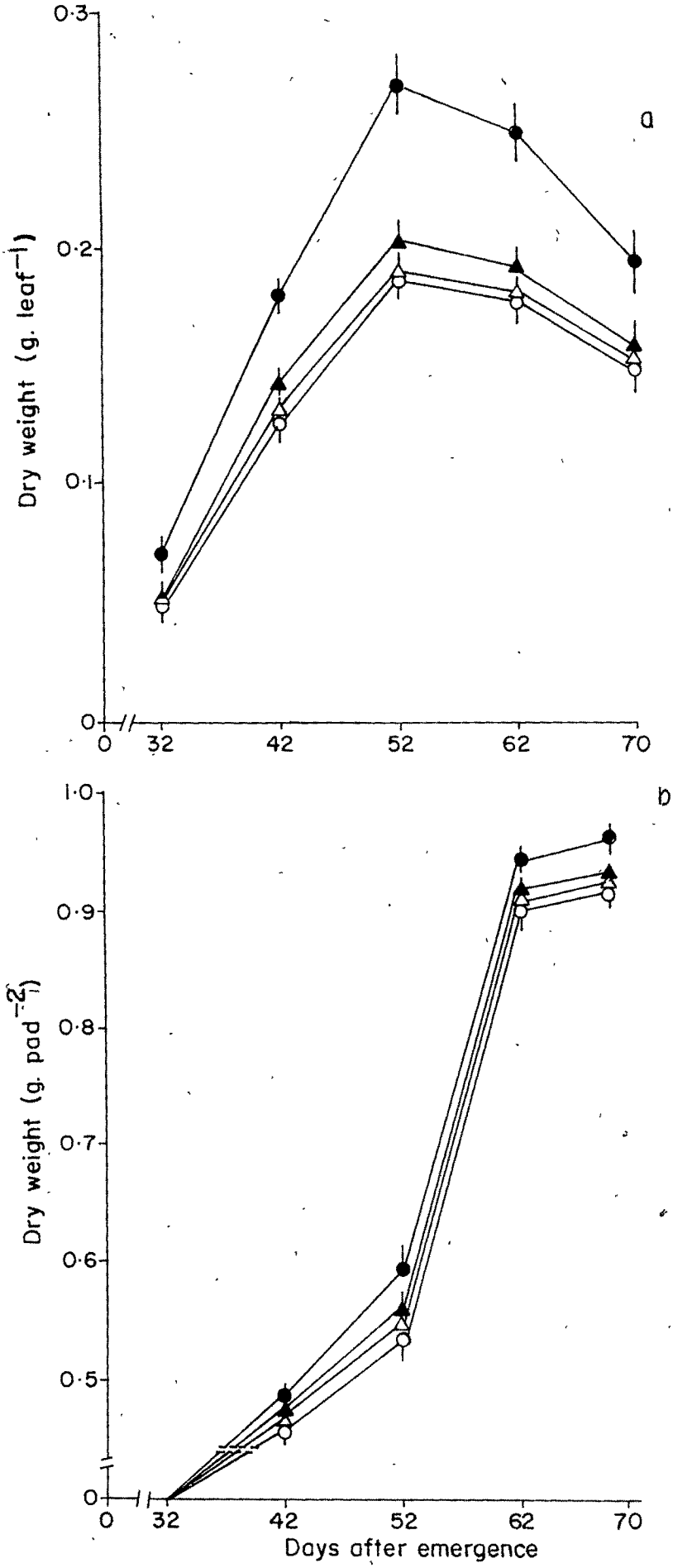
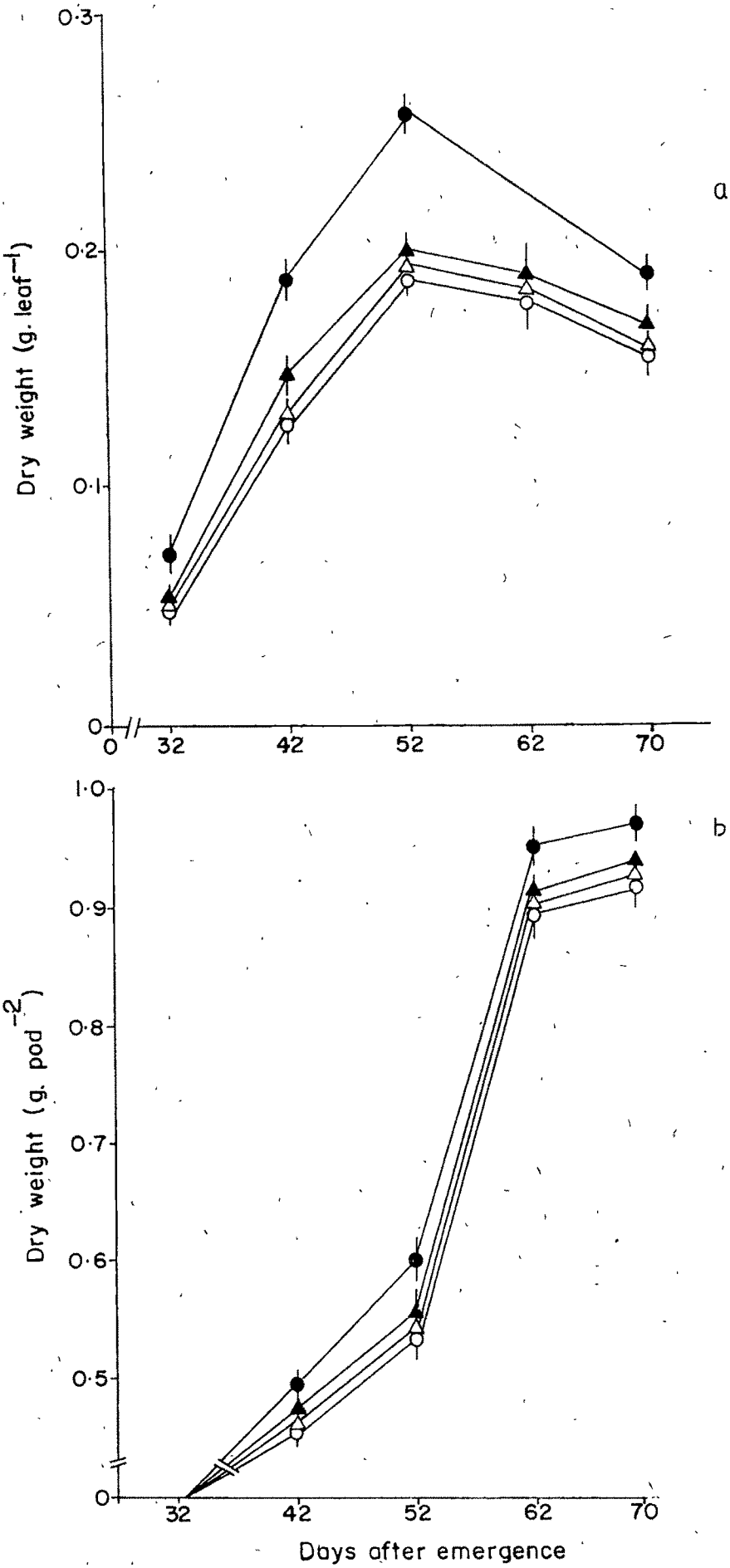

a
Dry weight (g. leaf⁻¹)
0·3
0·2
0·1
0
0
32
42
52
62
70
b
Dry weight (g. pad⁻²)
1·0
0·9
0·8
0·7
0·6
0·5
0
Days after emergence

Fig. 21. Effect of pre and post flowering sprays with CCC on the dry weight of source leaf (a) and pods (b) of mung bean. Control (○), CCC 500 ppm (△), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.


0·3
0·2
0·1
0
Dry weight (g. leaf⁻¹)
a
0
32
42
52
62
70
1·0
0·9
0·8
0·7
0·6
0·5
0
Dry weight (g. pod⁻²)
b
32
42
52
62
70
Days after emergence

Total soluble sugars

The pattern of accumulation of total soluble sugars in the source leaf (subtending leaf) is shown in the Figs. 22a and 23a. Total soluble sugars increased steadily till the 52nd day and declined thereafter. Same was true with other treatments. Upon CCC (1000 ppm) administration a considerable increase in the amount of total soluble sugars was recorded in the subtending leaf. Total soluble sugars accumulated in the subtending leaf of CCC (1000 ppm) treated plants on day 52 was 30.5 % more than that of the control.

Reducing sugars

The reducing sugar contents in the source leaf also showed a similar trend of accumulation as observed in the case of total soluble sugars (Figs 22b and 23 b). A dramatic increase in the content of reducing sugars was observed in the leaf which received 1000 ppm CCC spray when compared to control. On day 52, the level of reducing sugars in the subtending leaf treated with 1000 ppm CCC registered a 75.9% increase over the control.

Starch

Starch content in the subtending leaf (source leaf) increased steadily until day 52 and dropped thereafter

Fig. 22. Effect of pre flowering spray with CCC on the contents of total soluble sugars (a) and reducing sugars (b) in the source leaf of mungbean. Control (O), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.

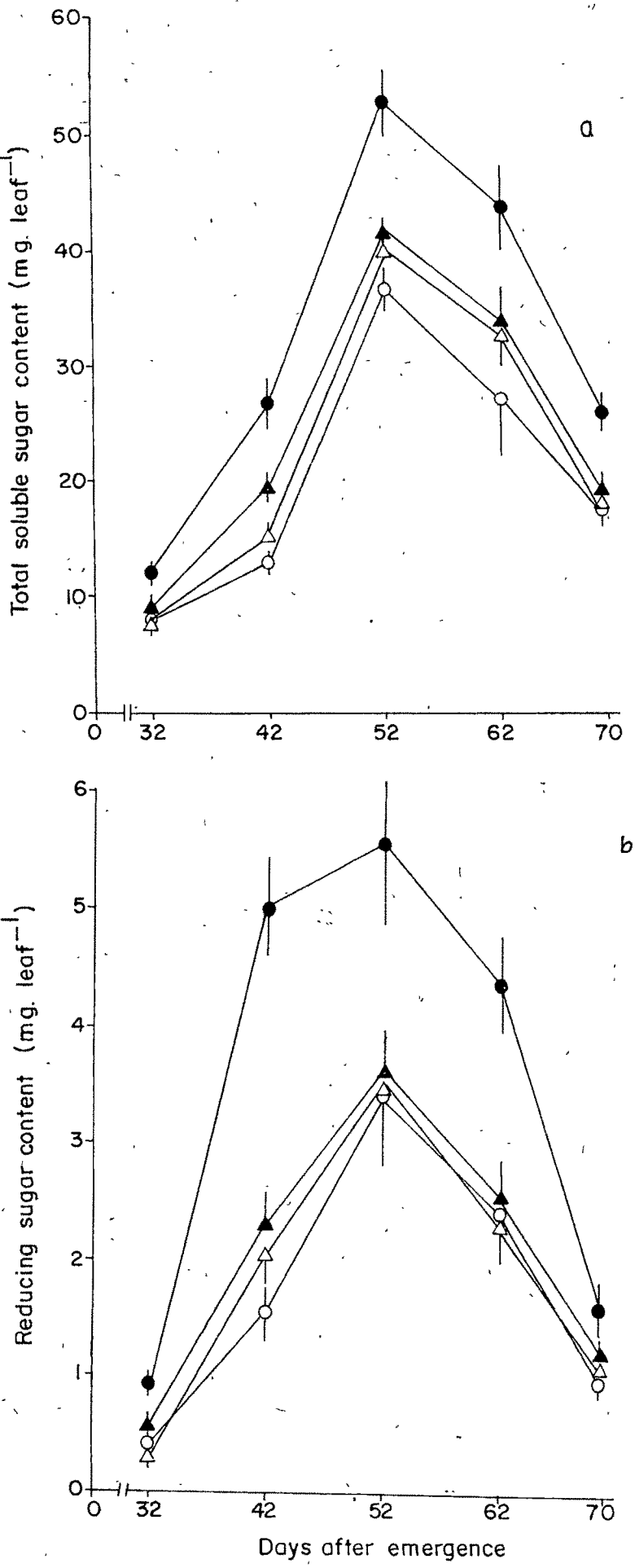
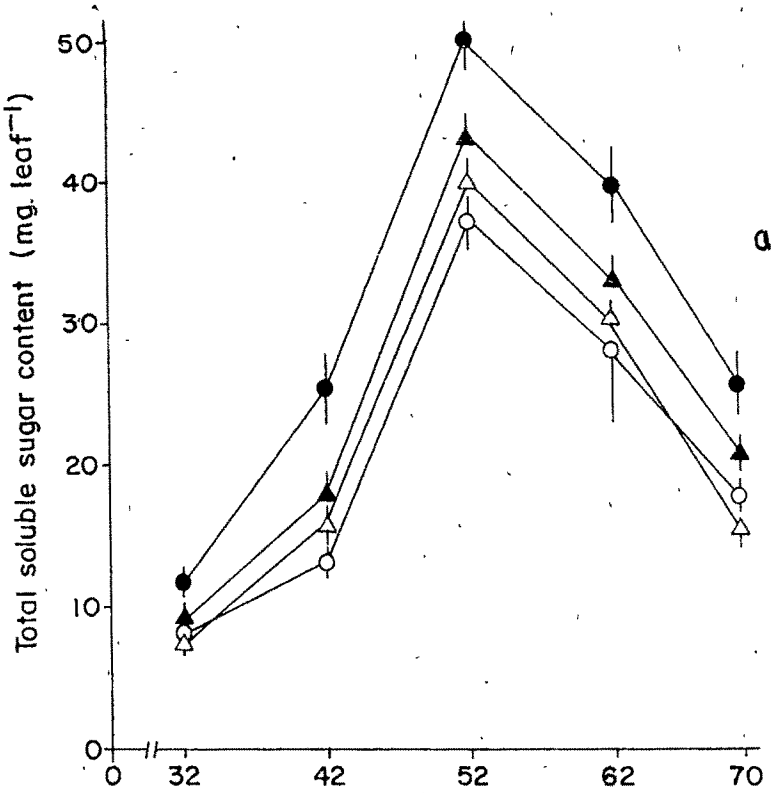
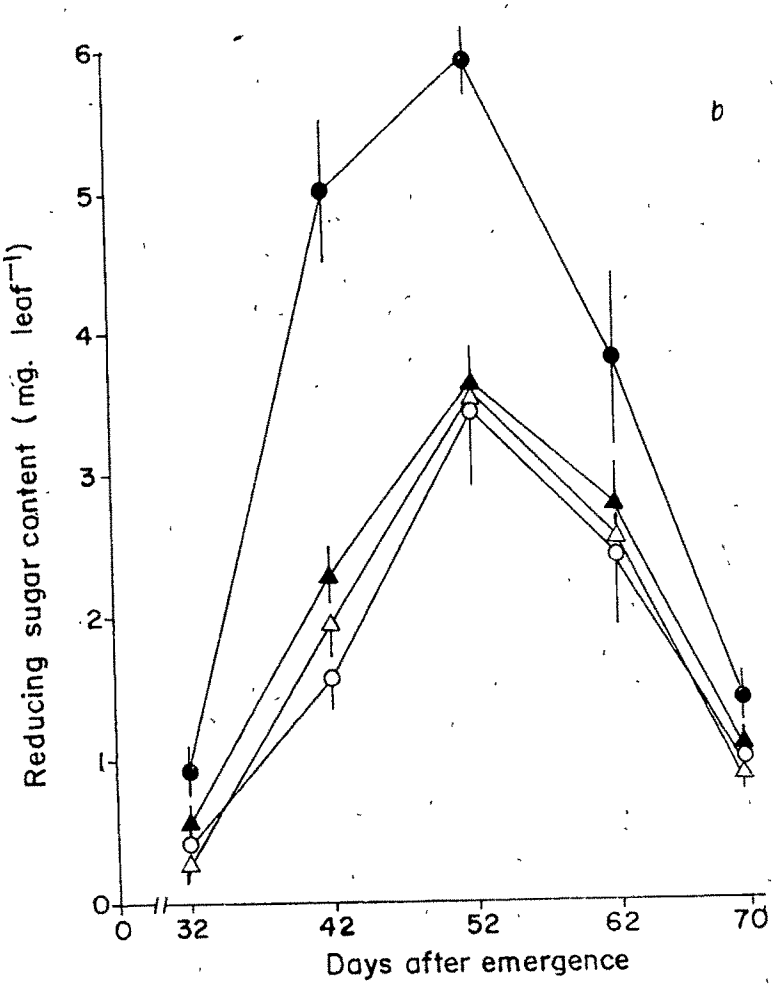

a
Total soluble sugar content (mg. leaf⁻¹)
60
50
40
30
20
10
0
0
32
42
52
62
70
b
Reducing sugar content (mg. leaf⁻¹)
6
5
4
3
2
1
0
Days after emergence

Fig. 23. Effect of pre and post flowering sprays with CCC on the contents of total soluble sugars (a) and reducing sugars (b) in the source leaf of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.


Total soluble sugar content (mg. leaf⁻¹)
50
40
30
20
10
0
0
32
42
52
62
70
a


Reducing sugar content (mg. leaf⁻¹)
6
5
4
3
2
1
0
0
32
42
52
62
70
Days after emergence
b

(Figs. 24a and 25a). Treatment with CCC did not alter the pattern of starch accumulation, though it at 1000 ppm remarkably increased the starch content.

The pods exhibited a steep rise in its starch content till the 52nd day and thereafter showed a gradual increase (Figs. 24b and 25b). CCC treatment did not alter the pattern of starch accumulation in pods, though a slight but significant increase in starch content was observed in pods of plants which received 1000 ppm CCC spray.

Total protein content

The protein content of the source leaf progressively increased till 52nd day and receded to a lower level thereafter (Figs. 26b and 27a). Application of CCC at 1000 ppm increased the protein content considerably in comparison with control.

The total protein content of the pod increased steadily till the end of the experimental period. Here also CCC treatment (1000 ppm) brought about a moderate but significant increase in the total protein content (Figs.26a and 27b). On day 70 the total protein content in the pods of CCC treated plants was increased by 23 % as compared to control.

Fig. 24. Effect of pre flowering spray with CCC on the starch content in the source leaf (a) and pods (b) of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.

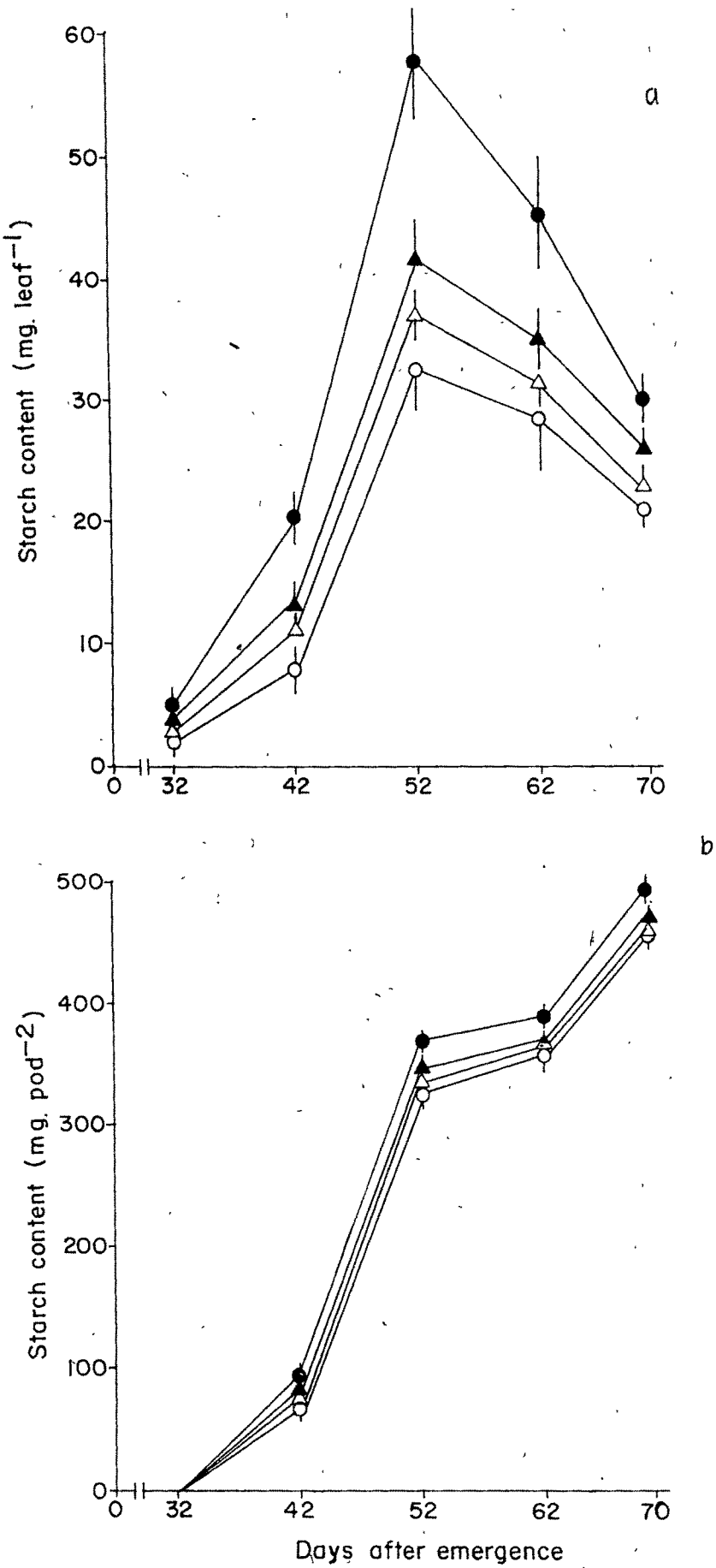
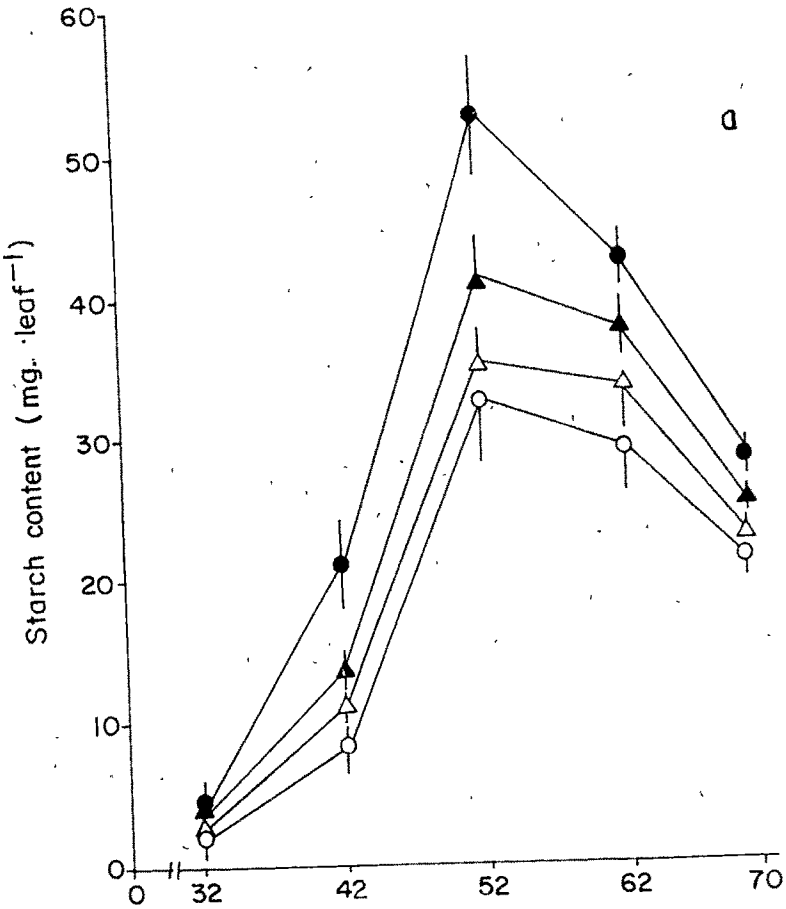

a
Starch content (mg. leaf^{-1})
60
50
40
30
20
10
0
0
32
42
52
62
70
b
Starch content (mg. pod^{-2})
500
400
300
200
100
0
Days after emergence

Fig. 25. Effect of pre and post flowering sprays with CCC on the starch content in the source leaf (a) and pods (b) of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Certical bars represent S.E. of the mean.


a
Starch content (mg. leaf^{-1})
60
50
40
30
20
10
0
0
32
42
52
62
70

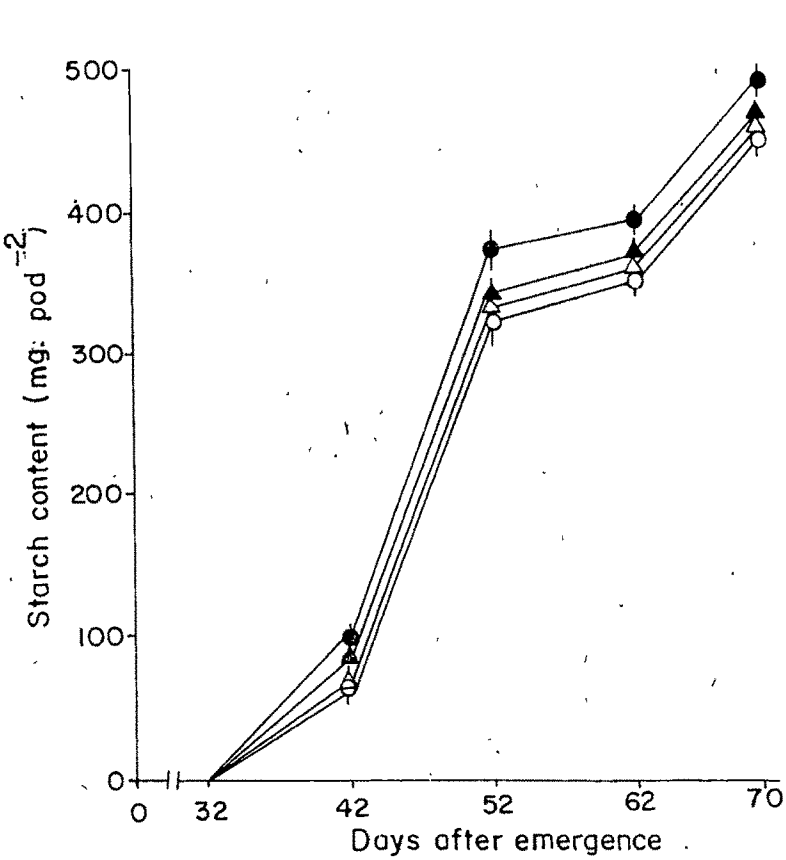

b
Starch content (mg. pod^{-2})
500
400
300
200
100
0
0
32
42
52
62
70
Days after emergence

Fig. 26. Effect of pre flowering spray with CCC on the total protein content in the source leaf (b) and pods (a) of mung bean. Control (O), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.

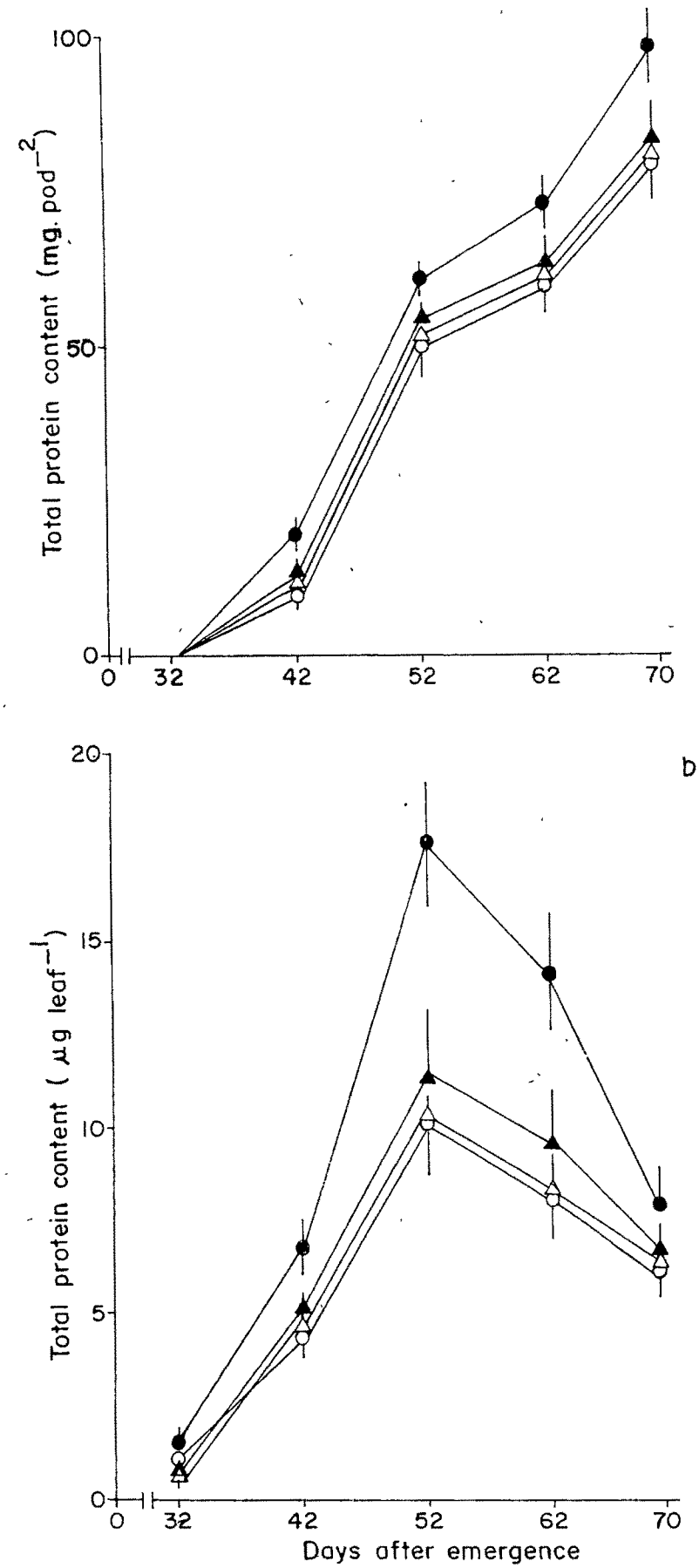
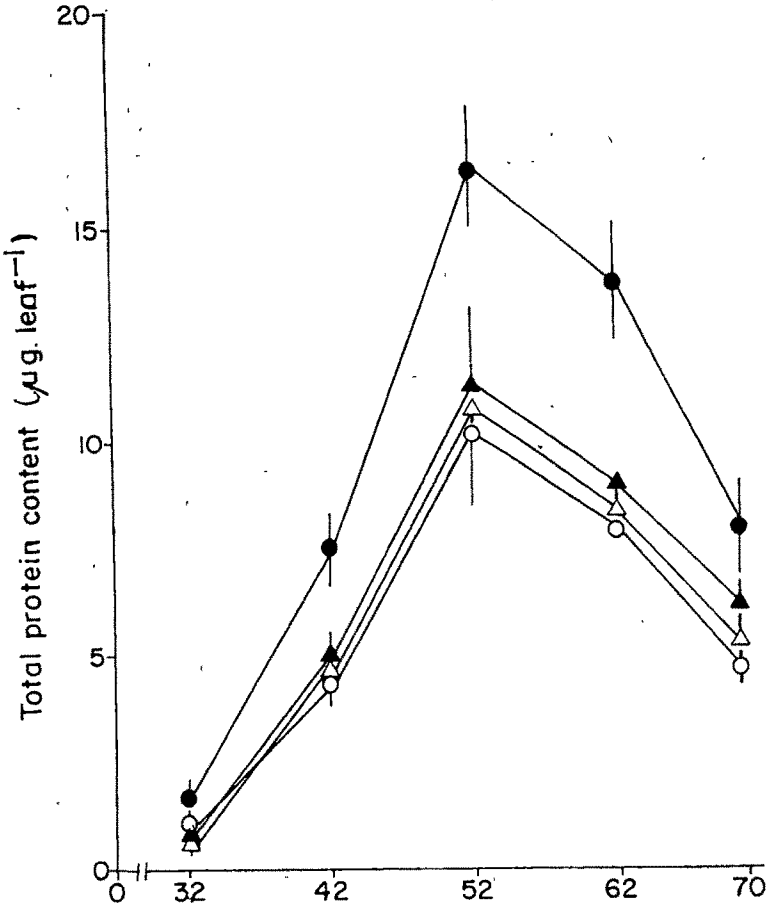
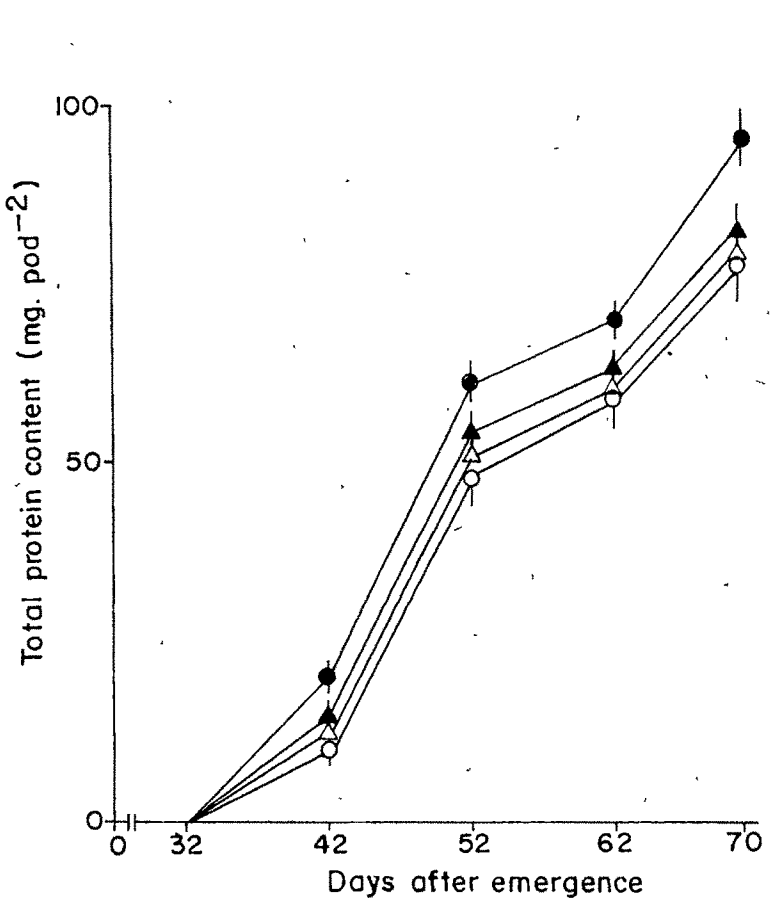

a
100
50
0
Total protein content (mg. pod^{-2})
0
32
42
52
62
70
b
20
15
10
5
0
Total protein content (µg leaf^{-1})
Days after emergence

Fig. 27. Effect of pre and post flowering sprays with CCC on the total protein content in the source leaf (a) and pods (b) of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.


a
Total protein content (µg. leaf⁻¹)
20
15
10
5
0
0
32
42
52
62
70


b
Total protein content (mg. pod⁻²)
100
50
0
0
32
42
52
62
70
Days after emergence

Total nitrogen content

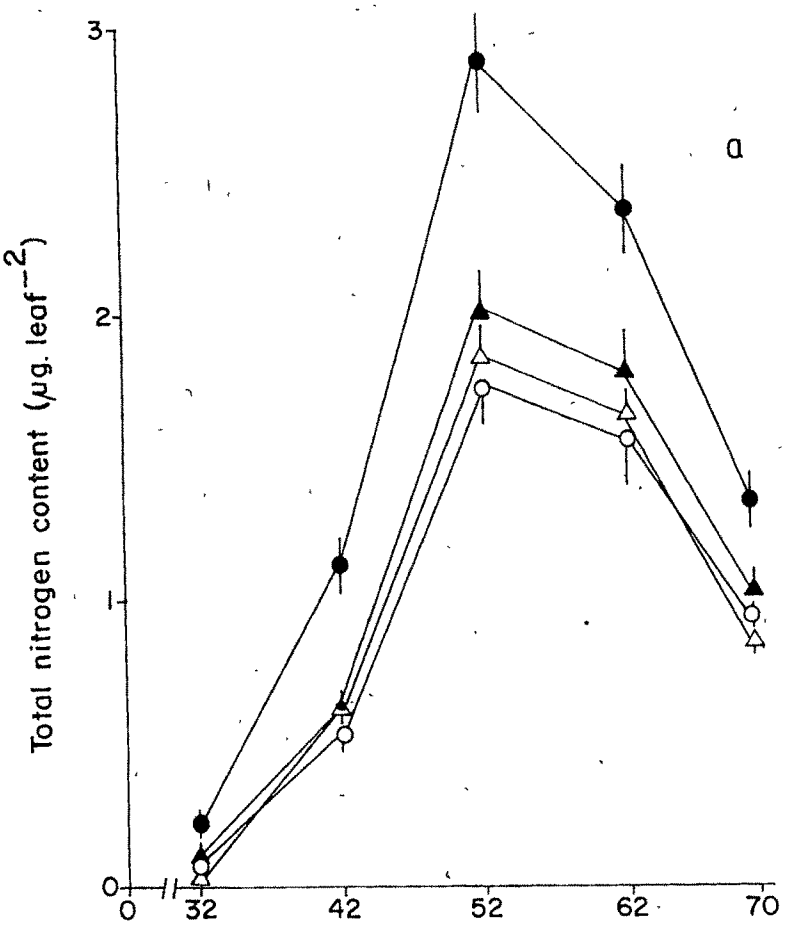
Accumulation of total nitrogen content of the pod and its source leaf displayed a similar trend as observed in the case of total protein following CCC treatment (Figs.28a,29a, 28b and 29b).

No significant difference was observed in the above mentioned results with the number of CCC sprays.

Seed yield

Application of CCC at 1000 ppm significantly increased the total number of pods per plant as well as seeds per pod. The number of pods per plant and number of seeds per plant were increased by 32.5 and 48.5 % respectively over the control by the CCC administration. However, there was no significant increase in 1000 seed weight following CCC treatment. No appreciable difference in the yield was observed between the plants which were given pre flowering and pre and post flowering sprays with CCC (Tables 29 and 30).

Fig. 28. Effect of pre flowering spray with CCC on the total nitrogen content in the source leaf (a) and pods (b) of mung bean. Control (○), CCC 500 ppm (△), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.


a
Total nitrogen content (μg. leaf^{-2})
3
2
1
0
0
32
42
52
62
70

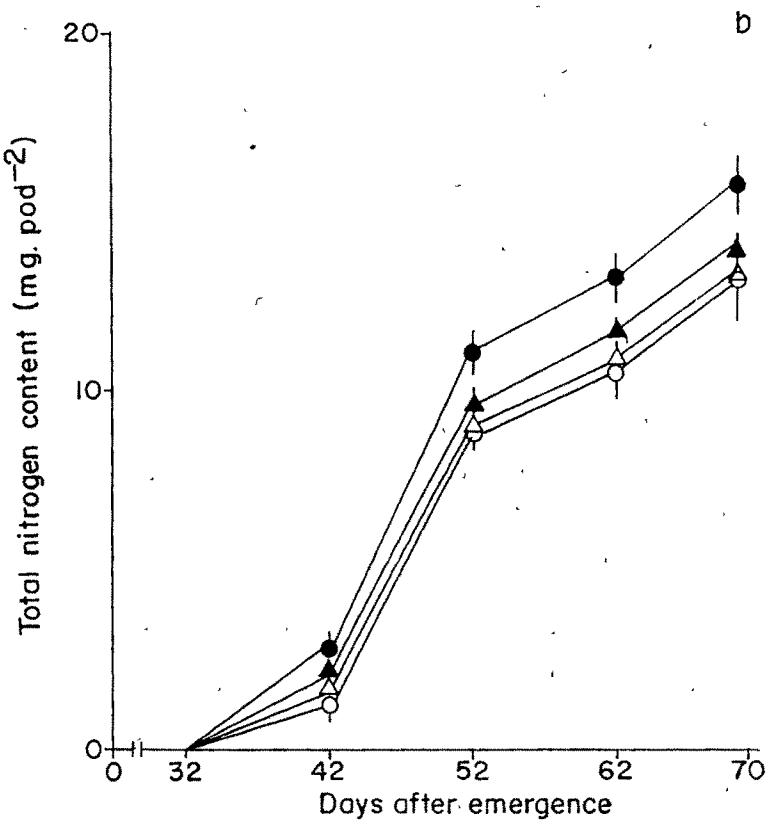

b
Total nitrogen content (mg. pod^{-2})
20
10
0
0
32
42
52
62
70
Days after emergence

Fig. 29. Effect of pre and post flowering sprays with CCC on the total nitrogen content in the source leaf (a) and pods (b) of mung bean. Control (o), CCC 500 ppm (Δ), 1000 ppm (●), 1500 ppm (▲). Vertical bars represent S.E. of the mean.

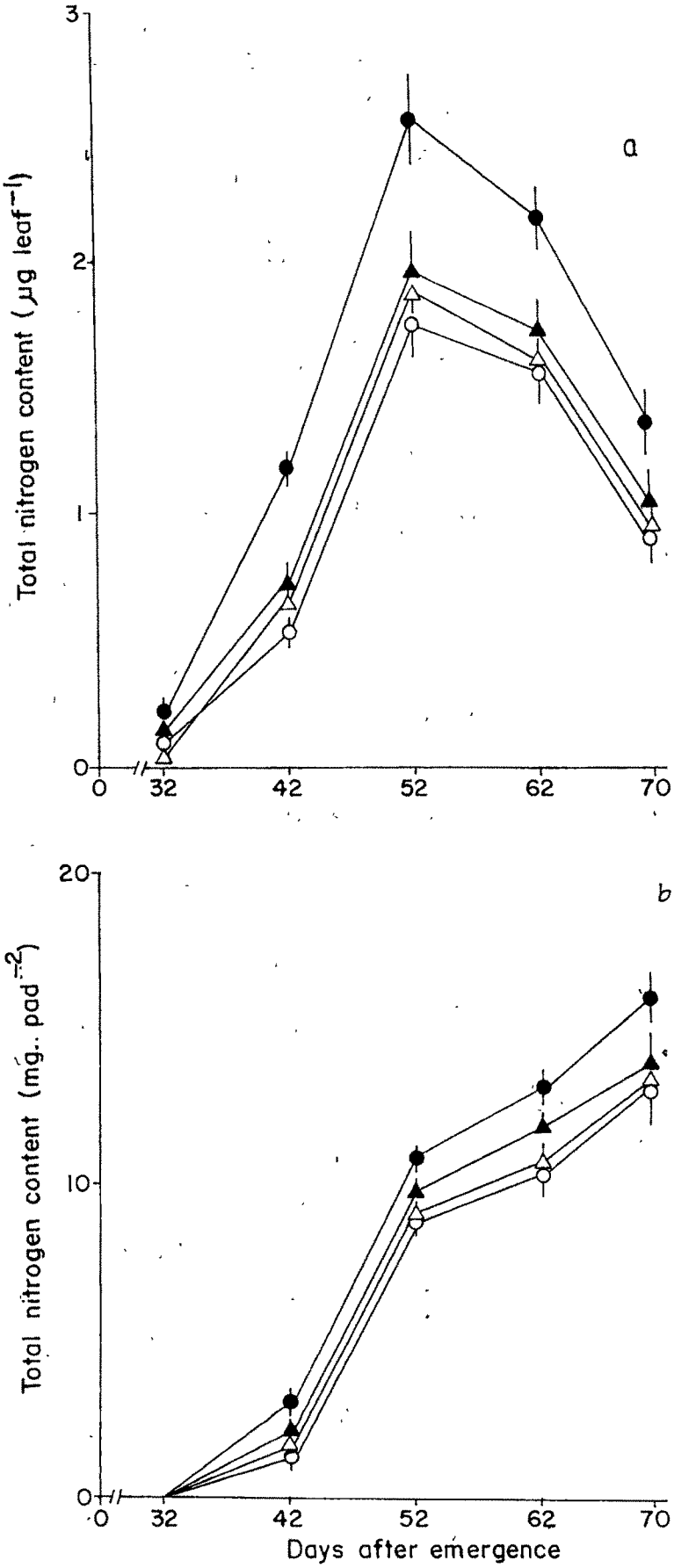

a
Total nitrogen content (µg leaf⁻¹)
3
2
1
0
0
32
42
52
62
70
b
Total nitrogen content (mg.. pad⁻²)
20
10
0
Days after emergence

Table 29. Effect of pre flowering-spray with CCC on the yield of Mung bean

Treatment CCC ppm	Number of pods per plant	Number of seeds per pod	Number of seeds per plant	1000 seed weight(g)
0	9.1_a	10.16_a	92.45_a	33.37_a
500	9.3_a	10.20_a	94.86_a	33.42_a
1000	12.06_b	11.4_b	137.4_b	35.61_a
1500	9.5_a	10.34_a	98.23_a	33.5_a

In each column values with different letters differ significantly ($P < 0.05$)

Table 30. Effect of pre and post flowering sprays with CCC on the yield of Mung bean

Treatment CCC ppm	Number of pods per plant	Number of seeds per pod	Number of seeds per plant	1000 seed weight(g)
0	9.1_a	10.16_a	92.45_a	33.37_a
500	9.28_a	10.24_a	94.84_a	33.45_a
1000	12.12_b	11.38_b	137.92_b	35.00_a
1500	9.56_a	10.33_a	98.75_a	33.45_a

In each column values with different letters differ significantly ($P < 0.05$).